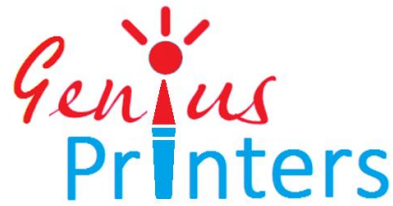


# PRIVATE PLACEMENT OFFERING

**Notice:** This document, and all attachments, are only for the eyes of the person that received it directly from Mr. Ulrich.  
This document is a working document intended for evaluation of possible financing.



## GENIUS PRINTERS CORPORATION



Name of Offeree: \_\_\_\_\_

PPM Number: \_\_\_\_\_

**Thank you for considering an investment in the endeavor to realize the below listed 3d printing technologies.**

**We showcase the Delaware C-corporation for potential later access to the US-stock market in combination with a cheap German UG for a quick start as an example how to wrap thoughts and work into a share-dividable entity. All signature dates are put into the future in order to stress that the action of foundation and merger has not yet taken place.**

**Other structurings in other countries are of course also an option, like Bulgaria for less than 10% tax flat rates with access to the European markets instead of or additionally to the German UG.**

**The first sections explain the corporate structure, whereas the business idea is depicted in the second half of this memorandum. So feel free to skip the juristic aspect and dive into the nitty gritty of what we want to do and to achieve, before you go back and explore how you could participate. In case you are a US citizen QIB or AI, a Reg D 506C PPM is available to you, please ask Mr. Ulrich.**



**Offering Availability:** This document, and all attachments, is only made available to investors that meet one of the following criteria:

- QIBs, Qualified Institutional Buyers, as defined in the U.S. Securities Act of 1933, Rule 144A.  
**or**
- Are outside of the United States in accordance with any or all regulations under the U.S. Securities Act.

**IMPORTANT:** The following stipulations need to be read and understood before continuing to read the remainder of this document and any attachments. They apply to the offering documents, and any attachments, that follow this page. By accessing offering documents, you are agreeing to be bound by the following terms and conditions. This includes any updates and modifications that may be made to the terms and conditions at any time.

**NOTHING WITHIN THIS TRANSMISSION ESTABLISHES AN OFFER OF SECURITIES FOR SALE IN ANY AREA, JURISDICTION, OR DOMAIN WHERE IT IS UNLAWFUL TO DO SO. NO SECURITIES HAVE BEEN, AND WILL NOT BE, REGISTERED UNDER THE SECURITY LAWS OF ANY STATE, PROVIDENCE, JURISDICTION, OR THE U.S. SECURITIES ACT OR IN THE UNITED STATES. ADDITIONALLY, THE SECURITIES MAY NOT BE SOLD OR OFFERED WITHIN THE UNITED STATES EXCEPT FOR THE FOLLOWING CONDITIONS:**

- **PROOF OF EXEMPTION FROM OR TRANSACTIONS THAT ARE NOT SUBJECT TO REGISTRATION REQUIREMENTS OF ANY APPLICABLE LOCAL OR STATE SECURITIES LAWS, OR THE U.S. SECURITIES ACT.**

**THE FOLLOWING DOCUMENTS ARE INDIVIDUAL-SPECIFIC AND MAY NOT BE FORWARDED, DISTRIBUTED, OR OTHERWISE GIVEN TO ANY OTHER PERSON. THE FOLLOWING DOCUMENTS CANNOT BE REPRODUCED IN ANY FASHION. FORWARDING, DISTRIBUTING, OR REPRODUCING ANY OF THE FOLLOWING DOCUMENTS, IN WHOLE OR IN PART, IS STRICTLY PROHIBITED. YOUR FAILURE TO COMPLY WITH AND ADHERE TO THIS DIRECTIVE MAY RESULT IN A VIOLATION OF THE SECURITIES ACT, STATE SECURITIES LAWS, OR THE APPLICABLE LAWS OF OTHER DOMAINS AND JURISDICTIONS.**

**Important Notice:** You have been sent this Offering Memorandum in electronic form. This is a reminder that documents transmitted via this method may have been altered during the transmission process and consequently neither any officer, employee, director or affiliate of any such person accepts any possible liability in respect of possible differences between the originally transmitted Offering Memorandum and the hard copy version that is available to you upon request from the Genius Printers Corporation, GPC.

This Offering Memorandum is not complete and may be altered. Additionally, this Offering Memorandum is not a proposal to sell these securities and is also not soliciting offers to purchase these securities in any area, jurisdiction, or domain where such activities are not authorized.

**Essential Information Regarding This Offering Memorandum:** The information contained within this Offering Memorandum is confidential. This Offering Memorandum has been prepared by GPC specifically for use in connection with a proposed offering of Shares. Offering Memorandums are created for each offeree personally and does not apply to any other person, party, entity or the general public.

**United States Investor Notice:** This Offering Memorandum has been confidentially submitted to a limited number of QIBs and is for informational use only in connection with the consideration of the possible purchase of shares. Any other use of this documents and any attachments is strictly prohibited. Reproduction, whole or in part, of this document and any attachments, distribution or disclosure of their contents to any other party other than the potential investors they have been submitted to is also strictly prohibited.

GPC is relying, for this offering, on exemptions from registration under the U.S. Securities Act for sales of securities and offers that are not involved in public offerings. This includes Rule 144A under the U.S. Securities Act. Potential investors are made aware that the sellers of the Shares are possibly relying on exemptions from the provision of U.S. Securities Act, Section 5, provided by Rule 144A. Shares will be subject to resale and transferability restrictions. Those who purchase the Shares may not transfer ownership or resell the Shares unless permitted under applicable U.S. state security laws and the U.S. Securities Act.

**Certain European Investors Notice:**

European Economic Area. This Offering Memorandum has been prepared under the assumption that all Share offers will be made pursuant to an exemption under Article 3 of Directive 2003/71/EC, as realized in member states of the EEA, from the obligation to produce a prospectus for offers of the Shares. Any party making, or intending to make, any offer for Shares within the EEA should do so only in circumstances in which no obligation arises for GPC to produce a prospectus for any such offer. GPC has not, and will not, authorize any offer of Shares through intermediary or arbitrator services other than those offers made by GPC, which establish the final location of Shares anticipated in this Offering Memorandum. In relation to each affiliate state of the EEA that has executed the Prospectus Directive, the offer to the public of any Shares which is the subject of this Offering contemplated by this Offering Memorandum is not, and will not be made in that specific affiliated state, except to:

- A legal entity that is considered a qualified investor as defined under the Prospective Directive which defines professional investors as set forth in Directive 2004/39/EC and
- Any circumstances falling within Article 3(2) of the Prospectus Directive, if no such offer of Shares will require GPC to produce a prospectus pursuant to the Prospectus Directive, Article 3

The expression, “offer to the public” in relation to the Shares in any Relevant Member State, implies the communication in any form and by any media of sufficient information on the terms of the offer and the Shares to be offered so as to enable an investor to decide to purchase the Shares, as the same may be varied in that Relevant Member State by any measure employing the Prospectus Directive in that Relevant Member State. The expression “Prospectus Directive” indicates Directive 2003/71/EC and its amendments to the extent implemented in the Relevant Member State and includes any related implementing measure in each Relevant Member State. The expression “2010 PD Amending Directive” refers to Directive 2010/73/EU.

**Grand Duchy of Luxembourg:** This Offering Memorandum has not and will not be submitted to the Commission de Surveillance du Secteur Financier for approval for the purposes of public offering or sales in the Grand Duchy of Luxembourg. This means that Shares are not to be sold or offered to the general public in Grand Duchy of Luxembourg directly or indirectly. This Offering Memorandum, advertising on any media, form of application, prospectus or any other type of material will not be distributed in Luxembourg except in specific circumstances that are not subject to prospectus requirements, as per the Luxembourg Act of July 10, 2005 under the topic of prospectuses for securities, as amended.

**Italy:** Actions have not and will not be taken that will allow for the public offering, trading, or selling of Shares in the Republic of Italy within the meaning of Article 1, paragraph 1, letter (t) of the Legislative Decree No. 58, dated February 24, 1998 and amended the Italian Financial Act. Shares may not be sold or offered directly or indirectly in the Republic of Italy. This Offering Memorandum, advertisements on any media, prospectus, form of application, or any other offering material or information that relates to GPC or the issuing Shares may be published or distributed in the Republic of Italy, except in specific circumstances that comply with all rules, orders, regulations and applicable laws. Shares cannot be sold or offered on primary or secondary markets in the Republic of Italy to any persons or entities other than qualified investors as defined by Article 100 OF THE Italian Financial Act, Article 34, paragraph 1, letter (b) of Regulation 11971 dated May 14, 1999 or unless in specific situations that are exempt from rules on public offers as per the Italian Financial Act and CONSOB regulations and Issuers Regulation. Shares may not be sold, delivered or

offered, and this Offering Memorandum and other materials relating to the Shares may be made available or distributed in the Republic of Italy unless such actions:

- Made by investment firms, financial intermediaries authorized to conduct such business in Italy or banks in accordance with the Legislative Decree 385, dated September 1, 1993 as amended, the Italian Financial Act, CONSOB Regulation 16190, dated October 29, 2007 as amended as well as any other applicable laws and regulations.
- Made in accordance with all relatable Italian securities, exchange and tax controls as well as applicable laws, regulations and requirements or limitations that could be imposed from time-to-time by the Bank of Italy or CONSOB or other authorizing entities. Investors that are purchasing the Shares are held solely responsible for ensuring that all transactions relating to the resale or offer of Shares is done so in accordance of applicable regulations and laws.

**United Kingdom:** This Offering Memorandum is only for distribution to the person or persons it is directed towards. Persons who:

- i. Professionals that are experienced in investment matters as described in the Financial Services and Markets Act of 2000 (Financial Promotion) Order 2005, Article 19(5), as amended the Financial Promotion Order.
- ii. Professionals that are described in Article 49(2)(a) thru (d) of the Financial Promotion Order, unincorporated associations, high net worth companies, etc.
- iii. Persons that have received an invitation or incentive to engage in investing activities, as per section 21 of the Financial Services and Markets Act 2000, in connection with issuing and selling of any Shares may be lawfully communicated. This Offering Memorandum is directed to relevant persons and must not be acted or relied on by others that are not relevant. Investment activities discussed by this document and its attachments is for the intended relevant persons. Shares discussed within this document and its attachments are being offered strictly to qualified investors as established in the Prospectus Directive. Additionally, the offer of Shares is not subject to the obligation to publish a prospectus as described by Article 5 of Directive 2003/71/EC.

**Confirmation of Your Representation:** In order to make an investment decision or view the Offering Memorandum, investors must either be:

- QIBs
- Purchasing the securities in an offshore transaction that is not located within the United States in trust on Regulation S.

The Offering Memorandum has been sent at your request and by accepting the email and opening the Offering Memorandum, you confirm to us that:

- You agree to the delivery of such Offering Memorandums by electronic means,
- You and any customers you represent are QIBs, or the email used to send the Offering Memorandum is not located in the United States as described in Regulation S.

Potential buyers that are QIBs are advised that the seller of the securities is relying on exemptions from provisions of the U.S. Securities Act, Section 5, pursuant to Rule 144A. Remember that this Offering Memorandum has been delivered to you on the assumption that you are a person that is legally authorized to have possession of this Offering Memorandum and is in accordance with any laws of the area, jurisdiction or domain you are located in and that you will not and are not authorized to deliver this Offering Memorandum and any of its attachments to any other party, person, or entity.

This document, and its attachments, are strictly for distribution to persons that:

- i. Professionals that are experienced in investment matters as described in the Financial Services and Markets Act of 2000 (Financial Promotion) Order 2005, Article 19(5), as amended the Financial Promotion Order.

- ii. Professionals that are described in Article 49(2)(a) thru (d) of the Financial Promotion Order, unincorporated associations, high net worth companies, etc.
- iii. Persons that are not located within the United Kingdom
- iv. Persons that have received an invitation or incentive to conduct investing activities as described in the Financial Services and Markets Act 2000 in relation to the issue, sale or distribution of securities may otherwise be legally communicated. This document is intended for these such persons and any actions on or relied on by others is strictly prohibited. Investment activities discussed in this document and its attachments is available only to the persons this document was intended for and are the only persons such activities will be engaged with.

**Advisory about This Offering Memorandum:** Information found within this Offering Memorandum is considered to be confidential and has been prepared by GPC for solely for proposed offering of Shares and all activities in conjunction with. This Offering Memorandum, like all others, was created for individual offerees and does not constitute an offering of Shares to the general public. Distribution to anyone other than the attended party, as well as disclosure of any portion of its contents without prior consent of GPC is unauthorized. Acceptance of the delivery of this document, and any attachments, means that you agree to the previously mentioned rules and that you also agree to not photocopy or otherwise reproduce this document or any portion of its contents.

We accept accountability for the information contained within this Offering Memorandum, except for the conditions mentioned below. No information contained within this Offering Memorandum should be relied upon as a promise by GPC, in the present or future. Your acceptance of this Offering Memorandum means that you agree to these terms. All due confirmation and inquiries have been made to the best of GPC's knowledge and information contained in this Offering Memorandum is in accord with factual information and does not neglect anything that would affect your decision. Additionally, this Offering Memorandum contains summaries that are believed to be accurate in regards to specific documents. However, for complete and accurate information, refer to the original documents. All references are qualified in respects to the references. These documents are available to you upon request sent to GPC. The information found within this Offering Memorandum is current in respects to the date found on its cover page. Changes may have been made since the indicated date. GPC does not signify that its business transactions are identical to those described or that the information found in this Offering Memorandum is correct. GPC does not suggest those things by the act of delivering this Offering Memorandum to you or by the act of selling you Shares.

Any information in respect to GPC that has been previously provided is superseded by this Offering Memorandum. Any references to any websites found in this Offering Memorandum does not make it a part of this Offering Memorandum.

Receiving this Offering Memorandum recognizes that you have requested and received all necessary information to verify the information's completeness and accuracy from GPC. Consultation from business, legal and tax advisors is recommended regarding an investment in any Shares. None of the information contained in this Offering Memorandum should be considered legal, business, or tax advice. You are not authorized to use any of the information contained in this Offering Memorandum for any purpose other than for a consideration of Shares investment.

GPC reserves the right to:

- Withdraw the offering of Shares at any time.
- Reject any offer purposed for the purchase of Shares, whole or in part, for any or no reason.
- Allot a lesser amount of Shares sought by the purchaser.

No securities authority, such as the U.S. Securities Exchange Commission or any non-U.S. securities authority, has disapproved or approved of the Shares or if this Offering Memorandum is complete or truthful. Any claim in contrary to this statement is considered a criminal offense.

This Offering Memorandum is in no way to be considered a solicitation to purchase Shares, or an offer to sell Shares in any jurisdiction or area where such an offer or sale is prohibited.

In certain jurisdictions, the offering or sale of Shares and distribution of this Offering Memorandum may be prohibited by law. In such instances, GPC does not imply that this Offering Memorandum or the offer and sale of Shares is legal. Compliance with any and all applicable registrations, laws and regulations are to be followed in the applicable jurisdictions. GPC will not be liable for any foregoing legal requirements that may apply. Specifically, GPC has taken no actions that would permit public offerings of Shares or allow distribution of this Offering Memorandum in jurisdictions where specific actions are required for these purposes. Therefore, no direct or indirect offering or selling of Shares, advertising, or other marketing materials, including this Offering Memorandum, will be distributed, published, or otherwise announced in any jurisdiction that prohibits these activities, except in circumstances that allow for these activities to be done so in compliance with any and all applicable laws.

All purchasers of Shares must obey any and all applicable laws in their perspective jurisdictions. Each purchaser of Shares must also obtain any approval necessary for the purchase, sale or offer of Shares under the applicable laws within their jurisdictions. All persons in possession of this Offering Memorandum must be knowledgeable of the laws, regulations and restrictions on the distribution of this Offering Memorandum, as well as the offering and sale of Shares. See the section that applies to your jurisdiction for more in-depth details. GPC does not imply that the Shares are a legal investment within your jurisdiction.

**Investor Notice:** GPC advises that you seek professional legal counsel before making any offers, pledges, resale or any other transaction for any Shares offered within these documents.

**European Economic Area:** This Offering Memorandum has been constructed on the assumption that all offers for Shares will be made pursuant to exemptions to Directive 2003/71/EC, Article 3, as executed by member states of the EEA, from requirements to produce a prospectus for any offers for Shares. In as much, any person that will be making, or intending to make, offers for Shares within the EEA will only do so in a manner that implies no obligation on GPC to produce a prospectus for such an offer. GPC has not and will not authorize the making of any offer through the use of financial mediators, other than those offers made by GPC and constitute a final placement of Shares to be expected in this Offering Memorandum. The offer of public Shares is not being made and will not be made in any Relevant Member State, other than to:

- Any entity that is a qualified investor as described in the Prospective Directive and defined in Directive 2004/39/EC.
- And
- In circumstances that fall within the Prospective Directive, Article 3(2), only if the offer of Shares does not require GPC to produce a prospectus.

For the purposes of this provision, “offer to the public” as it relates to the Shares in any Relevant Member State means communication via any form or media of adequate information on terms of the offer and the Shares that are to be offered so as to allow and educated decision on the part of the investor in regards to the purchase of Shares.

**Italy:** There has been no actions, nor will there be any actions taken, that would allow for the offering of Shares to the public within the Republic of Italy as described in the Italian Financial Act, Article 1, paragraph 1, letter t). In as much, no Shares will be offered, sold or otherwise distributed directly or indirectly within the Republic of Italy. Additionally, neither this Offering Memorandum nor any other printed marketing materials, or any other marketing materials will be published, distributed, or otherwise reproduced that relates to GPC or the Shares to be distributed, except under those circumstances that will result in actions that are within compliance of any and all applicable regulations, rules and laws. Shares will not and cannot be sold or offered on the primary

or secondary markets in the Republic of Italy to any person, entity, or organization other than to qualified investors as described in Issuers Regulation, issued by CONSOB, Article 100, or unless such actions are exempt from rules on public offers as described in the Italian Financial Act and implementing CONSOB regulations.

Shares cannot be sold, delivered or offered and this Offering Memorandum, or any other related material, cannot be made available within the Republic of Italy unless such actions are made as follows:

- Made by investment firms, financial intermediaries authorized to conduct such business in Italy or banks in accordance with the Legislative Decree 385, dated September 1, 1993 as amended, the Italian Financial Act, CONSOB Regulation 16190, dated October 29, 2007 as amended as well as any other applicable laws and regulations.
- Made in accordance with all relatable Italian securities, exchange and tax controls as well as applicable laws, regulations and requirements or limitations that could be imposed from time-to-time by the Bank of Italy or CONSOB or other authorizing entities. Investors that are purchasing the Shares are held solely responsible for ensuring that all transactions relating to the resale or offer of Shares is done so in accordance of applicable regulations and laws.

**United Kingdom:** This Offering Memorandum is only for distribution to the person or persons it is directed towards. Persons who:

- i. Professionals that are experienced in investment matters as described in the Financial Services and Markets Act of 2000 (Financial Promotion) Order 2005, Article 19(5), as amended the Financial Promotion Order.
- ii. Professionals that are described in Article 49(2)(a) thru (d) of the Financial Promotion Order, unincorporated associations, high net worth companies, etc.
- iii. Persons that have received an invitation or incentive to engage in investing activities, as per section 21 of the Financial Services and Markets Act 2000, in connection with issuing and selling of any Shares may be lawfully communicated. This Offering Memorandum is directed to relevant persons and must not be acted or relied on by others that are not relevant. Investment activities discussed by this document and its attachments is for the intended relevant persons. Shares discussed within this document and its attachments are being offered strictly to qualified investors as established in the Prospectus Directive. Additionally, the offer of Shares is not subject to the obligation to publish a prospectus as described by Article 5 of Directive 2003/71/EC.

**Grand Duchy of Luxembourg:** This Offering Memorandum has not and will not be acquiesced to Commission de Surveillance du Secteur Financier for approval for the purposes of public offering or sales in the Grand Duchy of Luxembourg. This means that Shares may not be sold or offered to the public in Grand Duchy of Luxembourg directly or indirectly. Neither this Offering Memorandum, advertising on any media, form of application, prospectus or any other type of material will be distributed in Luxembourg except in specific circumstances that are not subject to prospectus requirements, as per the Luxembourg Act of July 10, 2005 under the topic of prospectuses for securities, as amended.

**United States:** Shares have not been enumerated under the securities laws of any jurisdiction or the U.S. Securities Act and the Shares, unless so registered, may not be sold or offered within the United States unless exempt from any registration requirements as set forth in the U.S. Securities Act and any applicable securities laws of any other jurisdiction. Therefore, GPC is only offering and selling Shares:

- To qualified institutional buyers, or QIBs, and in compliance with the U.S. Securities Act, Rule 144A.  
And



- In transactions that occur outside of the United States and in compliance with the U.S. Securities Act, Regulation S.

“Offshore transaction” and “United States” are used by GPC with the meanings as described in Regulation S.

If you involve yourself in the purchase of Shares, you will be considered to have agreed to the following:

- You understand that the Shares have not been registered under any applicable securities laws, including the U.S. Securities Act, and that the offered Shares are for resale in transactions that do not require registration under such laws and regulations, including Rule 144A, and unless otherwise registered, may not be transferred except where in compliance with U.S. Securities Act requirements and other applicable securities laws and in compliance with the guidelines for transfer as stated in the following paragraphs, specifically, the fourth and fifth:
- You are not an affiliate of GPC and you are either a QIB that is aware that the Shares will be made in compliance with Rule 144A and the transaction will be for the acquisition of Shares for your own account, or that of another QIB, or the Shares you are purchasing are in compliance with Regulation S.
- You acknowledge that GPC or any of their representatives have not made any presentation to you in respects of selling or offering any of the Shares, except for the information found within this Offering Memorandum that has been delivered to you and which you are using to make your decision regarding the possible investment of Shares. You also acknowledge that neither GPC nor any of their representatives have made any warranty regarding the accuracy of this Offering Memorandum. You were afforded access to the necessary financial data regarding GPC and the Shares that you would need to make your decision on the purchase of such Shares. This also includes opportunities to seek further information from GPC.
- The purchase of Shares is for your account, or the account of an investor that you are acting as an agent for and do not have the intent to offer or sale Shares in any manner that would violate and securities laws or the U.S. Securities Act. Additionally, said accounts will be in your control, or the control of the investors that you represent and that they are in accordance with Regulation S, 144A or any other exemption from registration available under the Securities Act.
- For Shares that fall under rule 144A, you agree on the behalf of you and the investors whose accounts you control and are purchasing 144A Shares for, as well as each subsequent shareholder of the 144A Shares, to sell, offer or transfer by other means, prior to the Resale Restriction Termination Date and is designated as one calendar year after the later of the date of initial issue and the last date on which either GPC or their associates were in possession of such Shares only:

i. To us

ii. Pursuant to registration statements that have been deemed effective under the U.S. Securities Act

iii. As long as the Shares eligibility is pursuant to Rule 144A found in the U.S. Securities Act, to an entity you believe to be a QIB, within reason, that has purchased for their own account or for the account of another QIB to whom notice has been given that the transfer is being made in trust on U.S. Securities Act, Rule 144A

iv. Pursuant to sales and offers that occur outside of the U.S. and are in compliance with the U.S. Securities Act, Regulation S, or

v. Pursuant to any available exemptions from U.S. Securities Act registration requirements, and the requirement of any law that its property at all times be within its or their control and in compliance with any and all applicable securities and local laws and regulations, and further subject to the Trustee’s and our rights prior to any such sale or offer:

a. Pursuant to clause

b. To require the delivery of certification to counsel

- c. To require that a certificate of transfer that is located on the reverse side of the security has been completed and delivered to the Trustee by the transferor, and
- d. Agrees that a notice has been to each person to whom the Note will be transferred to that satisfactorily falls in line with this legend. The terms “Offshore Transaction” and “United States” are used in a manner as defined by the U.S. Securities Act, Regulation S.

The abovementioned restrictions on the resale of Shares will not apply following to the Resale Restriction Termination Date. Each purchaser recognizes that each of the Notes will have a legend largely in the following format:

“THIS NOTE HAS NOT, AND WILL NOT, BE REGISTERED UNDER THE SECURITIES LAWS OF ANY OTHER JURISDICTION OR STATE, OR THE U.S. SECURITIES ACT OF 1933, FURTHER AMENDED THE U.S. SECURITIES ACT. UNLESS EXEMPT FROM ANY REGISTRATION REQUIREMENTS UNDER THE U.S. SECURITIES ACT, THIS NOTE, ANY INTEREST OR CONTRIBUTION HEREIN MAY NOT BE TRANSFERRED, ENCUMBERED, SOLD, OFFERED OR DISPOSED OF BY ANY OTHER MEANS WITHOUT SAID REGISTRATION. BY ACCEPTING THIS NOTE, THE HOLDER:

1. REPRESENTS THAT:
  - THE HOLDER IS, IN ACCORDANCE WITH U.S. SECURITIES ACT, RULE 144A, A QUALIFIED INSTITUTIONAL BUYER, OR
  - THE HOLDER IS USING AN OFFSHORE TRANSACTION TO ACQUIRE THIS NOTE PURSUANT TO THE U.S. SECURITIES ACT, REGULATION S, RULE 904
2. AGREES ON THE BEHALF OF ANY INVESTORS OR THEMSELVES THAT ANY TRANSFER, SALE OR OFFER OF THIS NOTE AS CONCERNING RULE 144A SHARES: PRIOR TO THE RESALE RESTRICTION TERMINATION DATE (ONE YEAR FROM THE LATER OF ORIGINAL ISSUE DATE AND LAST DATE THE COMPANY OR ANY OF ITS AFFILIATES WAS THE HOLDER OF THIS NOTE, OR ANY PREVIOUS HOLDERS OF THIS NOTE) IS MADE ONLY:
  - TO THE COMPANY OR SUBSIDIARIES THEREOF
  - PURSUANT TO REGISTRATION STATEMENTS DECLARED TO BE EFFECTIVE UNDER THE U.S. SECURITIES ACT
  - SO LONG AS THE SHARES ARE AUTHORIZED FOR RESALE AS PER U.S. SECURITIES ACT, RULE 144A TO A PERSON THAT IS BELIEVED TO BE A QUALIFIED INSTITUTIONAL BUYER, WITHIN REASON, AS DESCRIBED IN THE U.S. SECURITIES ACT, RULE 144A, THAT MAKES THE PURCHASE FOR THEIR OWN ACCOUNT, OR THE ACCOUNT OF ANOTHER QUALIFIED INSTITUTIONAL BUYER THAT HAS RECEIVED NOTICE THAT THE TRANSFER IS BEING CONDUCTED ON RELIANCE OF THE U.S. SECURITIES ACT, RULE 144A
  - PURSUANT TO SALES AND OFFERS CONDUCTED IN OFFSHORE TRANSACTIONS AS DESCRIBED IN THE U.S. SECURITIES ACT, REGULATION S
  - PURSUANT TO ANY AVAILABLE EXEMPTIONS FROM THE U.S. SECURITIES ACT REGISTRATION REQUIREMENTS, SUBJECT TO THE REQUIREMENTS OF ANY LAW THAT THE NATURE OF ITS PROPERTY, OR THAT OF INVESTOR ACCOUNTS, BE WITHIN THEIR CONTROL AND IN ACCORDANCE WITH ANY LOCAL AND SECURITIES LAWS AND REGULATIONS AND ADDITIONALLY SUBJECT THE COMPANY OR TRUSTEES RIGHTS PRIOR TO ANY SUCH TRANSACTION
  - PURSUANT TO CLAUSE (E) THAT REQUIRES THE DELIVERY OF CERTIFICATION, OPINION OF COUNSEL AND/OR ANY OTHER INFORMATION THAT WOULD BE SATISFACTORY TO ALL, AND, IN EACH OF THE PREVIOUS CASES, REQUIRE A CERTIFICATE OF TRANSFER IN THE FORM BEING PLACED ON THE REVERSE SIDE OF THIS NOTE IS DELIVERED AND COMPLETED TO THE TRUSTEE FROM THE TRANSFEROR, AND AGREES THAT EACH RECIPIENT OF THE TRANSFERRED NOTE WILL RECEIVE NOTICE LARGELY TO THE EFFECT OF THIS LEGEND. THE TERMS “UNITED STATES” AND “OFFSHORE TRANSACTION” HOLD THE MEANING AS DESCRIBED IN THE U.S. SECURITIES ACT, REGULATION S. FAILURE TO PROVIDE THE COMPANY, PAYING AGENT AND TRUSTEE WITH THE APPLICABLE U.S.

FEDERAL INCOME TAX CERTIFICATIONS (FORM W-9), OR APPLICABLE FORMS, FOR PERSONS THAT IS CONSIDERED A “UNITED STATES PERSON” AS DESCRIBED IN SECTION 7701(A)(30) OR AN APPLICABLE FORM W-8 TO PERSONS NOT CONSIDERED A “UNITED STATES PERSON” AS DESCRIBED IN SECTION 7701(A)(30) COULD RESULT IN THE U.S. FEDERAL GOVERNMENT WITHHOLDING FROM PAYMENTS TO THE HOLDER IN REGARDS TO THE SHARES REPRESENTED BY THIS CERTIFICATE.”

You will also be considered to have acknowledge that previous restrictions apply to holders of beneficial interests in these Shares as well as to holders of these Shares through the act of purchasing Shares.

- You acknowledge that the Registrar is not required to accept registration of transfer for any Shares that you acquire until they, and GPC, are presented with satisfactory evidence that all restrictions have been obeyed.
- You acknowledge that:
  1. GPC, and other parties involved, will rely upon the accuracy and truthfulness of your representations, agreements and acknowledgements as set forth and you agree that you will promptly notify GPC, in writing if there are any changes that would cease the accuracy and truthfulness of your representations, agreements and acknowledgements, and
  2. If acquiring Shares as an agent for qualified investors, that you represent each such account that you:
    - a. Have sole discretion in relation to investments, and
    - b. Have full power and authority to make, and do make, the previously mentioned representations, agreements and acknowledgments on the behalf of your investors and their accounts.
- You will provide notice of any restrictions on the transfer of Shares to those whom you represent.
- You acknowledge that you understand that no actions have been taken by GPC, in any jurisdiction, including the United States, that would authorize a public offering of Shares, or the circulation, possession or distribution of any marketing materials, including this Offering Memorandum, and any attachments, that relate to GPC or the Shares in any area where such actions would require further actions to be taken. Therefore, the transfer of any Shares will be subject to any restrictions as established under the section “Plan of Distribution”.

**Forward-Looking Statements:** The forward-looking statements found within this Offering Memorandum, are within in the meanings as established in the securities laws and specific pertinent jurisdictions. They include, but are not limited to, all statements, except for statements of historical facts, that are found within this Offering Memorandum, including but not limited to, those statements that are regarding GPC’s results of operations, future financial positions, GPC plans objectives, strategies, targets and goals, the future development of markets in which GPC participates or is seeking to take part in or any anticipated regulatory changes in those markets. Forward-looking statements can be identified where terminology such as: aim, anticipate, continue, could, believe, expect, estimate, and should are used.

**Offering Limits:**

Price per Share: \$1.00

Maximum Shares / Investment Amount: 3,000,000 / \$3,000,000.00

Minimum Shares Offered / Investment Amount: 25,000 / \$25,000.00

Minimum Investment Shares/ Amount 10,000 / \$10,000.00

Genius Printers Corp., GPC, a Delaware Company, referred to from this point on as The Company, is offering an investment opportunity that has a minimum 25,000 share limit, and a maximum share

limit of 3,000,000 at a rate of \$1.00 per share. This initial offering price has been subjectively determined by The Company.

**Risk Factors:** These securities will involve a high degree of risk. Consequently, only investors that are in a position to potentially lose the entirety of their investment should invest in these shares. The offered securities have not been registered in accordance with the Securities Act of 1933, from this point on, referred to as the Act, securities laws of the state of Delaware, or under any securities regulations or laws of any other state or area.

Memorandum Date: 30 June 2017

1. The Company holds the right to renounce the 10,000 share minimum limitation for any investor. The Offering is not endorsed and the shares are offered on a “best efforts” basis through the officers and directors of the Company. This Offering has a minimum investment amount of \$25,000, or 25,000 shares, and will be directly to the Company’s corporate account upon completion of the sale. All funds will be available for the Company’s use, at the discretion of the Company.
2. Dealers who have entered into a Participating Dealer Agreement with the Company and FINRA shareholder brokers are authorized to sell the Company shares. Said persons will receive a commission of up to 8% of the price of the shares they sell. The Company reserves the right to pay Offering-related expenses from funds generated by the Offering. For further details, see the “Use of Proceeds” and “Plan of Placement” sections.
3. Termination of this Offering will be the earliest of:
  - Date elected by the Company, at its discretion, decides to terminate the Offering.
  - Date all shares have been sold.
  - 31 January, 2018. This date may be extended by the Company but no more than 180 days later.

THE OFFERING PRICE FOR SHARES HAS BEEN SUBJECTIVELY SET BY THE COMPANY’S MANAGEMENT. NO ASSURANCES ARE MADE THAT ALL, OR ANY, OF THE SECURITIES WILL BE SOLD. THIS OFFERING HAS NOT BEEN UNDERWRITTEN.

THE OFFERED SECURITIES HAVE NOT BEEN APPROVED OR DISAPPROVED BY ANY STATE OR LOCAL AGENCIES, INCLUDING THE SECURITIES AND EXCHANGE COMMISSION. ADDITIONALLY, NO SUCH REGULATORY ENTITY HAS REVIEWED THIS OFFERING MEMORANDUM TO CHECK FOR COMPLETENESS OR ACCURACY. SINCE THESE SECURITIES HAVE NOT BEEN REGISTERED, IT IS POSSIBLE THAT THERE MAY BE RESTRICTIONS REGARDING THEIR TRANSFERABILITY BY AN INVESTOR. ALL POTENTIAL INVESTORS ARE ADVISED OF THE ECONOMIC RISKS INVOLVED WITH THE INVESTMENT SINCE THE SECURITIES MAY NOT BE SOLD UNLESS THEY ARE AFTERWARDS REGISTERED IN ACCORDANCE WITH APPLICABLE SECURITIES ACTS; UNLESS THERE IS AN AVAILABLE EXEMPTION FROM SUCH REGISTRATION REQUIREMENTS. CURRENTLY, THERE IS NO MARKET FOR THE SHARES THE COMPANY IS OFFERING AND THERE ARE ALSO NO GUARANTEES THAT ANY MARKET WILL DEVELOP IN THE FUTURE. ADDITIONALLY, THERE ARE NO GUARANTEES THAT THE SHARES WILL EVER BE INCLUDED ON NASDAQ OR ANY OTHER MARKET EXCHANGES AT ANY FUTURE DATE. THE COMPANY HOLDS NO OBLIGATION TO REGISTER FOR SALE, UNDER ANY FEDERAL OR STATE SECURITIES LAWS, OF ANY SHARES, AND THE SHARES ISSUANCE IS BEING COMPLETED PURSUANT TO THE SECURITIES ACT, REGULATION S. CONSEQUENTLY, THE TRANSFER, SALE OR ANY OTHER SHARES DISPOSITION MAY BE RESTRICTED BY APPROPRIATE STATE AND FEDERAL SECURITIES LAWS AND REGULATIONS, DEPENDING ON THE AREA IN WHICH THE INVESTOR RESIDES, AND BY PROVISIONS ESTABLISHED AND REFERRED TO WITHIN THE SUBSCRIPTION AGREEMENT. THE OFFERING ARBITRARILY ESTABLISHED OFFERING PRICE FOR SECURITIES, TO WHICH THE CONFIDENTIAL TERM SHEET COMMUNICATES, DOES NOT AUTOMATICALLY BEAR ANY RELATION TO ASSETS, POTENTIAL COMPANY EARNINGS, THE BOOK VALUE OR ANY OTHER SORT OF VALUE MEASURES.

This Memorandum has been prepared specifically for the informational use of the person to whom it has been delivered to on behalf of the Company. Distribution to any other person, organization

or entity, other than the prospective investor except for advisors of the person to which this Memorandum was created for, is strictly prohibited. This Memorandum, whole or in part, may not be reproduced by any means and disclosure of the content found within the Memorandum not be given without the prior written permission of the Company. By accepting this Memorandum, the prospective investor agrees that they will return the Memorandum and any other documents or attachments to the Company if the Offering is terminated or if the prospective investor's subscription is unaccepted. Furthermore, acceptance of this Memorandum by the prospective investor recognizes and accepts the importance of conducting their own investigation before they consider purchasing any Shares. Information found within this Memorandum should in no way be considered legal, tax, or investment advice and should consult with their individual consultant regarding an investment in this Offering.

There are no persons that are authorized to make any representation or give any information that is not contained within this Memorandum and any information or representation that is not currently found within this Memorandum should not be construed as accurate and reliable information.

This Memorandum should not be considered an offer to sell or solicit for an offer to buy any Shares in any state or jurisdiction in which such actions would be considered unlawful or unauthorized. This Memorandum also does not constitute an offer if the prospective investor is found to be unqualified under applicable laws and regulations.

The Company's Management has provided all necessary information found within this Memorandum. The Company makes no implied or express representation or guarantee regarding the completeness of the information. As for projections, estimates, forward looking assumptions and statements and future plans, the above applies to the attainability of these topics and the assumptions from which they have been derived. The estimates of Company performance are subject to a high degree of uncertainty and results may vary. Each prospective investor is urged to pursue their own independent investigation before purchasing any Shares.

This Offering is made subject to cancellation, withdrawal or any modifications by the Company without prior notice and at the discretion of the Company. Additionally, the Company will reserve all rights to reject any subscription or allotment to any prospective investor that is less than the number of Shares that have been subscribed for by the prospective investor.

**Contents**

IMPORTANT:.....	3
OFFERING SUMMARY.....	16
Risk Factors.....	18
Blue Sheet.....	29
Agreement for Share Exchange - Exhibit 2.1.....	32
Lockup Agreement –Exhibit D.....	55
License Agreement – Exhibit 2.1.1.....	57
Exhibit A1.....	60
Exhibit A2.....	88
Exhibit A3.....	109
Exhibit A4.....	126
Exhibit A5.....	133
Exhibit A6.....	145
Exhibit A7.....	147
Exhibit A8.....	161
Certificate of Incorporation.....	176
Employment Contract.....	186
Business Plan – Exhibit 12.....	190
The Project, Pictures:.....	196
Gel-Printer.....	198
Powder sintering technologies.....	200
Resin jetting drum printer.....	203
Molten granulate jetting.....	204
SLA: Peeling mechanism for daylight printer.....	206
FDM: 6 filament nozzle.....	207
FDM: Variable print width nozzle.....	208
HSS: Drum printer.....	208
Business Plan-FAQ (incl. Terms and Financial Plans):.....	210
CV of Managing Director/CEO –Exhibit 13.....	240
Pro-Forma Combined Financial Statements – Exhibit 99.2.....	243
Regulation S Subscription And Investor Representation Agreement.....	247
Investor Questionnaire.....	254

Prior to any sale and during the course of the Offering, the offeree of the Shares, as well as their advisor, are invited and encouraged to ask questions in regards to the terms and conditions of the Offering and are also encouraged to gather additional information that they deem necessary to verify the information found within this Memorandum. The Company will provide, to the extent of their abilities and without expense or unreasonable effort, any information that you may request.

ALL POTENTIAL INVESTORS WILL BE AFFORDED THE OPPORTUNITY TO ASK QUESTIONS AND RECEIVE ANSWERS FROM THE MANAGEMENT OF THE COMPANY IN REGARDS TO THE TERMS AND CONDITIONS OF THIS OFFERING. POTENTIAL INVESTORS WILL ALSO BE AFFORDED AN OPPORTUNITY TO OBTAIN ADDITIONAL INFORMATION FROM THE COMPANY, WITHIN THEIR ABILITIES AND WITHOUT EXPENSE OR UNREASONABLE EFFORT, THAT MAY BE NECESSARY TO VALIDATE THE ACCURACY OF THE INFORMATION FOUND WITHIN THIS MEMORANDUM. IF YOU DESIRE MORE INFORMATION OR HAVE QUESTIONS REGARDING THIS OFFERING, OR WOULD LIKE ADDITIONAL DOCUMENTATION TO VALIDATE OR ENHANCE THE INFORMATION FOUND WITHIN THIS MEMORANDUM, PLEASE CONTACT US AT:

GENIUS PRINTERS, MARKUS ULRICH

1873 Rte de L'Abadie, 067340

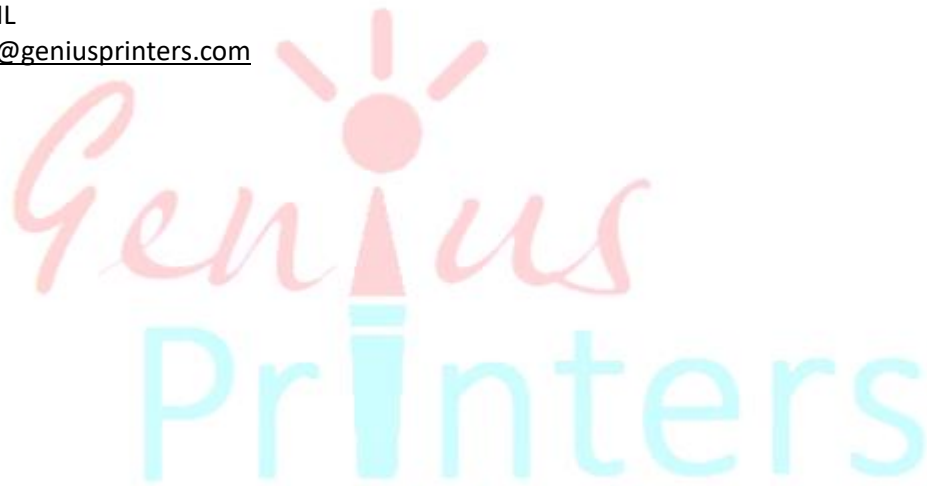
St. André de la Roche, France

OR PHONE

0033954458634

OR EMAIL

[investor@geniusprinters.com](mailto:investor@geniusprinters.com)



## OFFERING SUMMARY

The following is a summary of the information that can be found in other sections of this Limited Offering Memorandum. Qualification of this summary is by express references to this Memorandum and the materials that are referred to. Each prospective investor is encouraged to review the entirety of this Memorandum, any attachments and all other materials that are referred to in this Memorandum and to conduct their own research before accepting this offer for Shares.

### A. Corporate Ownership Benefits

Shareholders, owners of C-Corp, own a specific number of shares. Here are some of the benefits of C-Corp ownership:

- When listed on public exchanges, shares are more easily bought and sold.
- Corporations are free of the K-1 issue, unlike LLCs.
- Flexibility for tax planning.
- Flexibility to minimize Medicaid and Social Security Taxes.

### B. The Company

Genius Printers Corporation's focus is the production of high-quality 3D printers. The Company/its owner began operations in 2016 and is structured as a C-Corp under Delaware State laws. Their main office is currently located at:

Genius Printers, Markus Ulrich  
1873 Rte de L'Abadie, 067340  
St. Andre de la Roche, France  
Phone: 0033954458634

Markus Ulrich is the controlling shareholder of the Company. As a result of a reverse merger, Genius Printers UG became a subsidiary of GPC.

### C. The Offering

With a minimum of 25,000 shares and a maximum of 3 million, the Company is offering their shares at a rate of \$1.00 per share, \$0.00001 par value per unit. Upon the completion of the Offering that consists of a total number between 25,000 and 3 million shares with 53 million shares remaining. Each investor that agrees to purchase shares must implement a Subscription Agreement that ensures certain demonstrations and guarantees to the Company that provide qualifications that the purchaser is and accredited investor as per the Securities and Exchange Commission.

### D. Business Plan

Prepared by the Company, the included business plan for GPC has portions that uses assumptions and forward looking statements. All potential investors are encouraged to review Exhibit 12, the GPC Business Plan, which is attached within this Memorandum, prior to purchasing any shares. The Management makes no guarantees to the precision or probability of the underlying assumptions or the projected results that are found within this Memorandum.

### E. Risk Factors

See "RISK FACTORS" in this Memorandum for possible adverse factors that can affect your investment in the shares. The factors include, but are not limited to, general economic factors,



unexpected impediments to the implementation of the business plan, and related risks involved with the 3D printer industry.

F. Registrar

With respect to the shares, the Company will serve as their own transfer agent and registrar.

G. Proceeds Use

Production of the 3D printers will be funded by proceeds received from the sale of shares. For further information, see the "Proceeds Uses" section.

H. Subscription Period

The Offering will terminate on one of the following factors, whichever is earliest:

- The date when all shares have been sold.
- January 31, 2018. This date may be extended by the Company, but will not exceed a 180-day time period past the offering period.
- In their discretion, the date the Company decides to terminate.

G. Minimum Offering/Escrow of Subscription Proceeds

The minimum offering proceeds that have been established by the Company is set at \$25,000 for this offering period. This equates to 25,000 shares. Once this minimum amount of shares has been sold, the proceeds will be delivered to the Company. After the sale of the maximum number of shares for this offering, the number of issued and outstanding shares will be held in the following manner:

94% = Present Shareholder

6% = New Shareholders

**Purchaser Requirements**

Potential investors should carefully consider the certain risk factors that are highlighted in the "Risk Factors" section. Ensure you pay special attention the speculative nature and limitations which are described under that caption in regards to the limited amount of available market for the shares and their long-term nature. This Offering is being made available to accredited investors that demonstrate that they have the adequate means to take on such risks.

A. Accredited Investors

The Offering will be conducted in such a manner so that only accredited investors will be authorized to purchase shares from the Company.

B. Suitability Standards

Shares will only be sold to potential investors, or their authorized representatives, that have represented a written subscription agreement to the Company that:

- Demonstrates that the potential investor has the adequate means to provide for their needs and has no need for liquidity in the shares in which they have invested.
- Demonstrates that the potential investor's commitment to the investment of shares, which are not readily marketable, is not unbalanced to their net worth and that such an investment will not cause an excessive burden.

- Demonstrates that each potential investor represents that the purchase of the shares is for their own account and are not intended for resale or distribution.
- Demonstrates that the potential investor is an accredited investor, as defined above.

C. Additional Requirements

No subscription for shares will be accepted from any investor unless they are acquiring the shares for their own account, or the accounts in which they have sole investment discretion, and will not be resold or redistributed. Potential investors may be required to provide the Company with information that demonstrates that they are an accredited investor.

## Risk Factors

Investing into the Company's share is extremely risky and potential investors should ensure that they are able to bear a loss of their investment, possibly a complete loss. Careful consideration should be given to the following factors:

**A. Management Dependence**

The Company's business will be significantly dependent on their management team during the early stages of development, with a large portion of that success being dependent upon Markus Ulrich. A material adverse effect could be felt by the Company if this individual should be lost in some manner.

**B. Development Stage**

Commencing operation in 2016 by its owner, Genius Printers Corp. is structured as a C-Corp under the Delaware state laws. Hence, the Company has no history to enable a thorough and accurate evaluation on its prospects and future performances. The proposed operations of the Company are subject to all business risks that are commonly associated with new enterprises. The Company's success should be considered in light of the expenses, complications, difficulties, delays and problems that are commonly encountered with operations in a competitive industry and business expansion. The possibility of future losses does exist and no guarantees can be made that GPC will operate profitably.

**C. Funds Shortage**

Proceeds which are set at a \$25,000 minimum and \$3 million maximum could be gathered. Management of the Company believes that such proceeds will sustain and capitalize GPC enough to allow them to implement their business plan. However, if enough shares are not sold, or other assumptions that are found within the business plan are proven to be incorrect, there is a possibility that the Company may not have sufficient funds to fully develop its business and could need other capital investments, such as debt financing, in order to implement their business plan.

**D. Consumer Spending and Preferences Trends**

Results from operating efforts could fluctuate greatly from one period to the next due to a variety of factors that include: debt service payments, principal reduction payments, economic conditions and competition. Success in the Company's ability to market its product is not guaranteed and neither is the amount of revenue the Company will generate from investments and contributions. Therefore, revenues could vary season causing operating results to fluctuate.

#### **E. Expansion Related Risks**

Expansion is included in the Company's business plans by attracting more investors and companies. These planned expansions will involve related risks. Expansion activities could involve operational maneuvers that could have a negative impact on the Company's profitability. Shareholders should assume that expansion could require funds expenditures that are greater than available resources the Company has and could result in the Company diverting management's resources and attention away from existing operations. This could lead to an adverse effect on business activities.

#### **F. Borrowing Risk**

If indebtedness is incurred by the Company, some of its cash flow will be dedicated to the elimination of the indebtedness. Some loan agreements might contain restrictive guidelines that could possibly hinder the operating flexibility of the Company. These agreements would most certainly also provide for default in the event the Company is unable to meet specific financial obligations. In the event of default, payment would become due immediately and if the amount remains unpaid, a judgment for the lender would be senior to shareholder rights in the Company and would give the creditor the right to foreclose on Company assets. Such an action would have an adverse effect on operating efforts and results.

#### **G. Competition**

The competitors for GPC include:

3D Systems which is one of the largest 3D printer manufacturers in the world and have a market value of over \$5 billion.

Stratasys with Makerbot. They are also one of the leading 3D printer manufacturers and also have a market value of over \$5 billion.

Massivit, EOS and many SLS-printer-producing companies are also competitors.

Even though the market is competitive, management feels that the ideas of GPC offer many advantages. GPC's future board will consist of expert coaches that will be advising the companies and helping potential investors to fully realize the Company's potential. While they may not be investing their own money, their guidance will help possible investors decide if an investment into the Company is right for them. Accredited investors can invest while other contributors will receive rewards based on the size of their contribution. However, the possibility of competitors imitating GPC's business model does exist and could lead to them producing competitive product models that mimic GPC's product focus. With better capitalization, it could give the competitors an advantage over GPC and could lead to the competitors seizing a significant portion of the market.

#### **H. Market Acceptance and Customer Base**

Start-ups and small businesses will make up the majority of the Company's customer base. However, this could lead to the need for additional funding and broader public awareness. The remainder of the customer base will consist of potential consumers. Through web-site promotion and marketing, the Company believes they can further develop their customer base. If they are unable to further develop their customer base, it could have an adverse effect. No guarantees can be given that the Company's product matrix and e-commerce website will reach a degree of market acceptance that will allow them to sustain a revenue that will create profitable operations.

#### **I. Unforeseen Obstacles to Business Plan Execution**

A significant amount of the activities found within the Company's business plan are capital intensive and could possibly be subject to various regulatory and statutory requirements and may require changes to be made to the business plan. Even under the current legal and economic conditions, the management feels that their strategies still achievable with the background, skills and knowledge

possessed by the Company's advisors and principals. Management will reserve the right to make any needed modifications that may be required, depending on future events.

**J. No Proprietary Rights Guaranties / Trade Secret Reliance**

Under certain circumstances, the Company may have to protect intellectual property, processes and proprietary technology through the use of trade secrets. No guaranties are given that the obligations of secrecy will be honored or that other entities will not develop products or technology that is similar or superior to GPC's. Even in cases where proprietary claims have been unsubstantiated, protection of proprietary technology and property through claims of trade secret status have been the focal point of an increasing amount of claims and legal action by various companies to protect proprietary rights and for competitive reasons. The cost for proprietary claims prosecution and defense of these claims is costly. Much like other competitors in the industry, the Company may be the subject of such claims from competitors over the use of technology and intellectual property that may be deemed proprietary by others.

**K. Use of Proceeds and Management Discretion**

Proceeds generated by this Offering will be used for purposes outlined in the "Proceeds Uses" section. The Company reserves all rights to use obtained funds generated by this Offering for other uses that are not currently realized but are deemed to be in the best interests of the Company and the shareholders. Success of the Company will be primarily dependent upon the judgment and discretion of the management and how they allocate the proceeds generated from this Offering. This means that investors will be entrusting the Company's management with their funds.

**L. Dilution**

When additional shares are issued by the Company at a future date, the action will dilute a purchaser's share investment.

**M. Lack of Current Market for Shares**

With this private Offering, there is no current market and there is no expectation for such a market in the near future.

**N. Investments and Their Long-Term Nature**

Liquidity of the investment in the shares may not be realized in the near future. As mentioned earlier, the sale and offer of the shares will not be registered under the Securities Act or any such securities regulation in any state or other country by reason of exemptions from any such registration. Potential investors are required to submit written representation to the Company that they are purchasing shares for their own personal account for the purposes of a long-term investment and not for distribution or resale. Therefore, those investors must be in such a position to bear the economic risks of their investment for an undetermined length of time. The ability to liquidate the investment in shares in the event of an emergency is unlikely.

**O. Dealer / Broker Sales of Shares**

The shares of the Company are not included on any exchange and no guarantees are made that they ever will be. The NASDAQ Stock Market, Inc. has certain entry and maintenance criteria in regards to listing eligibility. These criteria include a requirement of \$4 million in tangible net assets or \$7.25 million of net income in two out of the last three years. Criteria also include a requirement of at least 1 million public float shares with a value of at least \$5 million and a price of \$2 per share. Additional requirements include a minimum of three market makers and a minimum of 300 shareholders.

Maintenance standers, different from entry standards, have a requirement of \$2 million or more in net tangible assets or \$500,000 in net income in two of the last three years, a 500,000-share public float with a \$1 million market value and a price of \$1 per share. Additional requirements include a minimum of two market makers and a minimum of at least 300 shareholders.

There are no guaranties are made that the Company shares will ever qualify for NASDAQ listing or any market. This leads to the Company shares being covered by a rule from the Securities and Exchange Commission that opposes further sales practice requirements on dealers/brokers that sell such securities to those that are not accredited investors. Transactions that are covered by this rule will require the dealer/broker to make special suitability determinations on and receive a written agreement from the purchaser prior to the sale transaction. The rule may affect the dealers/brokers ability to sell the shares of the Company and will affect the ability of the shareholders to sell shares on a secondary market.

#### **P. Transferability and Liquidity Limits**

In order to satisfy requirements of specific exemptions from Securities Act registration, and to follow applicable securities laws, investors will need to acquire their shares for investment use only and not with the intention of redistribution. Prior to any transfer or sale, certain conditions will have to be met due to the Securities Act. These conditions include minimum holding periods, the manner in which sales are sold, limitations on the number of shares sold, availability of specific reports from GPC, including financial statements from GPC.

GPC is authorized to prohibit any transfer or sale of shares unless it receives and option of counsel that will be provided at the shareholders expense, which must be satisfactory to GPC, which states the proposed transfer will not result in any applicable state or federal securities laws violation. There is currently no public market for the shares and such a market is not expected to develop. Shareholders may have to maintain possession of their investment for an extended period of time, or indefinitely, and may not be able to liquidate the investment or pledge them to serve as security for a loan in the event of an emergency.

#### **Q. Offering Price**

GPC has arbitrarily established an offering price under the considerations of general condition of the industry and the Company's business development. The established offering price bears little association to the net worth, assets, or other valuing criteria of GPC.

#### **R. Securities Law Compliance**

The shares that are a part of this Offering are in reliance upon specific exemptions from the Securities Act, Delaware Securities Laws, and other state and federal securities laws registration requirements. If the sales transactions were to fail to qualify for these exemptions, may opt for rescission of their shares purchase. If a significant amount of investors obtain rescission, the impact would cause GPC to face substantial financial demands that could negatively impact GPC and non-rescinding investors as a whole.

#### **S. Alleged Infringement Claims**

In spite of GPC's research into patent and trademark data, the Company may become subject to intellectual property infringement claims from vendors, individuals and other companies that have established patents in the 3D printing fields for the purpose of developing competing products or simply to place claims against the Company. Such claims of infringement upon intellectual property rights could cause the Company to incur significant litigation cost in the defense of, or resolution of the claims. If the Company is unable to effectively defend against these claims, their market share, sales and profitability could be negatively effected.

**T. Failure to Expand the Company's Intellectual Property Portfolio**

Intellectual property portfolio expansion is one of the planned methods that will be used to grow the Company's profits and revenues. Such actions will involve costly and complex activities that possess uncertain outcomes. The Company's ability to acquire patents and other intellectual property can be impacted negatively if the employees of the Company prove to be ineffective by demonstrating insufficient inventiveness, by changes to intellectual property laws, regulations, treaties and by legislative actions. The lack of valuable intellectual property could negatively affect the Company's ability to expand their portfolio in intellectual property. There are no guaranties made that the Company will be able to acquire valuable intellectual property in areas where they, and their competitors, operate.

**U. The Negative Effects Alternate Forms of 3D Printing May Have on the Company's Profitability and Revenue.**

Significant changes continue to evolve in the 3D printing sector through technological advancements that prevent the Company from making accurate predictions on the effects these advancements will have on the Company's revenue and profitability of their 3D printing products. Future advancements may cause the Company to make changes to their operating procedures and could result in unforeseen costs.

**V. Lack of Firm Underwriter**

The Offering of the shares is done so on a "best efforts" basis by Controlling GPC Shareholders without compensation and through FINRA registered dealers/brokers that enter a Participating Dealer/Broker agreement with the Company. There is no guarantee that any FINRA dealer/broker, or the Company, will successfully sell the maximum required shares or any lower amount.

**W. Inability of the Company To Protect Intellectual Property and Ineffective Competition**

The Company's ability to compete partly depends on the strength of their proprietary rights in technologies, content and brands. The Company is currently, and in the foreseeable future, relying on a combination of foreign and U.S. trade secret laws, patents, trademarks and license agreements to establish and maintain their protection of their proprietary and intellectual property rights. The Company has taken actions, and will continue to do so, in order to protect their proprietary and intellectual property rights. However, these efforts might not be effective or sufficient at preventing unauthorized use of their proprietary and intellectual rights. Additionally, the availability and cost-effectiveness of trademark, copyright, trade secret protection and patents in every country the Company's products and services are available. This could lead to situations where the Company may not be able to completely protect their proprietary and intellectual property rights. If the Company is unable to completely protect these rights, the value of their products could be negatively impacted. This could also allow for competitors to infiltrate the Company's markets and distribute products that are the same, or similar, to that of the Company's. Another concern is that the protection required for the Company's proprietary and intellectual rights is expensive and will require the management to divert critical resources. The Company will rely, in part, on issued patents that they currently have to bolster their competitive situation. No guarantees are made that a portion of the Company's patents will not be confronted at some later date. There are also no guarantees made that the Company will successfully obtain additional patents that may be needed to support future projects and growth initiatives. The ability of the Company to defend their patents if they should be challenged, or their inability to secure future patents, could have a negative effect at a future period and would have an equally negative impact on business results and financial outcomes. If the Company must resort to legal proceedings to defend proprietary and intellectual

rights and are unsuccessful of it they cannot afford to pursue this course of action, these rights will be at risk. Possible extensive patent issuance delays could also have a negative impact on the Company's ability to protect their marketed products.

Development of intellectual property that is needed in support of the Company's intermediate and long-term plans continues and no guarantees are made that the Company will complete these processes. These added intellectual properties that are needed to support the Company's growth is dependent on the quality and continuous services of the Company's technology team and their ability to develop the technologies need to support these activities and plans. If the Company does not have the financial means for this development, their ability to produce and develop future products, and improve current products, could be adversely effected. The Company may be unable to acquire the necessary licenses for proprietary rights or patents. If this is the case, the Company could encounter delays with product development or that the manufacture, development and sale of the products that are requiring the licenses may be foreclosed.

From time to time, the Company may collaborate with and support research conducted by governmental research organizations and universities. In these situations, the Company may be unable to obtain exclusive rights to technical information or inventions that are the results of these partnerships; this could arise to rights disputes.

#### **X. Disruptions To Manufacturing Facilities / Disruptions of Sales / Unforeseen Incurred Costs**

The Company's final assembly, at least for the prototypes, will be conducted in the facilities located in Germany or France. If disruptions occur at these facilities, the Company's ability to fulfill customer orders would be hampered significantly during the periods of disruption. Such events would cause the Company to lose revenue on uncompleted orders and would possibly need to modify standardized sales terms in order to obtain new customers during the periods of disruption or longer. Significant losses could be incurred, depending on the length and severity of the disruption, before product shipments can resume. Such events could have adverse effects on Company earnings.

#### **Y. Lack of Revenues**

Currently, the Company has no revenues and their existing cash will not be able to fund their longer term business goals and needs. This means that they will have to generate significant revenue in order to continue operations. The Company's current business plan anticipates possible losses during the period ending January 2018.

#### **Z. Competitors May Take Advantage of Expiring Patents**

Once the Company's patents expire, competitors may take advantage of this situation and introduce products that may contain the same technology that is used by the Company and could be at a lower price than the Company's products. This will negatively impact the Company's revenues.

Additionally, expiring patents could enable other fabrication systems to enter the market and would reduce the Company's market share and potential earnings. In the event competitors would use the Company's technology to produce inferior products, potential customers may view the Company's products in a negative way and would adversely impact the Company's reputation and competitive abilities.

#### **AA. Failure to Raise Additional Capital or Failure to Implement the Business Plan**

The Company currently has limited resources, and to date, their operations are entirely funded by their shareholder. The Company does not have the capital or revenue needed to meet projected or current expenses incurred from operations. They anticipate that they will need a significant increase in capital in the near future for product development and marketing.

The Company does not possess any financing commitments to meet expenses from long-term projections and may not be able to obtain additional financing that have acceptable terms. In the event they do obtain financing for near-term product development and operations, they project that they will still need additional capital. The inability to raise the needed additional capital would have a negative impact on the Company's operational capabilities. If debt financing is the only option available, it could involve agreements that could include contracts arrangements that would restrict the Company's ability to take certain actions, such as incurring additional debt, and would obligate the Company to repay the debt, regardless of operating outcomes. Additionally, the Company may issue equity securities for any debt financing. This could lead to the ownership and economic dilution for the current stockholders and could require the Company to grant specific rights and partialities to new investors. Moreover, the Company could seek additional funding due to favorable market conditions or due to conditions that would allow for the Company to take advantage of their marketing position if they feel they have ample funds for current ongoing operations.

The Company does not have credit facilities or credit arrangements in place to serve as a funds source and no guarantees are given that they will be able to acquire additional funds that will be sufficient and will have terms that are acceptable to the Company. If no such capital is available, the Company may have to delay, lower, or stop the research and development of products, possibly stop all together.

#### **AB. Loss of Funds Due to Investments in Other Companies**

The Company has plans on exploring opportunities in acquiring other companies or technologies in the future, subject to financial limitations. The risks involved that could negatively affect the Company include, but are not limited to:

- Inability to integrate the purchased assets with current business goals and plans.
- Costs of the purchase may outweigh actual returns.
- Distraction of management's focus from primary business concerns.
- Acquired assets may have a minimal operating history and may require significant capital after acquisition.
- Potential employee loss from current business or acquired businesses.
- Assumption of unplanned liabilities relating to the purchased asset.
- Market infiltration in which the Company has little or no experience.
- Loss in share value as a result of issuing equity securities as part of the purchase price.

#### **AC. Underestimated Operating Expenses**

The Company has devoted a large percentage of their efforts into the research and development, initial marketing activities and infrastructure building. No assurances are given that the Company's cost projections or estimated sales are accurate and will be achieved. If the Company is unable to meet forecasted sales volumes may have a negative impact on their cash flow, survival and profitability. The Company anticipates their operating expenses to increase as they continue to develop new products and expand their marketing activities. They may also experience unexpected costs that are greater than the anticipated amounts found within their business plan. If such costs and expenses were incurred, the effects on the Company's financial performance would adverse.

#### **AD. Fluctuating Financial Situation and Operating Results**

From quarter-to-quarter and year-to-year, results of the Company's operating efforts could fluctuate and will likely continue to do so due to various factors. Many of these factors are outside the control of the Company. In the event that the operating results do not meet investors and securities analysts expectations, the common stocks market price will likely drop. In addition the risks factors mentioned throughout this section, other factors include, but are not limited to:



- Changes in advertising costs.
- Changes in the amount spent on developing, acquiring or licensing new products.
- Developments in competitive products by other entities.
- Delays in realizing revenues from newly developed and marketed products and services.
- Costs changes in satisfying obligations, such as warranties and services on installed systems.
- Tax laws and accounting rules changes.
- Acceptance of the Company's product on the market.
- Geographical sales distribution.
- Responses to competitors and competitions prices.

#### **AF. Competition from Established and Larger Companies**

Our industry is focused. There are a wide range of 3D printing and RP organizations in Europe and North America and our administrations won't be one of a kind to their administrations. Despite the fact that the business is profoundly divided, it has various huge and settled organizations, which are gainful and have added to a brand name. Forceful advertising strategies actualized by our rivals could affect our restricted budgetary assets and unfavorably influence our capacity to contend in our business. Our failure to contend adequately with bigger organizations could have a material unfavorable impact on our business exercises, money related condition and consequences of operations.

#### **AG. Loss of Executive Officer Services and Their Efforts**

Our future achievement depends significantly on the proceeded with administrations of our official officers. Specifically, our execution depends, in vast part, upon our officers and their current connections in the business. We don't keep up key man disaster protection on any of our official officers and executives. In the event that one or more of our official officers are incapable or unwilling to proceed in their present positions, we may not be capable to supplant them promptly, if by any means. Hence, our business may be seriously upset, and we may bring about extra costs to enlist and hold new officers. Moreover, if any of our administrators joins a contender or structures a contending organization, we may lose some of our clients.

#### **AH. Changes to Government Regulations**

The generation, dissemination, deal and showcasing of our items are liable to the standards and regulations of different government, state and nearby offices, different natural statutes, and different other elected, state what's more, nearby statutes and regulations relevant to the generation, transportation, deal, security, and publicizing of or relating to our items. New statutes and regulations might likewise be founded in the future. Agreeability with appropriate government and state regulations is vital to our prosperity. In spite of the fact that we accept that we are in consistence with relevant regulations, ought to the national government or any state in which we work revise its rules or force more stringent translations of current laws or regulations, we will be unable to follow these new rules. Such regulations could require the reformulation of specific items to meet new guidelines, market withdrawal or suspension of certain items we are not able to update or reformulate, burden of extra record keeping necessities also, extended documentation in regards to the properties of specific items. Inability to follow appropriate prerequisites could bring about authorizations being forced on us or the makers of any of our items, including however not constrained to fines, orders, item reviews, seizures and criminal arraignment. Further, if an administrative power observes that a present or future item on the other hand creation run is not in consistence with any of these regulations, we may be obliged to have the bundling of our items changed which might unfavorably influencing our money related condition and operations. We are

likewise not able to foresee whether or to what degree a notice under any of relevant statute would have an effect on expenses or offers of our items.

#### **AI. Inability to Retain Key Personnel**

Our development arrangements oblige us to hold key workers in, and to procure extra gifted representatives to improve existing items and grow new items. Our powerlessness to hold and contract key specialists and different workers could postpone our improvement and presentation of new items, which would unfavorably influence our incomes. Likewise, a conceivable lack of such faculty in our area could oblige us to pay more to hold and contract key representatives, along these lines expanding our expenses.

#### **AJ. Currency and Exchange Risks**

Our working results may be influenced by instability in money trade rates and our capacity to adequately deal with our cash exchange and interpretation dangers. All in all, we lead our business, procure income furthermore, and acquire costs in the nearby money of the nation in which we work, which is Euro. Thus, our global operations present dangers from money conversion standard changes. The money related condition also, consequences of operations are accounted for in the significant nearby coin, Euro, and after that meant U.S. dollars at the relevant cash conversion scale for consideration in our united money related explanations. We try not to deal with our remote cash presentation in a way that would take out the impacts of changes in remote trade rates. Along these lines, changes in return rates between any outside monetary forms and the U.S. dollar will influence the recorded levels of our remote resources and liabilities, and also our incomes, expense of products sold, and working edges, and could bring about trade misfortunes in any given reporting period. Later on, we may not profit by great conversion standard interpretation impacts, and unfavorable conversion standard interpretation impacts may hurt our working results. Notwithstanding cash interpretation dangers, we acquire coin exchange dangers at whatever point we go into either a buy or a deal exchange utilizing an alternate cash from the money in which we get incomes. In such cases we may endure a trade misfortune on the grounds that we don't, at present, take part in coin swaps or other cash supporting systems to address this danger. Given the instability of trade rates, we can give no certification that we will have the capacity to adequately oversee our cash exchange and/or interpretation dangers or that any unpredictability in coin trade rates won't have an unfriendly impact on our aftereffects of operations.

#### **AK. United States Federal Securities Laws and the Location of Directors and Assets**

Our working organization and is at present situated in France and Germany. Moreover, all of our present chiefs and officers dwell outside of the United States. It might consequently be troublesome for speculators in the United States to authorize their legitimate rights taking into account the common risk procurements of the United States government securities laws against us in the courts of either the United States or Germany and France and, regardless of the possibility that common judgments are gotten in United States courts, to authorize such judgments in German courts.

#### **AL. The European Union and its Current Economic Uncertainty**

The disappointment of the European Union to balance out the monetary condition and reliability of its part economies, for example, Greece, Portugal, Spain, Ireland, and Italy, could have critical ramifications on our arrangements to grow inside of the European Union. Certain European Union part states have huge financial commitments, which have brought on financial specialist concern over such nations' capacity to keep on overhauling their obligation and foster monetary development. As of now, the European obligation emergency has brought about liquidity to be less

bottomless. A weaker European economy has brought about and may keep on bringing on business sector members to lose trust in the wellbeing and soundness of European budgetary foundations and the strength of European Union part economies, and may similarly influence other worldwide establishments and the security of the worldwide monetary markets.

Also, the conceivable deserting of the Euro cash by one or more individuals from the European Union could substantially influence our business later on. Notwithstanding measures taken by the European Union to give subsidizing to certain European Union part states in monetary troubles and by various European nations to balance out their economies and decrease their obligation troubles, it is conceivable that the Euro could be deserted as a coin later on by nations that have officially received its utilization. This could lead to the re-presentation of individual monetary standards in one or more European Union part states, or in more great circumstances, the disintegration of the European Union. The consequences for our business of a potential disintegration of the European Union, the way out of one or more European Union part states from the European Union or the relinquishment of the Euro as a cash, are difficult to anticipate with assurance, and any such occasions could have a material unfriendly impact on our business, exchanging volumes and aftereffects of operations, especially in the long haul.

#### **AM. Cost Associated With Complying With New Corporate Governance**

We may confront new corporate administration necessities under the Sarbanes-Oxley Act of 2002, and also new standards and regulations in this way embraced by the Securities and Exchange Commission ("SEC") and the Public Company Accounting Oversight Board. These laws, standards and regulations keep on advancing and may turn out to be progressively stringent later on. Specifically, under SEC principles, we would be obliged to incorporate administration's report on inside controls as a component of our yearly report, in accordance with Section 404 of the Sarbanes-Oxley Act. The money related expense of consistence with these laws, principles and regulations is normal to be considerable. We can't guarantee you that we will have the capacity to completely consent to these laws, rules and regulations that address corporate administration, inside control reporting and comparative matters. Inability to consent to these laws, tenets and regulations could physically antagonistically influence our notoriety, money related condition and the estimation of our securities.

#### **AN. Risks Associated With Conducting International Operations**

We, right now, direct operations in France and Germany, and anticipate growing our operations to extra worldwide markets, including the United States, European Union and China. Our future working results in worldwide markets could be adversely influenced by a mixed bag of variables, a large portion of which are outside our ability to control. These variables incorporate political conditions, including political insecurity, financial conditions, legitimate and administrative limitations, exchange arrangements, cash regulations, and other matters in any of the nations or districts in which we work, now or later on. Additionally, the economies of a percentage of the nations in which we as of now have, or plan to have operations, have in the past experienced high rates of expansion and cash debasements, which, on the off chance that they happened once more, could antagonistically influence our money related execution. Different components which may affect our operations incorporate remote exchange, money related and financial approaches both of the United States and of different nations, laws, regulations and different exercises of remote governments, offices and comparable associations, and dangers connected with having various officers situated in nations which have truly been less steady than the United States. Extra dangers intrinsic in our global operations for the most part incorporate, among others, the expenses and challenges of overseeing global operations, antagonistic assessment results and more prominent trouble in implementing licensed innovation rights in nations other than the United States.

#### **AO. Negative Effects of the Current Global Economic Conditions on the Company's Results**

The current disturbances in the worldwide credit and monetary markets has prompted decreased liquidity and credit accessibility, a decrease in customer certainty, a decrease in financial development, an expanded unemployment rate, and instability about monetary soundness. There can be no certification that there will not be further decay in credit and money related markets and trust in financial conditions. These monetary instabilities influence organizations, for example, our own in various ways, making it hard to precisely gauge and arrange our future business exercises. The current antagonistic worldwide monetary conditions and fixing of credit in money related markets may lead buyers to delay spending. We are not able to anticipate the possible length of time and seriousness of the present disturbances in the credit and monetary markets and unfriendly worldwide monetary conditions. In the event that the current unverifiable financial conditions proceed with or further decay, our business and aftereffects of operations could be really and antagonistically influenced.

#### **AP. Lack of Dividend Payments to Stockholders**

The revelation, installment and measure of any future profits will be made at the caution of our board of executives, and will rely on, in addition to other things, the aftereffects of our operations, money streams and money related condition, working and capital prerequisites, and different variables the top managerial staff considers applicable. There is no arrangement to pay profits within a reasonable time-frame, and if profits are paid, there can be no certification regarding the measure of any such profit.

#### **AQ. Articles of Incorporation and the Delaware Law**

In accordance with our Articles of Incorporation, we right now have 100,000,000 shares of basic stock approved. Starting today, we have 50,000,000 shares of basic stock issued and outstanding. Therefore, our Board of Directors can issue countless shares of basic stock without stockholder endorsement, which, if issued, could bring about significant weakening to our current stockholders. What's more, we may choose to issue favored stock or different securities later on having rights and inclinations more prominent to our regular stock. Pending regard by a greater part of our stockholders, our articles of consolidation will provide that the Board may assign the rights and inclinations of favored stock without a vote by the stockholders.

#### **AR. Failure in Complying With U.S. Foreign Corrupt Practices Act and Other Anti-Corruption Laws**

The Company plans to work in various nations all through the world, including nations known for dishonesty. We are focused on working together as per appropriate anticorruption laws. We are subject, then again, to the danger that our subsidiary materials or our separate officers, chiefs, workers and specialists may make a move resolved to be infringing upon such hostile to defilement laws, and in addition, exchange agreements directed by the Office of Foreign Assets Control and the U.S. Bureau of Commerce. Any such infringement could bring about generous fines, sanctions, common and/or criminal punishments, shortening of operations in specific regions, and may unfavorably influence our outcomes of operations. What's more, real or asserted infringement could harm our notoriety and capacity to do business.

#### **AS. General Economic Standings**

The financial achievements of the Company may be sensitive to negative changes in financial conditions in the United States, for example, expansion, recession, unemployment, and interest rates. Such evolving conditions could diminish request in the commercial center for the Company's

items. Administration accepts that the approaching development of the business sector, and standard business sector acknowledgment of 3D printers will protect the Company from over the top diminished interest. Nevertheless, GPC has no influence over these progressions.

## Blue Sheet

### Forward Looking Information

A percentage of the information contained in this Memorandum, including data fused by reference, examine future desires, or state other forward looking data. This information is liable to known and obscure dangers, vulnerabilities and different variables, a few of which are past the Company's control, which could bring about the genuine results to vary tangibly from those referenced by the information. The forward looking data is in light of different elements and was determined utilizing various suppositions. In light of the dangers, suspicions, and vulnerabilities included, there can be no certification that the forward looking data contained in this Memorandum will indeed come to pass or turn out to be precise. Essential elements that may bring about the genuine results to vary from those communicated inside of may incorporate, however are not restricted to:

- The achievement or disappointment of the Company's endeavors to effectively create 3D printers.
- The Company's capacity to draw in organizations to take an interest in offering the printers.
- The Company's capacity to draw in speculators and benefactors for the organizations included.
- The impact of changing financial conditions;
- The capacity of the Company to get sufficient obligation financing if a small amount of this Offering is sold;

These alongside different dangers, which are portrayed under "Risks Factors", may be depicted in future interchanges to shareholders. The Company makes no representation and embraces no commitment to overhaul the forward looking data to reflect genuine results or changes in presumptions or different variables that could influence this information.

### Proceeds Uses

The Company looks to raise a minimum of \$25,000 and a maximum of \$3,000,000 from the offer of shares in this Offering. The Company plans to apply these returns generously as stated in this Memorandum, subject just to reallocation by Management to the greatest advantage of the Company.

Maximum \$3,000,000 - Minimum \$25,000 - Minimum is nearly 0.8% of Maximum amount.

Expenses: Total material estimation components \$ 250,000-2,000,000

Agent Consulting Fees \$0-300,000\*

Operations and Marketing \$ 10,000-350,000

Saved for organization and R&D \$10,000-350,000

Absolute: \$3,000,000

\*If stock agents are not used to underwrite this endeavor, or if they are paid a portion of these charges, the offset will be exchanged to the Operations Account.

### Officer

A. Administration

At the present time, one individual is effectively included in the administration of the Company. The Administrator is Markus Ulrich – CEO

Mr. Ulrich has established, possessed and/or dealt with a few entrepreneurial endeavors in different fields and commercial enterprises. He was head of News Net Börseninformationssysteme GmbH, a German stock data framework for banks and vast web portal sites. Following 13 years the business was sold to a backup of the daily paper HANDELSBLATT. News Net had up to eleven individuals that made up the staff. The CV of the CEO is shown as Exhibit 13.

Currently, there is one Board Member, Markus Ulrich, president.

Until today, Mister Ulrich paid all costs out of his pocket without charging GPUG. Mr. Ulrich will incorporate without charges (with the exception of patent rights, see License Agreement) all learning and gear (research center, machines, drawings, licenses, trademarks, models, contracts, organization, suppliers and everything contacts needed to produce the printers) with his understandings.

#### B. Weakening

Extra Shares issued by the Company later on will weaken a buyer's interest in the shares.

### **Current Shareholders**

The below stated data contains certain data starting 31st of January 2018 as to the quantity of shares valuably possessed by (i) every individual known by the Company to claim advantageously more than 5% of the Company's shares, (ii) every individual that is a Controlling Shareholder in the Company, (iii) all individuals as a bunch who are Controlling Shareholders and/or Officers of the Company, and as to the rate of the outstanding shares held by them on such dates and as changed in accordance with offer impact to this Offering:

Markus Ulrich ... ....94%  
(also see Employment Contract)

### **Litigation**

The Company: Neither currently an assembly to any material case, nor to the knowledge of the Company's Management, is any prosecution debilitated against the Company, which might negatively influence the Company or any of its assets.

### **Shares Description**

The Company is putting forth a minimum of 25,000 and a maximum of 3,000,000 Shares at a cost of \$1.00 per Unit, \$0.00001 standard value per unit. At the completion of the Offering, around 50,025,000 and 53,000,000 shares will be outstanding. The shares of proprietorship in all regards, are equal, at the completion of the Offering, the Shares will represent proprietorship in the Company and will serve as the only representation of ownership. Shares are not redeemable and don't have transformation rights until obtaining ROC. The Shares at present that are outstanding are, and the Shares that will be issued at the end of this Offering will be, completely paid and non-assessable.

In the event of the disintegration or liquidation of the Company, the benefits then legitimately accessible for dissemination to the Shareholders will be circulated ratably among such Shareholders in extent to their shares upon a first in-first out premise. Shareholders are just qualified for benefit disseminations proportionate to their Shares of possession, when and if pronounced by the Controlling Shareholders out of funds that are lawfully accessible thusly. The Company to date has not given any such benefit appropriations. Future benefit circulation approaches are liable to the caution of the Controlling Shareholders and will depend upon various variables, including in addition

to other things, the capital prerequisites and the budgetary state of the Company. Every offer will be qualified for one vote.

### **Registrar and Transfer Agent**

The Company will assume services as their own registrar and transfer agent for the shares of ownership.

### **Placement Plan**

The shares are offered straightforwardly by the Controlling Shareholders of the Company on the terms and conditions put forward in this Memorandum. Dealers and brokers might likewise offer shares. The Company is offering the shares on a "best endeavors" premise. The Company will utilize its earnest attempts to offer the shares to investors. There can be no confirmation that all or any of the shares offered, will be sold.

Step by step instructions to Subscribe for Shares

A buyer of Shares must finish, date, execute, and convey to the Company the below records, as appropriate. All of which are incorporated as a component of the Investor Subscription Package:

- a) An Investor Suitability Questionnaire,
- b) A signed original facsimile of the proper Subscription Agreement,
- c) This GPC PPM,
- d) A check payable to "Genius Printers Corporation" in the sum of \$1.00 per Unit for every Unit bought as called for in the Subscription Agreement (a minimum of 10,000 Shares for \$10,000).

Buyers of shares will get an Investor Subscription Package which will contain the Investor Suitability Survey and two photocopies of the Subscription Agreement.

### **Additional Information**

Potential investors may ask questions about this offering in regards to the terms and conditions and may also obtain any additional information from the Company, if they so possess it and without unreasonable expense and effort, in order to verify the accuracy of the information found within this Memorandum. The address for the main executive office is:

Genius Printers  
Markus Ulrich  
1873 Rte de L'Abadie, 067340  
St. Andre de la Roche, France

### **Exchange Transactions**

On January 5, 2018 (the "End Date"), Genius Printers Corporation, a Delaware organization ( "Company") went into and fulfilled a willful offer trade exchange with Genius Printers UG (haftungsbeschränkt), a private constrained organization composed under the laws of Germany ("Genius Printers UG" or "GPUG"), and the shareholder of Genius Printers UG ("Selling Shareholder") in accordance with a Stock Exchange Agreement (the "Trade Agreement") by and among the Company, Genius Printers UG, furthermore, the Selling Shareholder.

As per the terms of Exchange Agreement, on the Closing Date, the Company issued 50,000,000 shares of its normal stock to the Selling Shareholder in return for 100% of the issued and exceptional capital supply of

Genius Printers UG (the "Trade Transaction"). As a consequence of the Exchange, the Selling Shareholder gained 100% of the Company's issued and exceptional basic stock, Genius Printers UG turned into the entirely claimed auxiliary, and the Company obtained the business what's more, operations of Genius Printers UG.

Genius Printers UG is a designer and future maker of purchaser and expert level 3-D printers.

The accompanying portrayal of the terms and states of the Exchange Agreement and the exchanges examined there under that are material to the Company does not imply to be finished and is qualified in its total by reference to the full content of the Exchange Agreement, a duplicate of which is documented as Show 2.1 hereto and fused by reference into this Item 2.01.

As a consequence of the Exchange Transaction, the Company's essential operations comprise of what was already the business and operations of Genius Printers UG. Along these lines, data is incorporated about the business, money related condition, and administration of Genius Printers UG before the Closing Date in PPM, all things considered data is pertinent to the Company's present and future business and operations. For bookkeeping purposes, the Exchange Transaction has been represented as a business mix between the Company and Genius Printers UG, with Genius Printers UG being the acquirer for both lawful also, bookkeeping purposes. Thusly, the combined money related explanations of the Company speak to a continuation of the monetary explanations of Genius Printers UG. For master forma money related data, see Display 99.2.

Issuance of Common Stock. At the end of the Exchange Transaction ("Closing"), the Company issued a aggregate of 50,000,000 shares of its normal stock to the Selling Shareholder in return for 100% of the issued and exceptional capital load of Genius Printers UG. Thusly, quickly preceding the Exchange Exchange, the Company had 0 shares of normal stock issued and remarkable. Instantly after the Trade Transaction, the Company had 50,000,000 shares of normal stock issued and remarkable. As a condition to shutting the Exchange Agreement, powerful on the Closing Date, Markus Ulrich was affirmed to be on the Company's Board of Directors. Markus Ulrich was likewise affirmed to be President, CEO and Chairman of the Board of Directors of the Company.

The accompanying individual comprises of the Company's official officer and executive ensuing to the end of the Exchange Transaction:

Name / Age / Position: Markus Ulrich / 52 / Director, President, Chief Executive Officer, Chairman of the Board of Executive

Additional information regarding Mr. Ulrich can be found in the Management section of this Memorandum. Exhibit 2.1 serves as qualifications to the foregoing description.

## Agreement for Share Exchange - Exhibit 2.1

THIS SHARE EXCHANGE AGREEMENT (the "Agreement") is made this 5 day of January, 2018 by and among Genius Printers Corporation, a Delaware company ("GPC") on one hand, and Genius Printers UG (haftungsbeschränkt), a private restricted organization sorted out under the laws of Germany ("GPUG") and the shareholder of GPUG as put forward on Exhibit A appended hereto ( the "Offering Shareholder"), on the other hand.

Foundation

A. The separate Boards of Directors of GPC and GPUG have discovered that an obtaining of GPC's exceptional shares by GPUG through a deliberate stock trade with the Selling Shareholder (the "Trade"), upon the terms and subject to the conditions put forward in this Agreement, would be reasonable and to the greatest advantage of their separate shareholders, and such Boards of Directors, alongside the Selling Shareholders, have endorsed such Exchange, as per which shares of capital load of GPUG issued and extraordinary instantly preceding the Effective Time (as characterized in Section 1.04), (the "Shares") will be traded (counting by booking for future issuances) for the privilege to get shares of regular stock of GPC (the " Exchange Shares").

At the Closing, the Selling Shareholder's possession enthusiasm for GPC might speak to one hundred percent (100%) of the issued and remarkable shares of basic load of GPC. GPUG, GPC, and the Selling Shareholder craving to make certain representations, guarantees, pledges furthermore,



understandings regarding the Exchange furthermore to recommend different conditions to the Exchange. For government pay expense purposes, the gatherings expect that the Exchange should qualify as revamping under the procurements of Section 368(a)(1)(B) of the Internal Revenue Code of 1986, as changed (the " Code").

Presently, THEREFORE, as a result of the representations, guarantees, contracts and assertions contained in this Agreement, the gatherings concur as takes after:

#### ARTICLE I

##### THE EXCHANGE

1.01 Exchange. Upon the terms and subject to the conditions put forward in this Agreement, and in understanding with the Delaware Revised Statutes ("Delaware Statutes"), at the Closing (as hereinafter characterized), the gatherings might do the following:

(a) The Selling Shareholder will offer, pass on, dole out, and exchange the Shares to GPC by conveying to GPC a stock authentication issued proving the Shares (the "Offer Certificate"). The Shares exchanged to GPC at the Closing should constitute 100% of the issued and remarkable value hobbies of GPUG.

(b) As thought for its procurement of the Shares, GPC might issue the Exchange Shares to the Selling Shareholder by conveying offer declarations to the Selling Shareholder enrolled for the sake of the Selling Shareholder, or his candidates, confirming the Exchange Shares (the "Trade Shares Certificates") in such sums inferable from the Selling Shareholder as put forward on Exhibit A hereto.

(c) For government salary expense purposes, the Exchange is proposed to constitute a "redesign" inside of the importance of Section 368 of the Code, and the gatherings should report the exchanges thought about by this Understanding reliable with such purpose and might take no position in any assessment documenting or legitimate continuing conflicting therewith. The gatherings to this Agreement therefore embrace this Agreement as an "arrangement of redesign" inside of the significance of Sections 1.368-2(g) and 1.368-3(a) of the United States Treasury Regulations. None of GPC, GPUG or the Selling Shareholder has taken or neglected to take, and after the Powerful Time (as characterized underneath), GPC should not take or neglect to take, any activity which sensibly could be anticipated that would bring about the Exchange to neglect to qualify as a "redesign" inside of the significance of Section 368(a) of the Code.

1.02 Effect of the Exchange. The Exchange should have the impacts put forward in the appropriate procurements of the Delaware Statutes.

1.03 Closing. Unless this Agreement should have been ended and the exchanges in this pondered should have been deserted according to Article VI and subject to the fulfillment or waiver of the conditions put forward in Article V, the end of the Exchange (the " Closing") will occur at 10:00 a.m. U.S. Pacific Standard Time on the business day inside of three (3) days of fulfillment of the conditions set forward in Article V (or when practicable from there on taking after fulfillment or waiver of the conditions set forward in Article V) (the " Closing Date"), at the workplaces of GPUG, unless another date, time or spot is concurred to in composing by the gatherings hereto.

1.04 Effective Time of Exchange. When practicable after the fulfillment or waiver of the conditions put forward in Article V, the gatherings might make all filings or recordings needed under Delaware Statutes and German Statutes. The Exchange might get to be compelling at such time as is admissible in understanding with Delaware Statutes and German Statutes (the time the Exchange gets to be compelling being the "Effective Time"). GPUG and GPC might utilize sensible endeavors to have the Closing Date and the Compelling Time to be that day.

1.05 Officer & Director Appointments. At the latest the Closing Date, GPC should bring about the arrangement of the people put forward on Schedule 1.05 to be the chiefs and officers of GPUG.

#### ARTICLE II

##### REPRESENTATIONS AND WARRANTIES

2.01 Representations and Warranties of GPC. But as put forward in the divulgence calendar conveyed by GPUG to GPC at the season of execution of this Agreement (the "GPUG Disclosure Schedule"), GPUG speaks to and warrants to GPC as follows:

(a) Organization, Standing and Power. GPUG is properly composed, truly existing and in great remaining under the laws of Germany and has the essential force and power and all administration licenses, approvals, allows, assents and approbations needed to claim, rent and work its properties and carry on its business as now being led. GPUG is properly qualified or authorized to work together and is in great remaining in every ward in which the way of its business or the proprietorship or renting of its properties makes such capability or permitting important, other than in such purviews where the inability to be so qualified or authorized (separately or in the total) would not have a material unfavorable impact (as characterized in Section 8.02).

(b) Subsidiaries. GPUG does not possess straightforwardly or in a roundabout way, any value or other proprietorship enthusiasm for any company, organization, joint endeavor or something else.

(c) Capital Structure. The measure of all approved, issued and extraordinary stock capital of GPUG is 1 Euro. Every single extraordinary offer of capital supply of GPUG are properly approved, truly issued, completely paid and non-assessable and not subject to preemptive rights. There are no extraordinary bonds, debentures, Shares then again different obligation or different securities of GPUG having the privilege to vote (or convertible into, or replaceable for, securities having the privilege to vote) on any matters. There are no remarkable securities, choices, warrants, calls, rights, duties, understandings, courses of action or endeavors of any sort to which GPUG is a gathering or by which they are bound committing GPUG to issue, convey or offer, or reason to be issued, conveyed or sold, extra shares of capital stock or other value or voting securities of GPUG or committing GPUG to issue, concede, amplify or go into any such security, alternative, warrant, call, right, responsibility, assertion, game plan or undertaking. There are no extraordinary contractual commitments, responsibilities, understandings or game plans of GPUG to repurchase, recover or generally obtain or make any installment in appreciation of any shares of capital load of GPUG. There are no assertions or game plans in accordance with which GPUG is or could be obliged to enlist shares of GPUG stock capital or different securities under the Securities Act of 1933, as corrected and the principles and regulations proclaimed there under (the "Securities Act") or different assertions or courses of action with or among any security holders of GPUG concerning securities of GPUG.

(d) Corporate Authority; Non-contravention. GPUG has all imperative force and power to go into this Understanding and to perfect the exchanges thought about by this Agreement. The execution and conveyance of this Agreement by GPUG and the culmination by GPUG of the exchanges thought about thusly have been (or at Closing will have been) rightfully approved by all vital activity with respect to GPUG. This Agreement has been properly executed and when conveyed by GPUG might constitute a legitimate and tying commitment of GPUG, enforceable against GPUG and the Selling Shareholder, as appropriate, in agreement with its terms, aside from in that capacity authorization may be constrained by chapter 11, bankruptcy or other comparable laws influencing the implementation of loan bosses' rights by and large or by general standards of value. The execution and conveyance of this Agreement don't, and the fulfillment of the exchanges examined by this Agreement and agreeability with the procurements in this regard won't, clash with, or result in any rupture then again infringement of, or default (with or without notification or breach of time, or both) under, or offer ascent to one side of end, crossing out or speeding up of or "put" right as for any commitment or to a loss of a material advantage under, or result in the formation of any endless supply of the properties or resources of GPUG under, (i) GPUG's endorsement of consolidation, articles of affiliation or other hierarchical or sanction archives of GPUG, (ii) any advance or credit understanding, note, bond, home loan, agreement, lease or other understanding, instrument, grant, concession, establishment or permit material to GPUG, its properties or resources, or (iii) subject to the administrative filings and different matters alluded to in the accompanying sentence, any judgment, request, order, statute, law, law, guideline, regulation or assertion honor material to GPUG, its properties or resources, other than, on account of provisos (ii) and (iii), any such clashes, breaks, infringement, defaults, rights, misfortunes or liens that independently or in the total couldn't have a material adverse impact regarding GPUG or couldn't forestall, thwart or physically postpone the capacity of GPUG to consummate the exchanges mulled over by this Agreement.

(e) Governmental Authorization. No assent, support, request or approval of, or enlistment, affirmation or recording with, or notification to, any United States court, regulatory office or commission, or other elected, state or neighborhood government or other legislative power, office, household or outside (a "Legislative Entity"), is needed by or as for GPUG regarding the execution and conveyance of this Agreement by GPUG or the culmination by GPUG of the exchanges mulled over thusly, aside from, regarding this Agreement, any filings under the Securities Act or the Securities Trade Act of 1934, as revised (the "Exchange Act").

(f) Financial Statements of GPUG. As of the Closing Date, GPC will put forth unaudited budgetary expressions of GPUG for the period finished January 31, 2018 (the "GPUG Financial Statements"). GPUG Financial Explanations genuinely exhibit the money related state of GPUG at the dates showed and its aftereffects of operations and money streams for the periods then finished and, aside from as demonstrated in that, mirror all cases against, obligations and liabilities of GPUG, altered or unforeseen, and of whatever nature. (i) Since the balance sheet date (the "GPUG Balance Sheet Date"), there has been no material antagonistic change in the advantages or liabilities, or in the business or condition, monetary or generally, or in the consequences of operations or prospects, of GPUG, whether as an aftereffect of any administrative or administrative change, renouncement of any permit or rights to work together, fire, blast, mishap, setback, work inconvenience, surge, dry spell, uproar, storm, judgment, demonstration of God, open power or generally and no material antagonistic change in the resources or liabilities, or in the business or condition, monetary or generally, or in the consequences of operation or prospects, of GPUG with the exception of in the normal course of business. (ii) Since GPUG Balance Sheet Date, GPUG has not endured any harm, demolition or loss of physical property (regardless of whether secured by protection) influencing its condition (money related or generally) or operations (present or planned), nor has GPUG, aside from as uncovered in composing to GPC, issued, sold or generally discarded, or consented to issue, offer or generally discard, any capital stock or some other security of GPUG and has not allowed or consented to give any alternative, warrant or other right to subscribe for or to buy any capital supply of some other security of GPUG or has brought about or consented to cause any obligation for obtained cash.

(g) Absence of Certain Changes or Events. Since the GPUG Balance Sheet Date, GPUG has led its business just in the conventional course predictable with past practice, and there is not and has not been any: material unfavorable change as for GPUG; occasion which, on the off chance that it had occurred after the execution of this Agreement, would not have been allowed without earlier assent of GPUG; condition, occasion or event which could sensibly be required to forestall, frustrate or physically postpone the capacity of GPUG to perfect the exchanges mulled over by this Agreement; (iv) incurrence, presumption or certification by GPUG of any obligation for obtained cash other than in the conventional course and in sums and on terms reliable with past practices or as unveiled to GPC in composing; (v) creation or other incurrence by GPUG of any lien on any benefit other than in the common course reliable with past practices; (vi) exchange or duty made, or any agreement or understanding went into, by GPUG identifying with its advantages or business (counting the procurement or demeanor of any benefits) or any surrender by GPUG of any agreement or other right, in either case, material to GPUG, other than exchanges and responsibilities in the standard course reliable with past practices and those considered by this Agreement; (vii) work question, other than standard, singular grievances, or, to the information of GPUG, any movement or continuing by a worker's guild or agent thereof to compose any representatives of GPUG then again any lockouts, strikes, lulls, work stoppages or dangers by or regarding such representatives; (viii) installment, prepayment or release of obligation other than in the standard course of business or any inability to pay any obligation when due; benefits or compose downs of any advantages of GPUG; creation, end or change of, or waiver of any directly under, any material contract of GPUG; harm, devastation or misfortune having, or sensibly anticipated that would have, a material unfriendly impact on GPUG; other condition, occasion or event which independently or in the total could sensibly be anticipated that would have a material unfavorable impact or offer ascent to a material antagonistic change as for GPUG; then again (xiii) understanding or duty to do any of the previous.

(h) Certain Fees. No business or discoverer's charges or payments are or will be payable by GPUG to any intermediary, money related counsel or expert, discoverer, situation operators, venture financier, bank or other individual as for the exchanges pondered by this Agreement.

(i) Litigation; Labor Matters; Compliance with Laws. There is no suit, activity or continuing or examination pending or, to the learning of GPUG, undermined against or influencing GPUG or any premise for any such suit, activity, continuing or examination that, separately or in the total, could sensibly be anticipated that would have a material antagonistic impact concerning GPUG or forestall, impede or really defer the capacity of GPUG to perfect the exchanges thought about by this Agreement, nor arrives any judgment, order, directive, manage or request of any Governmental Entity or mediator extraordinary against GPUG having, or which, seeing that sensibly could be anticipated by GPUG, later on could have, any such impact. (ii) GPUG is not a gathering to, or bound by, any aggregate bartering understanding, contract or other assertion on the other hand understanding with a worker's party or work association, nor is it the subject of any procedure stating that it has submitted an out of line work practice or trying to urge it to deal with any work association as to wages or states of business nor arrives any strike, work stoppage or other work debate including pending or, to its information, debilitated, any of which could have a material unfriendly impact concerning GPUG. (iii) The behavior of the matter of GPUG agrees to all statutes, laws, regulations, rules, judgments, requests, pronouncements or intervention recompenses appropriate thereto.

(j) GPC is not a gathering to any Benefit Plan under which GPUG at present has a commitment to give advantages to any present or previous representative, officer or executive of GPUG. As utilized in this, "Advantage Plan" should mean any worker advantage plan, project, or game plan of any sort, including any characterized advantage or characterized commitment arrangement, stock proprietorship arrangement, official pay project or game plan, reward arrangement, impetus pay arrangement or course of action, benefit sharing arrangement or plan, conceded pay arrangement, understanding or game plan, supplemental retirement arrangement or course of action, excursion pay, ailment, handicap, or passing advantage arrangement (whether gave through protection, on a supported or unfunded premise, or something else), restorative or extra security arrangement giving advantages to representatives, retirees, or previous workers alternately any of their wards, survivors, or recipients, severance pay, end, pay continuation, or worker help arrangement.

(k) Certain Employee Payments. GPUG is not a gathering to any job assertion which could bring about the installment to any present, previous or future chief or worker of GPUG of any cash or other property or rights or quicken or give some other rights or advantages to any such worker or chief as an aftereffect of the exchanges mulled over by this Agreement, whether or not (i) such installment, quickening or procurement would constitute a "parachute installment" (inside of the importance of Section 280G of the Code), or (ii) some other resulting activity or occasion would be obliged to bring about such installment, quickening or procurement to be activated.

(l) Properties and Tangible Assets. (i) GPUG has legitimate area utilization rights for all genuine property that is material to its business and excessive, clear and attractive title to all the unmistakable properties and substantial resources reflected in the most recent accounting report as being claimed by GPUG or procured after the date thereof which are, exclusively or in the total, material to GPUG's business (aside from properties sold or generally discarded subsequent to the date thereof in the common course of business), without a worry in the world of every single material lien, encumbrances, claims, security interest, alternatives and limitations of any nature at all. Any genuine property and offices held under lease by GPUG is held by it under legitimate, subsisting and enforceable leases of which GPUG is in consistence, aside from as proved unable, separately or in the total, have or sensibly be relied upon to result in a material unfriendly impact.

(ii) GPUG has great and attractive title to, or on account of rented property, a substantial leasehold interest for, the workplace space, PCs, hardware and other material unmistakable resources which are material to its business. Each such unmistakable resource is in every single material appreciation in great working condition and repair (subject to ordinary wear and tear), is suitable for the reasons for which it right away is utilized, and, with the exception of as to rented resources, without a worry

in the world of any security intrigues. GPUG does not have any learning of any question or case made by whatever other individual concerning such right, title and enthusiasm for such substantial resources.

(m) Intellectual Property. As utilized as a part of this Agreement, "Intellectual Property" implies okay, title and enthusiasm for or identifying with all licensed innovation, whether ensured, made or emerging under the laws of the United States or whatever other locale or under any global tradition, including, however not constrained to the accompanying:

(a) administration imprints, trademarks, exchange names, exchange dress, logos and corporate names (and any determinations, changes or adjustments thereof), Internet area names and Internet sites (and substance thereof), together with the goodwill connected with any of the previous, what not applications, enrollments, reestablishments and augmentations thereof (by and large, "Marks");

(b) licenses and patent applications, including all continuations, divisional, continuations to some degree and provisional and licenses issuing accordingly, and all reissues, reevaluations, substitutions, replenishments and augmentations thereof (on the whole, "Patents");

(c) copyrights, works of creation and good rights, and all enrollments, applications, reestablishments, expansions and inversions thereof (all in all, "Copyrights");

(d) private and exclusive data, competitive advantages and non-open revelations, ideas, thoughts, research and development, innovation, know-how, formulae, creations (regardless of whether patentable and whether or not lessened to practice), arrangements, forms, methods, specialized information and data, systems, plans, drawings, particulars, databases, client records, supplier records, evaluating and expense data, and business and showcasing arrangements and recommendations, for every situation barring any rights in appreciation of any of the prior that involve or are ensured by Patents (by and large, "Trade Secrets"); and

(e) Innovation. For purposes of this Agreement, "Innovation" implies all Software, data, plans, formulae, calculations, systems, strategies, procedures, thoughts, know-how, innovative work, specialized information, programs, subroutines, instruments, materials, details, forms, innovations (whether or not patentable and regardless of whether lessened to practice), mechanical assembly, manifestations, changes and other comparable materials, and all recordings, diagrams, drawings, reports, examinations, and different compositions, and other encapsulations of any of the previous, in any structure or media regardless of whether particularly recorded in this. Further, for purposes of this Agreement, "Software" implies all PC programs, whether in source code or item code; databases and arrangements, whether machine discernible or generally; depictions, stream graphs and other work item used to outline, plan, sort out and add to any of the previous; and all documentation, including client manuals and other preparing documentation, identified with any of the previous. (ii) Schedule A puts forward a rundown and depiction of the Intellectual Property needed for GPUG to work, or utilized or held for utilization by GPUG, in the operation of its business, including, however not constrained to

(a) every issued Patent and pending Patent applications, enlisted Marks, pending applications for enrollment of Marks, unregistered Marks, enlisted Copyrights of GPUG and the record proprietor, enrollment or application date, serial or enlistment number, and purview of such enrollment or utilization of each such thing of Intellectual Property,

(b) all Software created by or for GPUG and

(c) any Software not only claimed by GPUG and consolidated, implanted or packaged with any Software recorded in provision

(d) above (with the exception of monetarily accessible programming thus called "therapist wrap" programming authorized to GPUG on sensible terms through business wholesalers or in buyer retail locations for a permit expense of no more than \$10,000).

(iii) Markus Ulrich is the restrictive proprietor of the patent granted (expiring if yearly extension fees unpaid) vat tilting system, and GPUG has a legitimate and enforceable a good fit for a long time to utilize this Intellectual Property demonstrated as Exhibit 2.1.1., and GPUG has a legitimate and enforceable right to utilize all other Intellectual Property and Trademarks recorded for GPUG in Schedule A (and whatever other Intellectual Property needed to be recorded in Schedule A) as the

same are utilized, sold, authorized and generally industrially misused by GPUG, liberated of all liens, security intrigues, encumbrances or whatever other commitments to others, and no such Intellectual Property has been deserted. The Intellectual Property possessed by GPUG and the Intellectual Property authorized to it in accordance with legitimate and enforceable composed permit understandings incorporate the greater part of the Intellectual Property vital and adequate to empower GPUG to direct its business in the way in which such business is at present being directed. The Intellectual Property possessed by GPUG and its rights in and to such Intellectual Property are substantial and enforceable. (iv) GPUG has not got, and is not mindful of, any composed or oral notification of any sensible premise for an claim against GPUG of any encroachment, misappropriation, or infringement by GPUG of any privileges of any outsider concerning any Intellectual Property, and GPUG is not mindful of any sensible premise for any case testing the possession, utilization, legitimacy or enforceability of any Intellectual Property claimed, utilized or held for utilization by GPUG. GPUG does not have any learning

(a) of any outsider utilization of any Protected innovation claimed by or solely authorized to GPC,

(b) that any outsider has a privilege to utilize any such Intellectual Property, or

(c) that any outsider is encroaching, abusing, or generally disregarding (or has encroached, abused or damaged) any such Intellectual Property.

(v) GPC has not encroached, misused or generally disregarded any Intellectual Property privileges of any outsiders, and GPC is not mindful of any encroachment, misappropriation or infringement of any outsider rights which will happen as an aftereffect of the proceeded with operation of GPUG as in the blink of an eye worked and/or the fulfillment of the exchange pondered by this Agreement. (vi) GPUG has taken sufficient efforts to establish safety to secure the classification and estimation of its Trade Insider facts (and any secret data possessed by an outsider to whom GPUG has a classified commitment). (vii) The fulfillment of the exchanges pondered by this Agreement won't unfavorably influence the right of GPUG to claim or utilize any Intellectual Property possessed, utilized or held for utilization by it. (viii) All essential enlistment, support, recharging and other applicable recording expenses regarding any of the Intellectual Property possessed by GPUG and recorded (or needed to be recorded) on Schedule A have been opportune paid and every single important enlistment, records, endorsements and other significant filings in association with such Intellectual Property have been opportune documented with the significant administrative compelling voices in the United States or remote purviews, as the case may be, with the end goal of keeping up such Intellectual Property and all issuances, enrollments and applications therefore. With the exception of the protected innovation uncovered in Exhibit 2.1.1, there are no annuities, installments, charges, reactions to office activities or different filings important to be made and having a due date as for any such Intellectual Property inside of ninety (90) days after the date of this Agreement.

(n) Undisclosed Liabilities. GPUG has no liabilities or commitments of any nature (whether settled or unfixed, secured or unsecured, known or obscure and whether outright, collected, unforeseen, or something else) aside from liabilities or commitments reflected or saved against in GPUG Financial Statements acquired in the standard course of business or such liabilities or commitments unveiled in Schedule 2.01(g).

(o) Board Recommendation. The Board of Directors of GPUG has collectively verified that the terms of the Exchange are reasonable to and to the greatest advantage of the Selling Shareholder of GPUG and suggested that the Selling Shareholder affirm the Exchange.

(p) Ownership of Stock. The Selling Shareholder possesses the majority of the issued and extraordinary shares of capital supply of GPUG, without a worry in the world of all liens, cases, rights, charges, encumbrances, and security hobbies of at all nature or sort.

(q) Material Agreements.

(i) Schedule 2.01(q) rundowns the accompanying contracts and different assertions (" Material Agreements") to which either GPUG or the Selling Shareholder are a gathering:

(a) any understanding (or gathering of related assertions) for the lease of genuine or individual property, including capital leases, to or from any individual accommodating yearly lease installments in abundance of \$25,000 (b) any permitting understanding, or any assertion framing an organization,

key organizations together, benefit sharing or joint endeavor; (c) any assertion (or gathering of related understandings) under which it has made, brought about, expected, or ensured any obligation for obtained cash in overabundance of \$25,000, or under which a security interest has been forced on any of its benefits, unmistakable or elusive; (d) any benefit sharing, investment opportunity, stock buy, stock gratefulness, conceded remuneration, severance, or other material arrangement or course of action for the advantage of its present or previous officers and administrators or any of GPUG's representatives; (e) any livelihood or self-employed entity understanding giving yearly remuneration in abundance of \$25,000 or giving post-end or severance installments on the other hand advantages or that can't be scratched off without over 30 days' notification; (f) any concurrence with any present or previous officer, executive, shareholder or partner of GPUG; (g) any understandings identifying with the acquisition (by merger, buy of stock or resources or something else) by GPUG of any working business or material resources or the capital load of whatever other individual; (h) any understandings for the offer of any of the resources of GPUG, other than in the common course of business; (i) any extraordinary understandings of certification, surety or reimbursement, immediate or aberrant, by GPUG; (j) any eminence assertions, licenses or other understandings identifying with Intellectual Property (barring licenses relating to "off-the-rack" economically accessible programming utilized in accordance with therapist wrap or navigate permit concessions to sensible terms for a permit expense of close to \$10,000); and (k) some other understanding under which the outcomes of a default or end could sensibly be required to have a material unfavorable impact on GPUG. (ii) GPUG has made accessible to GPC either a unique or a right and complete duplicate of each composed Material Agreement. But as put forward on Schedule 2.01(q), as for every Material Agreement to which GPUG or the Selling Shareholder are a gathering thereto: (a) the assertion is the legitimate, substantial, tying, enforceable commitment of GPUG or the Selling Shareholder and is in full compel and impact in all material regards, subject to chapter 11 and impartial cures special cases; (b)(X) neither GPUG nor the Selling Shareholder's gathering thereto is in material break or default thereof, (Y) no occasion has happened which, with notice or omission of time, would constitute a material break or default of, or license end, alteration, or speeding up under, the Material Agreement; or (Z) GPC has not got any notification or has any information that whatever other gathering is, in default in any appreciation under any Material Agreement; and (c) neither GPUG nor the Selling Shareholder have renounced any material procurement of the assertion.

(r) Material Contract Defaults. GPUG is not, and has not got any notification or has any learning that any other gathering is, in default in any appreciation under any GPUG Material Contract; and there has not happened any occasion that with the slip of time or the giving of notification or both would constitute such a material default. For purposes of this Agreement, a "GPUG Material Contract" implies any agreement, understanding or responsibility that is viable as of the Closing Date to which GPUG or the Selling Shareholder are a gathering (i) with expected receipts or uses in abundance of \$25,000, (ii) obliging GPUG or the Selling Shareholder to reimburse any individual, (iii) allowing selective rights to any gathering, (iv) confirming obligation for acquired or credited cash in abundance of \$25,000 or all the more, including insurances of such obligation, or (v) which, if ruptured by GPUG or the Selling Shareholder in such a way would (A) allow some other gathering to cross out or end the same (with or without notification of entry of time) or (B) give a premise to some other gathering to claim cash harms (either separately or in the total with all other such claims under that agreement) from GPUG or the Selling Shareholder or (C) offer ascent to one side of increasing speed of any material commitment or loss of any material advantage under any such contract, assertion on the other hand duty.

(s) Tax Returns and Tax Payments. (i) GPUG has auspicious documented with the fitting burdened powers all Tax Returns needed to be recorded by it (considering every single relevant augmentation). All such Tax Returns are genuine, right and complete on the whole regards. All Taxes due and owing by GPUG have been paid (regardless of whether indicated on any Tax Return and regardless of whether any Tax Return was needed). The unpaid Taxes of GPUG did not, as of GPUG Pro Forma Asset report Date, surpass the store for Tax risk (barring any store for conceded Taxes set up to

reflect timing contrasts in the middle of book and Tax salary) put forward on the substance of GPUG Pro Forma Financial Statements (as opposed to in any Shares thereto). Since the Balance Sheet Date, GPUG has not caused any risk for Taxes outside the normal course of business predictable with past custom and rehearse. As of the Closing Date, the unpaid Taxes of GPUG won't surpass the store for Tax risk (barring any store for conceded Taxes built up to reflect timing contrasts in the middle of book and Tax salary) put forward on the books and records of GPUG.(ii) No material case for unpaid Taxes has been made or turned into a lien against the property of GPUG or is being declared against GPUG, and no augmentation of the statute of restrictions on the appraisal of any Assessments has been allowed to GPUG and is as of now as a result. (iii) As utilized thus, "Assessments" should mean all expenses of any sort, including, without impediment, those on or measured by or alluded to as salary, gross receipts, deals, use, advertisement valorem, establishment, benefits, permit, withholding, finance, job, extract, severance, stamp, occupation, premium worth included, property alternately fortune benefits charges, traditions, obligations or comparable expenses, appraisals or charges of any sort at all, together with any interest and any punishments, increments to expense or extra sums forced by any administrative power, local or remote. As utilized in this, "Government form" might mean any arrival, report on the other hand articulation needed to be recorded with any administrative power regarding Taxes.

(t) Environmental Matters. GPUG is in agreeability with every Environmental Law in every single material admiration. GPUG holds all licenses and approvals needed under pertinent Environmental Laws, unless the inability to hold such allows and approvals would not have a material antagonistic impact on GPUG, and is agreeable with all terms, conditions and procurements of every single such allow and approvals in all material regards. No arrivals of Hazardous Materials have happened at, from, in, to, on or under any genuine property at present or in the past possessed, worked or rented by GPUG or any ancestor thereof and no Hazardous Materials are available in, on, about or relocating to or from any such property which could bring about any risk to GPUG. GPUG has not transported or masterminded the treatment, stockpiling, taking care of, transfer, or transportation of any Hazardous Material to any off-site area which could bring about any obligation to GPUG. GUG has no risk, outright or unexpected, under any Environmental Law that if upheld or gathered would have a material unfriendly impact on GPUG. "Environmental Laws" implies all material remote, government, state and neighborhood statutes, rules, regulations, mandates, requests, announcements and basic law relating in any way to sully, contamination or insurance of human wellbeing or nature, and comparative state laws. "Hazardous Material" means any harmful, radioactive, destructive or generally risky substance, including petroleum, its subsidiaries, by-items and different hydrocarbons, or any substance having any constituent components showing any of the previous qualities, which in any occasion is directed under any Environmental Law.

(u) Accounts Receivable. The majority of the records receivable of GPUG that are reflected in GPUG Pro Forma Budgetary Statements or the professional forma bookkeeping records of GPUG as of the Closing Date (by and large, the "GPUG Accounts Receivable") speak to or will speak to substantial commitments emerging from deals really made or administrations really performed in the normal course of business and are not subject to any safeguards, counterclaims, or privileges of set off other than those emerging in the common course of business and for which satisfactory stores have been set up. GPUG Accounts Receivable are completely collectible to the degree not held for on the asset report on which they are indicated.

(v) Compliance With Anti-Corruption Laws. Neither GPUG nor to the learning of GPUG, any executive, officer, operators, representative or other individual following up for the benefit of GPUG has, throughout its activities for, or for, GPUG (i) utilized any corporate stores for any unlawful commitment, blessing, diversion or other unlawful costs identifying with political movement; (ii) made any immediate or circuitous unlawful installment to any outside or local government authority or worker from corporate trusts; (iii) disregarded or is in infringement of any appropriate U.S. laws; or (iv) made any unlawful pay off, discount, result, impact installment, kickback or other unlawful installment to any remote or residential government authority or representative.



(w) OFAC. Neither GPUG, nor to the learning of GPUG, any chief, officer, specialists, worker, member or individual following up in the interest of GPUG, is at present subject to any U.S. assents directed by the Office of Outside Assets Control of the U.S. Treasury Department.

(x) Money Laundering Laws. The operations of GPUG are and have been led at all times in consistence with all relevant budgetary record keeping and reporting prerequisites, against terrorist financing enactment and government evasion statutes of every single relevant purview and any related or comparable guidelines, regulations or rules issued, directed or implemented by any Governmental Entity (all things considered, "Tax evasion Laws"), and no activity, suit or continuing by or under the watchful eye of any court or legislative office, power or body or any mediator including GPUG as for Money Laundering Laws are pending or, to the best information of GPUG, undermined.

(y) Full Disclosure. The greater part of the representations and guarantees made by GPUG in this Agreement, what not explanations put forward in the testaments conveyed by GPUG at the Closing according to this Agreement, are genuine, right and complete in every single material regard and don't contain any untrue explanation of a material actuality or preclude to express any material reality essential to make such representations, guarantees or explanations, in light of the circumstances under which they were made, deceiving. The duplicates of all archives outfitted by GPUG in accordance with the terms of this Agreement are finished and exact duplicates of the first reports. The calendars, endorsements, and any different proclamations and data, whether outfitted in composed or electronic structure, to GPC or its delegates by or in the interest of any of GPUG or its associates regarding the arrangement of this Agreement and the exchanges thought about thusly don't contain any material misquote of reality or discard to express a material actuality or any truth important to put forth the expressions contained in that not deceptive.

2.02 Representations and Warranties of GPC. GPC speaks to and warrants to GPUG and the Selling Shareholder as takes after:

(a) Organization, Standing and Corporate Power. GPC is properly composed, legitimately existing and in great remaining under the laws of the State of Delaware and has the essential corporate force and power and all administration licenses, approvals, allows, assents and approbations needed to claim, lease and work its properties and carry on its business as now being directed. GPC is rightfully qualified or authorized to work together and is in great remaining in every ward in which the way of its business or the possession or renting of its properties makes such capability or permitting important, other than in such wards where the inability to be so qualified or authorized (independently or in the total) would not have a material antagonistic impact as for GPC. Shares are basic load of GPC, standard quality \$0.00001 ("GPC Common Stock").

(b) Subsidiaries. GPC does not possess straightforwardly or in a roundabout way, any value or other proprietorship enthusiasm for any organization, company, association, joint endeavor or something else.

(c) Capital Structure of GPC. As of the Closing Date, the approved capital supply of GPC might comprises of 100,000,000 shares of GPC Common Stock, \$0.00001 standard worth, of which 50,000,000 shares of GPC Normal Stock will be issued and remarkable after the end. No shares of GPC Common Stock are issuable upon the activity of warrants, convertible Shares, alternatives or something else. No value securities of GPC are issued, held for issuance or extraordinary. All shares which may be issued compliant with this Understanding will be, when issued, properly approved, truly issued, completely paid and non-assessable, not subject to preemptive rights, and issued in consistence with all pertinent state and government laws concerning the issuance of securities.

(d) Corporate Authority; Non-contravention . GPC has all essential corporate and other force and power to go into this Agreement and to perfect the exchanges mulled over by this assertion. The execution and conveyance of this Agreement by GPC and the fulfillment by GPC of the exchanges thought about thus have been (or at Closing will have been) rightfully approved by all necessary corporate activity with respect to GPC. This Agreement has been rightfully executed and when conveyed by GPC should constitute a legitimate and tying commitment of GPC, enforceable against GPC in agreement with its terms, aside from thusly requirement may be restricted by chapter 11, indebtedness or other comparable laws influencing the requirement of loan bosses' rights for the

most part or by general standards of value. The execution and conveyance of this Agreement don't, and the fulfillment of the exchanges pondered by this Agreement and consistence with the procurements about won't, clash with, or result in any break then again infringement of, or default (with or without notification or omission of time, or both) under, or offer ascent to one side of end, undoing or quickening of or "put" right as for any commitment or to loss of a material advantage under, or result in the making of any endless supply of the properties or resources of GPC under, (i) its articles of fuse, local laws, or other contract reports of GPC (ii) any advance or credit assertion, note, bond, home loan, arrangement, lease or other understanding, instrument, grant, concession, establishment or permit relevant to GPC, its properties or resources, or (iii) subject to the legislative filings also, different matters alluded to in the accompanying sentence, any judgment, request, order, statute, law, law, tenet, regulation or mediation grant material to GPC, its properties or resources, other than, in the instance of statements (ii) and (iii), any such clashes, breaks, infringement, defaults, rights, misfortunes or liens that exclusively or in the total couldn't have a material unfriendly impact regarding GPC or proved unable avert, ruin or really postpone the capacity of GPC to perfect the exchanges thought about by this Agreement.

(e) Government Authorization. No assent, approbation, request or approval of, or enlistment, affirmation then again documenting with, or notification to, any Governmental Entity, is needed by or as for GPC in association with the execution and conveyance of this Agreement by GPC, or the culmination by GPC of the exchanges mulled over thus, aside from, as for this Agreement, filings under the Delaware Statutes, if any.

(f) Financial Statements. The professional forma money related articulations of GPC included in the reports, plans, structures, proclamations and different archives documented by GPC go along as to frame in every single material admiration with appropriate bookkeeping prerequisites and have been readied as per U.S. for the most part acknowledged bookkeeping standards and genuinely exhibit the budgetary position of GPC as of the dates thereof and the aftereffects of operations and changes in real money streams for the periods then finished (subject, on account of unaudited quarterly articulations, to typical year-end review conformities as dictated by GPC's autonomous bookkeepers). GPC has not brought about any liabilities or commitments of any nature (whether collected, supreme, unexpected or generally) which, separately or in the total, could sensibly be anticipated that would have a material antagonistic impact regarding GPC.

(g) Absence of Certain Changes or Events. GPC has led its business just in the customary course reliable with past practice in light of its present business circumstances, and there is not and has not been any: material unfriendly change concerning GPC; occasion which, on the off chance that it had occurred after the execution of this Agreement, would not have been allowed without earlier assent of GPC; condition, occasion or event which could sensibly be relied upon to avoid, thwart or tangibly postpone the capacity of GPC to perfect the exchanges pondered by this Agreement; (iv) incurrence, presumption or certification by GPC of any obligation for acquired cash other than in the customary course and in sums and on terms steady with past practices or as unveiled to GPC in composing; (v) creation or other incurrence by GPC of any lien on any advantage other than in the normal course reliable with past practices; (vi) exchange or duty made, or any agreement or assertion went into, by GPC identifying with its advantages or business (counting the procurement or mien of any benefits) or any surrender by GPC of any agreement or other right, in either case, material to GPC, other than exchanges and responsibilities in the common course reliable with past practices and those covered by this Agreement; (vii) work question, other than normal, singular grievances, or, to the information of GPC, any movement or continuing by a worker's organization or agent thereof to compose any representatives of GPC or any lockouts, strikes, log jams, work stoppages or dangers by or as for such representatives; (viii) installment, prepayment or release of obligation other than in the common course of business or any inability to pay any obligation when due; benefits or compose downs of any advantages of GPC; creation, end or revision of, or waiver of any directly under, any material contract of GPC; harm, decimation or misfortune having, or sensibly anticipated that would have, a material antagonistic impact on GPC; other condition, occasion or event which exclusively or in the total could

sensibly be normal to have a material unfriendly impact or offer ascent to a material antagonistic change as for GPC; or understanding or duty to do any of the previous.

(h) Certain Fees. No business or discoverer's charges or payments are or will be payable by GPC to any intermediary, money related counselor or expert, discoverer, arrangement specialists, speculation financier, bank or other individual with appreciation to the exchanges pondered by this Agreement.

(i) Litigation; Labor Matters; Compliance with Laws. There is no suit, activity or continuing or examination pending or, to the learning of GPC, undermined against or influencing GPC or any premise for any such suit, activity, continuing or examination that, independently or in the total, could sensibly be relied upon to have a material unfavorable impact concerning GPC or forestall, impede or tangibly defer the capacity of GPC to perfect the exchanges considered by this Agreement, nor arrives any judgment, order, directive, lead or request of any Governmental Entity or judge remarkable against GPC having, or which, seeing that sensibly could be anticipated by GPC, later on could have, any such impact. (ii) GPC is not a gathering to, or bound by, any aggregate dealing assertion, contract or other understanding on the other hand understanding with a worker's guild or work association, nor is it the subject of any procedure affirming that it has submitted an unreasonable work practice or trying to urge it to deal with any work association as to wages or states of job nor arrives any strike, work stoppage or other work question including it pending or, to its learning, debilitated, any of which could have a material unfriendly impact as for GPC. (iii) The behavior of the matter of GPC consents to all statutes, laws, regulations, mandates, rules, judgments, requests, declarations or intervention recompenses appropriate thereto.

(j) Benefit Plans. GPC is not a gathering to any Benefit Plan under which GPC as of now has a commitment to give advantages to any present or previous worker, officer or executive of GPC.

(k) Certain Employee Payments. GPC is not a gathering to any livelihood understanding which could bring about the installment to any present, previous or future chief or worker of GPC of any cash or other property on the other hand rights or quicken or give some other rights or advantages to any such representative or executive subsequently of the exchanges thought about by this Agreement, whether or not (i) such installment, increasing speed or procurement would constitute a "parachute installment" (inside of the significance of Section 280G of the Code), or (ii) some other ensuing activity or occasion would be obliged to bring about such installment, increasing speed or procurement to be activated.

(l) Material Contract Defaults. GPC is not, or has not, got any notification or has any information that any other gathering is, in default in any appreciation under any GPC Material Contract; and there has not happened any occasion that with the omission of time or the giving of notification or both would constitute such a material default. For purposes of this Agreement, a "GPC Material Contract" implies any agreement, understanding or responsibility that is successful as of the Closing Date to which GPC is a gathering (i) with expected receipts or uses in overabundance of \$25,000, (ii) obliging GPC to reimburse any individual, (iii) conceding elite rights to any gathering, (iv) confirming obligation for obtained or lent cash in abundance of \$25,000 or more, counting insurances of such obligation, or (v) which, if ruptured by GPC in such a way would

(A) allow whatever other gathering to scratch off or end the same (with or without notification of entry of time) or

(B) give a premise to whatever other gathering to claim cash harms (either independently or in the total with all other such claims under that agreement) from GPC or

(C) offer ascent to one side of quickening of any material commitment or loss of any material advantage under any such contract, understanding or responsibility.

(m) Properties. GPC has legitimate area utilization rights for all genuine property that is material to its business and great, clear and attractive title to all the unmistakable properties and substantial resources reflected in the most recent offset sheet as being claimed by GPC or procured after the date thereof which are, exclusively or in the total, material to GPC's business (aside from properties sold or generally discarded subsequent to the date thereof in the conventional course of business), without a worry in the world of every single material lien, encumbrances, claims, security interest, alternatives and limitations of any nature at all. Any genuine property and offices held under lease by

GPC are held by them under legitimate, subsisting and enforceable leases of which GPC is in agreeability, aside from as proved unable, independently or in the total, have or sensibly be required to come about in a material unfriendly impact.

(n) Intellectual Property. GPC possesses or has legitimate rights to utilize the Trademarks, exchange names, area names, copyrights, licenses, logos, licenses and PC programming projects (counting, without impediment, the source codes thereto) that are essential for the behavior of its business as now being directed. All of GPC's licenses to utilize Software projects are present and have been paid for the proper number of clients. To the learning of GPC, none of GPC's Intellectual Property or GPC License Agreements encroach upon the privileges of any outsider that may offer ascent to a reason for activity or case against GPC or its successors. The term "GPC License Agreements" implies any permit understandings giving any privilege to utilize alternately hone any rights under any Intellectual Property (aside from such assertions for off-the-rack items that are by and large accessible for not exactly \$10,000), and any composed settlements identifying with any Protected innovation, to which GPC is a gathering or generally bound.

(o) Board Determination. The Board of Directors of GPC has consistently discovered that the terms of the Trade are reasonable to and to the greatest advantage of GPC and its shareholders.

(p) Undisclosed Liabilities. GPC has no liabilities or obligations of any nature (whether fixed or unfixed, secured or unsecured, known or unknown and whether absolute, accrued, contingent, or otherwise) except for liabilities or obligations incurred in the ordinary course of business.

(q) Compliance With Anti-Corruption Laws. Neither GPC nor to the knowledge of GPC, any director, officer, agent, employee or other person acting on behalf of GPC has, in the course of its actions for, or on behalf of, GPC (i) used any corporate funds for any corrupt activity that may include illegal contributions, gifts, entertainment or other unlawful expenses relating to political activity; (ii) made any direct or indirect illegal payment to any domestic or foreign government official or employee from corporate funds; (iii) violated or is in violation of any applicable U.S. laws; or (iv) made any illegal bribe, refund, payment, influence payment, inducement or other unlawful payment to any foreign or domestic government official or employee.

(r) OFAC. Neither GPC, nor to the knowledge of GPC, any director, officer, agent, employee, affiliate or person acting on behalf of GPC, is currently subject to any U.S. sanctions administered by the Office of Foreign Assets Control of the U.S. Treasury Department.

(s) Money Laundering Laws. The operations of GPC are and have been conducted at all times in compliance with all Money Laundering Laws, and no action, suit or proceeding by or before any court or governmental agency, authority or body or any arbitrator involving GPC with respect to Money Laundering Laws is pending or, to the best knowledge of GPC, threatened.

(t) Full Disclosure. All of the representations and warranties made by GPC in this Agreement, and all statements set forth in the certificates delivered by GPC at the Closing pursuant to this Agreement, are true, correct and complete in all material respects and do not contain any untrue statement of a material fact or omit to state any material fact necessary in order to make such representations, warranties or statements, in light of the circumstances under which they were made, misleading. The copies of all documents furnished by GPC pursuant to the terms of this Agreement are complete and accurate copies of the original documents. The schedules, certificates, and any and all other statements and information, whether furnished in written or electronic form, to GPUG or its representatives by or on behalf of GPC and the GPC Stockholders in connection with the negotiation of this Agreement and the transactions contemplated hereby do not contain any material misstatement of fact or omit to state a material fact or any fact necessary to make the statements contained therein not misleading.

2.03 Representations and Warranties of Selling Shareholder. The Selling Shareholder represents and warrants to GPC as follows:

(a) Ownership of the Shares. The Selling Shareholder owns all of the Shares, free and clear of all liens, claims, rights, charges, encumbrances, and security interests of whatsoever nature or type.

(b) Power of Selling Shareholder to Execute Agreement. The Selling Shareholder has the full right, power, and authority to execute, deliver, and perform this Agreement, and this Agreement is the

legal binding obligation of the Selling Shareholder and is enforceable against the Selling Shareholder in accordance with its terms, except that (i) such enforcement may be subject to bankruptcy, insolvency, reorganization, moratorium, or other similar laws now or hereafter in effect relating to creditors' rights, and (ii) the remedy of specific performance and injunctive and other forms of equitable relief may be subject to equitable defenses and to the discretion of the court before which any proceeding therefore may be brought.

(c) Agreement Not in Breach of Other Instruments Affecting Selling Shareholder. The execution and delivery of this Agreement, the consummation of the transactions hereby contemplated, and the fulfillment of the terms hereof will not result in the breach of any term or provisions of, or constitute a default under, or conflict with, or cause the acceleration of any obligation under any agreement or other instrument of any description to which the Selling Shareholder is a party or by which the Selling Shareholder is bound, or any judgment, decree, order, or award of any court, governmental body, or arbitrator or any applicable law, rule, or regulation.

(d) Accuracy of Statements. Neither this Agreement nor any statement, list, certificate, or any other agreement executed in connection with this Agreement or other information furnished or to be furnished by the Selling Shareholder to GPC in connection with this Agreement or any of the transactions contemplated hereby contains or will contain an untrue statement of a material fact or omits or will omit to state a material fact necessary to make the statements contained herein or therein, in light of circumstances in which they are made, not misleading.

#### ARTICLE III

##### COVENANTS RELATING TO CONDUCT OF BUSINESS PRIOR TO EXCHANGE

3.01 Conduct of GPUG and GPC. From the date of this Agreement and until the Effective Time, or until the prior termination of this Agreement, GPUG and GPC shall not, unless mutually agreed to in writing:

(a) engage in any transaction, except in the normal and ordinary course of business, or create or suffer to exist any lien or other encumbrance upon any of their respective assets or which will not be discharged in full prior to the Effective Time;

(b) sell, assign or otherwise transfer any of their assets, or cancel or compromise any debts or claims relating to their assets, other than for fair value, in the ordinary course of business, and consistent with past practice;

(c) fail to use reasonable efforts to preserve intact their present business organizations, keep available the services of their employees and preserve its material relationships with customers, suppliers, licensors, licensees, distributors and others, to the end that its good will and ongoing business not be impaired prior to the Effective Time;

(d) except for matters related to complaints by former employees related to wages, suffer or permit any material adverse change to occur with respect to GPUG and GPC or their business or assets; or

(e) make any material change with respect to their business in accounting or bookkeeping methods, principles or practices, except as required by GAAP.

#### ARTICLE IV

##### ADDITIONAL AGREEMENTS

4.01 Access to Information; Confidentiality.

(a) GPUG shall, and shall cause its officers, employees, counsel, financial advisors and other representatives to, afford to GPC and its representatives reasonable access during normal business hours during the period prior to the Effective Time to its properties, books, contracts, commitments, personnel and records and, during such period, GPUG shall, and shall cause its officers, employees and agents to, outfit immediately to GPC all data concerning its business, properties, money related condition, operations and work force in that capacity other gathering may every now and then sensibly ask. For the reasons of deciding the precision of the representations and guarantees of GPC put forward thus what's more, consistence by GPC of its commitments hereunder, amid the period before the Effective Time, GPC should give GPUG and its delegates with sensible access amid typical business hours to its properties, books, contracts, duties, work force and records as may be important to empower GPUG to affirm the exactness of the representations and guarantees of GPC

put forward thus and agreeability by GPC of its commitments hereunder, and, amid such period, GPC might, and should bring about its officers, workers and agents to, outfit immediately to GPUG upon its solicitation (i) a duplicate of every report, plan, enrollment proclamation and other record documented by it amid such period in accordance with the necessities of government or state securities laws and (ii) all other data concerning its business, properties, money related condition, operations and faculty all things considered other gathering may every once in a while sensibly ask. But as needed by law, each of GPUG and GPC will hold, and will bring about its individual chiefs, officers, representatives, bookkeepers, counsel, money related consultants and other delegates and partners to hold, any nonpublic data in certainty.

(b) No examination compliant with this Section 4.01 should influence any representations or guarantees of the gatherings in this or the conditions to the commitments of the gatherings hereto.

4.02 Best Efforts. Upon the terms and subject to the conditions put forward in this Agreement, each of the gatherings consents to utilize its earnest attempts to take, or reason to be taken, all activities, and to do, or reason to be done, and to help and coordinate with alternate gatherings in doing, all things vital, fitting or prudent to consummate and make viable, in the most quick way practicable, the Exchange and the different exchanges thought about by this Agreement. GPUG and GPC might commonly collaborate with a specific end goal to encourage the accomplishment of the advantages sensibly expected from the Exchange.

4.03 Public Announcements. GPUG, from one perspective, and GPC, then again, will counsel with each other before issuing, and give one another the chance to survey and remark upon, any press discharge or other open proclamations regarding the exchanges mulled over by this Agreement and should not issue any such squeeze discharge or put forth any such open expression before such discussion, aside from as may be needed by pertinent law or court process. The gatherings concur that the introductory press discharge or discharges to be issued as for the exchanges considered by this Agreement should be commonly settled upon preceding the issuance thereof.

4.04 Expenses. All expenses and costs brought about regarding this Agreement and the exchanges mulled over therefore should be paid by the gathering acquiring such costs.

4.05 No Solicitation. But as beforehand consented to in composing by the other party, neither GPUG nor GPC might approve or allow any of its officers, chiefs, operators, agents, or guides to (a) request, start or energize or make any move to encourage the accommodation of request, recommendations or offers from any individual identifying with any matter concerning any trade, merger, solidification, business blend, recapitalization or comparative exchange including GPUG or GPC, individually, other than the exchange examined by this Agreement or some other exchange the culmination of which would or could sensibly be relied upon to obstruct, meddle with, avert or postponement the Exchange or which would or could be required to weaken the advantages to either GPUG or GPC of the exchanges thought about therefore. GPUG then again GPC will instantly stop and reason to be ended any current exercises, exchanges and transactions with any gatherings led leading up to now as for any of the previous.

4.06 Post-Closing Delivery of the Exchange Shares Certificate. Inside of three (3) business days of the Closing Date, GPC might have made all move important to have the Exchange Shares Certificates conveyed to the Selling Shareholder.

4.07 Financing. GPC might finish a private arrangement under Regulation S in the total measure of roughly \$25,000 to \$3,000,000 of which all stores should be progressed to GPUG upon the execution of this Agreement, to cover charges and costs acquired by the day by day business of GPUG.

4.08 Officer & Director Appointments. At the very latest the Closing Date, GPUG might bring about the arrangement of the individual put forward in Exhibit A to be the executive and officer of GPUG.

## ARTICLE V

### CONDITIONS PRECEDENT

5.01 Conditions to Each Party's Obligation to effect the Exchange. The commitment of every gathering to impact the Exchange and generally perfect the exchanges thought about by this Agreement is liable to the fulfillment, at or preceding the Closing, of each of the accompanying conditions:

(a) No Restraints. No interim limiting request, preparatory or lasting directive or other request keeping the fulfillment of the Exchange might have been issued by any court of skilled locale or whatever other Governmental Entity having purview and should stay essentially, and there might not be any material lawful prerequisite ordered, received or esteemed appropriate to the Exchange that makes culmination of the Exchange illicit.

(b) Governmental Approvals. All approvals, assents, requests, presentations or endorsements of, or filings with, or terminations or closes of holding up periods forced by, any Governmental Entity having purview which the inability to get, make or happen would have a material unfavorable impact on GPUG or GPC might have been gotten, made or happened.

(c) No Litigation. There might not be pending or undermined any suit, activity or continuing in the witness of any court, Legislative Entity or power (i) relating to the exchanges examined by this Agreement or (ii) trying to restrict or limit the proprietorship or operation by the GPUG, GPC or any of its backups, or to discard or hold isolate any material bit of the business or resources of GPUG or GPC.

(d) Selling Shareholder Approval. The Selling Shareholder should have received and endorsed this Assertion and the Exchange as per pertinent law.

5.02 Conditions Precedent to Obligations of GPC. The commitment of GPC to impact the Exchange and generally consummate the exchanges thought about by this Agreement are liable to the fulfillment, at or before the Closing, of each of the accompanying conditions:

(a) Representations, Warranties and Covenants. (i) The representations and guarantees of GPUG and the Offering Shareholder in this Agreement should be genuine and right in every single material appreciation (with the exception of such representations and guarantees that are qualified by their terms by a reference to materiality or material antagonistic impact, which representations and guarantees as so qualified might be genuine and right on the whole regards) both when made and on and as of the Closing Date, and (ii) GPUG and the Selling Shareholder might every have performed and gone along in every material admiration with all pledges, commitments and states of this Agreement needed to be performed and conformed to by each of them before the Effective Time.

b) Consents. GPC might have gotten proof, in structure and substance sensibly attractive to it, that such licenses, grants, assents, regards, approvals, capabilities and requests of Governmental Elements and other outsiders as important regarding the exchanges pondered thus have been gotten.

(c) Officer's Certificate of GPUG. GPC should have gotten a declaration executed for GPUG by an official officer of GPUG affirming that the conditions put forward in Sections 5.02(a) and 5.02(d) have been fulfilled.

(d) No Material Adverse Change. There might not have happened any adjustment in the business, condition (money related or generally), consequences of operations or resources (counting elusive resources) and properties of GPUG that, exclusively or in the total, could sensibly be required to have a material antagonistic impact on GPUG.

(e) Selling Shareholder 144 Rules Acceptance. GPUG might be sensibly fulfilled that the issuance of GPC Regular Stock in accordance with the Exchange is absolved from the enrollment prerequisites of the Securities Act. Offering Shareholder acknowledges the guidelines expressed in Exhibit B.

(f) Employment Agreements. GPUG and should have executed a job understanding in the structure appended hereto as Exhibit 10.2.

(g) Conveyance of the Share Certificate. GPUG should have conveyed the Share Certificate to GPC on the Closing Date.

(h) Secretary's Certificate of GPC. GPUG should have gotten a declaration, dated as of the Closing Date, from the Secretary of GPC, guaranteeing (i) as to the incumbency and marks of the officers of GPC, who should execute this Agreement and reports at the Closing and (ii) that joined thereto is a genuine and complete duplicate of

(A) the authentication of joining of GPC and all changes thereto,

(B) the articles of relationship of GPC and all changes thereto, and

(C) resolutions of the Board of Directors of GPC and its shareholder approving the execution, conveyance and execution of this Agreement by GPC.

(i) Due Diligence Investigation. GPC might be sensibly fulfilled by the aftereffects of its due ingenuity examination of GPUG in its sole and outright prudence.

(j) Lock-Up Agreements. The Selling Shareholder might have executed and conveyed to GPC a lock-up understanding in significantly the structure connected hereto as Exhibit D.

5.03 Conditions Precedent to Obligation of GPUG. The commitment of GPUG to impact the Exchange and generally consummate the exchanges thought about by this Agreement is liable to the fulfillment, at alternately preceding the Closing, of each of the accompanying conditions:

(a) Representations, Warranties and Covenants. (i) The representations and guarantees of GPC in this Assertion might be genuine and right in every single material admiration (aside from such representations and guarantees that are qualified by their terms by a reference to materiality or material antagonistic impact, which representations and guarantees as so qualified might be genuine and right in all regards) both when made what's more, on and as of the Closing Date, and (ii) GPC might have performed and gone along in every material appreciation with all pledges, commitments and states of this Agreement needed to be performed and consented with by it preceding the Effective Time.

(b) Consents. GPUG might have gotten proof, in structure and substance sensibly tasteful to it, that such licenses, grants, assents, supports, approvals, capabilities and requests of Governmental Elements and other outsiders as fundamental regarding the exchanges examined thus have been gotten.

(c) Officer's Certificate of GPC. GPUG should have gotten an endorsement executed in the interest of GPC by an official officer of GPC, affirming that the conditions put forward in Sections 5.03(a) and 5.03(d) have been fulfilled.

(d) No Material Adverse Change. There should not have happened any adjustment in the business, condition (money related or generally), consequences of operations or resources (counting immaterial resources) and properties of GPUG that, separately or in the total, could sensibly be relied upon to have a material unfavorable impact on GPC.

(e) Board Resolutions. GPUG should have gotten resolutions properly received by GPC's Board of Directors endorsing the execution, conveyance and execution of the Agreement and the exchanges mulled over by the Agreement.

(f) Officer & Director. GPC should convey to GPUG confirmation of the arrangement of the individual put forward on Plan 1.05 to be the chief and officer of GPC.

#### ARTICLE VI

End, AMENDMENT AND WAIVER End. This Agreement may be ended and relinquished whenever preceding the Effective Time:

(a) by shared composed assent of GPUG and GPC; by either GPUG or GPC if any Governmental Entity should have issued a request, declaration or controlling or taken any other activity for all time charging, limiting or generally forbidding the Exchange and such request, declaration, decision or other activity should have ended up last and non-appealable;

(c) by either GPUG or GPC if the Exchange should not have been culminated at the latest January 31, 2018 (other than as an aftereffect of the disappointment of the gathering trying to end this Agreement to perform its commitments under this Agreement needed to be performed at or before the Effective Time);

(d) by GPUG, if a material unfriendly change might have happened in respect to GPC (and such change is most certainly not treatable inside of thirty (30) days);

(e) by GPC if a material unfriendly change might have happened in respect to GPUG (and such change is most certainly not treatable inside of thirty (30) days);



(f) by GPC, if GPUG tenaciously neglects to perform in any material regard any of its material commitments under this Agreement; or

(g) by GPUG, if GPC persistently neglects to perform in any material regard any of its commitments under this Assertion.

6.02 Effect of Termination. In the occasion of end of this Agreement by either GPC or GPUG as given in Section 6.01, this Agreement should forthwith get to be void and have no impact, with no risk or commitment with respect to GPUG or GPC, other than the procurements of the last sentence of Section 4.01(a) and this Section 6.02. Nothing contained in this Section should alleviate any gathering for any break of the representations, guarantees, contracts or assertions put forward in this Agreement.

6.03 Amendment. This Agreement may not be altered with the exception of by an instrument in composing marked on sake of each of the gatherings upon endorsement by the gathering, if such gathering is an individual, and upon regard of the Boards of Directors of each of the gatherings that are corporate substances.

6.04 Extension; Waiver. Subject to Section 6.01(c), whenever preceding the Effective Time, the gatherings might

(a) develop the time for the execution of any of the commitments or different demonstrations of alternate gatherings, (b) waive any errors in the representations and guarantees contained in this Agreement or in any report conveyed in accordance with this Agreement, or (c) waive agreeability with any of the understandings or conditions contained in this Agreement. Any concession to the piece of a gathering to any such augmentation or waiver should be substantial just if put forward in an instrument in composing marked in the interest of such gathering. The disappointment of any gathering to this Agreement to state any of its rights under this Agreement or generally might not constitute a waiver of such rights.

6.05 Return of Documents. In the occasion of end of this Agreement for any reason, GPC and GPUG will come back to the next gathering the greater part of the other party's archives, work papers, and different materials (counting duplicates) identifying with the exchanges mulled over in this Assertion, whether acquired before or after execution of this Agreement. GPC and GPUG won't utilize any data so got from the other party for any reason and will make every sensible move to host such other get-together's data kept secret.

## ARTICLE VII

### Repayment AND RELATED MATTERS

7.01 Survival of Representations and Warranties. The representations and guarantees in this Agreement alternately in any instrument conveyed as per this Agreement should make due until twelve (12) months after the Viable Time (aside from those representations and guarantees concerning Taxes which should survive for the relevant statute of constraints in addition to 90 days, and agreements that by their terms make due for a more drawn out period).

#### Repayment.

GPC should reimburse and hold the Selling Shareholder and GPUG safe for, from and against any liabilities, commitments, harms, misfortunes, insufficiencies, costs, punishments, intrigue and costs (counting, however not restricted to, any costs at all sensibly brought about in researching, planning or guarding against any case, started or debilitated, or any case at all) (by and large, "Misfortunes") to which GPC may get to be subject coming about because of or emerging out of any break of a representation, guarantee or pledge made by GPC as put forward in this. (b) GPUG might repay and hold GPC and GPC's officers and executives ( "GPC's Representatives") innocuous for, from and against all Losses to which GPUG or GPC's Representatives may get to be subject coming about because of or emerging out of (i) any break of a representation, guarantee or contract made by GPUG or Selling Shareholder as put forward thus; or (ii) any liabilities emerging out of or in association with: (An) any of the advantages of GPUG preceding the Closing; or (B) the operations of GPUG before the Closing.

7.03 Notice of Indemnification. Quickly after the receipt by any reimburse party (the "Indemnitee") of notification of the beginning of any activity or continuing against such Indemnitee, such

Indemnitee might, in the event that a case with deference thereto is or may be made against any reimbursing gathering (the "Repaying Party") as per this Article VII, give such Indemnifying Party composed notification of the initiation of such activity or continuing and give such Indemnifying Party a duplicate of such claim and/or procedure what not lawful pleadings in association therewith. The inability to give such notice should not calm any Indemnifying Gathering of any of its repayment commitments contained in this Article VII, with the exception of where, and exclusively to the degree that, such disappointment really and physically preferences the privileges of such Indemnifying Party. Such Reimbursing Party might have, upon solicitation inside of thirty (30) days after receipt of such notice, however not in any occasion after the settlement or trade off of such claim, the privilege to shield, at its own particular cost and by its own guidance sensibly worthy to the Indemnitee, any such matter including the stated risk of the Indemnitee; gave, then again, that if the Indemnitee confirms that there is a sensible likelihood that a case might substantially and unfavorably influence it, other than exclusively as an aftereffect of cash installments needed to be repaid in full by such Indemnifying Party under this Article VII or if a irreconcilable circumstance exists in the middle of Indemnitee and the Indemnifying Party, the Indemnitee might have the right to safeguard, bargain or settle such claim or suit; and, gave, further, that such settlement or trade off might not, unless agreed to in composing by such Indemnifying Party, which should not be nonsensically withheld, be convincing as to the risk of such Indemnifying Party to the Indemnitee. In any occasion, the Indemnitee, such Repaying Party and its insight should collaborate in the resistance against, or trade off of, any such attested obligation, and in situations where the Indemnifying Party might have expected the guard, the Indemnitee might have the privilege to partake in the guard of such attested obligation at the Indemnitee's own cost. If such Indemnifying Party might decrease to partake in or expect the guard of such activity, preceding paying or settling any case against which such Indemnifying Party is, or may be, committed under this Article VII to repay an Indemnitee, the Indemnitee might first supply such Repaying Party with a duplicate of a last court judgment or declaration holding the Indemnitee at risk on such case or, coming up short such judgment or declaration, the terms and states of the settlement or trade off of such claim. An Indemnitee's inability to supply such last court judgment or declaration or the terms and states of a settlement or trade off to such Indemnifying Party should not diminish such Indemnifying Gathering of any of its repayment commitments contained in this Article VII, with the exception of where, and singularly to the degree that, such disappointment really and physically preferences the privileges of such Indemnifying Party. On the off chance that the Repaying Party is protecting the case as put forward over, the Indemnifying Party should have the privilege to settle the case just with the assent of the Indemnitee.

#### Article VIII

##### General Provisions

8.01 Notices. All notification and different correspondences hereunder should be in composing and might be regarded properly given to the gathering to whom the same is so conveyed, sent or sent at locations and contact data put forward underneath (or at such different location for a gathering as might be indicated by like notice.) Any and all notification or different correspondences or conveyances obliged or allowed to be given hereunder should be considered given and powerful on the soonest of: (a) on the date of transmission, if such notice or correspondence is conveyed by means of copy at the copy number put forward on the mark pages connected hereto preceding 5:30 p.m. (Eastern Standard Time) on a business day, (b) on the following business day after the date of transmission, if such notice or correspondence is conveyed by means of copy at the copy number set forward on the mark pages appended hereto on a day that is not a business day or later than 5:30 p.m. (Eastern Standard Time) on any business day, (c) on the second business day taking after the date of mailing, on the off chance that sent by a broadly perceived overnight dispatch administration, or (d) if by individual conveyance, upon genuine receipt by the gathering to whom such notice is obliged to be given.

On the off chance that to GPC:

Genius Printers Corporation

16192 Coastal Highway,  
Lewes, Delaware,  
DE 19958, USA  
Attention: President  
Phone: (123) 123-1234  
On the off chance that to GPUG:  
Genius Printers UG (haftungsbeschränkt)  
Schillerstr.4  
41564 Kaarst  
Germany  
Attention: President  
Phone: 0033954458634

All Notices to the Selling Shareholder might be sent "attention of" GPUG.

8.02 Definitions. For purposes of this Agreement, and notwithstanding different terms characterized somewhere else in this Assertion, the accompanying terms have the significance allotted to them beneath: (a) an "associate" of any individual means someone else that specifically or in a roundabout way, through one or more mediators, controls, is controlled by, or is under normal control with, such first individual;

(b) "material antagonistic change" or "material unfriendly impact" implies, when utilized as a part of association with GPC or GPUG, any change or impact that either exclusively or in the total with all other such changes or impacts is physically antagonistic to the business, resources, properties, condition (monetary or generally) or result of operations of such gathering and its backups taken in general (in the wake of giving impact on account of GPC to the culmination of the Exchange);

(c) "conventional course of business" means the normal course of business steady with past custom and work on (counting as for amount and recurrence);

(d) "individual" means an individual, enterprise, organization, joint endeavor, affiliation, trust, unincorporated association or other substance;

(e) "backup" of any individual means someone else, a measure of the voting securities, other voting possession or voting association hobbies of which is adequate to choose no less than a lion's share of its leading body of executives or other overseeing body (or, if there are no such voting intrigues, fifty percent (half) or a greater amount of the value hobbies of which) that is claimed specifically or in a roundabout way by such first individual; and

(f) "security interest" means any home loan, promise, lien, encumbrance, deed of trust, lease, charge, right of first refusal, easement, bondage, intermediary, voting trust or understanding, exchange limitation under any shareholder or comparative understanding or some other security interest, other than (i) mechanic's, material-men's, furthermore, comparative liens, (ii) statutory liens for duties not yet due and payable, (iii) buy cash liens and liens securing rental installments under capital lease game plans, (iv) promises or stores made in the customary course of business regarding laborers' remuneration, unemployment protection or other comparable standardized savings enactment; and (v) encumbrances, security stores or stores needed by law or by any Administrative Entity.

8.03 Interpretation. At the point when a reference is made in this Agreement to a Section, Exhibit or Schedule, such reference should be to a Section of, or an Exhibit or Schedule to, this Agreement unless generally demonstrated. The headings contained in this Agreement are for reference purposes just and should not influence at all the significance or elucidation of this Agreement. At whatever point the words "incorporate," "incorporates" or "counting" are utilized as a part of this Agreement, they should be esteemed to be trailed by the words "without impediment."

8.04 Entire Agreement; No Third-Party Beneficiaries. This Agreement and alternate assertions alluded to thus constitute the whole assertion, and supersede every single former assertion and understandings, both composed and oral, among the gatherings as for the topic of this Agreement. This Agreement is not proposed to give upon any individual other than the gatherings any rights or cures.

8.05 Governing Law. This Agreement might be administered by, and understood as per, the laws of the State of Delaware, paying little heed to the laws that may some way or another represent under pertinent standards of clashes of laws thereof.

8.06 Assignment. Neither this Agreement nor any of the rights, hobbies or commitments under this Understanding should be appointed, in entire or to a limited extent, by operation of law or generally by any of the gatherings without the earlier composed assent of alternate gatherings. Subject to the previous sentence, this Agreement will be tying upon, inure to the event of, and be enforceable by, the gatherings and their particular successors and allots.

8.07 Enforcement. The gatherings concur that hopeless harm would happen if any of the procurements of this Agreement were not performed as per their particular terms or were generally broke. It is in like manner concurred that the gatherings should be qualified for a directive or orders to avert breaks of this Agreement and to implement particularly the terms and procurements of this Agreement in any court of the United States situated in the State of Delaware, this being notwithstanding whatever other solution for which they are entitled at law or in value. Moreover, each of the gatherings hereto

(a) concurs that it won't endeavor to deny or thrashing such individual purview or venue by movement or other demand for leave from any such court, and

(b) concurs that it won't convey any activity identifying with this Understanding or any of the exchanges thought about by this Agreement in any state court other than such court.

8.08 Severability. At whatever point conceivable, every procurement or segment of any procurement of this Agreement will be deciphered in such way as to be successful and legitimate under pertinent law however in the event that any procurement or bit of any procurement of this Agreement is held to be invalid, illicit or unenforceable in any admiration under any pertinent law or standard in any locale, such invalidity, wrongness or unenforceability won't influence any other procurement or bit of any procurement in such ward, and this Agreement will be improved, understood and upheld in such locale as though such invalid, illicit or unenforceable procurement or bit of any procurement had never been contained in this.

8.09 Counterparts. This Agreement may be executed at the same time in two or more partners, any one of which need not contain the marks of more than one gathering, however every single such partner taken together will constitute one and the same Agreement. This Agreement, to the degree conveyed by method for a copy machine or electronic mail (any such conveyance, a "Electronic Delivery"), should be dealt with taking all things together way and regards as a unique assertion or instrument and might be considered to have the same tying lawful impact as though it were the first marked form thereof conveyed in individual. At the solicitation of any gathering hereto, one another gathering hereto should re-execute unique structures concerning this and convey them in individual to every other party. No gathering hereto should raise the utilization of Electronic Delivery to convey a mark on the other hand the way that any mark or assertion or instrument was transmitted or imparted through the utilization of Electronic Delivery as a barrier to the development of an agreement, and each such gathering perpetually waives any such resistance, but to the degree such guard identified with absence of validness.

Lawyers Fees.

In the occasion any suit or other lawful continuing is brought for the authorization of any of the procurements of this Agreement, the gatherings hereto concur that the overarching party or gatherings might be qualified for recuperate from the other party or gatherings upon last judgment on the benefits sensible lawyers' expenses, including lawyers' charges for any offer, and expenses caused in bringing such suit or continuing.

Money.

All references to coin in this Agreement might allude to the legal cash of the United States of America.

IN WITNESS WHEREOF, the undersigned have brought about their appropriately approved officers to execute this Assertion as of the date first above composed.

GPC: Genius Printers Corporation

By: /s/ Markus Ulrich  
President  
GPUG:  
Genius Printers UG (haftungsbeschränkt)  
By: /s/ Markus Ulrich  
Markus Ulrich  
Director

#### COUNTERPART SIGNATURE PAGE TO STOCK EXCHANGE AGREEMENT

The undersigned does hereby agree to be bound by all of the terms and provisions of the Stock Exchange Agreement, including all exhibits and schedules attached thereto, dated January 5, 2018, by and among, Genius Printers Corporation, a Delaware corporation ("GPC") on one hand, and Genius Printers UG (haftungsbeschränkt), a limited liability corporation organized under the laws of Germany (the "GPUG") and of the shareholder of GPUG ("Selling Shareholder") on the other hand.

Selling Shareholder:

By: \_\_\_\_\_  
Print Name: Markus Ulrich  
GPC: \_\_\_\_\_  
Title: Markus Ulrich, Director

#### Exhibit A

Distribution of Shares to Selling Shareholders

<u>Selling Shareholder Name</u>	<u>No. of Shares to Be Exchanged</u>
Markus Ulrich	50,000,000

#### Limitations on the Resale of Restricted Stock and Control Stock / SEC Rule 144

Limited securities will be securities procured in unregistered, private deals from GPC. Offering Shareholder gets limited securities through this Exchange Transaction. Principle 144(a)(3) distinguishes what deals produce confined securities. Limited stock will more often than not have the prohibitive legend, "confined", on the declarations to serve as notice that their resale is limited. Control stock will be stock claimed by the Selling Shareholder, who is a corporate chief, officer, and a stockholder with more than 10% of the voting stock. SEC Rule 144 spots impediments on any resale of confined securities. Control stock is additionally confined; in any case, control stock endorsements as a rule don't have the prohibitive legend. Despite the fact that these confinements can be evacuated by completely enlisting the security, the time and cost of a full enrollment is typically restrictive. In any case, control persons can offer regularly confined stock without confinements if sold as a major aspect of an enrolled essential offering by GPC. No limited stock can be sold unless GPC is present in recording all obliged money related proclamations to the SEC.

Before confined stock can be exchanged:

Offering Shareholder more likely than not had the completely paid stock for 1 year. GPC has conformed to the intermittent reporting prerequisites of the Securities Exchange Act of 1934. On the off chance that the amount of the stock surpasses 500 shares or \$10,000 in worth, then Selling Shareholder must likewise record a Form 144, Notice of Proposed Sale, with the SEC with the points

of interest of the deal and consistence with Rule 144. The deal must occur inside of a 90-day period; generally another Form 144 must be recorded that will cover an additional 90 days.

The aggregate estimation of a trade exchanged stock can't surpass the more noteworthy of 1% of GPS's remarkable stock, or the normal week after week volume for the previous 4 weeks. In the event that the stock is just exchanged over the counter, then the deal can't surpass 1% of the GPC's exceptional stock. The stock must be sold as a standard financier exchange with the consistent commission charged. Neither the dealer nor the specialist can request requests to purchase the securities. Special cases to the 144 necessity incorporate the resale by a part firm in an office limit, on the other hand if a business sector creator in the security buys the issue as a key for his own record.

Regardless of the possibility that the above conditions are fulfilled, limited stock can't be sold to the general population unless the prohibitive legend is expelled from the declaration. Just the exchange specialists can do this, with the assent of GPC.



## Lockup Agreement –Exhibit D

THIS LOCKUP AGREEMENT (the 'Understanding') is gone into as of this fifth day of January, 2018 by what's more, among Markus Ulrich (the 'SHAREHOLDER') what's more, Genius Printers Corporation, a Delaware partnership (the 'Organization').

While, the Shareholder holds regular supply of the Company or ('SECURITIES'); WHEREAS, the Organization trusts it is to the greatest advantage of its stockholders to set up a methodical exchanging business for shares of the Company's normal stock;

Though, the Company wants the Shareholder to hold back offering Securities held by the Shareholder to empower deliberate exchanging shares of the Company's normal stock;

Presently, THEREFORE, regarding the premises, and for other great and significant thought, the receipt and adequacy of which is thus recognized, the gatherings hereto concur as takes after:

### LOCKUP OF SECURITIES.

The Shareholder concurs, that without the earlier composed assent of the Company, that, until the prior of the first commemoration of the date of this Agreement, the Shareholder won't make or bring on any offer of any of the 50,000,000 shares which, as of the date of this Agreement, the Shareholder claims both of record or gainfully, and which the Shareholder has the ability to control the aura; gave, nonetheless, that the Shareholder might, without the Company's former composed assent, (i) offer or generally exchange Securities to Genius Printers UG (haftungsbeschränkt), Germany, or (ii) make an endowment of Securities without thought to an association absolved from assessment under Section 501(c)(3) of the Internal Revenue Code of 1986, as altered, or (iii) exchange shares to an trade reserve if such exchange does not require the Shareholder to record a Form 144 compatible to the guidelines of the Securities and Exchange Commission.

### Exchange; SUCCESSOR AND ASSIGNS.

The terms and states of this Agreement should inure to the event of and be tying upon the separate successors and allocates of the parties. Nothing in this Agreement, express or inferred, is planned to present upon any gathering other than the gatherings hereto or their particular successors and doles out any rights, cures, commitments, or liabilities under or by reason of this Agreement, with the exception of as explicitly gave in this Agreement.

### Overseeing LAW.

This Agreement should be represented by and translated under the laws of the Condition of Delaware.

### Partners.

This Agreement may be executed in two or more partners, each of which might be regarded a unique, however all of which together should constitute one and the same instrument.

### TITLES AND SUBTITLES.

The titles and subtitles utilized as a part of this Agreement are utilized for comfort just and are not to be considered in understanding or translating this Agreement.

### Notice.

(A) All notification, demands, requests and different correspondences under this Assertion or in association herewith might be given or made upon (i) the Shareholder at such Shareholder's location put forward on the mark page hereto; and (ii) the Company at Genius Printers Corporation, 16192 Coastal Highway, Lewes, Delaware, DE 19958, USA, consideration President.

(B) All notification, demands, requests and different interchanges given or made in understanding with the procurements of this Agreement might be in composing, and should be sent by overnight dispatch, or by copy with affirmation of receipt, and might be considered to be given or made when receipt is so affirmed.

(C) Any gathering may, by composed notification to the other, change its location or respondent, and such notice should be given as per the terms of this Section. Lawyers' FEES. On the off chance that any activity at law or in value (counting assertion) is important to implement or translate the terms

of this Agreement, the common party might be qualified for sensible lawyers' expenses, expenses and vital distributions notwithstanding some other alleviation to which such gathering may be entitled as controlled by such court, value or assertion continuing.

Corrections AND WAIVERS.

Any term of this Agreement may be altered with the composed assent of the Company and the Shareholder. SEVERABILITY. In the event that one or more procurements of this Agreement are held to be unenforceable under relevant law, segments of such procurements, or such procurements in their whole, to the degree fundamental, should be separated from this Agreement and the equalization of the Agreement should be deciphered as though such procurement were so avoided and might be enforceable in agreement with its terms.

Postponements OR OMISSIONS.

No deferral or oversight to practice any right, power or cure gathering to any gathering to this Agreement, upon any break or default of the other party to this Assertion should hinder any such right, power or cure of such holder nor might it be understood to be a waiver of any such break or default, or a quiet submission in that, or of or in any comparative break or default from there on happening; nor might any waiver of any rupture or default be regarded a waiver of some other rupture or default theretofore or from there on happening. Any waiver, allow, assent or approbation of any sort or character with respect to any gathering to this Agreement of any rupture or default under this Agreement, or any waiver on the piece of any gathering of any procurements or states of this Agreement, must be in composing furthermore, should be powerful just to the degree particularly put forward in such written work. All cures, either under this Agreement or by law or generally stood to any holder might be aggregate and not elective.

Whole AGREEMENT.

This Agreement constitutes the whole understanding between the gatherings hereto relating to the topic in this regard, and all other composed or oral understandings existing between the gatherings hereto are explicitly wiped out.

IN WITNESS WHEREOF, the gatherings hereto have executed this Agreement as of the date first above composed.

Genius Printers Corporation  
By: Markus Ulrich, CEO

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Shareholder:  
Markus Ulrich  
1873 Rte de L'Abadie  
06730 St. André de la Roche  
France

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## License Agreement – Exhibit 2.1.1

This is a License Agreement of protected innovation between:

Genius Printers UG (haftungsbeschränkt), a German constrained risk organization working together as Genius Printers UG (haftungsbeschränkt), Schillerstr.4, 41564 Kaarst, Germany, from now on alluded to as (the "Organization"); What's more, Markus Ulrich, 1873 Rte de L'Abadie, 06730 St. André de la Roche, France, (the "LICENSOR")

Award:

The LICENSOR thusly allows to the COMPANY the restrictive permit for the created item depicted in Schedule A (the "Authorized Item") and to utilize the skill to: make, offer, market what's more, convey the Licensed Item. For thought of the stipend, COMPANY should pay sovereignties of 5% of the business cost of each 3D printer sold by the COMPANY utilizing the development.

Installment of Royalties:

Organization will pay sovereignties inside of 31 days of the end of every quarter. Going with every sovereignty installment will be a rundown of records which bought the development utilizing printers amid that quarter what's more, the measure of every deal. In the occasion generally installment, the COMPANY will pay enthusiasm on such reprobate sum at the rate per annum equivalent to 10%. Sovereignties won't be expected for records, which have petitioned for chapter 11 or are wiped out or have not paid exceptional receipts for more than 120 days what's more, conformities for these sums may be made on ensuing sovereignty installments.

End:

In the occasion that COMPANY does not offer its printers utilizing Licensed Item before Dec 31, 2020, all rights passed on from this permit to COMPANY are invalid and void and all rights return back to OWNER. In the event that the COMPANY ought to stop the assembling of the Licensed Item, or ought to the COMPANY end its business or go into liquidation, then all rights to said Licensed Item should return back to the OWNER forthwith.

Guarantees:

The Company speaks to and warrants to the Licensor that: (i) this Agreement constitutes the lawful, legitimate and tying commitment of the Company enforceable against the Company as per its terms and (ii) items based upon the Licensed Item will be of good quality in configuration material and workmanship and will be fabricated, sold and appropriated as per material laws and regulations.

The Inventor/Licensor warrants that the subject of the permit is unique work and that claims of ownership of intellectual properties are subject to the license.

Security:

The Licensor, Owner and Inventor will not be held liable for any claims, proceedings, actions or judgments, as well as any cost associated with such actions.

This Agreement is executed on this 16<sup>th</sup> day of January, 2018.

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The Company

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The Licensor

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For: Genius Printers UG

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The Inventor and Owner/patent specification author

#### **Schedule A**

1. Licensed items description: See attached Schedule A-1 - A-8 with Exhibits A1-A8
2. Territory: Global
3. Term: Ten years with renewal option from first shipment date.
4. Royalties and Payments paid by the Company to the Inventor and Licensor: The number of sold 3D printers using the licensed item will determine the license grant. Royalty payments will equal five percent of the sale price of each printer.

#### **Schedule A-1**

Licensed Item: The vat tilting mechanism that is used to separate the polymerized layer from the vat. Unlike hinged systems widely used in the industry, the vat can be moved horizontally or vertically or in a trigonometric combination thereof, by moving every vat corner separately, mostly sequentially, enabling a very smooth but fast separation of the object from the vat.  
Number on file at DPMA, German Patent Office: 10201411433.7

#### **Schedule A-2**

Licensed Item: The Robot arm on a moving platform with external recalibration process after each platform movement, pressing hot resin out of a cooled and turnable duckbill valve in order to produce wide/thick walls as well as fine detailed objects.  
Number on file at DPMA, German Patent Office: DE102015016823

#### **Schedule A-3**

Licensed Item: The resin drum printer that could jet resin to the outside out of cartridges installed inside the drum in order to print multi (color) material in an un-accelerated way, thus allowing for much higher speed, targeted for 5-50 layers/second.  
Number on file at DPMA, German Patent Office: DE102014019392

#### **Schedule A-4**

Licensed Item: A compilation of three different SLS technologies, using a) a drum, dispersing powder with scrapers in multiple sections around the drum, where each section also sinters the distributed powder. A continuous curved layer production allowing object printing circa ten times faster than current SLS printers; b) a planar layer production, where the electro-chargeable powder is transferred within a laser printer-like device onto a foil that is pressed by a heat stamp onto the object, transferring the whole layer in one stroke. Vertically driving drums produce intervals, so that the continuous print concurs with the heat stamp without any loss of time. Wetted foils allow for the processing of non electro-chargeable powders. A multi (color) material printer; c) laser printer-cartridge-system from (b) sits inside a continuously rotating drum and transfers powder directly to the outside onto the curved object layer, where every laser-printer unit inside the drum has its own sinter unit. A continuous curved layer production allowing multi (color) material object printing circa ten times faster than current SLS printers.  
Number on file at DPMA, German Patent Office: DE102016002598

#### **Schedule A-5**

Licensed Item: A print technology that uses granulate for plastic injection moulding machines in order to facilitate the acceptance of 3d printers in this vast mass producing market segment. Heated granulate is melted in standard atmospheric conditions and conveyed in a loop inside a rotating drum, flowing through the printhead that consists of a perforated sheet with holes too tiny to let the plasticized mass go through. Each hole has a heating unit to heat the plastic up instantaneously (ie via spark between anode/cathode), reducing the plastic's viscosity to allow the centrifugal forces of the drum's rotation to press the plastic droplet through the heated hole of the perforated sheet. A

technology to replace current injection moulding machines, allowing complex structures unthinkable to do with today's injecting machines.

Number on file at DPMA, German Patent Office: DE102016015617

**Schedule A-6**

Licensed Item: A print technology that uses an FDM printhead. Load (filament pressure) control by tmc chips; Filament movement control by AMS hall sensor chips (blue circle) and knurled shaft held by ball bearing,

Stepper steps=2.18µm filament movement, ams detection=1.15µm, so nearly 2 bits per stepper step. Print length ca 19x2.18µm= ca 41µm resolution for filament mix (ca 25 steps=1 printed mm), theoretical filament pushing force>4kg! (88mNm stepper pull-in torque on a dia 4mm extruder wheel), interlocking extruder wheels (orange circles) biting into the filament from two sides, adjustable force (distance), just controlled by spi&i2c w/o any additional wires

**Schedule A-7**

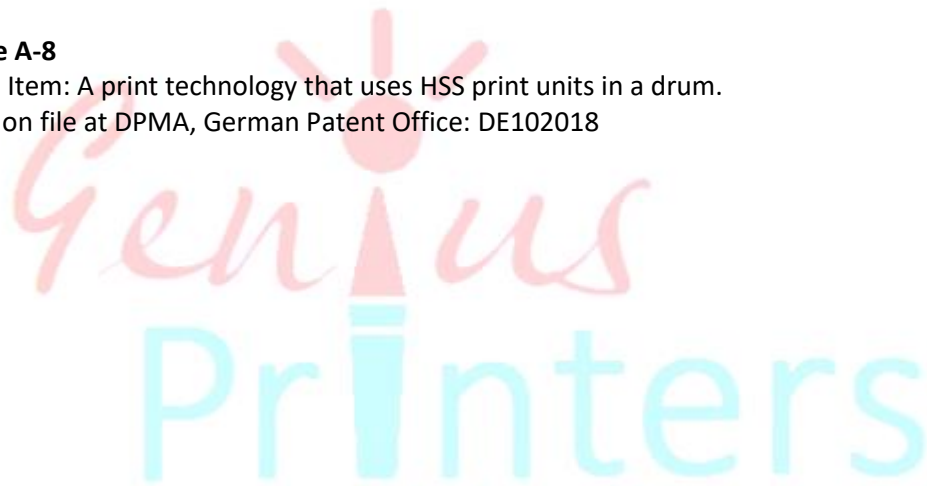
Licensed Item: A print technology that uses a flexible FDM nozzle to allow for variable print width, eliminating multiple row-printing back and forth.

Number on file at DPMA, German Patent Office: DE102017012061

**Schedule A-8**

Licensed Item: A print technology that uses HSS print units in a drum.

Number on file at DPMA, German Patent Office: DE102018



# Exhibit A1

genius printers  
Markus Ulrich  
1873 rte de l abadie

06730 st andre de la roche  
FRANKREICH

- 1 -

## 3D-Drucker

Die Erfindung betrifft ein Verfahren und eine Vorrichtung zur Herstellung von dreidimensionalen Objekten mittels schichtweiser Harzpolymerisation durch Strahlenbeschuss. Insbesondere gilt die Erfindung der Trennung des Objektes vom Gefäß in der Überkopfbjekterstellung und dem Harztransport im Gefäß.

## Stand der Technik

Die Entwicklung technischer Verfahren zur Herstellung dreidimensionaler Objekte läuft auf Hochtouren. Experten sagen voraus, dass insbesondere das additive Verfahren des 3D Drucks die vierte industrielle Revolution einläuten könnte. Hierbei werden Objekte schichtweise erzeugt, z.B. mittels Pulverbenässung, Plastikdrahtschmelzung, Pulverschmelzung, Harzpolymerisation, usw.

Erfindungen waren immer dann besonders förderlich, wenn sie letztendlich dem Konsumentenmarkt zuträglich sein konnten. Dies wird auch beim 3D Druck der Fall sein. Hierfür muss darauf geachtet werden, dass die Objekterstellungsmethode folgende

Eigenschaften berücksichtigt: Sicherheit, Geschwindigkeit, Farbe, Materialvielfalt, Temperaturstabilität, Hinterschneidungsgrade, Nachbearbeitungsaufwand, und natürlich die Kosten.

Bezogen auf diese umfangreiche Anforderungsliste sieht der Autor die Flüssigharzpolymerisierungsmethode allen anderen Verfahren derzeit als überlegen an. Dipropylen Glykol Diacrylat als Basisstoff mit Zugabe eines geeigneten Photoinitiators kann bspw. kostengünstig hergestellt werden und in Mikrosekunden polymerisieren, ist genügend maßhaltig und fest, kann eingefärbt werden, und die Objekte können viele Hinterschneidungsgrade haben, wenn die Software entsprechende Stützen einplant.

Die DLP Projektion kann zwar eine Schicht auf einmal härten, die Auflösung ist jedoch durch die Anzahl der Spiegel auf dem Chip begrenzt. Galvanometer (Galvos) können derzeit zehntausende Punkte pro Sekunde anfahren, und die Skalierbarkeit bietet in Bezug auf Objektgröße und Auflösung mehr Möglichkeiten. Als Lichtquelle kann eine preiswerte Laserdiode, bspw. im UV-Bereich, dienen; derartig konzipierte Maschinen sind bereits im Einsatz. Hier wird die Harzschicht von oben aufgetragen, oder das Objekt wird kopfüber erstellt, sodass dieses im Harz über einer transparenten Platte hängt.

Ein Problem bei der Kopfüberharzpolymerisation stellt die Abtrennung des gehärteten Objektes von der transparenten Platte (z.B. Glas (vorzugsweise Borosilikat oder Quarz) oder Acryl) dar. Hierzu wird entweder der Tisch, an dem das Objekt hängt, senkrecht oder zunächst an einer Seite angehoben, oder/und das Harzgefäß wird senkrecht oder zunächst an einer Seite abgesenkt. In jedem Fall befinden sich Tisch und Gefäß für die nächste Schichthärtung senkrecht fluchtend an der gleichen Position. Auftretende Probleme sind: Masshaltigkeitsgefährdung bei nicht senkrechter Anhebung, sowie bei Wiederabsenkungsmethode, falls das Harzgefäß unbeweglich ist. Das Harz läuft gemäß Viskosität und Oberflächenreibung der transparenten Platte, es entstehen hohe Harzflussgeschwindigkeitsdifferenzen in Abhängigkeit vom Harzort auf der Platte. Langsamer Anlauf des Harzes, nur abhängig von Plattenkippwinkel, Viskosität, Plattenoberflächenbeschaffenheit, Harzfüllstand, Harzdichte und Erdanziehung als Beschleuniger. Das Gefäß ändert seine Position von Schichtbelichtung zu Schichtbelichtung NICHT).

Die häufig genutzte einseitige Absenkung des Harzgefäßes erfolgt nicht nur zwecks Trennung von Objekt und Gefäß, sondern auch zu dem Zweck, das Harz an die zu polymerisierende Stelle nachfließen zu lassen, da sich genau dort nun meist kein Harz mehr

befindet. Adhäsionskräfte unterstützen den Vorgang und „saugen“ das Harz unter das Objekt. Da dies nicht ausreicht, wird eben einseitig abgesenkt und je nach Viskosität gewartet, bis Harz nachlaufen konnte. Die Adhäsionskräfte verkleinern den harzfreien Raum, schließen ihn jedoch meist nicht.

EP 2173538B1, Figur 9D, zeigt beispielsweise eine derartige Anordnung, ebenso US20140085620A1, Figur 2. US20130292862A1 verschiebt das Gefäß zur Seite und wieder zurück, sie alle kreieren die nächste Schicht stets am gleichen Platz. WO92/07705 muss das Gefäß horizontal verschieben, weil das Verfahren zweier unterschiedlicher Flüssigkeiten bedarf. WO2005110721 trennt mittels Folie vorteilhafterweise nahezu zugkraftfrei, benötigt für den Trennvorgang jedoch wesentlich mehr Zeit.

Weitere gattungsgemäße Verfahren sind aus der US 2004/0159340 A1 und der US 5238614 A bekannt.

Alle genannten Verfahren benötigen mehr Zeit. Druckzeit und Anschaffungspreis bilden den derzeitigen Hemmschuh in der Demokratisierung des 3D Drucks. Das Verhältnis Polymerisation zu notwendiger Positionsbenässung auf der transparenten Platte bestimmt stark die Objekterstellungszeit. Der Härtungsvorgang kann durchaus nur 50% des Zeitraumes ausmachen, den die Maschine für eine komplette Schichterstellung benötigt. Der Rest wird fast nur für die Objektrennung und Benässung benötigt.

Wird die Platte zu schnell hochgefahren, kann das sich im Grünstadium befindliche Objekt in seiner Maßhaltigkeit gestört werden. Ebenso kann diese verloren gehen, wenn die Adhäsionskräfte nebst Schwerkraft beim Absenken bzw. Anheben des Harzgefäßes oder des Tisches das Flüssigharz am Objekt zu stark wirken lassen, etwa, wenn zu schnell und/oder zu weit abgesenkt/angehoben wird. Je nach Harzgefäßfüllstand und Objektdesign müsste evtl. Flüssigharz -ähnlich Luft im eingeschlossenen Raum eines Hauses- von umschlossenen Objektwänden (und vor allem von Böden) gehalten und getragen werden; die sich im Grünstadium befindlichen Objektstrukturen müssten den dynamischen Kräften während der Hebe/Senkvorgänge standhalten. Mindestens die Maßhaltigkeit wäre negativ betroffen.

Die Nutzung mehrerer unterschiedlicher Flüssigkeiten mit mehreren notwendigen Gefäßen verkompliziert das Verfahren zusätzlich.

Eine vertikale oder einseitige Plattformanhebung oder Gefäßabsenkung (mit oder ohne darauf folgender horizontaler Gefäßverschiebung) belastet das Objekt stark, Verformungen stören die Maßhaltigkeit.

Folien zur Trennung benötigen weiteres Material, Platz, verschleifen und verteuern die Maschine.

Viele Mechanismen zur Objektabtrennung und Harzbenässung benötigen so viel Raum, dass das Design gestört und die Maschine unerwünscht groß wird.

Viele Mechanismen haben Schwierigkeiten, eine Deckung der Tisch- zur Gefäße Ebene zu erlangen. Dies wird bei zunehmend dünneren Schichtdicken zu einem Problem.

Viele Mechanismen haben Schwierigkeiten, das Objekt gleichmäßig vom Gefäß zu trennen (siehe einseitig gelagerte Gefäße), sodass unterschiedliche Zugkräfte aus meist nur einer Richtung auf das Objekt wirken und die Masshaltigkeit negativ beeinflussen.

Die Aufgabe der Erfindung besteht im Aufbau eines sehr schnellen, einfach und preiswert realisierbaren Mechanismus auf möglichst kleinem Raum, mit geringem Materialaufwand, zudem soll die Objektabtrennung die Maßhaltigkeit möglichst wenig beeinflussen.

#### Offenbarung der Erfindung

Diese Aufgabe wird durch ein Verfahren mit den Merkmalen nach Anspruch 1 und eine Vorrichtung nach Anspruch 8 gelöst.

Beim dem Verfahren ist vorgesehen, dass die Gefäße Ebene mit an mindestens drei umlaufend beanstandet angeordneten Stellen getrennt absenkbar gestaltet und einzeln gesteuert in vorgegebener Reihenfolge abgesenkt wird. Vorteilhaft ist dabei die Ausbildung als eckiges, z. B. rechteckiges oder quadratisches Gefäß, wobei die Stellen im Bereich der Ecken angeordnet sind. Aber auch runde oder ovale Gefäße oder ähnliche Formen sind möglich. Die Kante des Gefäßes verläuft umfangsseitig im Randbereich, wobei einzelne Kantenabschnitte an den Ecken ineinander übergehen oder bei nicht eckigen Gefäßen die Kante stetig umlaufend ausgebildet ist. Der Boden des Gefäßes ist insbesondere ein Glasboden, aber auch andere ähnliche Materialien (z.B. Keramik) kommen in Betracht.

Bei der Vorrichtung ist vorgesehen, dass eine von einer Steuerungseinrichtung gesteuerte Konstruktionseinheit vorhanden ist, mittels deren mindestens drei umlaufend beanstandet angeordnete Stellen, bei eckiger Ausführung des Gefäßes insbesondere den Ecken, einer Ebene der Tischplattform einzeln - bezogen auf einen Bruchteil eines Millimeters voneinander unabhängig - auf eine Referenzebene auffahren und ein jeweiliger Anschlag vorzugsweise tasterlos durch eine Motorblockier-Erkennungselektronik erkennbar ist.

Vorteilhafte Ausgestaltungen sind in den abhängigen Ansprüchen angegeben.

Durch die erfindungsgemäße Lösung werden die Nachteile des Stands der Technik eliminiert und die folgenden Vorteile erzielt:

1. Die Mechanik ist kaum störanfällig.
2. Die Mechanik ist gegen unkontrollierten Zugang des Nutzers geschützt, nicht unbeabsichtigt berührbar, störfähig oder zerstörbar.
3. Die Mechanik benötigt nur wenig mehr Bauraum (z. B. 3%).
4. Der Aufbau ist sehr preisgünstig realisierbar.
5. Die Mechanik ist um ein Vielfaches schneller als die der meisten herkömmlichen Mechaniken.
6. Die Objekttrennung ist schonender als bei fast jedem bekannten Verfahren.
7. Die Mechanik, die Baufläche, ist skalierbar bis zu ca. 1 m<sup>2</sup>.
8. Die Mechanik erreicht durch Steuerung aller Ecken der Tisch- wie auch Gefäßebene die beste Deckung beider Ebenen zueinander.
9. Die Mechanik transportiert Harz richtungsgelenkt aktiv, wo es für die nächsten Schichterstellungen benötigt wird, ohne dass auf Harzfluss gewartet werden muss.

Wenn das Objekt schneller und gleichmäßiger vom Gefäß getrennt wird und das Harz durch ein anderes technisches Verfahren Unterstützung findet, um schneller an der zuvor belichteten Position für die nächste Belichtung wieder zur Verfügung zu stehen, kann die Objekterstellung sehr viel schneller (Zielfaktor : 10) von Statten gehen. So können größere Objekte mit hoher Auflösung in akzeptabler Zeit erstellt werden.

Beschreibung der Erfindung: Grundsätzlicher Aufbau mit wesentlichen erfindungsgemäßen Merkmalen

Nachdem Objektplattform und Gefäßplatte eine deckungsgleiche vorzugsweise horizontale Ebene gefunden haben, wird eine Schicht erstellt. Jede Schicht kann unterschiedlich dick sein, wofür Laserstärke, Belichtungszeit, Laserstrahldurchmesser und Tischanhebung stets



neu berechnet werden müssen. Nun muss das kopfüber erstellte Objekt vom Gefäß getrennt werden, danach muss die Software der Steuerungseinrichtung entscheiden, ob die nächste Schicht am gleichen Gefäßsort erstellt werden kann oder welcher Gefäßsort hinsichtlich Materialtransport und zuvor genutztem Harzverbrauchsort der Beste wäre, und ob gegebenenfalls eine Transportphase vorgenommen werden muss, sodass zwischen zwei Schichterstellungen Harz zum nächsten Schichterstellungsort transportiert wird.

Zwecks Findung der Deckungsgleichheit zwischen Plattform und Gefässebene werden Gefässebene und Tischebene nach unten bewegt. Beide Ebenen sollten vorzugsweise mindestens trianguliert aufgehängt sein um alle Ecken beider Platten einstellen zu können. Haben alle Ecken der Tischebene ihren Anschlagpunkt auf den Gefäßhalterahmen vorzugsweise durch eine Motorblockier-Erkennungselektronik gefunden, merkt sich die Elektronik diese Position. Die Gefässebene fährt nun hoch, bis alle vorzugsweise getrennt gesteuerten Ecken vorzugsweise durch die die Motorstellung detektierende Elektronik ihren Anschlagpunkt auf die Objektplattform gefunden haben, und die Elektronik merkt sich diese Position.

Zwecks Abtrennung wird das an der Plattform haftende Objekt zunächst vorzugsweise nicht bewegt, sondern die vorzugsweise PDMS beschichtete Glasplatte wird vorzugsweise vertikal nach unten bewegt.

Diese Bewegung ist vorzugsweise ca. doppelt so lang wie die zuletzt erstellte Schicht dick ist.

Diese Vertikalbewegung beginnt bei einem vorzugsweise quadratisch gestalteten Gefäß an einer Ecke, ohne dass die anderen Ecken aktiv bewegt werden.

Hat die erste Glasplattenecke vorzugsweise vertikal die Distanz absolviert, bleibt sie dort stehen, und es wird vorzugsweise eine verbundene Ecke auf vorzugsweise die gleiche Art und Weise bewegt, danach die dritte Ecke, zum Schluss die vierte.

Die Glasplatte steht nun vorzugsweise vertikal vom Objekt getrennt unter dem Objekt. Der Tisch wird so weit hochgefahren, wie die nächste Schicht dick sein soll.

Die Software hat das Objekt nach einer aus dem Stand der Technik an sich bekannten Methode vorzugsweise derartig in den Raum gelegt, dass es möglichst wenige Stützelemente benötigt, aber auch möglichst wenige zusammenhängende Flächen in einer

Schicht polymerisieren müssen. Dennoch ist es möglich, dass die vorige Schicht großflächig Harz von der Platte gezogen hat und für die nächste Schicht nun keines schnell genug nachfließen könnte. In diesem Fall, wenn man nicht warten will, bis Harz an die benötigte zuvor genutzte Stelle nachgelaufen ist, kann die Gefässebene nicht an den vorigen Ort zurückkehren, sondern muss einen anderen Ort unter das Objekt bringen, von dem für die letzte Schichterstellung kein Harz gezogen wurde. Die Vorrichtung bietet vier verschiedene Orte an.

Alternativ oder zusammenwirkend wird im Fall gemäß dem vorhergehenden Absatz, bei dem die Gefässebene nicht an den vorigen Ort zurückkehren kann, weil sich dort nicht genügend Harz befände, eine Transportphase zwischen die Polymerisationsphasen eingebaut: Das Gefäß fährt langsam in eine Richtung (die Vorrichtung bietet vier verschiedene Hauptrichtungen an) und fährt dann so schnell vorzugsweise zum Ursprungsort zurück dass die Massenträgheit (harzabhängig) überwunden wird oder andersherum: Das Gefäß fährt so schnell in eine Richtung und dann langsam vorzugsweise zum Ursprungsort zurück, dass die Massenträgheit (harzabhängig) in die erste Richtung überwunden wird, während das Harz bei Gefässbewegung in Gegenrichtung mitgenommen wird. Richtungen können nach jedem Takt verändert werden, sodass jeder Winkel und jede Richtung möglich ist.

Wenn sich das Gefäß alternierend zwischen zwei Orten und Distanzen bewegt, die schnell genug überwindbar sind, aber weit genug voneinander entfernt sind, sodass der vorletzte Ort durch Harznachlaufen und Gefässverschiebung harzgefüllt ist, wenn das Gefäß den letzten Ort verlässt, erlaubt dies eine sehr viel schnellere Objekterstellung als aus dem Stand der Technik bekannt. Das gezeigte Ausführungsbeispiel erlaubt die Bewegung über eine Ortsdistanz von 4300µm und überwindet diese in ca. 0,35 Sekunden.

#### Beschreibung der Zeichnungen und der bevorzugten Ausführungsform der Erfindung

Die vorliegende Erfindung wird nachfolgend beispielhaft und nicht einschränkend anhand von Zeichnungen näher erläutert. Es zeigen:

Figur 1: Verfahren zum Erreichen der Deckungsgleichheit der Tisch- und Gefässebenen

Figuren 2a-d: Verfahren zur Objekttrennung

Figuren 3a-c: Verfahren zum Harztransport

Figuren 4a-c: Verfahren zum Ortswechsel für die nächste Beschichtung

Figuren 5a-c: Vorrichtung zum Herstellen der Deckungsgleichheit der Tisch- und Gefässebenen

Figuren 6a-e: Vorrichtung zur Objekttrennung

Figuren 7a-e: Vorrichtung für den Harztransport

Figuren 8a-b: Vorrichtung zum Ortswechsel für die nächste Beschichtung

In Figur 1 ist die Vorgehensweise zum Herstellen der Deckungsgleichheit der Tischebene 1 und Gefäße Ebene 2 schematisch dargestellt.

Die Deckungsgleichheit der Tischebene 1 zur Gefäße Ebene 2 gewinnt bei zunehmend dünneren Schichtdicken an Bedeutung. Diese Deckung ist bei planaren Tisch- und Gefäßplattformen erreicht, wenn alle Ecken dieser beiden Plattformen den exakt gleichen Abstand zueinander aufweisen. Zur Erreichung dieses Ziels werden vorzugsweise alle Ecken getrennt gesteuert, eine trianguläre Steuerung der Ebenen ist die Mindestvoraussetzung.

Die Figuren 2a-d zeigen die Vorgehensweise zur Objekttrennung.

Das polymerisierte Harzobjekt haftet Schicht auf Schicht an der Tischplattform. Die zuletzt erstellte Schicht haftet zusätzlich an der Glasplatte 2. Das Objekt mit seiner an der Glasplatte 2 haftenden Schicht muss nun in möglichst schonender Weise von der Glasplatte getrennt werden, um die Maßhaltigkeit nicht zu gefährden. Einseitiger Zug würde das Objekt in eine Richtung ziehen.

Daher wird mit der Glasplattenabsenkung um vorzugsweise zwei Schichtdicken an einer Ecke begonnen 2a, danach wird vorzugsweise eine verbundene Ecke der Gefäßebenen 2, die eine Glasplatte sein kann, ebenfalls vorzugsweise zwei Schichtdicken nach unten gefahren 2b, gefolgt von vorzugsweise ebenfalls einer hiermit verbundenen Eckenabsenkung 2c, gefolgt von einer Absenkung der letzten Ecke (die Gefäßebene 2 sollte vorzugsweise rechteckig gestaltet sein).

Bei dem gezeigten Ausführungsbeispiel befindet sich die Gefäßebene 2 vorzugsweise zwei Schichtdicken unterhalb der Tischplatte, das Harzobjekt wurde von der Glasplatte 2 getrennt, es wurde in mehrere Richtungen belastet (in diesem Beispiel in vier).

Im nächsten Objekttrennungsvorgang sollte zwecks Gleichmäßigkeit der Zugrichtungen vorzugsweise von 2d nach 2a verfahren werden, d.h., es wird mit der Absenkung der Ecke, die zuletzt runtergefahren wurde, begonnen und mit der Ecke, die bei der letzten Objekttrennung zuerst abgesenkt wurde, geendet.

Die Figuren 3a-c zeigen das Verfahren für den Harztransport.

Diverse geforderte Materialeigenschaften des gedruckten Objekts lassen sich nicht ohne eine Mindestviskosität und eine Maximaltemperatur des Harzes bewerkstelligen. Daraus ergibt sich eine in die Steuerung einzubauende Warteschleife zwischen zwei Schichterstellungsprozessen, da das zähflüssige Harz unmittelbar nach der Polymerisierung am Ort fehlt und nachlaufen muss um die Lücke zu füllen („Harzloch“ auf der Glasplatte).

Die Objektpositionierung an der Tischplatte soll vom Programm vorzugsweise derartig erfolgen, dass möglichst wenige und vor allem möglichst kleine zusammenhängende Flächen in einer Schicht polymerisiert werden müssen, nicht nur, weil der Polymerisationsvorgang wärmefreisetzend ist, sondern, weil das Auffüllen eines großen Harzloches auf der Glasplatte noch mehr Zeit benötigt. Manchmal ist diese Forderung jedoch nicht zu erfüllen, und eine Region der Harzplatte benötigt für die Erstellung weiterer Schichten viel mehr Harz als andere Regionen.

In diesem Fall wird es für schnelles Drucken unerlässlich, das Harz in die harzarme Region zu transportieren. Ein aktiver Schub benötigt viel weniger Zeit als eine Ebenenschrägstellung, bei der auf das nachfließende Harz gewartet werden muss, zudem müsste diese Schrägstellung dann in mehrere Richtungen ermöglicht werden.

Das hiesige Harztransportverfahren bedient sich zwecks Verschiebung der Harzmasse einer gegenläufigen Glasplattenbewegung mit unterschiedlichen Geschwindigkeiten: Das Harzgefäß mit der Gefäßebenen 2 bewegt sich zunächst in Richtung der harzarmen Zone mit einer Geschwindigkeit, die das zähflüssige Harz „mitnimmt“, um bei Erreichung der Endposition viel schneller in die Gegenrichtung zurückzufahren bzw. zurückzuschwingen, sodass der Massenträgheitseffekt das Harz in der Nähe der Hinschwingposition- Endposition belässt.

Durch Aneinanderreihung dieses Hin- und Rückschwingprozesses erreicht das Harz die harzarme Region, die nun aufgefüllt wird.

Wenn die Gefäßebenenverschiebung mit unterschiedlichen Geschwindigkeiten in unterschiedliche Richtungen vorgenommen wird, kann Harz gezielt in jede Region transportiert werden, sogar im Kreis: Figur 3b zeigt die Aneinanderreihung zweier perpendicular zueinander stehender Harzschübe, sodass sich vektoriell eine Harzverschiebung um  $45^\circ$  ergibt. Wird noch ein  $90^\circ$  Vorgang drangehängt, fließt das Harz wie in 3b zweites Bild in Richtung  $22,5^\circ$ , usw.

Figur 3c deutet an, dass durch Kombination unterschiedlicher Gefässrichtungsschübe 2 fast jede Richtung möglich ist.

Die Figuren 4a-c zeigen die Vorgehensweise beim Ortswechsel für die nächste Beschichtung.

Ein Ortswechsel des Gefäßes mit der Gefäßebene 2 zwecks Erstellung der nächsten nur ein Material benötigenden Schicht innerhalb des gleichen Gefäßes wurde beim Stand der Technik nicht realisiert. Hierin liegt jedoch der entscheidende Vorteil der vorliegenden Erfindung, dass das durch die letzte Schichterstellung entstandene Harzloch 3 in Figur 4a für die nächste Schicht nicht benötigt wird. Es hat mindestens eine Schichterstellungsdauer Zeit, sich durch Adhäsions-, Sog-, Ebenenschräglegungs-, und Gefässschwingeffekte aufzufüllen (Figur 4b).

Da jedoch je nach Gefäßebenenverschiebungsmechanismus mehrere Positionen für die Wahl des im nächsten Vorgang zu polymerisierenden Punktes 4 möglich sind, kann je nach Umstand und Notwendigkeit dem Harzloch 3 mehr Zeit gegeben werden, innerhalb der diesem Punkt durch Gefässbewegungen neues Harz zugeführt wird, wie in Figur 4c angedeutet.

Die Figuren 5a-c beschreiben eine Vorrichtung zum Herstellen der Deckungsgleichheit der Tisch- und Gefäßebenen.

Mit diesem Ausführungsbeispiel der vorliegenden Erfindung wird ein 3D Drucker realisiert, der die Deckungsgleichheit der Tisch- 1 und Gefäßebenen 2 mit sieben Steppermotoren bewerkstelligt. Die Tischplattform 1 wird mittels einer (nicht gezeigten) Steuerungseinrichtung trianguliert mittels Spindelstepper gesteuert, während das Gefäß 2 von 4 Exzenter- Getriebesteppern bewegt wird. Hier wurde auf die üblichen Limit-Taster verzichtet und stattdessen eine Motorblockier-erkennungselektronik eingesetzt, sodass die Mechanik flexibel ist und die gewünschten Ebenen zueinander finden können.

Figur 5b zeigt die abgesenkte Gefäßebene 2, sodass der herabfahrende Tisch mit der Tischebene 1 nur auf die (Gefässmotorträger)-Plattform 9 fahren kann. Hat der Tisch nun diese Ebene erreicht, ist es am Gefäß, sich auf die Tischebene einzustellen.

Figur 5c zeigt, wie die Motoren 5-8 mittels ihrer Exzenter jede Ecke schrittweise anheben, bis die Elektronik den Anschlag jedes Eckpunktes erkannt hat. Nun fahren die Stepper in die Gegenrichtung um auch hier die Polymerisierungsebene festzulegen.

Die Figuren 6a-e zeigen eine Vorrichtung zur Objekttrennung.

Die Motoren 5-8 stellen über ein hier nicht näher beschriebenes (da anderweitig bekanntes) Verfahren ihren jeweiligen Nullpunkt fest ( $0^\circ$  in Figur 6a). Der Arbeitsbereich liegt zwischen  $+90,7^\circ$  und  $+89,3^\circ$ , was in diesem Beispiel der Absenkung der Gefässplatte um zwei Schichtdicken entspricht. Das Objekt 10 wurde also bei einer Exzenterwellenposition von  $90,7^\circ$  erstellt (oberes Dreieck) und ist spätestens getrennt, wenn alle Motoren 5-8  $1,4^\circ$  oder 2 Vollschrte nach unten gefahren wurden (unteres Dreieck). Das obere Dreieck stellt also das Objekt 10 dar, das noch an der z.B. PDMS-beschichteten Glasplatte klebt und abgelöst werden soll. Nach Durchfahren der Motorsequenz, die vorzugsweise reihum in der Beispielsausführung ca.  $1,4^\circ$  das Gefäß mit der Plattform 2 nach unten bewegt, ist das vom Glasboden getrennt (Darstellung unteres Dreieck in Figur 6a). Eine neue Schichterstellungssequenz kann beginnen.

Der Abtrennungsvorgang beginnt beispielsweise mit Motor 5 in die einzig mögliche Richtung (Figur 6b), gefolgt von Motor 6 (Figur 6c), dann Motor 7 (Figur 6d), zum Schluss fährt Motor 8 (Figur 6e). Das Objekt 10 ist nun von der Glasplatte 2 getrennt, und seine zuletzt polymerisierte Schicht steht ca. zwei Schichtdicken über der Glasplatte (Die Glasplatte kann zur leichteren Abtrennung eine PTFE- oder PDMS Schicht aufweisen).

Die Figuren 7a-e zeigen die Ausbildung der Vorrichtung für den Harztransport.

Die vier Exzentertriebmotoren 5-8 können über die für die Abtrennung nötigen Winkel  $+90,7^\circ$  bis  $+89,3^\circ$  hinaus neben der fast vertikalen Gefässbewegung auch noch eine vertikal-horizontale Gefässbewegung ausführen (siehe Figur 6a). Diese Bewegung lässt sich für den Harztransport nutzen: Das Gefäß 2 fährt in eine Richtung langsam los, das Harz nimmt die Bewegungsenergie auf. Die Umkehr wird bei ca.  $30-40^\circ$  eingeleitet, sodass das Harz die Horizontalkomponente der Bewegungsenergie nicht verliert und „ausgehebelt“ wird durch die Vertikalkomponente der Exzenterbewegung (fliegt hoch). Hierdurch reißt der Harzfilm noch leichter vom (teflon- oder silikonbeschichteten) Boden ab, und das Harz kann der nun viel schnelleren Umkehrbewegung des Gefäßes (Figur 7b) nicht mehr folgen. Natürlich kann der Vorgang auch umgekehrt begonnen werden: Das Gefäß bewegt sich schnell nach unten,

dann seitlich, der Harzfilm reißt ab, und bei ca. 30-40° kehrt das Gefäß die Bewegungsrichtung um und nimmt das Harz mit.

Der Harztransport funktioniert in jede Richtung, die maximale Harzverschiebungsstrecke pro Vorgang lässt sich durch Steuerung aller vier Motoren 5-8 mittels der Steuerungseinrichtung gleichzeitig erreichen (ca. 40% mehr Strecke als bei Steuerung zweier gegenüberliegender Motoren). Figuren 7a bis 7b zeigen die 45° Harzverschiebung unter Zuhilfenahme aller 4 Gefässmotoren, Figuren 7c bis 7d zeigen die Verschiebung nach 90°.

Die Kombination (Aneinanderreihung) der Verschiebeprozesse ermöglicht jede beliebige Richtungssteuerung, beispielhaft gezeigt in Figur 7e für die Bewegung in Richtung 67,5°.

Die Figuren 8a-b zeigen die Ausbildung der Vorrichtung zum Ortswechsel für die nächste Beschichtung.

Eine Schichterstellung, während der die Gefäßplatte im entscheidenden Moment am entscheidenden Ort ein Harzloch aufweist, wird fehlerhaft sein. Daher ist bspw. eine Schichterstellungsfolge im Millisekundenbereich ohne Gefäßverschiebung unmöglich, das Harz kann nicht schnell genug nachfließen. Die vorliegende Erfindung baut deshalb auf einen Ortswechsel des Gefäßes für die nächstfolgende Schicht.

Im Normalfall werden alle vier Gefässmotoren gleichzeitig und so schnell wie möglich gefahren. Figur 8a zeigt den aktuellen Polymerisationspunkt 3 der aktuellen Schicht. Dieser Punkt muss nun für die nächste Schichterstellung gemieden werden. Die Diagonalebewegung dieser Maschine entfernt den zuletzt erstellten Objektpunkt relativ zum Punkt 3 um über 4300µm, sodass auch eine millimeterdicke Wand im Normalfall nicht auf diesen Punkt 3 zurückgreifen muss (Figur 8b).

Sollte die Steuerungseinrichtung mit der Software dennoch diesen Fall nicht verhindert haben können, so wäre der Harztransport als Zwischenschritt anzuwenden oder eine andere Position anzufahren, also nicht diagonal, sondern nur in X- oder nur in Y- Richtung.

Figur 8c zeigt einen möglichen Aufbau einer diese Erfindung nutzenden Maschine. Der Exzentermechanismus 11 erlaubt die Bewegung der Gefäßebene 2 in vier Richtungen, weil die Exzenterwelle durch das ans Gefäß mit der Gefäßebene 2 angeflanschte Lager rutschen kann. Hier werden vorteilhafterweise kostengünstige Buchsengleitlager eingesetzt, die die Axialbewegungen auf der Welle erlauben. Diese Bewegungsfreiheit ist unerlässlich, da das

System ansonsten statisch überbestimmt wäre. Der Exzentermechanismus ist der einfachste um die Rotation – und damit die komplexe Raumbewegung des Gefässes (Kombination von Vertikal –und Horizontalbewegungen)- zu erreichen. Denkbar sind natürlich auch Hub/Zugmagnete, Kolbenbewegungen durch Pneumatik/Hydraulikzylinder für grossvolumige Anwendungen, oder Piezzos für kleinräumige Anwendungen, z.B Nanodrucker. Besonderes Augenmerk wurde beim gezeigten Aufbau mit Exzenterwellen jedoch auf Simplizität und Effizienz gelegt. Linearantriebe wären erheblich teurer. Durch die kreisende Bewegung der Exzenterwelle bewegt sich jede Gefässecke rauf und runter, aber auch vor und zurück, und wird dabei gleichzeitig lateral bewegt.

Legende Zahlenbezeichnungen:

- 1 Tischplatfornenebene
- 2 Gefässebene (Glasplatte)
- 3 Polymerisierungsposition= fehlendes Harz auf der Glasplatte für nächste Schichterstellung („Harzloch“)
- 4 neue Polymerisierungsposition auf der Glasplatte, harzgefüllt= kein „Harzloch“
- 5 erster (Gefäß-) Motor
- 6 zweiter (Gefäß-) Motor
- 7 dritter (Gefäß-) Motor
- 8 vierter (Gefäß-) Motor
- 9 (Gefässmotorträger)-Plattform
- 10 Objekt
- 11 Exzentermechanismus



## Ansprüche

1. Verfahren zur Herstellung dreidimensionaler kopfüber erstellter Objekte (10) zwischen einer obig angebrachten Tischplattform, an der das Objekt klebt, und einem Harz enthaltenden Gefäß mit einem Boden, an dem eine zuletzt erstellte Objektschicht haftet und von dem das Objekt durch Absenken mindestens einer Gefäße Ebene (2) mittels triangulierter oder quadrangulärer Ebenensteuerung getrennt wird, dadurch gekennzeichnet, dass die Gefäße Ebene (2) mit an mindestens drei umlaufend beanstandet angeordneten Stellen getrennt absenkbar gestaltet und einzeln gesteuert in vorgegebener Reihenfolge abgesenkt wird.
2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, dass eine erste Ebene (1) und die Gefäße Ebene (2) tasterlos elektromotorisch zueinander eingestellt werden, wobei die erste Ebene (1) sich mittels Triangulation oder Quadrangulation auf eine Referenzebene (9) einstellt, und die Gefäße Ebene (2) sich daraufhin ebenfalls mittels elektromotorisch gesteuerter Triangulation oder Quadrangulation auf die erste einstellt.
3. Verfahren nach Anspruch 1 oder 2, dadurch gekennzeichnet, dass eine Gefäßplattform mit der Gefäße Ebene (2) exzenterwellenmotorisch gesteuert bewegt wird, wobei je eine Exzenterwelle in einem an jeder der Stellen angeflanschten Lager axial verschiebbar lagert und darin axial bewegt wird, wobei Bewegungen mit horizontalen und/oder vertikalen und/oder lateralen Richtungskomponenten generiert werden.
4. Verfahren nach Anspruch 3, dadurch gekennzeichnet, dass einzelne Motoren (5-8) mit je einer Exzenterwelle in Wirkverbindung stehen und dass die einzelnen Motoren derart betrieben werden, dass die Gefäße Ebene (2) mittels der Exzenterwellen zur Abtrennung eines Objekts (10) gekippt wird, wobei die Kipprichtung auf Basis von bis zu vier Richtungen gesteuert wird.
5. Verfahren nach Anspruch 4, dadurch gekennzeichnet,

dass an den Kanten der Gefäßebene (2) je eine Exzenterwelle in einer angeflanschten Buchse axial verschoben wird und durch raumkreisende Bewegungen der Gefäßebene (2) Harztransport ermöglicht wird, wobei die Gefäßebene (2) durch die Anordnung der Exzenterwellen von der untersten Wellenposition betrachtet das Gefäß in vier Richtungen fahren kann und von der 3 bzw. 9 Uhr Position betrachtet das Gefäß in die jeweilige Gegenposition in unterschiedlichen Geschwindigkeiten bewegt wird, sodass Harz bei langsamer Gefäßbewegung in eine Richtung mitgenommen wird, jedoch bei hoher Gefäßrückführungsgeschwindigkeit in der Nähe des Gefäßverschiebeumkehrpunktes verbleibt.

6. Verfahren nach Anspruch 5  
dadurch gekennzeichnet,  
dass verschiedene Gefäßbewegungsrichtungen miteinander kombiniert werden, um Harz in jede für den Transport erforderliche Richtung und über jede Distanz im Bereich konstruktiver Vorgaben innerhalb des Gefäßes zu transportieren.
7. Verfahren nach einem der Ansprüche 1 oder 2,  
dadurch gekennzeichnet,  
dass die Gefäßplattform mit der Gefäßebene (2) exzenterwellenmotorisch gesteuert bewegt wird, wobei an deren Kanten je eine Exzenterwelle in einer angeflanschten Buchse axial verschiebbar lagert und durch raumkreisende Bewegungen Ortswechsel der Gefäßebene (2) relativ zum Objekt (10) ermöglicht und wobei das Gefäß sich bei mindestens paarweiser Steuerung gegenüberliegender Motoren (5 und 7 und/oder 6 und 8) mit einer benässen Fläche (4) unter das Objekt stellt und in der vorigen Schichterstellung genutzte Flächen (3) zur Benässung freihält.
8. Vorrichtung zur Herstellung dreidimensionaler kopfüber erstellter Objekte mit einer obig an einer Tragvorrichtung angebrachten Tischplattform und einem unterhalb angeordneten, einen Boden aufweisenden, mit Harz befüllbaren Gefäß, wobei ein Objekt (10) zwischen der Tischplattform und dem Gefäß erstellbar ist und dabei an der Tischplattform klebt und mit einer zuletzt erstellten Objektschicht an dem Boden haftet, und mit einer Trennungsvorrichtung, mittels deren das Objekt von dem Boden durch Absenken mindestens einer Gefäßebene (2) und triangulierter oder quadrangulärer Ebenensteuerung getrennt wird,  
dadurch gekennzeichnet,  
dass eine von einer Steuerungseinrichtung gesteuerte Konstruktionseinheit vorhanden ist, mittels deren mindestens drei umlaufend beanstandet angeordnete Stellen einer Ebene (1) der Tischplattform einzeln - bezogen auf einen Bruchteil eines Millimeters voneinander unabhängig - auf

eine Referenzebene (9) auffahren und ein jeweiliger Anschlag vorzugsweise tasterlos durch eine Motorblockier-Erkennungselektronik erkennbar ist.

9. Vorrichtung nach Anspruch 8,  
dadurch gekennzeichnet,  
dass je eine Exzenterwelle in einem an jeder von mindestens drei umlaufend beanstandet angeordneten Stellen der Gefäßebene (2) angeflanschten Lager axial verschiebbar gelagert ist, wobei Bewegungen mit horizontalen und/oder vertikalen Richtungskomponenten generierbar sind und dass die Gefäßebene (2) durch Steuerung einzelner, mit den Exzenterwellen in Wirkverbindung stehender Motoren (5-8) auf die Referenzebene (9) auffährt.
10. Vorrichtung nach Anspruch 9,  
dadurch gekennzeichnet,  
dass die Trennungsvorrichtung in der Weise ausgebildet ist, dass die Abtrennung des Objektes (10) durch schrittweises Absenken jeder der Stellen der Gefäßebene (2) durch Steuerung jedes Gefäßmotors (5-8), vorzugsweise reihum, erfolgt, sodass das Objekt gleichmäßig von jeder Seite belastet wird, wobei der nächste Abtrennungsprozess vorzugsweise in umgekehrter Motorreihenfolge (8-5) erfolgt.
11. Vorrichtung nach einem der Ansprüche 8 bis 10,  
dadurch gekennzeichnet,  
dass die Gefäßebene (2) exzenterwellenmotorisch gesteuert bewegbar ist, wobei an den beanstandeten Stellen der Gefäßebene (2) je eine Exzenterwelle in einem angeflanschten Lager axial verschiebbar lagert und durch raumkreisende Bewegungen der Gefäßebene (2) Harz transportierbar ist, wobei das Gefäß bei mindestens paarweiser Steuerung gegenüberliegender Motoren (5 und 7 und/oder 6 und 8) in eine Richtung mit harzmitnehmender Geschwindigkeit fahrbar ist, in Gegenrichtung jedoch so schnell bewegbar ist, dass der Harzfilm keine Haftung mehr am beschichteten Gefäßboden findet und abreißt, sodass das Harz in der Nähe der Gefäßumkehrposition verbleibt, wobei der Ortsverbleib des Harzes durch die Vertikalkomponente der Exzenterbewegung unterstützt wird, bei dem die Fliehkraft die Harzablösung fördert.
12. Vorrichtung nach Anspruch 11  
dadurch gekennzeichnet,

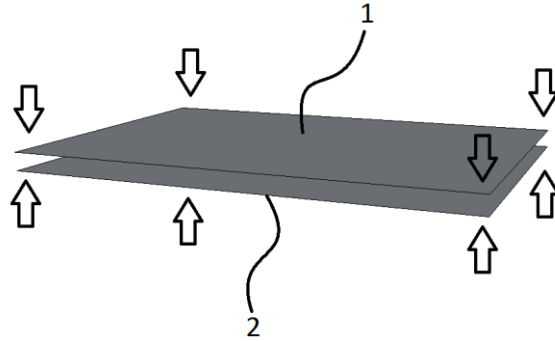
dass das Harz durch eine Kombination von Richtungswechseln der Gefäßebene (2) durch paarweise Steuerung gegenüberliegender Motoren (5 und 7 oder 6 und 8) oder Aktivierung aller Motoren (5-8) gleichzeitig in jede gewünschte Richtung lenkbar ist.

13. Vorrichtung nach Anspruch 11,  
dadurch gekennzeichnet,  
dass die Gefäßebene (2) durch die raumkreisenden Bewegungen Ortswechsel der Gefäßebene (2) relativ zum Objekt (10) ermöglicht, wobei das Gefäß bei mindestens paarweiser Steuerung gegenüberliegender Motoren (5 und 7 und/oder 6 und 8) an einen anderen Ort als zum Punkt (3) bewegbar ist, nämlich zu einem benästen Punkt (4), der vorzugsweise eine halbe Exzenterwellendrehung weit entfernt ist.

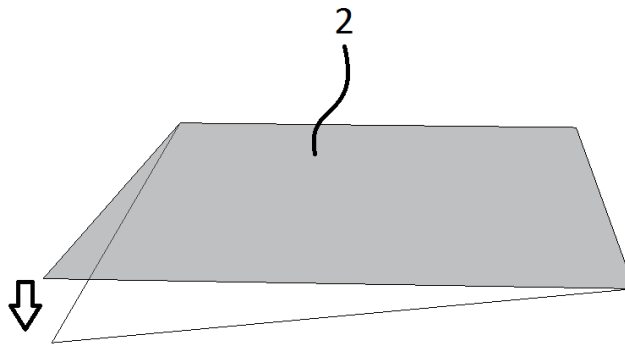
### Zusammenfassung

Die Erfindung betrifft ein Verfahren und eine Vorrichtung zur Herstellung dreidimensionaler kopfüber erstellter Objekte zwischen einer obig angebrachten Tischplattform, an der das Objekt klebt, und einem Harz enthaltenden eckigen Gefäß, an dessen Glasboden die zuletzt erstellte Objektschicht haftet und von dem es durch Absenken mindestens der Gefäßebene (2) mittels triangulierter oder quadrangulärer Ebenensteuerung getrennt wird. Ein sehr schnelles, einfaches und preiswertes Verfahren auf möglichst kleinem Raum, mit geringem Materialaufwand, wobei zudem die Objektabtrennung die Maßhaltigkeit möglichst wenig beeinflusst. Die Erfindung betrifft ebenfalls eine Vorrichtung zur Durchführung des Verfahrens, bei dem die Gefäßebene (2) an jeder ihrer Kanten oder Ecken getrennt absenkbar gestaltet wird und einzeln gesteuert in vorgegebener Reihenfolge, vorzugsweise reihum abgesenkt wird (Fig. 2a).

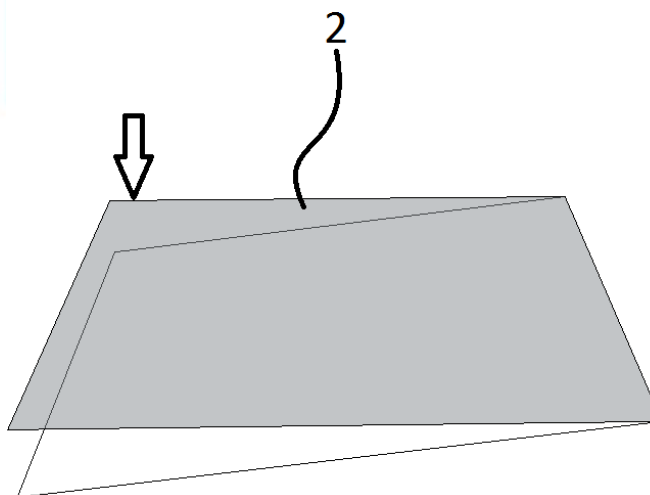
Figures:  
Figur 1:



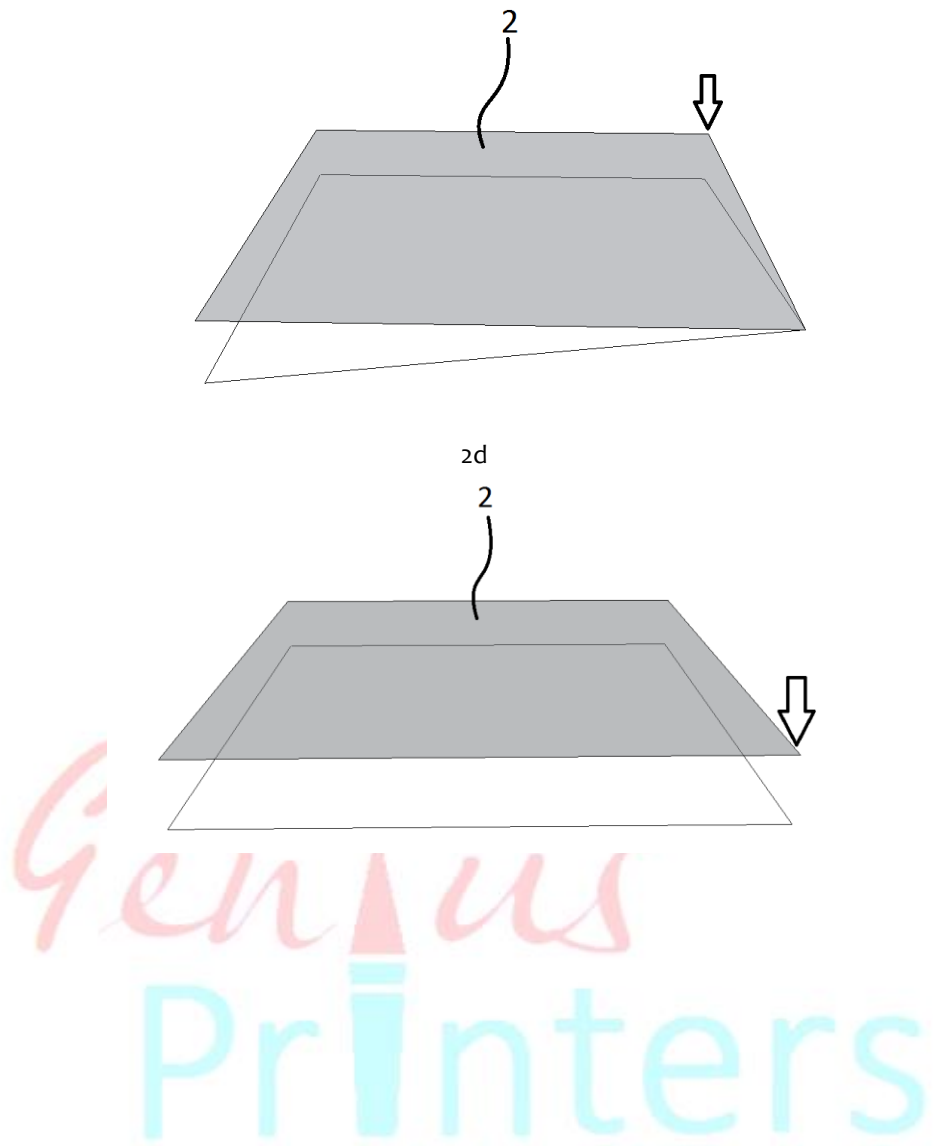
Figuren 2a-d:  
2a



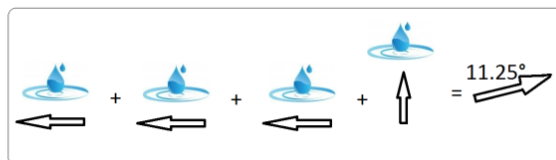
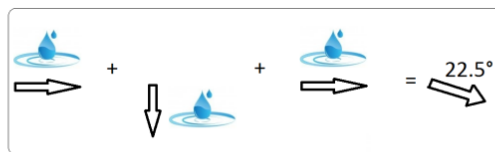
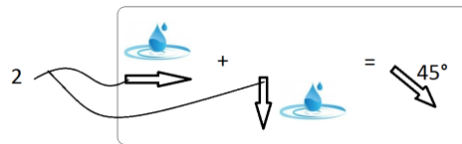
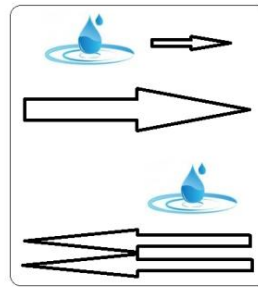
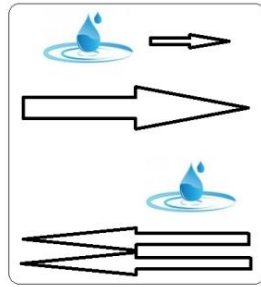
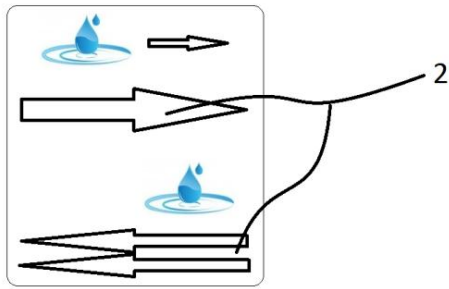
2b



2c



Figuren 3a-c:  
3a



3c

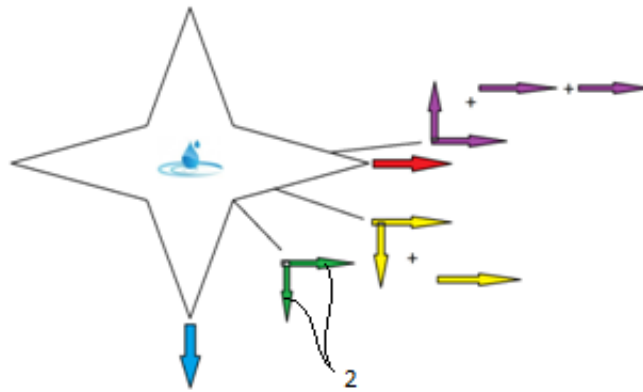
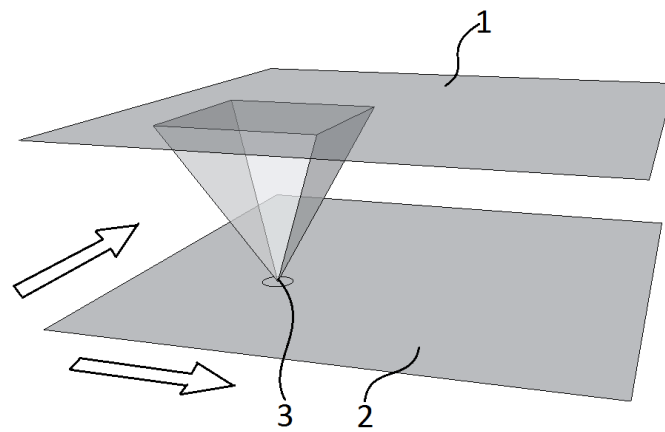
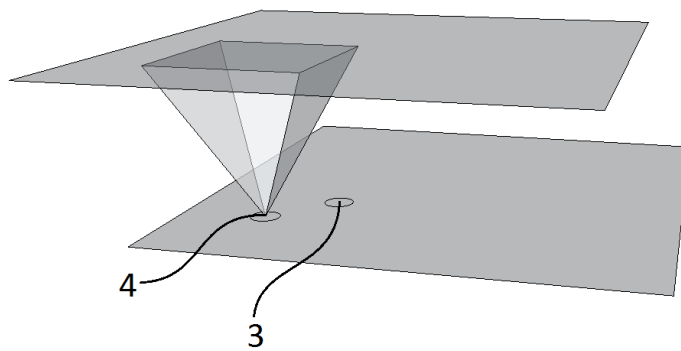


Figure 4a-c:  
4a

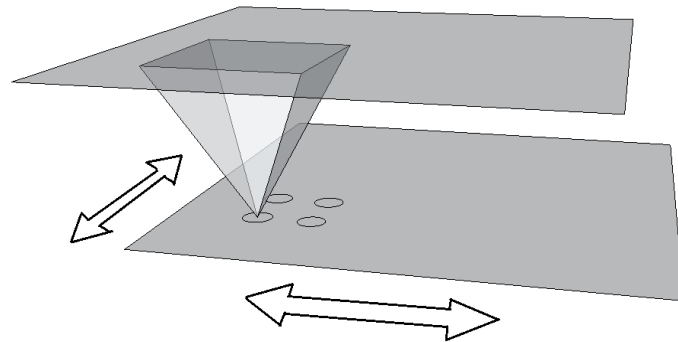


4b

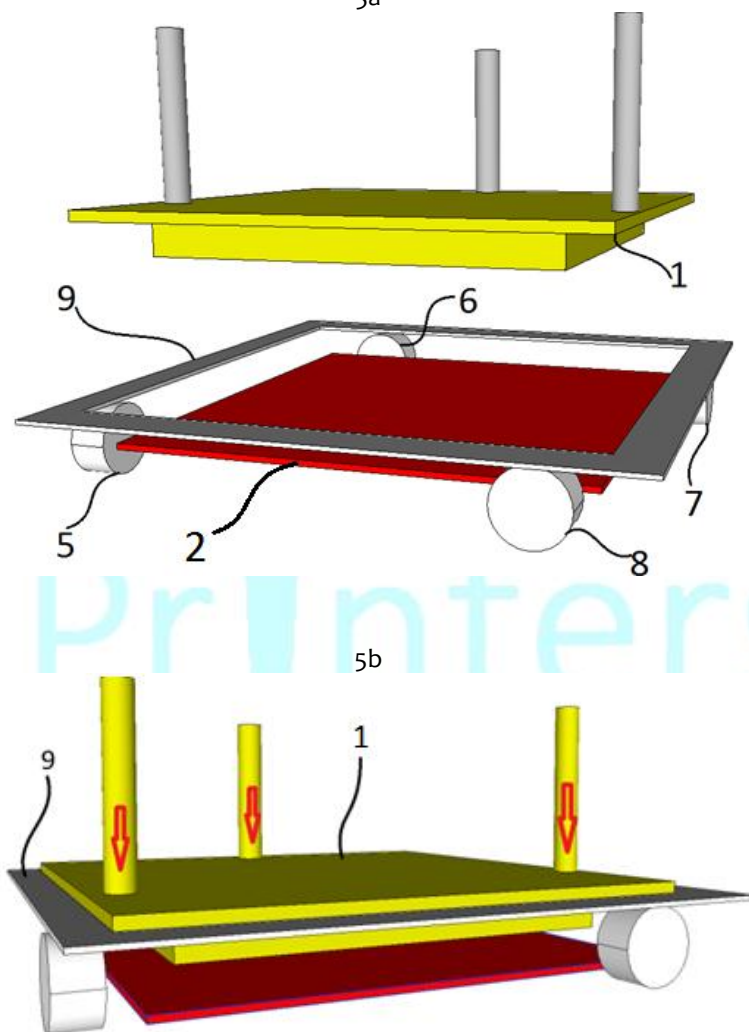


4c





Figuren 5a-c:  
5a



5c

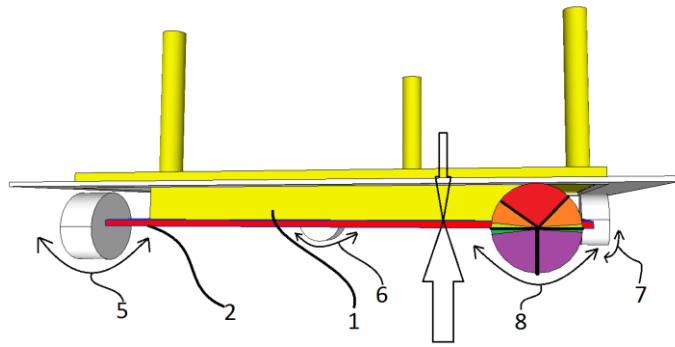
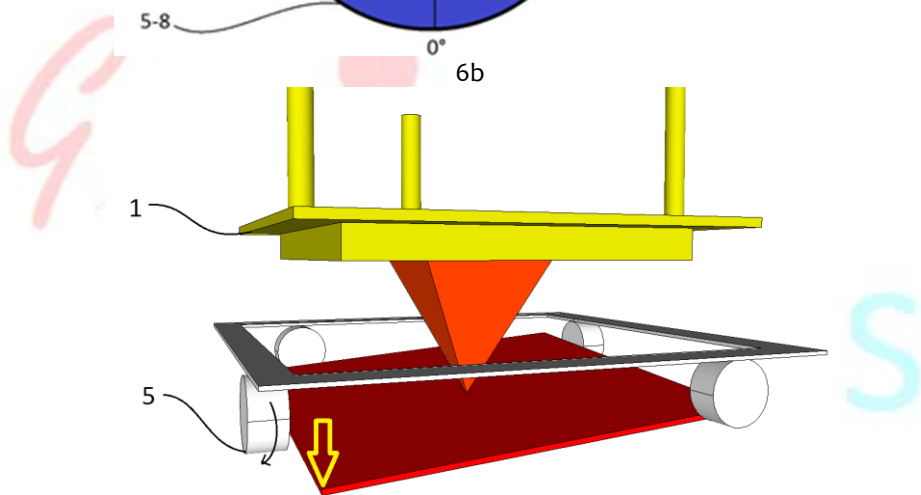
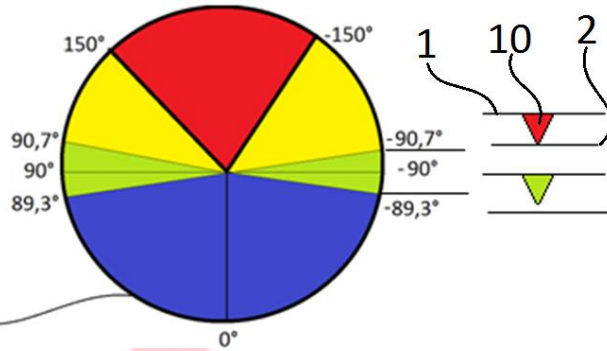
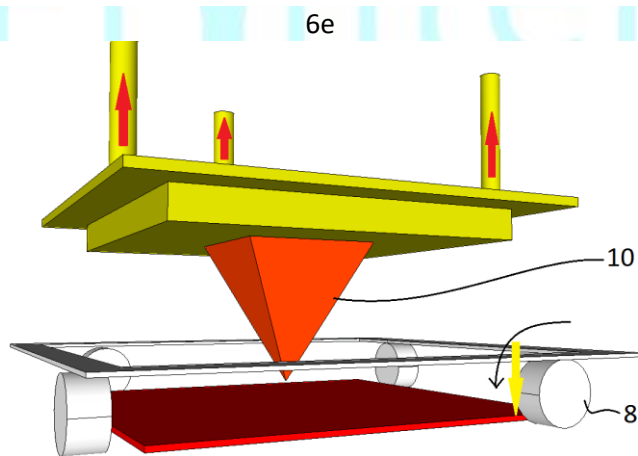
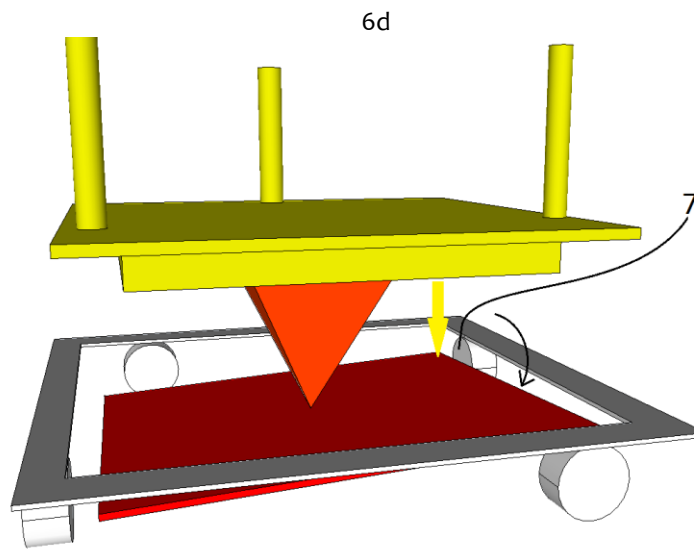
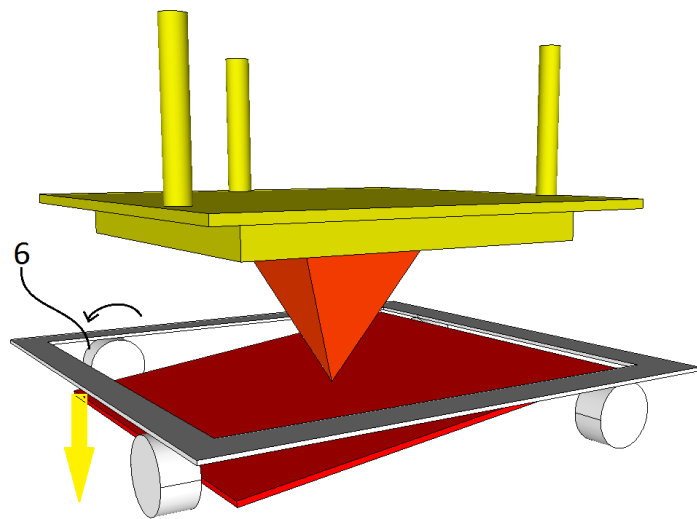


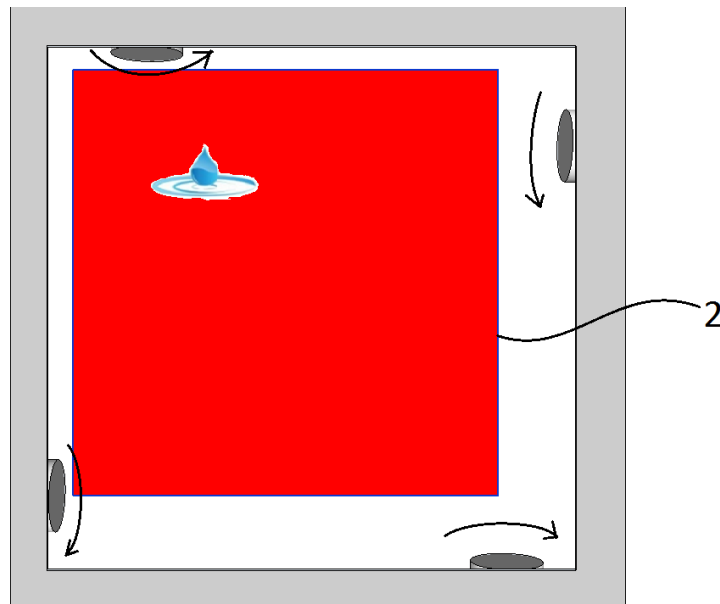
Figure 6a-e:  
6a



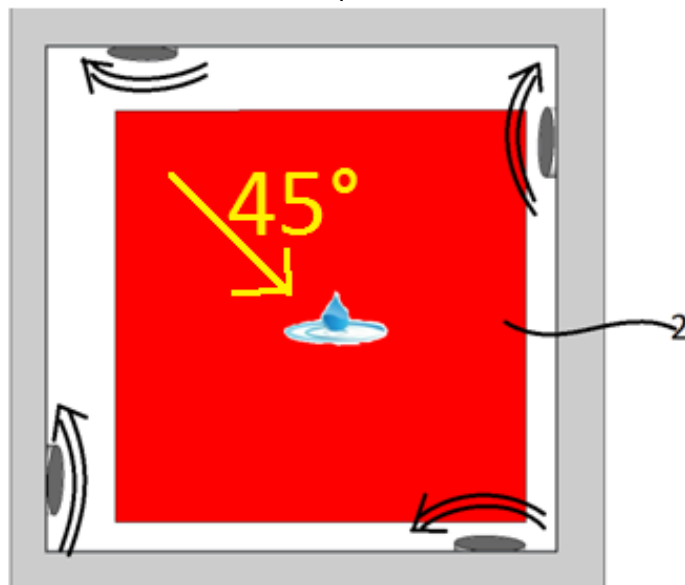
6c



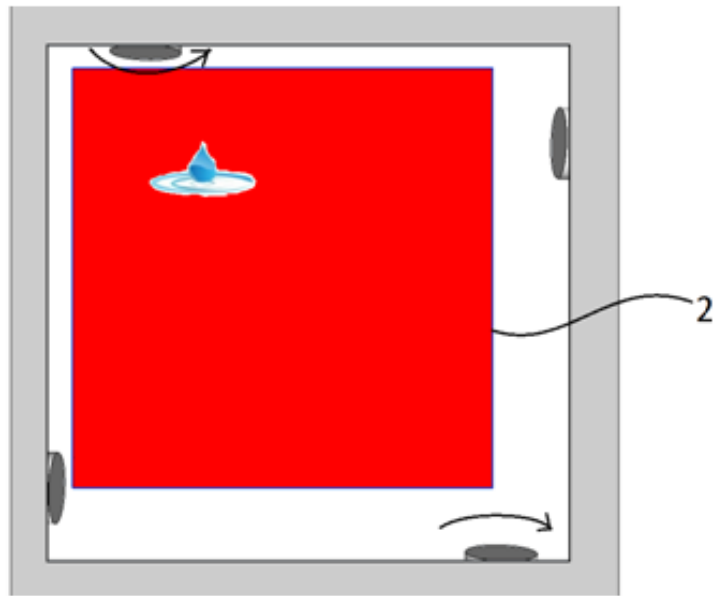
Figuren 7a-e:  
7a



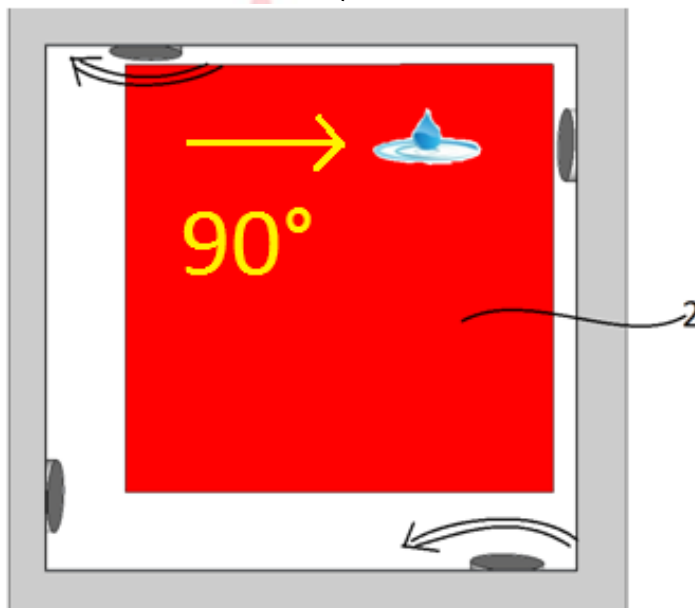
7b



7c



7d



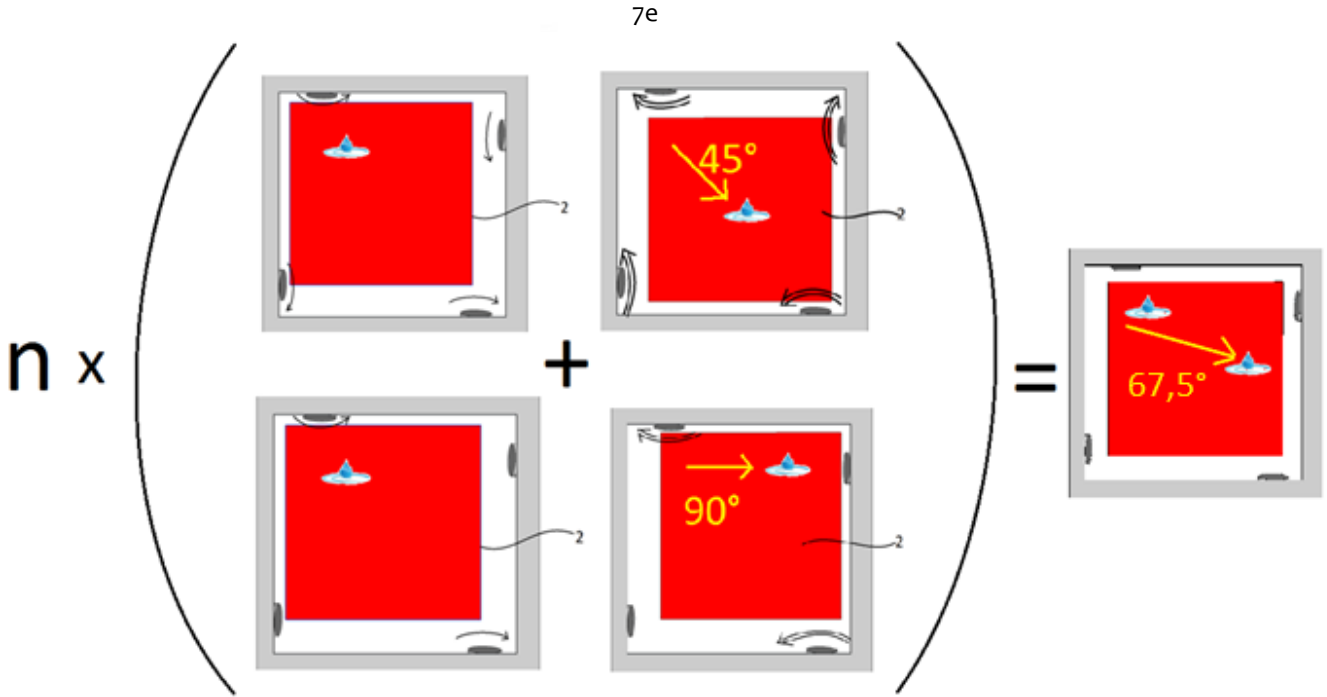
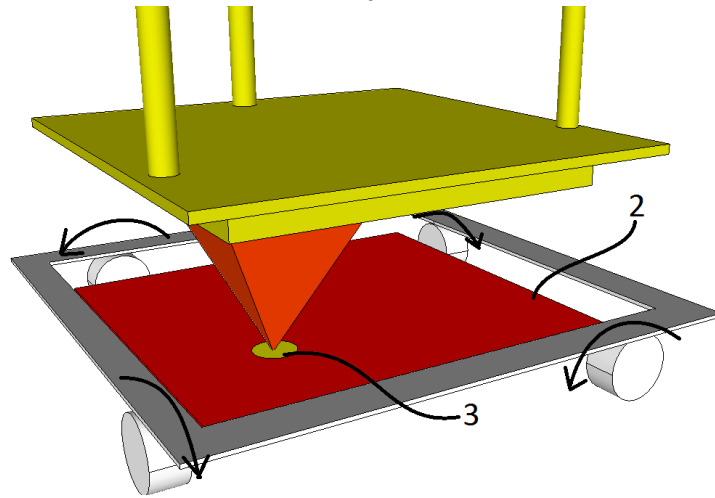
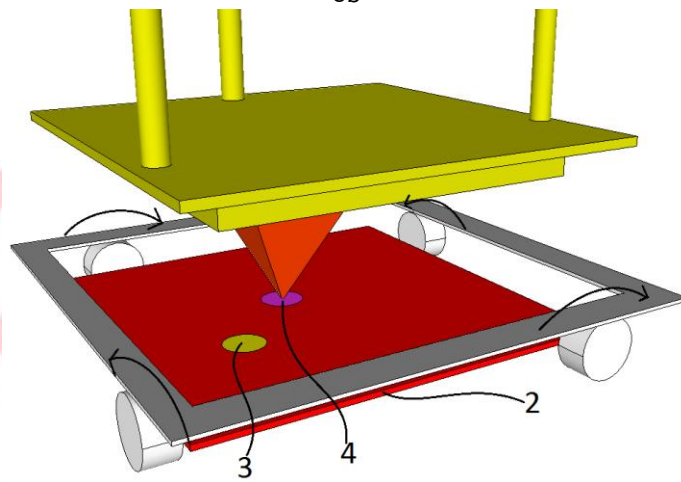


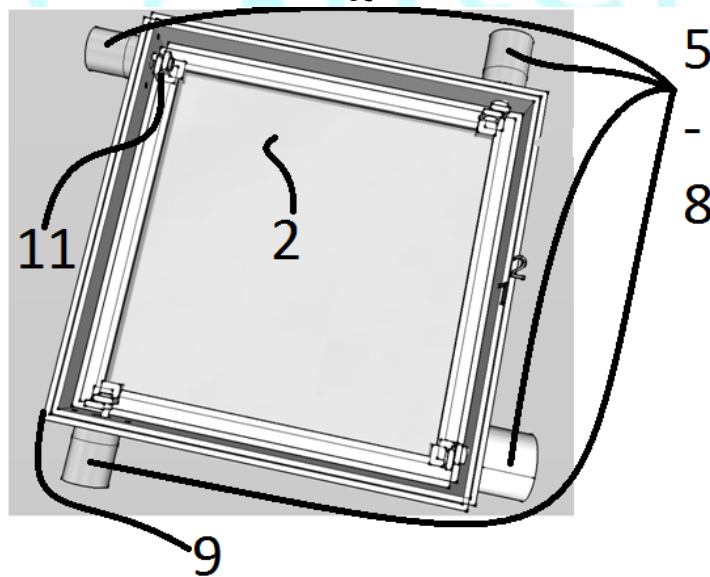
Figure 8a-c:  
8a



8b



8c



## Exhibit A2

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41564 Kaarst

### **3D Grossformatdrucker mit Durchsatz- und Form-variabler Düse, hochviskosem Harz und Deckeninstalliertem Roboterarm.**

Die Erfindung betrifft ein Verfahren zur Herstellung dreidimensionaler Objekte mittels einer drehbaren Durchsatz- und Form-variablen Düse, hochviskosen einfarbbaren Harzes und Deckeninstallierten Roboterarms zwecks möglichst senkrechten Drucks relativ zur zuvor erstellten Bahn, unabhängig von festen Schichthöhen, und –breiten.

Die Vorrichtung zeigt ein kastenloses Design, dessen Skalierbarkeit kaum begrenzt wird und das lebensgrosse, nahezu vollfarbige Objekte bisher kaum druckbarer Grösse sowohl extrem schnell wie auch detailgetreu erstellen kann.

#### Stand der Technik

Die Bauvolumina wie auch die Herstellungsverfahren werden im 3D Druck immer vielfältiger: Auf der einen Seite können Nanodrucker Objekte im Mikrometerbereich erstellen ( zB Nanoscribe), auf der anderen Seite schaffen Grossformatdrucker heutzutage bereits 8m3 (Voxeljet). Es wird gesintert, polymerisiert, geschnitten, geschmolzen, usw.

Die Anforderungskombination von glatten Oberflächen, grossem Volumen, Materialeigenschaften ohne weitere Verarbeitungsvorgänge, und das alles bei vertretbaren Kosten, erschwert jedoch die Wahl der Druckmethode.

Die Aufgabe der Erfindung besteht im Aufzeigen eines Verfahrens zur Herstellung sehr grosser eingefärbter Objekte (zB 8-20m3). So soll der Druck bspw einer lebensgrossen Limousine über Nacht ermöglicht werden. Ebenso sollen Dekorationsstücke individuell



erstellbar sein, bspw ein lebensgrosser Elefant, in einem Stück, in wenigen Stunden, mit selbsttragender Struktur und aus einem Material, das nachbearbeitbar aber auch ohne weitere Prozesse direkt einsetzbar ist. Ein weiterer Schwerpunkt könnte der Druck lebensgrosser Abbilder von Menschen sein.

Als Druckmethoden kommen hier bspw. FDM, Harzpolymerisation und Kunststoffsisinterung in Frage. Allerdings soll das gesinterte Objekt ob seiner Grösse nicht im Ofen nachbehandelt werden müssen. Auch die geforderte Schichtdicke zur schnellen Herstellung wäre problematisch, und eine Pulverabsaugung wäre ebenso schwierig wie die Herstellung eines Rahmens, der das Tonnen-schwere Pulver während des Druckvorgangs halten müsste. FDM hätte das Problem der Drahtaufschmelzung (Gasentwicklung) und eventueller Formgebung des geschmolzenen Plastiks bei der Aufbringung, und der Druck würde sehr lange dauern.

Das Ausgangsmaterial soll möglichst kalt formbar sein, weitgehend ungefährlich, schnell aufbringbar und schnell härtbar; es soll preiswert herstellbar sein, der Elefant (evtl 2.5 x 2 x 3.5m, Fläche bspw. 40m<sup>2</sup>, ca 200Kg Druckmaterial) soll keine 20000€ kosten. Der Druck von 200Kg Material soll in weniger als 12h mit ca 500 Schichten erfolgen. Andererseits sollen bspw. die Stosszähne viel präziser gedruckt werden, zb mit 500µm Schichtdicke. Bei 12KM angenommener gesamter Bahnlänge betrüge die Materialaufbringgeschwindigkeit ca 30cm/Sekunde. Die Geschwindigkeit hinge nun noch von der Materialhärtezeit sowie von der Fahrgeschwindigkeit des Druckkopfes ab.

Genius  
Printers

### Offenbarung der Erfindung

Diese Aufgabe wird durch ein Verfahren mit den Merkmalen nach Ansprüchen 1 bis 4 gelöst.

Beim dem Verfahren ist vorgesehen, dass eine Dosierpumpe das hochviskose Harz aus dem Grosstank durch einen Schlauch zum computergesteuerten Ventil am Druckkopf pumpt um mittels der Fahrgeschwindigkeit der Roboterarms und des Pumpdrucks die Form des abgelegten Harzstreifens bestimmen zu können. Diese Formgebung wird weiter unterstützt, indem der drehbare Druckkopf die Harzbahn mittels variabler Wände (Kellen) glättet, an die darunterliegende Kontur anpasst und der gelegten Bahn die gewünschte Form gibt. Somit sind zB schmale hohe Bahnen möglich, aber auch schmale flache, dicke hohe und dicke flache, je nachdem welche Wanddicke das Objekt mit welcher Detailgenauigkeit benötigt. Vorzugsweise wird ein Laser eingesetzt um die Bahn zu härten. Die Schichterstellung ist also nicht nur vom Pumpdruck, der Bahnhöhe und Bahnbreite sowie von der Roboterarmfahrgeschwindigkeit abhängig, sondern insbesondere von der Aushärtezeit der jeweiligen Bahnform (die wiederum von der Durchfärbung des Harzes abhängt). Das TPE- oder Silikon-Dosierventil (zB bekannt aus Ketchup-Flaschen, oder besser Entenschnabel) hat vorzugsweise eine ovale Austrittsform und erlaubt bei drehbarem Druckkopf dicke wie dünne Bahnen. Die seitliche Bahnformgebung kann auch mittels Silikon-ähnlicher Stützwände erfolgen, die sich hochbiegen, wenn eine Bahn neben einer anderen erstellt werden soll. Wichtiger ist jedoch, dass das ausgedrückte Harz auf eine Unterlage stösst. Dies ist bei Roboterarmen zumeist gegeben, wenn das Ventil des Druckkopfes derartig gedreht wird, dass es möglichst perpendicular zur zuvor gelegten Bahn fährt.

Bei der vorgeschlagenen Vorrichtung ist vorgesehen, dass vorzugsweise ein Roboterarm an vorzugsweise der Decke montiert wird. Sollen langgezogene Objektdrucke erzielt werden (Säulen, Yachten, Hochhäuser, etc.), so ist der Roboterarm unter einen Linearantrieb montierbar. Die Tragkraft liegt bei unter 1 Kg. Der Schlauch ist 8m lang und trägt ca 500gr Harz. Die Fliessgeschwindigkeit liegt bei ca 30cm/s, der Druck bei unter 100bar. Die Zahnradpumpe fördert bis zu 1L/Minute. Der Bewegungsradius des eingesetzten Roboterarms erlaubt ein kreisrundes Bauvolumen von 3m Durchmesser, bei einer Deckeninstallation im Standardgebäude (2,5m Raumhöhe) ist eine Objekthöhe von 2m möglich, das zylindrische Bauvolumen beträgt somit ca 14m<sup>3</sup>.

Zwecks Nutzung der Kellen ist darauf zu achten, dass genügend Lichtenergie in das Harz zwischen den Kellen geführt wird, sodass das Grünstadium eine Formmodellierung zulässt, aber keine Verklebung der Kellen erfolgt.

Bei Einfärbung des Harzes kommt ein weiterer Parameter hinzu, die Lichtenergie muss nun der Druckgeschwindigkeit, der Bahnform und der Lichtdurchdringbarkeit der jeweiligen Farbe angepasst werden.

Die Farbmischung beginnt mit den computergesteuerten Dosierventilen der Farbkanäle unmittelbar am Druckkopf am Nadeleinlass.

Die Farbe wird mittig des Schnabelventils eingespritzt. Das Harz wird nicht völlig eingefärbt und bleibt durchleuchtbar.

Der Farbtransport durch ca 8m lange Schläuche ist zwar lang, aber das Gesamtvolumen beträgt bei 2mm Schlauchdurchmesser nur 25ml. Das Gesamtgewicht aller Dosierventile inkl gefüllter Schläuche liegt bei unter 0,5-1Kg Traglast am Druckkopf.

Vorteilhafte Ausgestaltungen sind in den abhängigen Ansprüchen angegeben.

Durch die erfindungsgemäße Lösung werden die Nachteile des Stands der Technik eliminiert und die folgenden Vorteile erzielt:

1. Der Roboterarm arbeitet ohne fahrenden, wackelnden x/y Tisch, wird bereits massenhaft produziert und ist sehr erprobt. Der Drucker benötigt aus mechanischen Gründen keinen Kasten und keine Wände.
2. Die Mechanik, die Baufläche, ist skalierbar auf über 100 m<sup>3</sup>
3. Die variablen Bahnformen erlauben präzisen oder schnellen Druck
4. Der drehbare formgebende Druckkopf erlaubt variable Bahnformen
5. Die Farbmischanlage erlaubt Vollfarbdruck, sein Bahnformdruck –meist perpendicular zur zuvor verlegten Bahn- sorgt für gute Haftung und geringe Oberflächenrauigkeit
6. Kein Drucker kann derzeit in so kurzer Zeit derartig grosse Kunststoffobjekte mit variabler Auflösung drucken.
7. Ein Linearantrieb zwischen Decke und Roboterarm bzw. ein Drucktisch unter dem Objekt ermöglicht Objektgrößen, die über die Roboterarmlänge hinausgehen. Dies ist insbesondere bei langgezogenen Objekten sinnvoll (Säulen, Yachten, Hochhäuser)
8. Der Druck erfolgt ohne feststehende Z-Schichtung wie heutzutage zumeist noch üblich. Die allseitige Druckkopfrotation erlaubt mittels steuerbarer Massendurchsätze weithin variable Bahnquerschnitte, die nicht mehr aus der Vertikalen gespritzt werden müssen.

Beschreibung der Erfindung: Grundsätzlicher Aufbau mit wesentlichen erfindungsgemäßen Merkmalen

Ein Roboterarm erlaubt ein kastenloses Design. Der Druckkopf ist 360° drehbar. Das drehbare Schnabelventil ermöglicht einen Öffnungsdurchmesser kleiner 500µm wie auch eine ovale Öffnung mit einer Breite von bspw. 10mm. Somit kann je nach Härtingszeit und Massendurchsatz eine feine Kontur für hohe Detailtreue oder eine Wand von bspw 20mm Höhe und 10mm Breite pro Bahn erzeugt werden. Dies erlaubt eine bisher unerreichte Objekterstellungszeit.

Die Oberfläche der aufgetragenen Bahn kann vom silikonartigen Schnabelstück nivelliert werden, die Seiten können der Wand mittels absenkbarer Silikonkellen angepasst werden, sodass keine „Blockhausstruktur“ entsteht, sondern die Bahnen vertikal ineinander übergehen. Die Kellen führen unter dem Schnabel oder laufen dem Schnabel vorzugsweise unmittelbar nach und erlauben die Formgebung auch für Folgeschichten, bspw. dergestalt, dass Seiten nach oben leicht hochgezogen werden um der Folgeschicht besseren Halt zu geben. Eine Kelle pro Seite kann seitlich wie vertikal einzeln gesteuert werden. Wichtiger ist jedoch, dass das ausgedrückte Harz auf eine Unterlage stößt. Dies ist bei Roboterarmen zumeist gegeben, wenn das Ventil des Druckkopfes derartig gedreht wird, dass es möglichst senkrecht zur zuvor gelegten Bahn fährt.

Das Lasermodul läuft wiederum dem Kellenmodul nach und härtet mit flexiblem Fokus, d.h., die elektronische Linse kann den Fokus derartig steuern, dass die Strahlbreite der Bahnbreite angepasst ist, die Intensität der Druckgeschwindigkeit. Dies erlaubt natürlich wesentlich höhere Bahngeschwindigkeiten bei kleinem Bahndurchmesser.

## Beschreibung der Zeichnungen und der bevorzugten Ausführungsform der Erfindung

Die vorliegende Erfindung wird nachfolgend beispielhaft und nicht einschränkend anhand von Zeichnungen näher erläutert. Es zeigen:

Figur 1: Darstellung des Verfahrens zum grossvolumigen Harzdruck mittels Roboterarms

Figuren 2: Darstellung des Verfahrens zur Erstellung grössen- formvariabler Harzbahnen

Figuren 3a-d: Darstellung des Verfahrens zur Rotation des Druckkopfes zwecks Härtung der unmittelbar zuvor gelegten Bahn

Figuren 4a-d: Darstellung der Vorrichtung zur Erstellung grössen- und formvariabler Harzbahnen

Figuren 5a-e: Darstellung des Fließens niedrig- und hochviskoser Harze

Figuren 6a-e: Darstellung verschiedener Verfahren zur Wanderstellung

Figuren 7a-c: Darstellung des Verfahrens und der Vorrichtung (vertikal) gebogener Wände

Figuren 8a-c: Darstellung des Verfahrens und der Vorrichtung zur Bahnformung

In Figur 1 ist das Verfahren zum grossvolumigen Harzdruck mittels Roboterarms schematisch dargestellt.

Ein Roboterarm (2) wird zentral über dem zu erstellenden Objekt (3) an der Decke (1) installiert. Evtl. unterstützt ein zwischenmontierter Linearantrieb die Herstellung längsorientierter Objekte. Möglich ist auch der Druck auf einem xy-verfahrbaren Tisch. Eine Zahnradschleuse (5) drückt hochviskoses Harz vom Tank (4) durch einen Schlauch (16) zum Dosierventil (7) am Druckkopf (8), das vom Computer (6) gesteuert den Harzfluss zum Schnabelventil (13) reguliert. Parallel zum harzführenden Schlauch werden farbengefüllte Schläuche zu den Regelventilen (15) nahe des Druckkopfes geführt.

Die Figuren 2 zeigt das Verfahren zur Erstellung grössen- formvariabler Harzbahnen

Der höhensteuerbare, drehbare Druckkopf (8) besteht mindestens aus einem Schnabelventil (13) zur Harzausgabe und einer Härtungseinheit (10) bestehend aus vorzugsweise einer starken Laserdiode (z.B. 5W) und einer Fokussiereinheit, die den Strahldurchmesser der Bahnbreite (9) und die Intensität der Wandhöhe (9) anpasst. Weitere Parametrierung ist der Materialeinfärbung -per im Schnabelventil steckender Nadel (14)- und der Fahrgeschwindigkeit (12) geschuldet. Möglich ist auch die Anbringung eines Kellensystems (11), das die Bahn in Form drückt bevor sie gehärtet wird.

Figuren 3a-d: Darstellung des Verfahrens zur Rotation des Druckkopfes zwecks Härtung der unmittelbar zuvor gelegten Bahn

Der Druckkopf (8) rotiert dergestalt, dass die Härtungseinheit (10) stets hinter dem Schnabelventil (13) über die unmittelbar zuvor erstellte Bahn gleitet. Nach der Bahnerstellung in Figur 3a wird in Figur 3b nun der Druckkopf gegen den Uhrzeiger gedreht, in Figur 3c dagegen erfolgt die Drehung (18) im Uhrzeigersinn.

Figuren 4a-d: Darstellung des Verfahrens zur Erstellung grössen- und formvariabler Harzbahnen

Das drehbare Schnabelventil (13) im drehbaren Druckkopf (8) erlaubt die definierte Aufbringung der Bahnformen (9). Figur 4a zeigt relativ zur Fahrriichtung (12) ein querstehendes Schnabelventil, aus dem bei niedrigstmöglichem Druck die dünnste Bahn mit kleinstem Durchmesser (niedrigste Wandhöhe für besten Detaildruck) ausgegeben wird. Figur 4b zeigt relativ zu Figur 4a ein um 90° gedrehtes Schnabelventil. Hiermit sind dünnste Wände bei höherer Druckgeschwindigkeit möglich. In Figur 4c wird der Massendurchsatz erhöht, sodass entweder hohe Druckgeschwindigkeiten oder hohe Wände ermöglicht werden. Figur 4d zeigt den höchsten Massendurchsatz: Das quer zur Druckrichtung stehende Schnabelventil druckt bei maximalem Massendurchsatz entweder breite Wände sehr schnell oder sehr hoch. Abhängig von der Härtungsenergie können hier ca 20cm<sup>3</sup>/s bei vorgestellter Vorrichtung gedruckt werden.

Figuren 5a-e: Darstellung des Fliessens niedrig- und hochviskoser Harze

Niedrigviskose Harze wie in Figur 5a gezeigt fließen zu schnell seitlich ab um genügend formstabil für eine Wanderstellung zu sein. Hochviskose Harzmasse wie in Figur 5b gezeigt bietet eine bessere Formstabilität. Figur 5c zeigt nochmals das Harzfließverhalten unter Berücksichtigung der jeweiligen Druckrichtungen. In Figur 5d wird der Druckkopf nicht abgesenkt, somit bestimmen Viskosität, Druckgeschwindigkeit und Massendurchsatz die Wandhöhe. Besser wäre jedoch die Höhenbegrenzung durch das Schnabelventil, so erhält

die Bahn nicht nur eine definierte Höhe, sondern wird auch –abhängig von Massendurchsatz und Druckgeschwindigkeit- gegen die benachbarte Bahn gepresst.

Figuren 6a-e: Darstellung verschiedener Verfahren zur Wanderstellung

Figur 6a zeigt die instabilste Form eines Wandaufbaus aus kreisrunden Bahnen, die kaum vertikale Berührungsfläche aufzeigen (Blockhausbau). Figur 6b zeigt eine typische FDM Wanderstellung aus mehreren vertikalen wie auch horizontalen Schichten, wobei jede Bahn vom Mündungsstück vertikal erstellt und möglichst in eine ovale Form gedrückt wurde, sodass die Zwischenräume innerhalb der Wand minimiert wurden. In Figur 6c wird die Wand aus einer Bahn mit grossem Höhen/Breitenverhältnis erstellt. Die Wandhöhe kann je nach Viskosität, Härtingsenergie, Materialeigenschaften, Fahrgeschwindigkeit und Massendurchsatz über 2cm betragen. Eine äusserst schnelle Objekterstellung zu Lasten der Wandrauhigkeit. Schräge Wände könnten gemäss der Methode aus Figur 7c dennoch versucht werden. Figur 6d zeigt weniger rauhe Wände zu Lasten einer erhöhten Anzahl von Bahnen, die jedoch aufgrund des variablen Massendurchsatzes mit drehbarem Schnabelventil nicht viel länger dauern müssen. Müssen die Wände aus statischen Gründen dicker ausfallen, so wäre dies mit höchstem Massendurchsatz, quergestellten Schnabelventil (wie in Figur 4d) möglich und ergäbe ein Bahnbild gemäss Figur 6e.

Figuren 7a-c: Darstellung des Verfahrens und der Vorrichtung vertikal gebogener Wände

Figur 7a zeigt die herkömmliche Methode definierter Schichthöhen und Bahnbreiten im FDM Druck. Soll hier eine wie in Figur 7a gezeigte gebogene Wand erstellt werden, so müssen die Bahnen in Form gelegt werden, mit dem Ergebnis, dass die Wand rau und die Form ungenau nachgezeichnet wäre. Bei einem vielachsigen drehbaren Druckkopf eines Roboterarms muss aber bei grossen Objekten nur selten (wenn der Druckkopf gegen das Objekt führe) von oben vertikal gedruckt werden. Das beste Druckbild entsteht, wenn der Druckkopf perpendicular zur zuvor erstellten Bahn drucken kann. Dies ist insbesondere bei Decken der Fall, insbesondere wenn diese parallel zur Horizontalen erstellt werden sollen. Wenn der Druckkopf in diesem Fall horizontal spritzen kann, drückt die Harzmasse bei richtiger Einstellung gegen die zuvor erstellte Bahn und findet dort Halt, sodass die Durchbiegung minimiert wird. So sind Decken ohne Stützstrukturen möglich. Figur 7b zeigt, dass hier ohne definierte Höhenschichten gedruckt wird und jede Bahn möglichst senkrecht

auf die zuvor erstellte trifft. Der Druckkopf (8) muss sich dafür wie in Figur 7c gezeigt ständig der Wandstruktur anpassen.

Figuren 8a-c: Darstellung des Verfahrens und der Vorrichtung zur Bahnformung

Die mittels Schnabelventils gelegte Bahn wird in Form gedrückt, indem Silikonkellen zu beiden Seiten des Ventils oder unmittelbar dahinter vertikal wie auch lateral Bahnlängszentriert verfahren können um die Bahn seitlich zu formen, sofern eine Wand erstellt wird (Figur 8a), oder nur eine seitenformgebende Kelle um die aktuelle Bahnhöhe heruntergefahren wird, wenn die Bahn neben eine andere und auf eine Fläche gelegt wird (Figur 8b), oder eine seitenformgebende Kelle um eineinhalb mal die aktuelle Bahnhöhe heruntergefahren wird, wenn die Bahn neben eine andere und auf eine Wand-Bahn gelegt wird (Figur8c).





Legende Zahlenbezeichnungen:

1. Objektzentrierte Deckenmontage, mit Linearantrieb bei langgezogenen Objekten
2. Roboterarm
3. Konisch nach unten zulaufendes Bauvolumen
4. Harztank
5. Dickstoffpumpe, zB 100Pas
6. PC
7. PC-gesteuertes Harz-Ventil
8. Drehbarer Druckkopf
9. Gedruckte Harzbahn
10. Intensitäts- und Durchmesser- variabler Laserstrahl
11. Höhen- und Distanz- variable Kellen
12. Druckrichtung
13. Höhenvariables (durch Roboterarmbewegung) und Austrittsöffnungs-variables (durch Massendurchsatz) drehbares Schnabelventil
14. Nadel zur Farbdurchmischung des transparenten Harzes
15. Vielfach-Ventil zum Durchlassen einer Farbe pro Kanal
16. Schlauch für Harz und Farbtransport zum Druckkopf
17. Multikanalpumpe für CMYBW
18. Indikation der Drehrichtung des Druckkopfes

## Ansprüche

14. Verfahren zur Herstellung dreidimensional erstellter grossvolumiger Objekte mittels eines Druckkopfes, der aufgrund der Bewegungsfreiheit des Roboterarms sowohl höhenverstellbar wie auch drehbar ist  
dadurch gekennzeichnet,  
dass der Druckkopf (8) ein drehbares Schnabelventil (bspw. aus Silikon) (13) mit vorzugsweise ovaler Austrittsöffnung aufweist, sodass die Ventilöffnung je nach Massendurchsatz und Druckkopffahrgeschwindigkeit (12) verschiedene Harzbahnformen erstellen kann, bspw. von breit flach (genügend Druck, dass das quer zur Bahn gedrehte Ventil oval öffnet, Ventilmündung drückt zusätzlich das die Harzbahn flach) (Figur 4a) auf schmal flach (genügend Druck, dass das längs zur Bahn gedrehte Ventil öffnet) (Figur 4b), auf schmal hoch (genügend Druck, dass das längs zur Bahn gedrehte Ventil oval öffnet) (Figur 4c), auf breit hoch (genügend Druck, dass das quer zur Bahn gedrehte Ventil oval öffnet) (Figur 4d).
15. Verfahren nach Anspruch 1,  
dadurch gekennzeichnet,  
dass der Druckkopf des vielachsigen drehbaren Roboterarms nicht von oben vertikal drückt, sondern perpendikular auf die zuvor erstellte Bahn. So sind Decken ohne Stützstrukturen möglich. Jede Bahn trifft möglichst senkrecht auf die zuvor erstellte (Figur 7b). Der Druckkopf (8) muss sich dafür wie in Figur 7c gezeigt ständig der Wandorientierung anpassen. Die Software benutzt keinen herkömmlichen Slicer mehr, jede Bahn kann an jedem Ort unterschiedlich hoch und breit sein, wobei die Bahnform (Dicke und Breite) sich im Raum an der zuvor erstellten Bahn und zu erstellenden Wandform orientiert (Figur 7b und c).
16. Verfahren nach Anspruch 2,  
dadurch gekennzeichnet,  
dass die mittels Schnabelventils gelegte Bahn in Form gedrückt wird, indem Silikonkellen zu beiden Seiten des Ventils oder unmittelbar dahinter vertikal wie auch lateral Bahn-längszentriert verfahren können um die Bahn seitlich zu formen, sofern eine Wand erstellt wird (Figur 8a), oder nur eine

seitenformgebende Kelle um die aktuelle Bahnhöhe heruntergefahren wird, wenn die Bahn neben eine andere und auf eine Fläche gelegt wird (Figur 8b), oder eine seitenformgebende Kelle um eineinhalb mal die aktuelle Bahnhöhe heruntergefahren wird, wenn die Bahn neben eine andere und auf eine Wand-Bahn gelegt wird (Figur8c).

17. Verfahren nach Anspruch 3,

dadurch gekennzeichnet,

dass die Farbgebung der Bahn im Schnabelventil unmittelbar vor seinem Öffnungsstück stattfindet, indem Dosierventile den jeweiligen Farbkanal öffnen und die Farben in der Nadel gemischt werden.



## Zusammenfassung

Die Erfindung betrifft ein Verfahren zur Herstellung dreidimensionaler Objekte mittels einer drehbaren Durchsatz- und Form-variablen Düse, hochviskosen einfarbbaren Harzes und Deckeninstallierten Roboterarms zwecks möglichst senkrechten Drucks relativ zur zuvor erstellten Bahn, unabhängig von festen Schichthöhen, und –breiten.

Ein kastenloses Design, dessen Skalierbarkeit kaum begrenzt wird und das nahezu vollfarbige, lebensgrosse Objekte bisher kaum druckbarer Grösse sowohl extrem schnell wie auch detailgetreu erstellen kann.

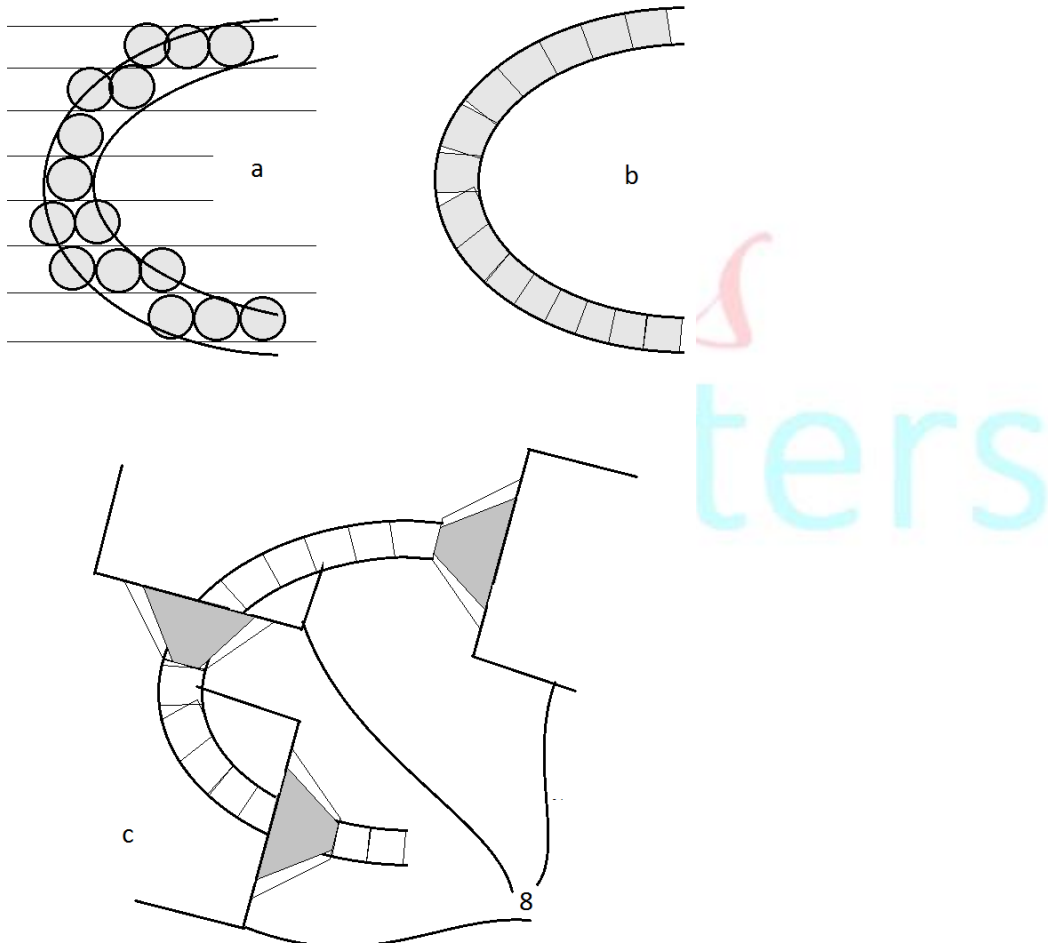
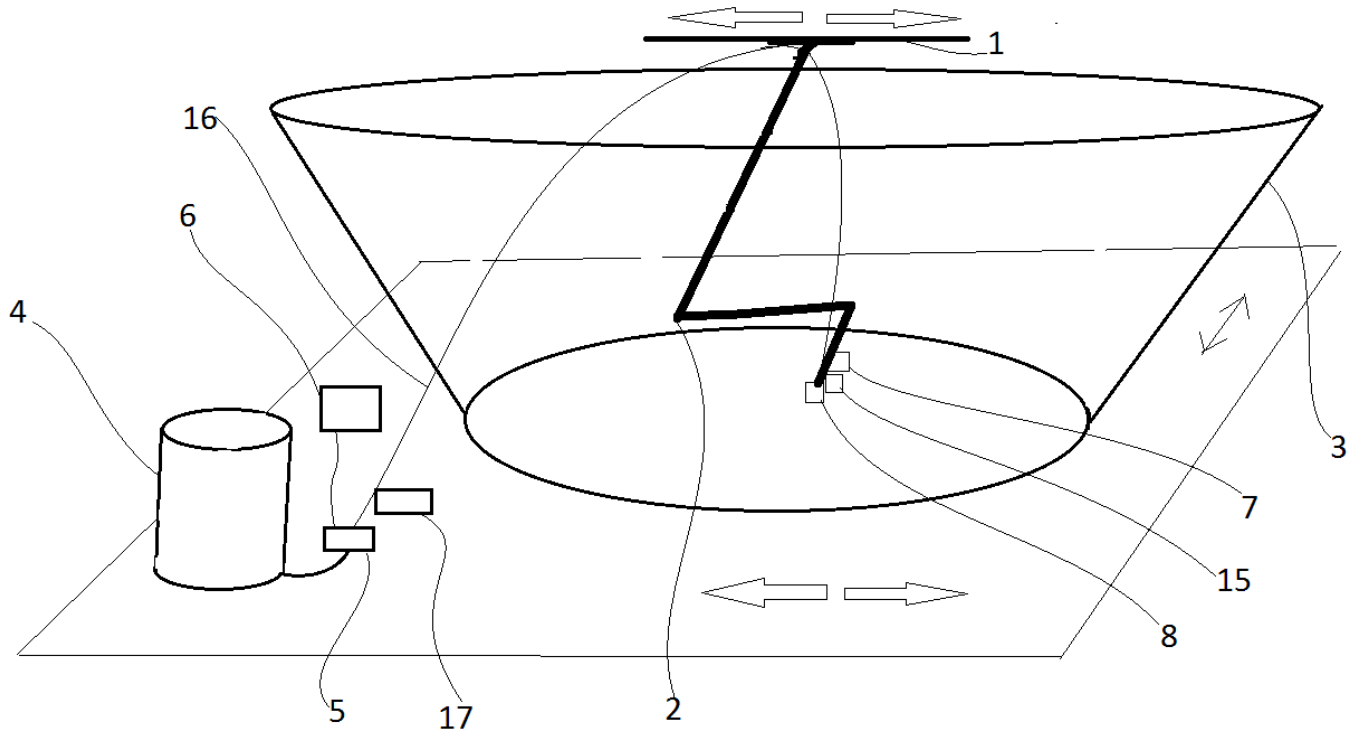


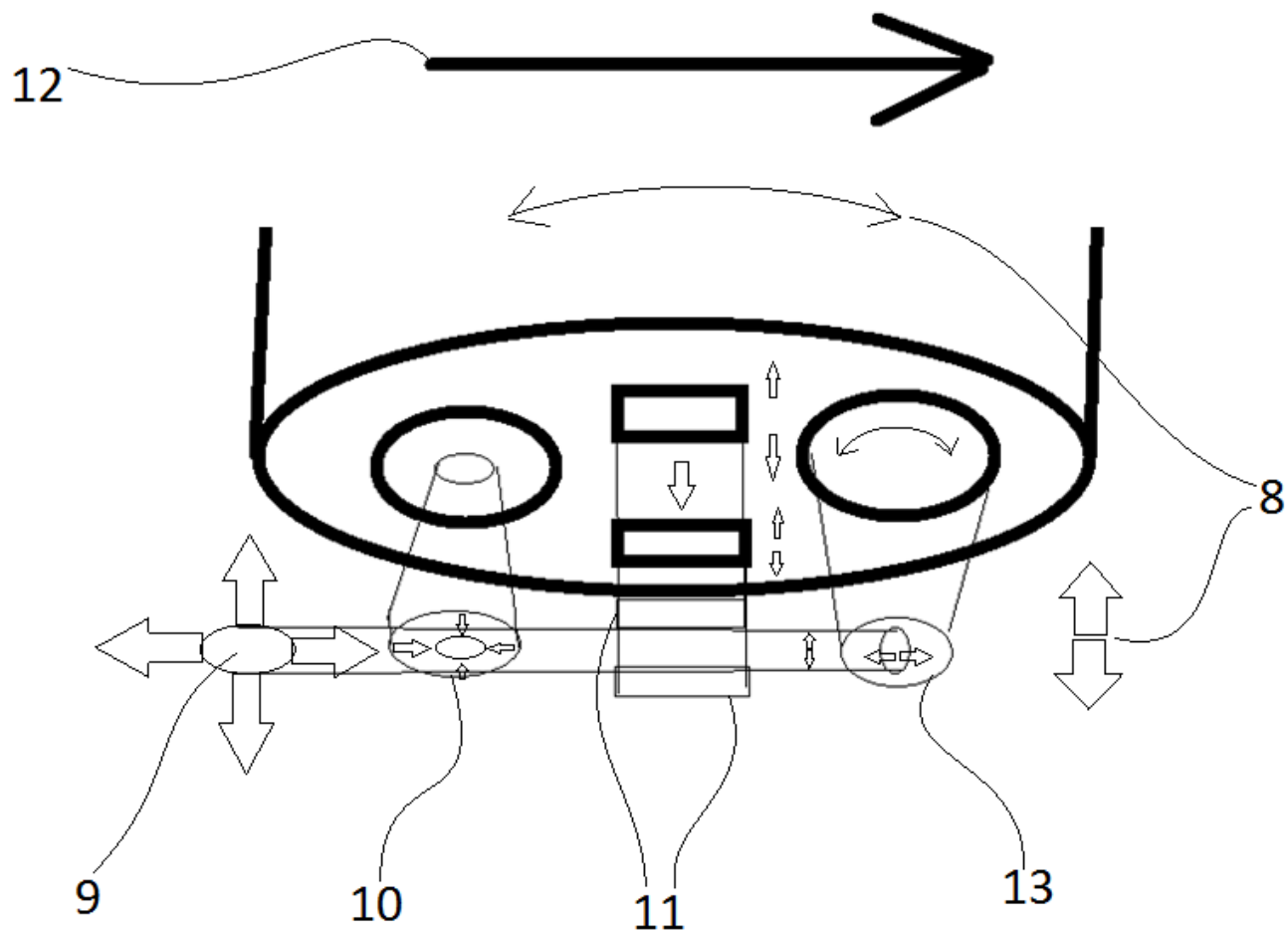
Figure 1-7:

Figure 1:



Printers

Figur2:



Printers

Figure 3a-c

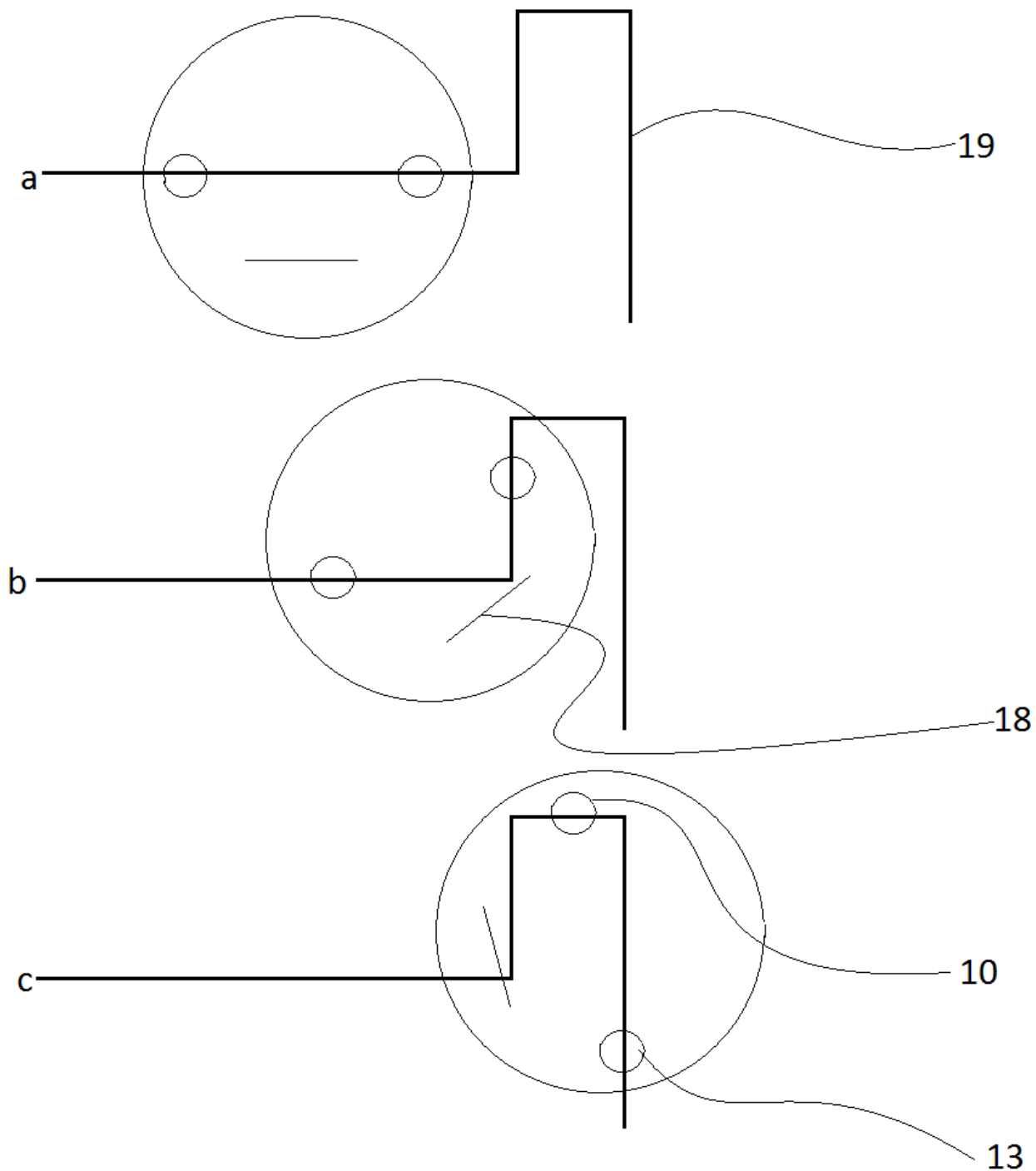
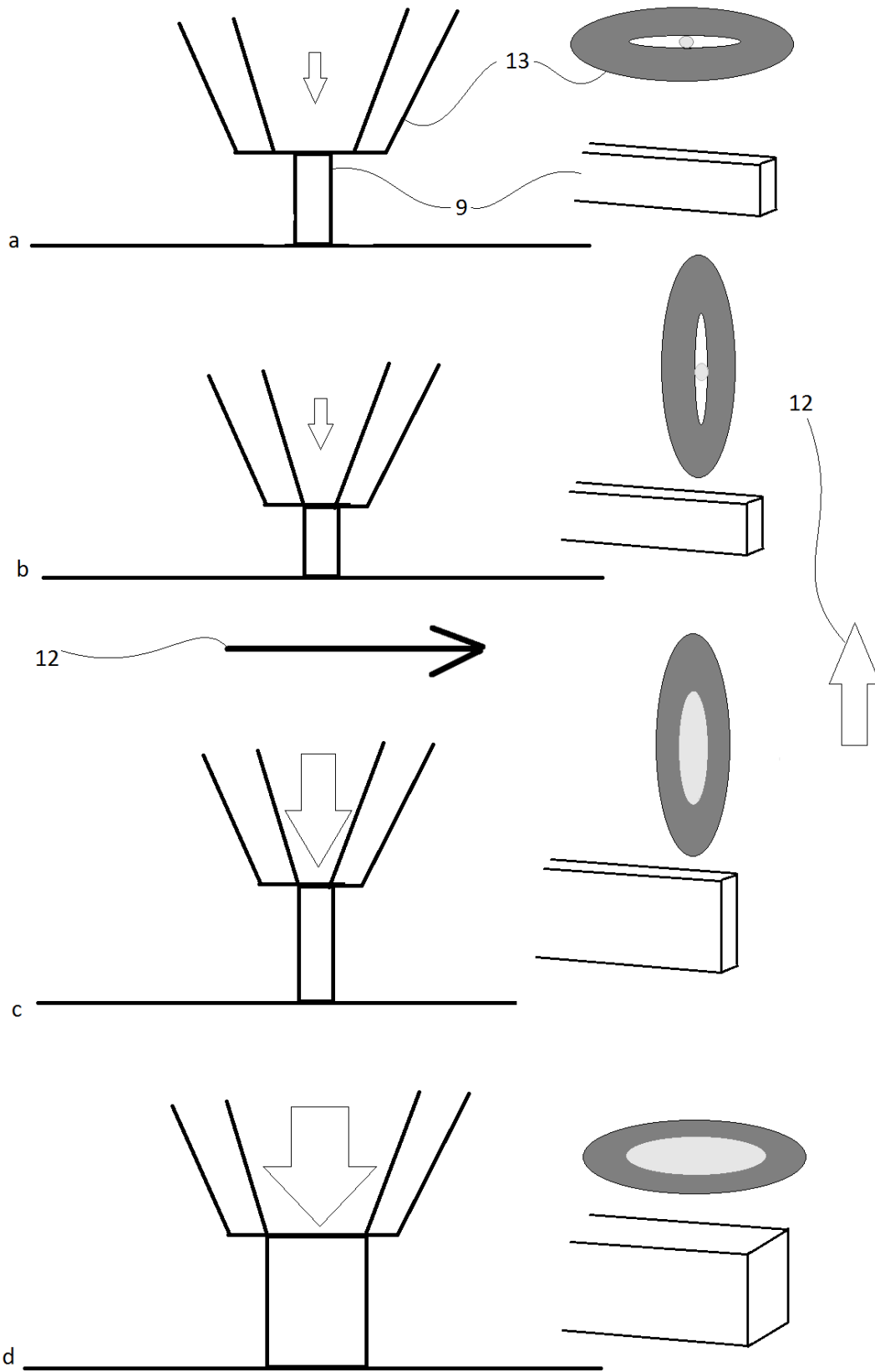


Figure 4a-d





Figuren 5a-e

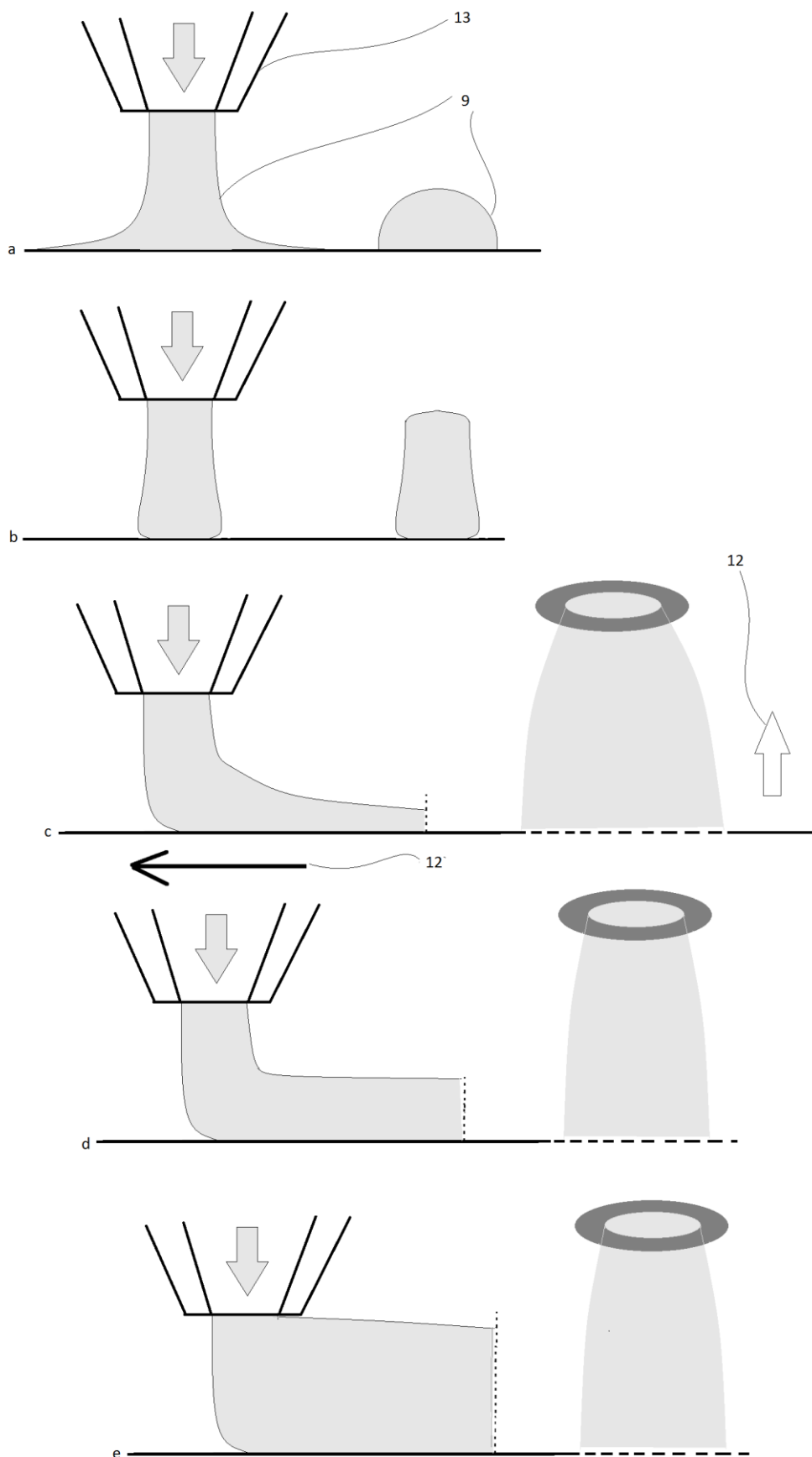


Figure 6a-e

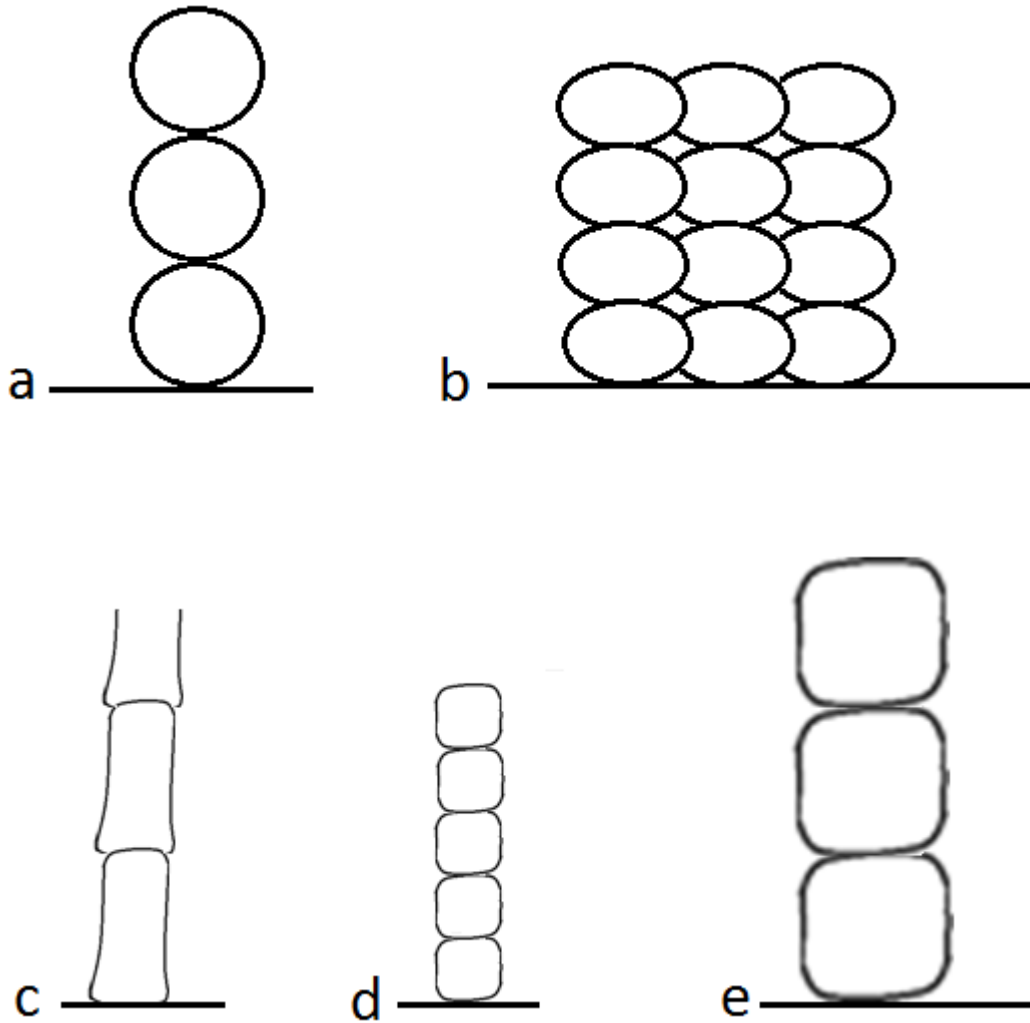


Figure 7 a-c

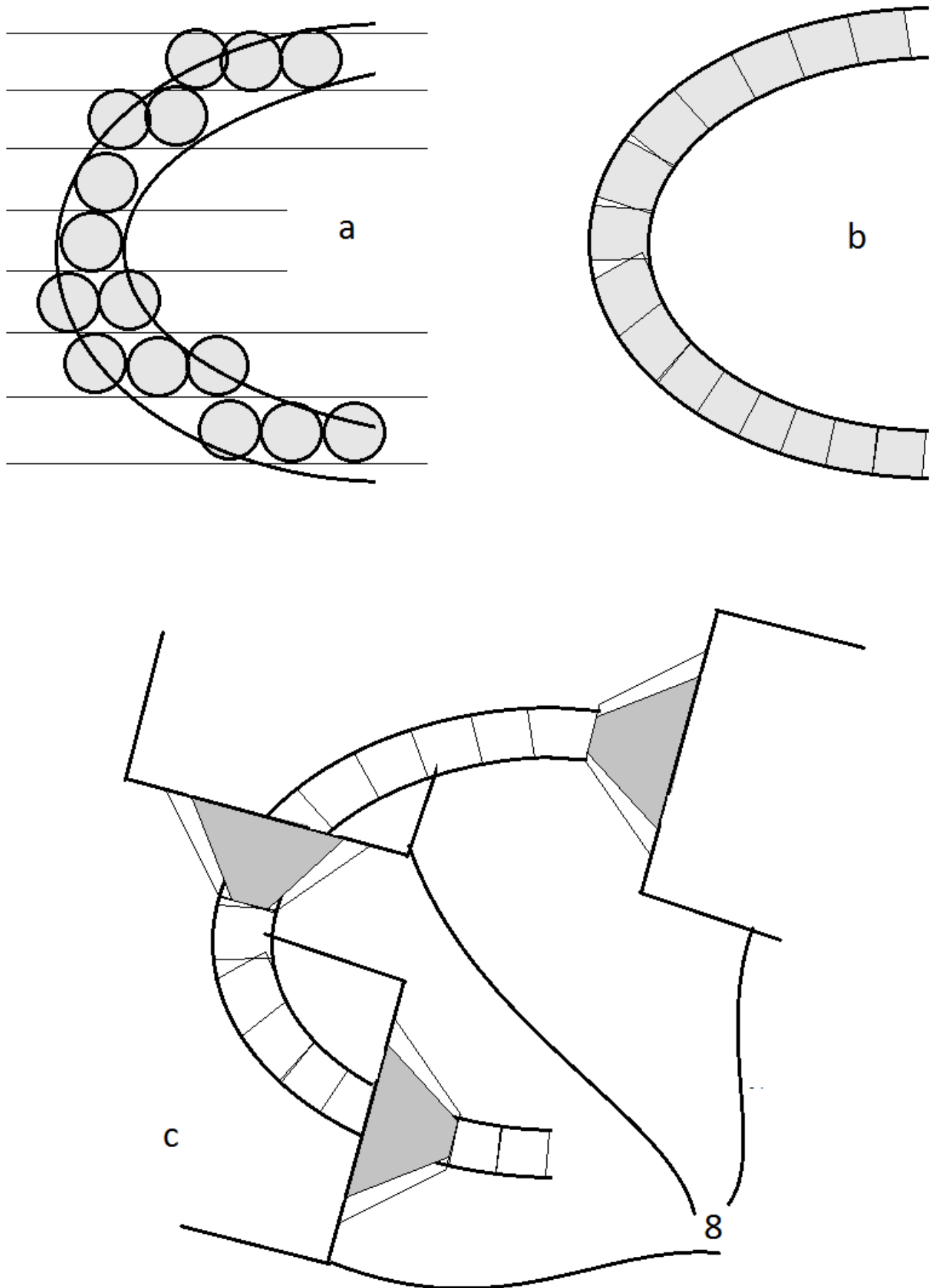
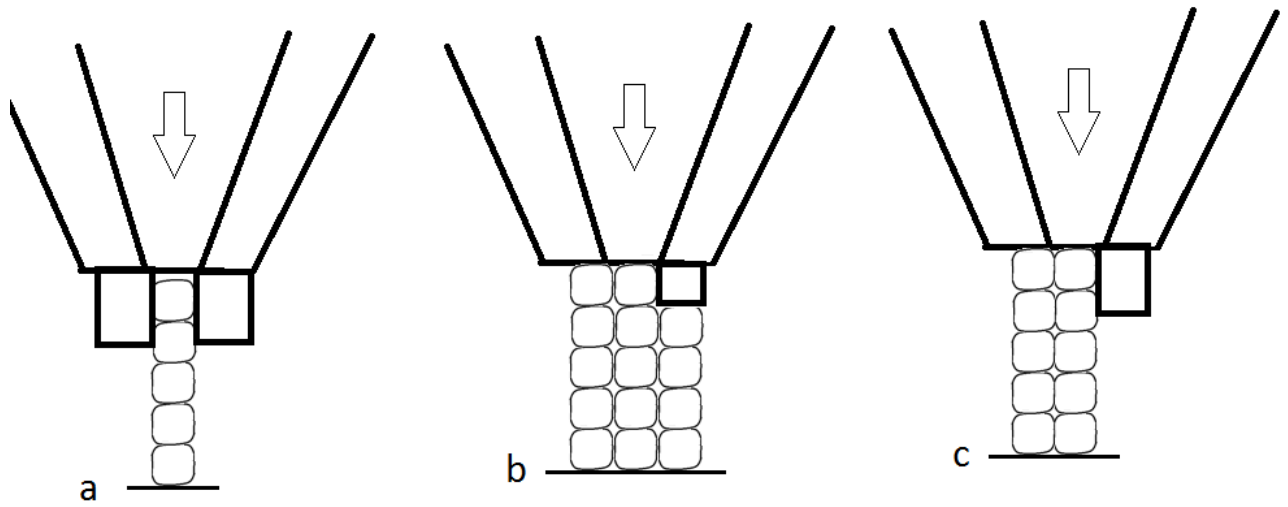


Figure 8a-c



Genius  
Printers

## Exhibit A3

### 3D-Trommeldrucker

Die Erfindung betrifft ein Verfahren und eine Vorrichtung zur schichtweisen Herstellung von dreidimensionalen Objekten. Insbesondere gilt die Erfindung der schichtweisen Herstellung von dreidimensionalen Objekten mittels einer Drucktrommel.

#### Stand der Technik

Die Entwicklung technischer Verfahren zur Herstellung dreidimensionaler Objekte läuft auf Hochtouren. Experten sagen voraus, dass insbesondere das additive Verfahren des 3D Drucks die vierte industrielle Revolution einläuten könnte. Hierbei werden Objekte schichtweise erzeugt, z.B. mittels Pulverbenässung, Plastikdrahtschmelzung, Pulverschmelzung, Harzpolymerisation, usw.

Nachdem das Basismaterial für die Objekterstellung bestimmt wurde (zB Harz), muss nun ein Mechanismus gesucht werden, der es möglichst schnell schichtweise auftragen und festigen/trocknen/härten kann. Üblicherweise bedient man sich kartesisch verfahrenender Druckköpfe, also entweder einer Druckkopfleiste, die schmaler als die Objektbreite ist und daher links, rechts UND vor und zurück fahren kann, oder einer genügend breiten Druckleiste, die nur noch links/rechts ODER vor/zurück fahren muss. Allen Verfahren gemein ist der schichtweise Aufbau, weshalb entweder die Druckköpfe angehoben oder das Objekt abgesenkt werden muss.

Die Physik unterteilt Bewegungsarten in gleichförmige und ungleichförmige. Ein kartesisch verfahrenender Druckkopf muss beschleunigt und abgebremst werden, bevor er seine Richtung ändert. Die hierfür notwendige Überwindung der Massenträgheit beeinträchtigt die Schichterstellungsgeschwindigkeit erheblich. Zudem muss die Druckgeschwindigkeit stets der sich ständig ändernden Fahrgeschwindigkeiten während der Beschleunigungsvorgänge angepasst werden. Kia Silverbrook hat ein MEMSJET Druckverfahren entwickelt, bei dem der objektbreite Druckkopf steht und das Objekt (Papier für einen 2D Drucker) unter dem

Druckkopf entlang fährt. Somit wurde Mechanik eingespart und die Druckgeschwindigkeit stark erhöht.

3D Massendruck soll die vierte industrielle Revolution einläuten: Individuelle Objekte unterschiedlicher Grössen, Formen, Farben und Materialeigenschaften sollen den Spritzguss ersetzen. 3D Systems Inc. haben ein „Racetrack“ System stehender Druckköpfe mit auf Schienen laufenden Objektträgern gebaut. Die Erstellungszeit pro Schicht wurde damit extrem erhöht, alle anderen Systemanforderungen jedoch erfüllt.

Die individuelle Massenproduktion verlangt individuelle Vervielfältigungen, wie sie im Spritzgussverfahren nicht realisierbar sind. 3D Drucker eignen sich hierfür hervorragend, jedoch ist das kartesische Bewegungsmuster eines oder mehrerer Druckköpfe aufgrund der Massenträgheiten niemals in der Lage, die Schichten mit der für Massenproduktion notwendigen Druckgeschwindigkeit zu erstellen.

Aufgabe dieser Erfindung ist nun, die oben genannten Anforderungen allesamt zu erfüllen: Individuelle 3D-Objekte unterschiedlicher Grössen, Formen, Farben und Materialeigenschaften schichtweise zu erstellen in einem Bruchteil der Zeit wie sie von geläufigen Systemen benötigt wird, dazu soll das System einfach und kostengünstig zu bauen, steuern und warten sein.

#### Offenbarung der Erfindung

Eine kontinuierliche Rotation des Druckkopfes (1) bringt die erforderliche Geschwindigkeit um zB. Harz aus bspw. hinter- und/oder nebeneinander kaskadierten MEMS-Kartuschen (4) mit anschliessender Härtung/Materialfestigung über zB nachlaufende UV LEDs aufzubauen. Verglichen mit herkömmlichen kartesischen oder „Racetrack“- Methoden bietet der Trommeldrucker grosse Vorteile zum zumeist mindestens zweidimensional fahrenden Druckkopf und zum fahrenden Objekt. Konnte bisher kaum eine Schicht pro Sekunde erstellt werden, sind nun Duzende, später evtl. sogar Hunderte Schichten pro Sekunde möglich. Die Beschränkungen der Druckzeit liegen beim Trommeldrucker nicht mehr in der Überwindung von Massenträgheiten beim Verfahren von Objekten oder Druckköpfen, sondern in der Spritzgeschwindigkeit des MEMS Kopfes und der anschliessenden Aushärtungszeit (zB notwendige Aufbringung der Irradiationsdosis).

Der Trommeldrucker kann mit liegender oder stehender Trommel ausgestaltet werden (Figur 1).

Er kann mehrere Objekte gleichzeitig erstellen (Figur 2b-c).

Die Trommel (1) kann zB. zylindrische, ellipsoide oder Kugelform annehmen.

Auf diese Weise ist eine gleichzeitige Massenproduktion von Objekten (3) unterschiedlicher Grössen, Formen, Farben und Materialeigenschaften in einem Bruchteil der Zeit wie sie von geläufigen Systemen benötigt wird möglich. Die Anzahl der Objekteigenschaften (Anzahl der verbauten Druckköpfe) ist nur von der Druckkopfgrosse relativ zur Trommelgrösse abhängig.

Diese Aufgabe wird durch ein Verfahren mit den Merkmalen nach Anspruch 1 und eine Vorrichtung nach Anspruch 3 gelöst.

Beim dem Verfahren ist vorgesehen, dass Druckkopfleisten (4) in die Trommelwand axial zur Trommelachse eingebaut werden. Die Druckköpfe können auch diagonal oder radial an der Trommel (1) angeordnet werden. Wichtig ist, dass die Elektronik der Software stets die genaue Position einer jeden Düse übergibt und die Druckköpfe exakte Dosen schnell genug spritzen können, was hier als gegeben gilt, da Jet Drucker bereits seit Jahren existieren.

Der Schichtdruck erfolgt ellipsoid bis halbkreisartig um die Trommelwand. Der Objektträger (Tisch (2)) entfernt sich nach Passieren der letzten aktiven Druckleiste um eine Schichtdicke, bspw. bereits während der Härtingsphase, die in Form einer Leiste oder einer ganzen Kaskade ausgestaltet sein kann, abhängig von der abgebbaren und der benötigten Dosis. Auflösbare Stützstrukturen werden Jetdruckern üblich in jede Schicht integriert. Neu an diesem Konzept ist lediglich der an die Trommelform angepasste das jeweilige Objekt haltende Tisch (2), die von ihrer jeweiligen Grösse abhängige mögliche Anbringung multipler Tische um die Trommel (1) herum, sowie die Trommel (1) selbst, die aufgrund ihrer einfachen, gleichförmigen Bewegung auch einfach und kostengünstig zu bauen, steuern und warten ist.

Bei der Vorrichtung ist vorgesehen, dass mehrere Tische (2) um die Trommel (1) angeordnet werden um kontinuierlichen Druck zu ermöglichen, d.h. wenn ein Objekt (3) erstellt ist, fährt der entsprechende Tisch in Objektentnahmeposition, während die Trommel weiter rotiert und andere Objekte druckt. Geschickte Taktzeitsteuerungen erlauben so mit geringem Personalaufwand eine 100%ige Auslastung von Personal und Maschine. Eine weitere Gestaltungsvariante besteht in einer axial beweglichen Trommel, zB. zwecks Erstellung grösserer Objekte.

Vorteilhafte Ausgestaltungen sind in den Ansprüchen angegeben.

Durch die erfindungsgemäße Lösung werden die Nachteile des Stands der Technik eliminiert und die folgenden Vorteile erzielt:

1. Weniger Mechanik zur Verfabrung der Druckköpfe
2. Keinerlei ungleichförmige Druckkopfbewegungen mehr
3. Einfachere Düsensteuerung durch kontinuierliche Rotation
4. Schmalerer Bauraum, da alle Druckköpfe in Kreisrotation über den Objektbereich fahren
5. Kaskadierbarkeit genügend vieler Druckleisten, daher keine Einschränkungen mehr bzgl. Materialeigenschaften der Objekte
6. Multiple Objekterstellung durch um die Trommel angeordnete Tische (unterschiedlicher Grösse falls gewünscht)
7. Schnellster 3D Druck durch kontinuierliche Trommelrotation ohne Druckkopfrichtungsänderung
8. Höchste Maschinen/Mitarbeiterauslastung durch kontinuierlichen Druck, wenn multiple Objekte erstellt werden.

#### Beschreibung der Erfindung: Grundsätzlicher Aufbau mit wesentlichen erfindungsgemäßen Merkmalen

Eine mit Druckköpfen (4) versehene Trommel (1) rotiert vorzugsweise gleichförmig vorzugsweise um ihre axiale Mittelachse und spritzt bspw eingefärbtes oder unmittelbar nach Aufbringung einfärbbares Harz auf das zu erstellende Objekt (3), bevor es, sofern notwendig, von einer nachfolgenden Härtingsleiste (zB. UV LEDs) nachbehandelt wird.

Nach einer Schichterstellung fahren die um die Trommel (1) angeordneten Tische (2) (mindestens einer) je eine Schichtdicke nach aussen. Mehrere Tische (evtl. unterschiedlicher Grössen) werden um die Trommel angeordnet und erlauben kontinuierlichen Druck. Ein Objekt (3) wird entnommen, während weitere Objekte an anderen Tischen weiter bedruckt werden.

#### Beschreibung der Zeichnungen und der bevorzugten Ausführungsform der Erfindung



Die vorliegende Erfindung wird nachfolgend beispielhaft und nicht einschränkend anhand von Zeichnungen näher erläutert.

Zwecks industrieller Anforderung wird hier eine Ausführung eines vertikalen Druckzylinders mit 4 Tischen in 2 Grössen dargestellt. Die MEMS Druckköpfe enthalten eingefärbtes Harz in den CMY Farben, zusätzlich transparentes, weisses und schwarzes Harz sowie auswaschbares Supportstrukturharz.

Zwecks Materialvielfalt ist es hier sinnvoll, transparente Harze verschiedener Materialeigenschaften aus den ersten Leisten zu spritzen und CMY Pigmente zwecks Einfärbung darüber zu spritzen.

Es zeigen:

Figur 1: Vertikale (obere Abbildung) und horizontale (untere Abbildung) Trommelstellung  
Figuren 2a-c: Einfacher Tisch und multiple Tische für gleichzeitige Erstellung mehrerer Objekte (auch unterschiedliche Tisch/Objektgrössen möglich).

Legende Zahlenbezeichnungen:

- 1 Drucktrommel
- 2 Objektisch
- 3 Objekt
- 4 Druckkopfleisten

## Ansprüche

18. Verfahren zur Herstellung dreidimensionaler Objekte (3) mittels einer oder mehrerer Flüssigkeiten, die aus Druckköpfen, vorzugsweise aus objektlangen Druckkopfleisten (4), gespritzt werden, dadurch gekennzeichnet, dass die Druckköpfe an einer rotierenden zylindrischen oder ellipsoiden Trommel oder einer Kugel angebracht werden und die Anzahl der Druckkopfleisten nur durch ihre Grösse relativ zur Trommelgrösse beschränkt wird.
19. Verfahren nach Anspruch 1, dadurch gekennzeichnet,

dass ein oder mehrere identische oder unterschiedlich grosse Tische um die Drucktrommel (1) angeordnet werden und dadurch gleichzeitige oder zeitlich versetzte Objekterstellungen mehrerer identischer oder unterschiedlicher Objekte, zB. zum Zwecke des kontinuierlichen Druckprozesses, ermöglicht werden.

20. Vorrichtung zur Herstellung dreidimensionaler Objekte (3) mittels einer oder mehrerer Flüssigkeiten, die aus Druckköpfen, vorzugsweise aus objektlangen Druckkopfleisten (4), gespritzt werden,

dadurch gekennzeichnet,

dass die das Objekt haltende Basisplatte des Tisches die Form der vorzugsweise vertikal angebrachten und vorzugsweise zylindrisch gestalteten Trommelwand annimmt, sodass das Objekt stets schichtweise vorzugsweise in kreisrunden Schichtebenen erstellt wird. Eine plane Basisplatte oder gekrümmte Basisplatte mit plan erstellten Objektschichten ist auch umsetzbar.

21. Vorrichtung zur Herstellung dreidimensionaler Objekte (3) mittels einer oder mehrerer Flüssigkeiten, die aus Druckköpfen, vorzugsweise aus objektlangen Druckkopfleisten (4), gespritzt werden,

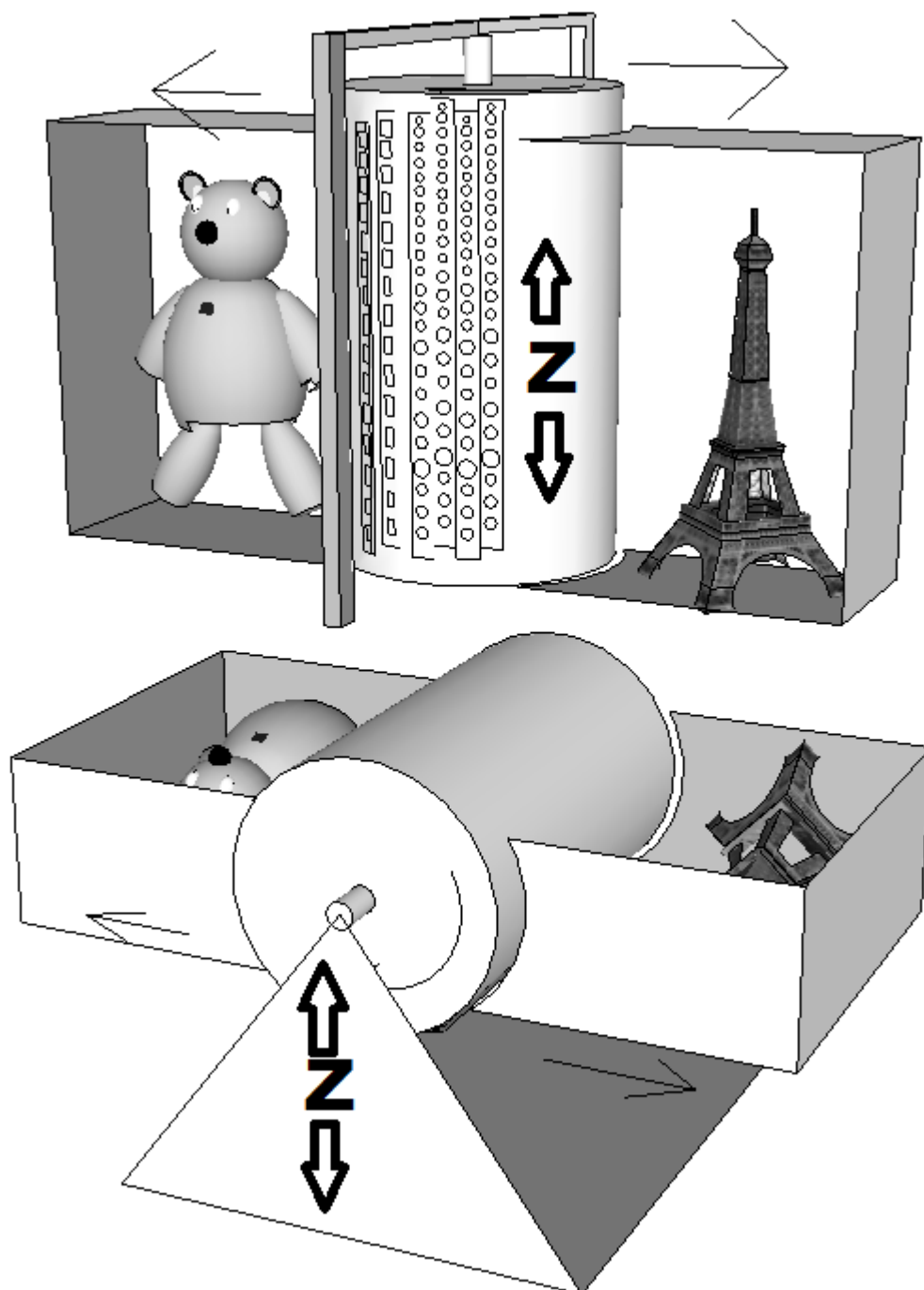
dadurch gekennzeichnet,

dass der Mindesttrommeldurchmesser von der Breite und Anzahl der Druckköpfe sowie von der Anzahl der Tische und der maximalen Objektbreite (Gesamtbreite aller Objekte siehe Figur 2b) abhängt -und die Mindesttrommelhöhe von der Druckkopfhöhe und Objekthöhe (Gesamthöhe aller Objekte siehe Figur 2b).

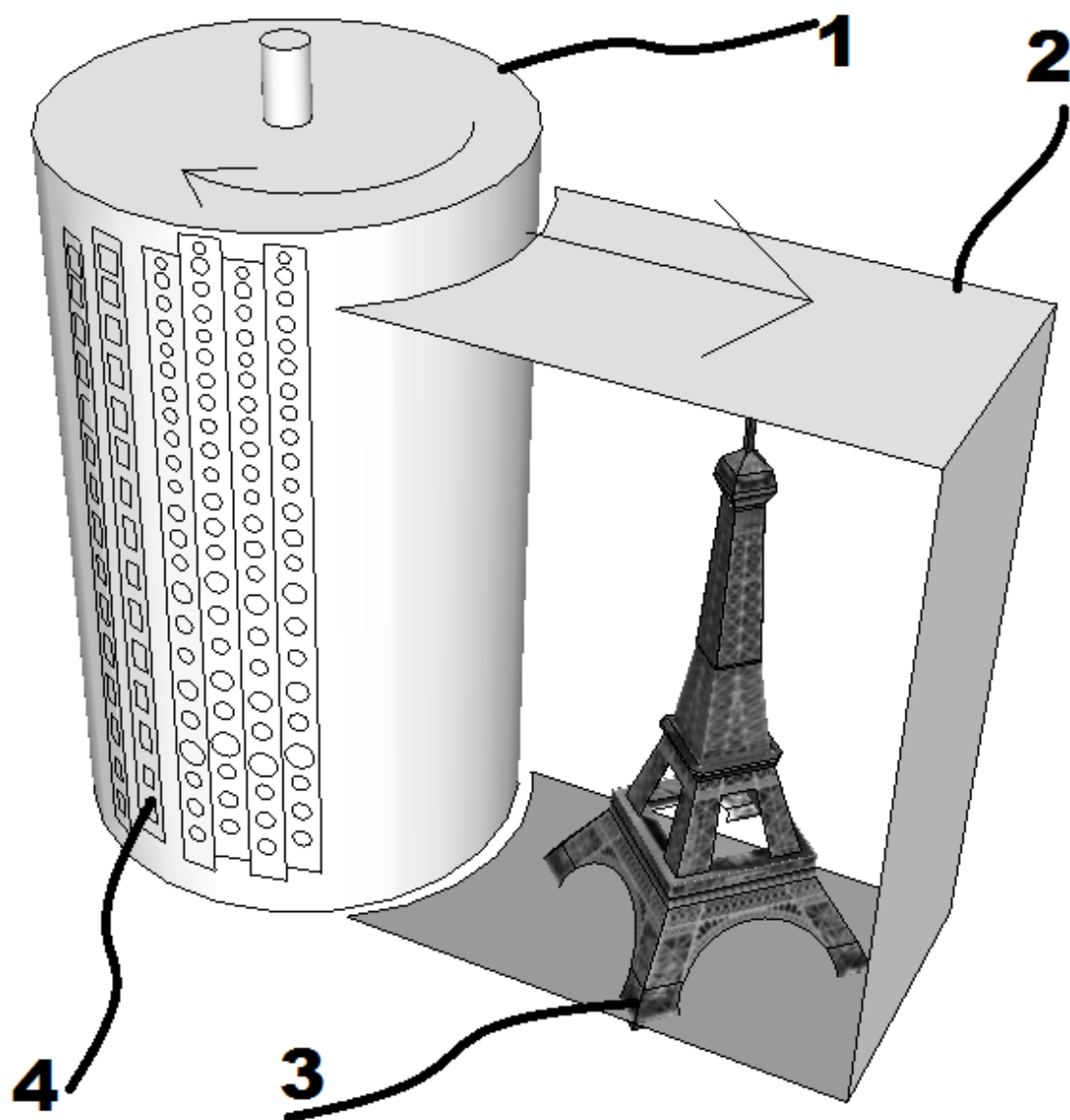
## Zusammenfassung

Die Erfindung betrifft ein Verfahren und eine Vorrichtung zur Herstellung dreidimensionaler Objekte mittels einer Trommel, in der MEMS Druckköpfe über die Drucklänge und hintereinander kaskadiert angebracht sind. Die Trommelrotation steuert den Druckkopf zum gewünschten Punkt auf den eine Flüssigkeit gespritzt wird (zB. Harz). Nachfolgende Leisten (zB. UV-LEDs) härten das Objekt. Ein sehr schnelles Verfahren auf möglichst kleinem Raum, mit weniger mechanischem Aufwand als geläufige Systeme benötigen. Die Erfindung betrifft ebenfalls eine Vorrichtung zur Durchführung des Verfahrens, bei dem die Druckertrommel zylindrisch ist und vertikal gelagert wird und die kontinuierliche Herstellung mehrerer Objekte mit unterschiedlichen Materialeigenschaften und Farben erlaubt (Fig. 2c), indem die Tischverfahrenebenen horizontal verlaufen.

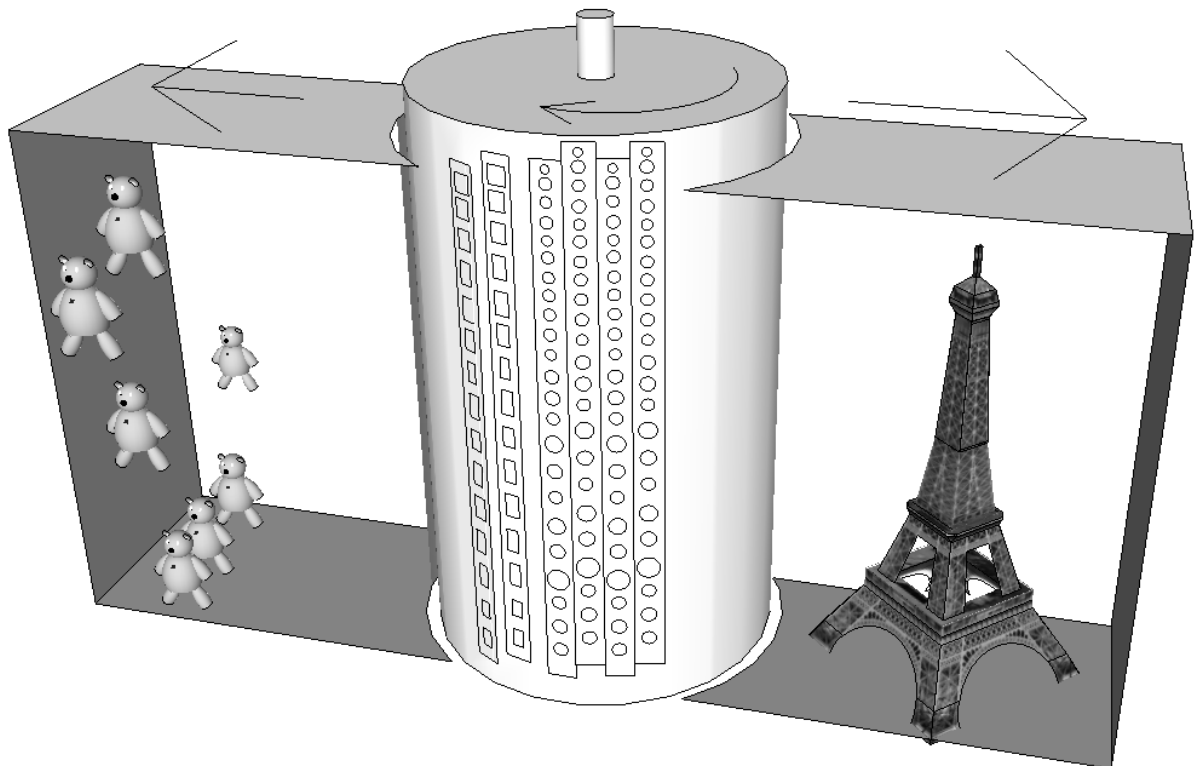
Figur1



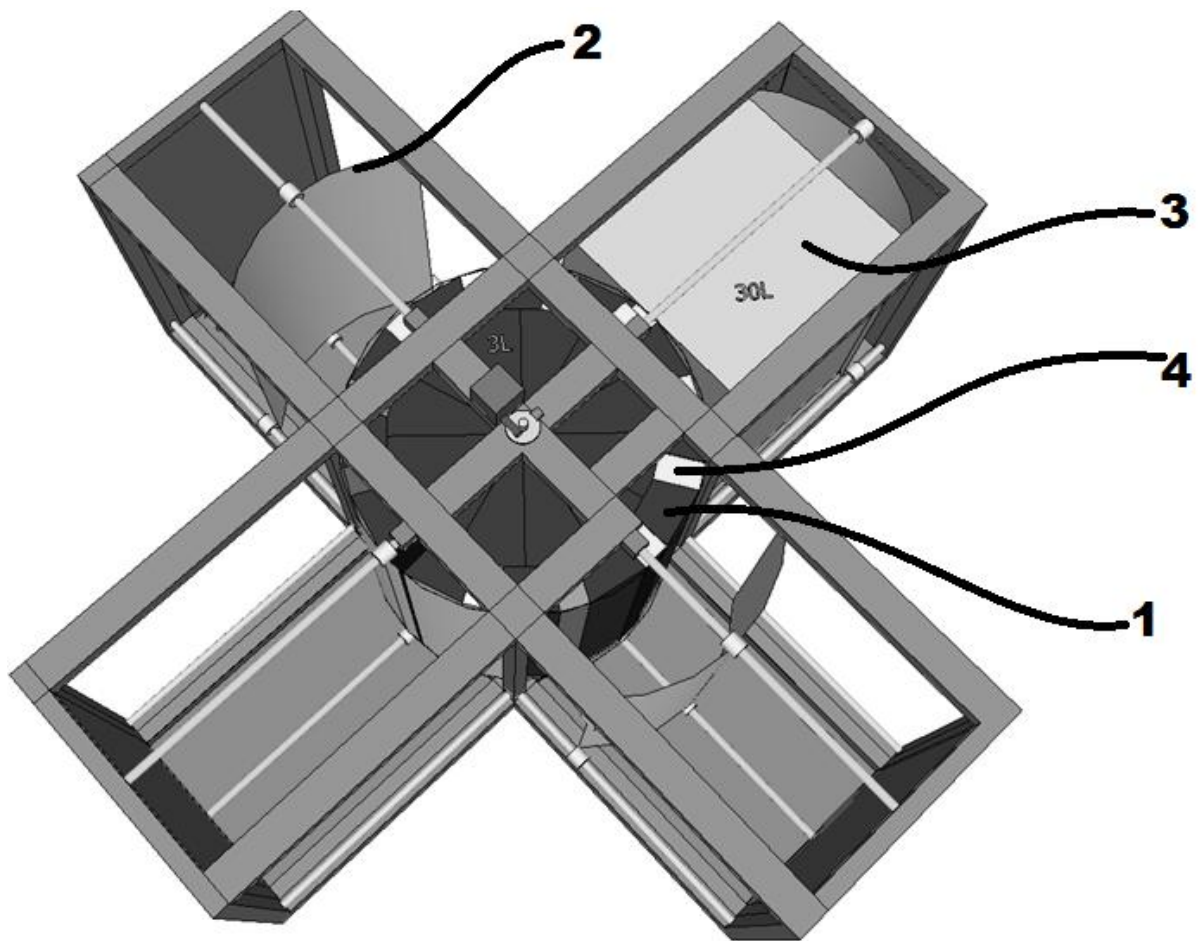
Figur 2a



Figur 2b



Figur 2c



Translation without any claim of accuracy: 3D drum printer

The invention relates to a method and device for layer-wise production of three-dimensional objects. In particular, the invention of the layer-wise manufacturing of three-dimensional objects by means of a drum applies.

State of the art

The development of technical process for producing three-dimensional objects is in full swing. Experts predict that in particular the additive methods of 3D printing, could usher the fourth industrial revolution. Here, objects are created in layers, for example, by wetting powder, fusing plastic, resin polymerization, etc.

After the base material was determined for object creation (eg resin), a mechanism must be found to apply it as soon as possible in layers and consolidate / dry / cure it. Usually one uses printheads in a Cartesian system, either a print head which is slimmer than the object width and therefore can go right/ left AND back and forth, or a long enough head that only needs to alternate one axis. All procedures have in common that they create layered structures with machines that either lower the printheads or the object.

Physics divide movement types in uniform and non-uniform. A cartesian printhead move needs to be accelerated and decelerated before it changes direction. The required inertia affects the layer creation speed considerably. In addition, the print speed needs to be adapted to the ever-changing driving speeds during the acceleration processes. Kia Silverbrook developed a MEMSJET printing process in which the object-wide print head is fixed and the object (paper for a 2D printer) moves below the print head. Thus mechanics are reduced and speed of printing is greatly increased.

3D mass printing to usher the fourth industrial revolution: Individual objects of different sizes, shapes, colors and material properties are to replace the injection moulding process. 3D Systems Inc. have a "Race Track" system with stationary print heads and objects moving underneath, mounted on a track slides. The print time per shift was increased, however the system met many other system requirements regarding material properties, colors, after processing, object accessibility, etc.



The individual mass production requires individualized products, which cannot be realized by injection molding. 3D printers are perfect for this, but the Cartesian movement patterns of one or more printheads -due to the inertia- will never be able to create the layer speed necessary for mass production printing.

The objective of this invention is to fulfill all of the above mentioned requirements: Customized 3D objects of different sizes, shapes, colors and material characteristics in layers created in a fraction of the time that is required by today's systems, simple and inexpensive to build, handle and maintain.

#### Disclosure of the Invention

A continuous rotation of the print head (1) provides the required speed to subsequently build layers of i.e resin jetted from adjacent cascaded MEMS cartridges (4), where the droplets will be hardened via eg trailing UV LEDs. Compared to conventional Cartesian or "Racetrack" – methods, the drum printer offers great advantages, preventing the movements of the print head (or the objects in a TNL or Race Track system). These systems can hardly create a layer per second, whereas the drum printer should be able to do even hundreds of layers per second with a more developed heads and consumables, a dozen layers should be possible at the date of this patent's creation. The limitations on printing time for the drum printer lie no longer in overcoming the inertia of moving heads, but in the injection speed of the MEMS head and the subsequent curing (material science).

The drum can be configured printer with a horizontal or a vertical drum (Figure 1).

It can create multiple objects simultaneously (Figur2b-c).

The drum (1), ca have a cylindrical, ellipsoidal or a spherical shape.

This enables a simultaneous mass production of objects (3) different sizes, shapes, colors and material properties in a fraction of the time as it is required by common systems. The number of object properties (number of built-in print heads) depends only on the print head size relative to the drum size.

This object is achieved by a method having the features of claim 1 and an apparatus of claim 3.

The drum printing method needs printhead strips (4) that are incorporated into the wall of the drum axially to the drum axis. The print heads may also be arranged diagonally or radially to the drum (1). It is important that the electronics of the software always delivers the exact position of each nozzle and the printheads can inject precise doses fast enough, which applies here as given since jet printers exist since years.

The layers are printed ellipsoid to semi-circularly around the drum wall. The platform (Table (2)) shifts backwards one layer thickness after passing the last active layer thickness. The Platform retraction occurs during the curing phase, which can be configured in the form of a bar or a whole cascade, depending on the deliverable and the required energy dose. Soluble support structures are commonly known for these kind of Jet-printers, they are integrated into each layer. What is new about this concept is only with regards to the drum shape and the holding tables (2), which are dependent on their respective size, the use of multiple tables around the drum (1), as well as the drum (1) itself, which is easy and inexpensive to build, manage and maintain due to the uniform motion.

For the device it is proposed that a plurality of tables (2) around the drum (1) is used to allow continuous printing, e.g. when an object (3) is created, the corresponding table moves in the object removal position, while the drum continues to rotate, and other objects printed on other tables. Skillful clock timings allow a 100% utilization of personnel and machinery with limited staff. Another design variant is an axial movement barrel, for example for creating larger objects.

Advantageous refinements are specified in the claims.

This solution according to the invention eliminates the disadvantages of the prior art and achieves the following advantages:

1. Less mechanics to move the printheads
2. No accelerated printhead movements anymore
3. Easier nozzle control by continuous rotation
4. Smaller machine foot print since all printheads go in circular rotation about the object-area
5. Cascading enough many print bars, so no more limitations concerning material properties of the objects
6. Multiple objects creation due to tables arranged around the drum.
7. Fastest 3D printing through continuous drum rotation without change of printhead direction

8. Highest machine / employee utilization by continuous printing when multiple objects are created.

Description of the Invention: General composition showing relevant characteristics of the invention

A drum (1) with internat printhead jetting to the outside rotates preferably uniformly preferably around its axial center line and injects eg resin onto the object to be created (3). Curing may be needed and could be given ie through UV LEDs).

After a layer has been created on at least one table that is arranged around the drum, the platform retracts for one layer thickness. Several tables (possibly of different sizes) are arranged around the drum and allow continuous printing. An object (3) is removed, while further objects are printed onto other tables.

Description of the drawings and the preferred embodiment of the invention

The present invention will be explained in more detail with reference to drawings, which in no way implies any limitation to this patent's usage:.

For the purpose of meeting industrial mass printing requirements, an embodiment of a vertical drum cylinder with 4 tables is presented. The MEMS printheads preferably contain colored resin in the CMY colors, additional transparent, white and black resin and washable support structure resin.

For the purpose of using a multitude of different materials, it is useful to jet transparent resins of different material properties and jet CMY pigments for the purpose of coloring it.

Shown is:

Figure 1: Vertical (top figure) and horizontal (bottom figure) drum position

Figures 2a-c: Single table and multiple tables for simultaneous creation of multiple objects (even different table / object sizes are possible).

Legend number designations:

1 printing drum

2 table

3 object

#### 4 Printhead strips

claims

1. A process for producing three-dimensional objects (3) by means of one or more liquids jetted from print heads, preferably of object-long print head strips (4), injected, characterized, that the print heads are mounted on a rotating cylindrical or ellipsoidal drum or a sphere and the number of print-head is limited only by their size relative to the drum size.
2. The method according to claim 1, characterized, that are arranged one or more identical or different sized tables around the printing drum (1) and enabling simultaneous object builds of several identical or different objects for the purpose of continuous printing.
3. An apparatus for producing three-dimensional objects (3) by means of one or more liquids with printheads, preferably from object-long printhead strips (4), injected, Characterized in a way, that the object-holding base plate of the table takes the form of the attached vertical front, preferably cylindrically shaped drum wall, so that the object is always created in layers, preferably in circular layer planes. A flat base plate or curved base plate with plane-created object layers is also feasible.
4. An apparatus for producing three-dimensional objects (3) by means of one or more liquids with printheads, preferably from object-long printhead strips (4), injected, Characterized in a way, that the minimum drum diameter of the width and number of print heads and the number of tables and the maximum object-width (total width of all objects see Figure 2b) depends on the least drum height of the printhead height and object height (total height of all objects see Figure 2b) ,

## Summary

The invention relates to a method and an apparatus for producing three-dimensional objects by means of a drum, where the MEMS print heads across the print length are mounted one behind the other in a cascade. The drum rotation turns the print head to the desired point and a liquid is injected (eg. Resin). Subsequent heads (eg. UV-LEDs) harden the object. A very fast process using the smallest possible space, requiring less mechanical effort than common systems. The invention also relates to a device for performing the method, in which the printing drum is cylindrical and is mounted vertically and the continuous production of multiple objects with different material properties and color is allowed (Fig. 2c) by horizontally retracting tables.



## **Exhibit A4**

### **Schnelle 3D- Sinterdrucker mit kontinuierlichem Vollfarbdruck**

Die Erfindung betrifft zwei Verfahren und Vorrichtungen zur schichtweisen Herstellung von dreidimensionalen Objekten, insbesondere gekrümmt geschichtet mittels einer Drucktrommel, direkter Lasersinterung über gemusterte Spiegelwalzen und kontinuierlicher Z-Tischabsenkung, bzw planar geschichtet mittels elektrostatischer Aufladung und Übertragung verschiedenster Kunststoffpulver (hinsichtlich Materialeigenschaften und Farbgebung) auf eine geschlossene, stetig umlaufende Folie als Zwischenträger mit Ausgleichsrollen um die aufgebrachte Schicht taktweise per Hitzestempel auf das Druckobjekt aufzubringen. Beide Methoden erlauben bislang unerreichte Druckzeiten.

#### Stand der Technik

SLS Drucker tragen meist eine Pulverschicht per Wischer planar auf bevor diese gelasert wird. Der Prozess wird beherrscht und liefert gute Materialeigenschaften, der Erstellungsprozess dauert jedoch viel zu lange um an einen Ersatz von Spritzgussmaschinen denken zu lassen. Ausserdem ist Vollfarbdruck bisher genauso unbekannt wie die Erstellung mit vielen unterschiedlichen Materialeigenschaften in einem Objekt.

Aufgabe dieser Erfindung ist nun, die oben genannten Anforderungen allesamt zu erfüllen: Individuelle 3D-Objekte unterschiedlicher Grössen, Formen, Farben und Materialeigenschaften schichtweise zu erstellen in einem Bruchteil der Zeit wie sie von geläufigen Systemen benötigt wird, dazu soll das System einfach und kostengünstig zu bauen, steuern und warten sein.

#### Offenbarung der Erfindung

Eine kontinuierliche Rotation des Druckkopfes –direkt auf das Objekt oder auf die Folie als Zwischenträger- bringt die erforderliche Geschwindigkeit um vielfach schneller zu drucken als bisher möglich ist.

Verglichen mit herkömmlichen Zweikreissystemen (erst wischen, dann sintern), bietet der Trommeldrucker grosse Vorteile. Konnte bisher kaum eine Schicht im Zehntelsekundentakt erstellt werden, ist nun eine Schicht pro Sekunde möglich, evtl. auch mehrere.

Die Trommel (1) kann zB. zylindrische, ellipsoide oder Kugelform annehmen, mehrere Trommeln sind kaskadierbar.

Die Aufgabe des Schnelldrucks mit schichtweise verschiedenen Materialien wird durch ein Verfahren mit den Merkmalen nach Anspruch 1 und eine Vorrichtung nach Anspruch 2 gelöst.

Die Aufgabe des Schnelldrucks mit innerschichtig verschiedenen Materialien und Farben wird durch ein Verfahren mit den Merkmalen nach Anspruch 3 und eine Vorrichtung nach Anspruch 4 gelöst.

Beim dem Verfahren des Schnelldrucks mit schichtweise verschiedenen Materialien ist vorgesehen, dass

Der Schichtdruck erfolgt kreisartig um die Trommelwand. Der Objektträger entfernt sich während einer Schichterstellung um eine Schichtdicke.

Bei der Vorrichtung ist vorgesehen, dass mehrere Tische (2) um die Trommel (1) angeordnet werden um kontinuierlichen Druck zu ermöglichen, d.h. wenn ein Objekt (3) erstellt ist, fährt der entsprechende Tisch in Objektentnahmeposition, während die Trommel weiter rotiert und andere Objekte druckt. Geschickte Taktzeitsteuerungen erlauben so mit geringem Personalaufwand eine 100%ige Auslastung von Personal und Maschine. Eine weitere Gestaltungsvariante besteht in einer axial beweglichen Trommel, zB. zwecks Erstellung grösserer Objekte.

Vorteilhafte Ausgestaltungen sind in den Ansprüchen angegeben.

Durch die erfindungsgemäße Lösung werden die Nachteile des Stands der Technik eliminiert und die folgenden Vorteile erzielt:

9. Weniger Mechanik zur Verfahrung der Druckköpfe
10. Keinerlei ungleichförmige Druckkopfbewegungen mehr

11. Einfachere Düsensteuerung durch kontinuierliche Rotation
12. Schmalerer Bauraum, da alle Druckköpfe in Kreisrotation über den Objektbereich fahren
13. Kaskadierbarkeit genügend vieler Druckleisten, daher keine Einschränkungen mehr bzgl. Materialeigenschaften der Objekte
14. Multiple Objekterstellung durch um die Trommel angeordnete Tische (unterschiedlicher Grösse falls gewünscht)
15. Schnellster 3D Druck durch kontinuierliche Trommelrotation ohne Druckkopfrichtungsänderung
16. Höchste Maschinen/Mitarbeiterauslastung durch kontinuierlichen Druck, wenn multiple Objekte erstellt werden.

#### Beschreibung der Erfindung: Grundsätzlicher Aufbau mit wesentlichen erfindungsgemäßen Merkmalen

Eine mit Druckköpfen (4) versehene Trommel (1) rotiert vorzugsweise gleichförmig vorzugsweise um ihre axiale Mittelachse und spritzt bspw eingefärbtes oder unmittelbar nach Aufbringung einfärbbares Harz auf das zu erstellende Objekt (3), bevor es, sofern notwendig, von einer nachfolgenden Härtingsleiste (zB. UV LEDs) nachbehandelt wird.

Nach einer Schichterstellung fahren die um die Trommel (1) angeordneten Tische (2) (mindestens einer) je eine Schichtdicke nach aussen. Mehrere Tische (evtl. unterschiedlicher Grössen) werden um die Trommel angeordnet und erlauben kontinuierlichen Druck. Ein Objekt (3) wird entnommen, während weitere Objekte an anderen Tischen weiter bedruckt werden.

#### Beschreibung der Zeichnungen und der bevorzugten Ausführungsform der Erfindung

Die vorliegende Erfindung wird nachfolgend beispielhaft und nicht einschränkend anhand von Zeichnungen näher erläutert.

Zwecks industrieller Anforderung wird hier eine Ausführung eines vertikalen Druckzylinders mit 4 Tischen in 2 Grössen dargestellt. Die MEMS Druckköpfe enthalten eingefärbtes Harz in den CMY Farben, zusätzlich transparentes, weisses und schwarzes Harz sowie auswaschbares Supportstrukturharz.

Zwecks Materialvielfalt ist es hier sinnvoll, transparente Harze verschiedener Materialeigenschaften aus den ersten Leisten zu spritzen und CMY Pigmente zwecks Einfärbung darüber zu spritzen.



Es zeigen:

Figur 1: Vertikale (obere Abbildung) und horizontale (untere Abbildung) Trommelstellung  
Figuren 2a-c: Einfacher Tisch und multiple Tische für gleichzeitige Erstellung mehrerer  
Objekte (auch unterschiedliche Tisch/Objektgrößen möglich).

Legende Zahlenbezeichnungen:

- 1 Drucktrommel
- 2 Objektisch
- 3 Objekt
- 4 Druckkopfleisten

## Ansprüche

22. Verfahren zur Herstellung dreidimensionaler Objekte (3) mittels einer oder mehrerer Flüssigkeiten, die aus Druckköpfen, vorzugsweise aus objektlangen Druckkopfleisten (4), gespritzt werden, dadurch gekennzeichnet, dass die Druckköpfe an einer rotierenden zylindrischen oder ellipsoiden Trommel oder einer Kugel angebracht werden und die Anzahl der Druckkopfleisten nur durch ihre Grösse relativ zur Trommelgrösse beschränkt wird.

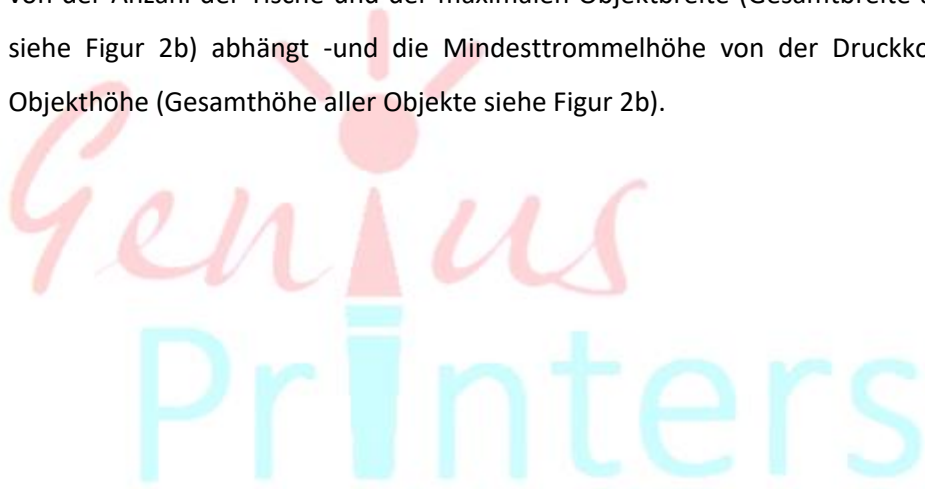
23. Verfahren nach Anspruch 1, dadurch gekennzeichnet, dass ein oder mehrere identische oder unterschiedlich grosse Tische um die Drucktrommel (1) angeordnet werden und dadurch gleichzeitige oder zeitlich versetzte Objekterstellungen mehrerer identischer oder unterschiedlicher Objekte, zB. zum Zwecke des kontinuierlichen Druckprozesses, ermöglicht werden.

24. Vorrichtung zur Herstellung dreidimensionaler Objekte (3) mittels einer oder mehrerer Flüssigkeiten, die aus Druckköpfen, vorzugsweise aus objektlangen Druckkopfleisten (4), gespritzt werden,

dadurch gekennzeichnet,

dass die das Objekt haltende Basisplatte des Tisches die Form der vorzugsweise vertikal angebrachten und vorzugsweise zylindrisch gestalteten Trommelwand annimmt, sodass das Objekt stets schichtweise vorzugsweise in kreisrunden Schichtebenen erstellt wird. Eine plane Basisplatte oder gekrümmte Basisplatte mit plan erstellten Objektschichten ist auch umsetzbar.

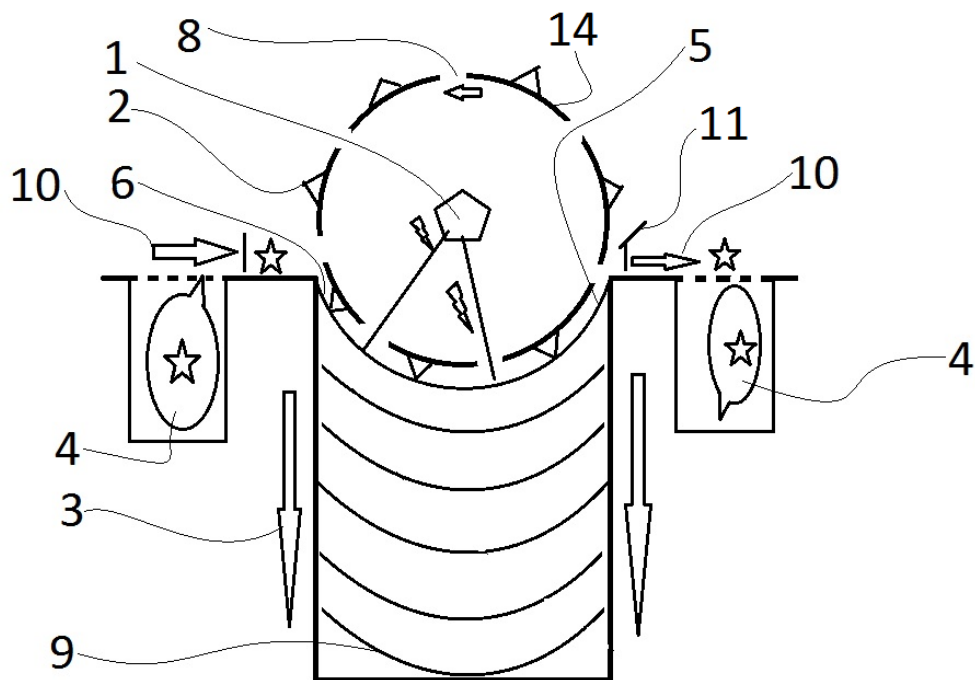
25. Vorrichtung zur Herstellung dreidimensionaler Objekte (3) mittels einer oder mehrerer Flüssigkeiten, die aus Druckköpfen, vorzugsweise aus objektlangen Druckkopfleisten (4), gespritzt werden,
- dadurch gekennzeichnet,
- dass der Mindesttrommeldurchmesser von der Breite und Anzahl der Druckköpfe sowie von der Anzahl der Tische und der maximalen Objektbreite (Gesamtbreite aller Objekte siehe Figur 2b) abhängt -und die Mindesttrommelhöhe von der Druckkopfhöhe und Objekthöhe (Gesamthöhe aller Objekte siehe Figur 2b).



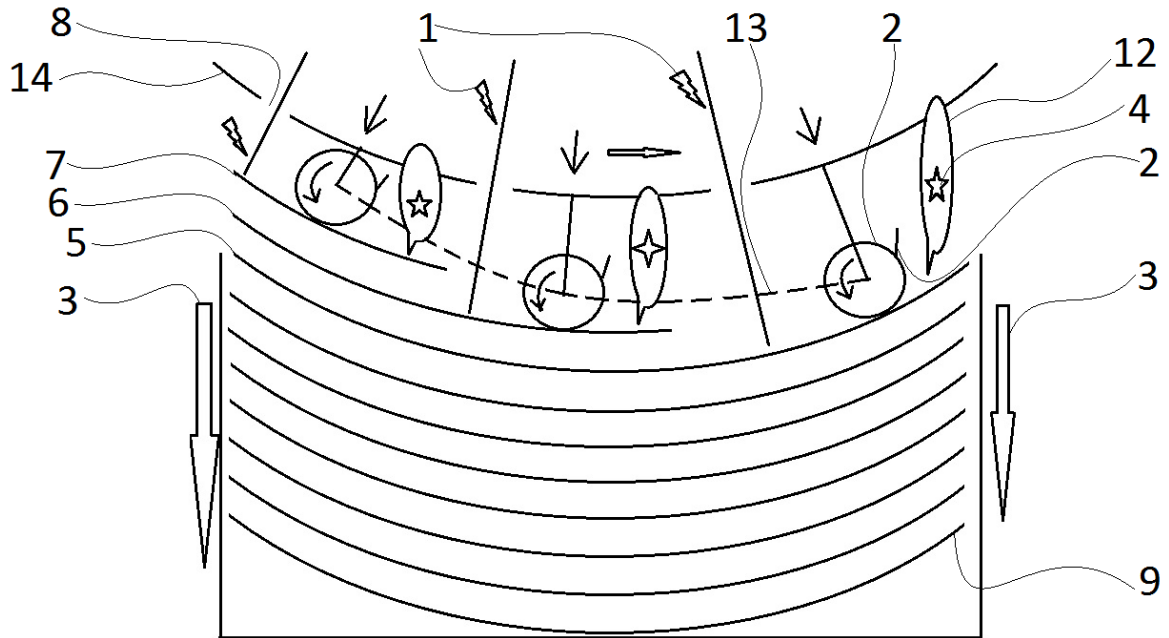
## Zusammenfassung

Die Erfindung betrifft zwei Verfahren und Vorrichtungen zur schichtweisen Herstellung von dreidimensionalen Objekten, insbesondere gekrümmt geschichtet mittels einer Drucktrommel, direkter Lasersinterung und kontinuierlicher Z-Tischabsenkung, bzw. planar geschichtet mittels elektrostatischer Aufladung und Übertragung verschiedenster Kunststoffpulver (hinsichtlich Materialeigenschaften und Farbgebung) auf eine geschlossene, stetig umlaufende Folie als Zwischenträger mit Ausgleichsrollen um die aufgebrauchte Schicht taktweise per Hitzestempel auf das Druckobjekt aufzubringen. Beide Methoden erlauben bislang unerreichte Druckzeiten.

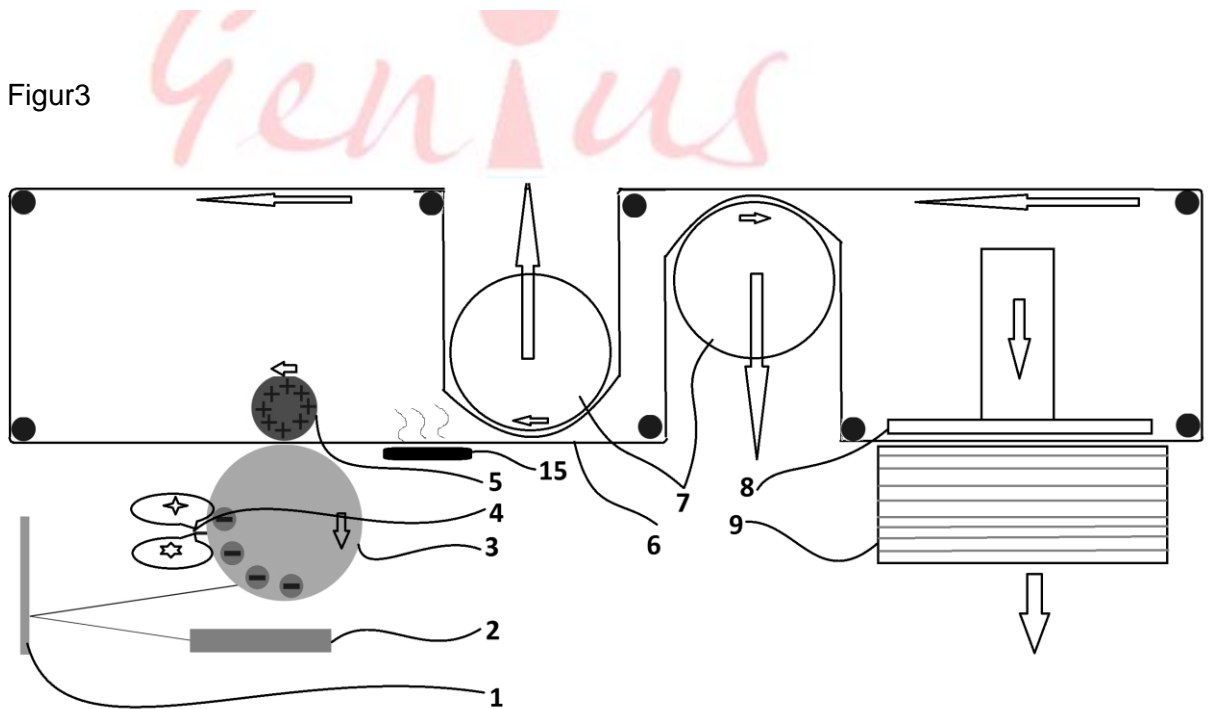
Figur 1



Figur 2



Figur3



# Exhibit A5

## 3D-Feststoff-Trommeldrucker

Die Erfindung betrifft ein Verfahren und eine Vorrichtung zur schichtweisen Herstellung von dreidimensionalen Objekten. Insbesondere gilt die Erfindung der schichtweisen Herstellung von dreidimensionalen Objekten mittels Aufschmelzung von Feststoffen in einer Drucktrommel.

### Stand der Technik

Die Entwicklung technischer Verfahren zur Herstellung dreidimensionaler Objekte läuft auf Hochtouren. Experten sagen voraus, dass insbesondere das additive Verfahren des 3D Drucks die vierte industrielle Revolution einläuten könnte. Hierbei werden Objekte schichtweise erzeugt, z.B. mittels Pulverbenässung, Plastikdrahtschmelzung, Pulverschmelzung, Harzpolymerisation, usw.

Nachdem das Basismaterial für die Objekterstellung bestimmt wurde (zB Kunststoff, Metall oder Keramik), muss nun ein Mechanismus gesucht werden, der es möglichst schnell schichtweise auftragen und festigen/trocknen/härten kann. Üblicherweise bedient man sich kartesisch verfahrenender Druckköpfe, also entweder einer Druckkopfleiste, die schmaler als die Objektbreite ist und daher links, rechts UND vor und zurück fahren kann, oder einer genügend breiten Druckleiste, die nur noch links/rechts ODER vor/zurück fahren muss. Allen Verfahren gemein ist der planare, schichtweise Aufbau, weshalb entweder die Druckköpfe angehoben und/oder das Objekt abgesenkt werden muss.

Die Physik unterteilt Bewegungsarten in gleichförmige und ungleichförmige. Ein 2D-kartesisch verfahrenender Druckkopf muss beschleunigt und abgebremst werden, bevor er seine Richtung ändert. Die hierfür notwendige Überwindung der Massenträgheit beeinträchtigt die Schichterstellungsgeschwindigkeit erheblich. Zudem muss die Druckgeschwindigkeit stets den sich ständig ändernden Fahrgeschwindigkeiten während der Beschleunigungsvorgänge angepasst werden. Kia Silverbrook hat ein MEMSJET Druckverfahren entwickelt, bei dem der objektbreite Druckkopf steht und das Objekt (Papier

für einen 2D Drucker) unter dem Druckkopf entlang fährt. Somit wurde Mechanik eingespart und die Druckgeschwindigkeit stark erhöht.

3D Massendruck soll die vierte industrielle Revolution einläuten: Individuelle Objekte unterschiedlicher Grössen, Formen, Farben und Materialeigenschaften sollen den Spritzguss ersetzen. 3D Systems Inc. haben ein „Racetrack“ System stehender Druckköpfe mit auf Schienen laufenden Objektträgern gebaut, ebenso TNO. Die Erstellungszeit pro Schicht wurde damit extrem erhöht, alle anderen Systemanforderungen jedoch erfüllt.

Die individuelle Massenproduktion verlangt individuelle Vervielfältigungen, wie sie im Spritzgussverfahren nicht realisierbar sind. 3D Drucker eignen sich hierfür hervorragend, jedoch ist das kartesische Bewegungsmuster eines oder mehrerer Druckköpfe aufgrund der Massenträgheiten niemals in der Lage, die Schichten mit der für Massenproduktion notwendigen Druckgeschwindigkeit zu erstellen.

Grosse Probleme ergeben sich zudem bei der Feststoffumformung, der Aufschmelzung bzw der voxel(punkt)weisen Zusammensetzung des zu erstellenden Objektes: Entweder der (Spritz)guss erlaubt kein „intelligentes“ Design, oder der Druckkopf erlaubt keine wie für herkömmlich genutzte Materialien benötigten Viskositäten, oder die aufgesetzten Punkte (oder Bahnen) geben in mindestens eine Richtung nicht die gewünschte Festigkeit. Masshaltigkeit ist durch Postprozesse wie Nachsinterung zusätzlich erschwert.

Aufgabe dieser Erfindung ist nun, eine Druckmethode aufzuzeigen, die insbesondere dem „intelligenten Spritzguss“ nahekommt: Individuelle 3D-Objekte unterschiedlicher Grössen, Formen, Farben und Materialien schichtweise mit bspw. funktionalen im Spritzguss längst erprobten Materialien zu erstellen, sodass herkömmliche Spritzgiesser ohne den bisher notwendigen Formenbau ihr bekanntes Granulat nutzen können und viele der meistens zur schalenweisen Produkterstellung notwendigen Montageschritte entfallen können.

#### Offenbarung der Erfindung

Eine kontinuierliche Rotation des Druckkopfes (1) in einer Trommel erzeugt die erforderliche Zentrifugalkraft (Tropfengeschwindigkeit) um zb. aufgeschmolzenes ABS-Granulat (6) durch eine Lochplatte (9) aus in der Trommel (1) befindlichen Köpfen (4) zu pressen. Das Druckmaterial wird im Druckkopf thermisch (8) (optional in Endlosschleife (5)) im Fluss

gehalten, die Lochdurchmesser in der Lochplatte sind klein genug, dass das jeweilige Druckmaterial (10) bei gegebener an die Fließfunktion (7) angepasster Viskosität und auf das Druckmaterial wirkender Zentrifugalkraft nicht durch die Löcher in der Lochplatte entweicht. An jedem Loch stehen sich mindestens zwei stromleitende Platten oder Stäbe gegenüber, sodass ein Funkenschlag ausgelöst werden kann, dessen Lichtbogen das Druckmaterial schlagartig auf eine Temperatur erhitzt, die die Viskosität mindestens soweit absenkt, dass die Zentrifugalkraft das Druckmaterial (11) nun durch das jeweilige Loch der Lochplatte im Druckkopf pressen kann. Denkbar wäre anstatt Lichtbogentechnik auch ein Heizelement.

Verglichen mit herkömmlichen meist kartesischen 3D Druckmethoden bietet der Trommeldrucker grosse Vorteile zum zumeist mindestens zweidimensional fahrenden Druckkopf und zum fahrenden Objekt: Konnte bisher kaum eine Schicht pro Sekunde erstellt werden, sind nun Duzende, später evtl. sogar Hunderte Schichten pro Sekunde möglich. Die Beschränkungen der Druckzeit liegen beim Trommeldrucker nicht mehr in der Überwindung von Massenträgheiten beim Bewegen von Objekten oder Druckköpfen, sondern in der Spritzgeschwindigkeit des Kopfes und der anschliessenden Aushärtungszeit.

Jeder Druckkopf kann unterschiedliche Materialien oder Farben spritzen, sodass Bilddruck ebenso möglich ist wie die Kombination unterschiedlicher Materialien, solange die Lochmaske an die fließbaren Materialien angepasst ist und die Viskosität durch Temperaturerhöhung schnell genug soweit absenkbar ist, dass das Material bei gegebener Zentrifugalkraft durch die Löcher pressbar ist.

Sollen Bahnen entlang der Bewegungsrichtung des Druckkopfes erstellt werden, ist ähnlich der FDM-Methode die konstante Materialerhitzung an gleichen Loch möglich (Wasserfall)

Der Trommeldrucker kann mit liegender oder stehender Trommel ausgestaltet werden (Figur 1).

Er kann mehrere Objekte gleichzeitig erstellen (Figur2b).

Die Trommel (1) kann zB. zylindrische, ellipsoide, sternförmige oder Kugelform annehmen.

Auf diese Weise ist eine gleichzeitige Massenproduktion von Objekten (3) unterschiedlicher Grössen, Formen, Farben und Materialeigenschaften in einem Bruchteil der Zeit wie sie von geläufigen Systemen benötigt wird möglich. Die Anzahl der Objekteigenschaften (Anzahl der verbauten Druckköpfe) ist nur von der Druckkopfgrösse relativ zur Trommelgrösse abhängig.

Diese Aufgabe wird durch ein Verfahren mit den Merkmalen nach Anspruch 1 und eine Vorrichtung nach Anspruch 2 gelöst.

Beim dem Verfahren ist vorgesehen, dass Druckkopfleisten (4) in die Trommelwand axial zur Trommelachse eingebaut werden. Die Druckköpfe können auch diagonal oder radial an der Trommel (1) angeordnet werden. Wichtig ist, dass die Elektronik der Software stets die genaue Position einer jeden Düse übergibt und die Druckköpfe exakte Dosen schnell genug spritzen können.

Der Schichtdruck erfolgt ellipsoid bis halbkreisartig um die Trommelwand. Der Objektträger (Tisch (2)) entfernt sich nach Passieren der letzten aktiven Druckleiste um die nachfolgende (nicht mit der zuletzt gedruckten unbedingt identischen) Schichtdicke. Auflösbare Stützstrukturen werden wie üblich und nötig in jede Schicht integriert.

Bei der Vorrichtung ist vorgesehen, dass mehrere Tische (2) um die Trommel (1) angeordnet werden um kontinuierlichen Druck zu ermöglichen, d.h. wenn ein Objekt (3) erstellt ist, fährt der entsprechende Tisch in Objektentnahmeposition, während die Trommel weiter rotiert und andere Objekte druckt. Geschickte Taktzeitsteuerungen erlauben so mit geringem Personalaufwand eine 100%ige Auslastung von Personal und Maschine. Eine weitere Gestaltungsvariante besteht in einer axial beweglichen Trommel, zB. zwecks Erstellung grösserer Objekte.

Vorteilhafte Ausgestaltungen sind in den Ansprüchen angegeben.

Durch die erfindungsgemäße Lösung werden die Nachteile des Stands der Technik eliminiert und die folgenden Vorteile erzielt:

Relativ zu Spritzgussmaschinen:

1. Individuelle 3D-Objekte unterschiedlicher Grössen, Formen, Farben und Materialien
2. viele der meistens zur schalenweisen Produkterstellung später notwendigen Montageschritte können entfallen

Relativ zu herkömmlichen 3D Druckern:

1. Weniger Mechanik zur Bewegung der Druckköpfe
2. Keinerlei ungleichförmige Druckkopfbewegungen mehr
3. Schmalerer Bauraum, da alle Druckköpfe in Kreisrotation über den Objektbereich fahren
4. Kaskadierbarkeit genügend vieler Druckleisten, daher keine Einschränkungen mehr bzgl. Materialeigenschaften der Objekte
5. Multiple Objekterstellung durch um die Trommel angeordnete Tische (unterschiedlicher Grösse falls gewünscht)



6. Schnellster 3D Druck durch kontinuierliche Trommelrotation ohne Druckkopfrichtungsänderung
7. Höchste Maschinen/Mitarbeiterauslastung durch kontinuierlichen Druck, wenn multiple Objekte erstellt werden.
8. Nutzbar für bspw. funktionalen Kunststoff in herkömmlicher Granulatform, daher weniger Bedenken/Umstellung für traditionelle Spritzgiesser.

### Beschreibung der Erfindung: Grundsätzlicher Aufbau mit wesentlichen erfindungsgemäßen Merkmalen

Eine mit Druckköpfen (4) versehene Trommel (1) rotiert vorzugsweise gleichförmig vorzugsweise um ihre axiale Mittelachse und spritzt bspw. herkömmliches automatisch nachgeführtes ABS Granulat, das im jeweiligen Kopf auf Fliesstemperatur erhitzt wird, durch eine Matrix angesteuerte per zb. Lichtbogen beheizbare Löcher in einer Lochmaske (Platte) des Druckkopfes auf das zu erstellende Objekt (3).

Nach einer Schichterstellung fahren die um die Trommel (1) zb. halbrund angeordneten Tische (2) (mindestens einer) je eine Schichtdicke nach aussen. Mehrere Tische (evtl. unterschiedlicher Grössen) werden um die Trommel angeordnet und erlauben kontinuierlichen Druck. Ein Objekt (3) wird entnommen, während weitere Objekte an anderen Tischen weiterhin gedruckt werden.

### Beschreibung der Zeichnungen und der bevorzugten Ausführungsform der Erfindung

Die vorliegende Erfindung wird nachfolgend beispielhaft und nicht einschränkend anhand von Zeichnungen näher erläutert.

Zwecks industrieller Anforderung wird hier eine Ausführung eines vertikalen Druckzylinders mit 4 Tischen gleicher Grössen dargestellt. Die Druckköpfe enthalten verschiedene Kunststoffmischungen unterschiedlicher Farben, zusätzlich auswaschbaren Supportstrukturkunststoff.

Es zeigen:

Figur 1: Vertikale (obere Abbildung) und horizontale (untere Abbildung) Trommelstellung

Figur 2a: Einfacher Tisch

Figur 2b: Multiple Tische für gleichzeitige Erstellung mehrerer Objekte (auch unterschiedliche Tisch/Objektgrössen möglich).

Figur 3: Druckkopf, Materialzuführung

Legende Zahlenbezeichnungen:

- 1 Drucktrommel
- 2 Objektisch
- 3 Objekt
- 4 Druckkopfleisten
- 5 optionale Schleife
- 6 Feststoff (zb ABS Granulat)
- 7 Materialvorschub (zb Schnecke)
- 8 Heizelement
- 9 Lochplatte
- 10 Druckmaterial hochviskos
- 11 Druckmaterial Niedrigviskos



## Ansprüche

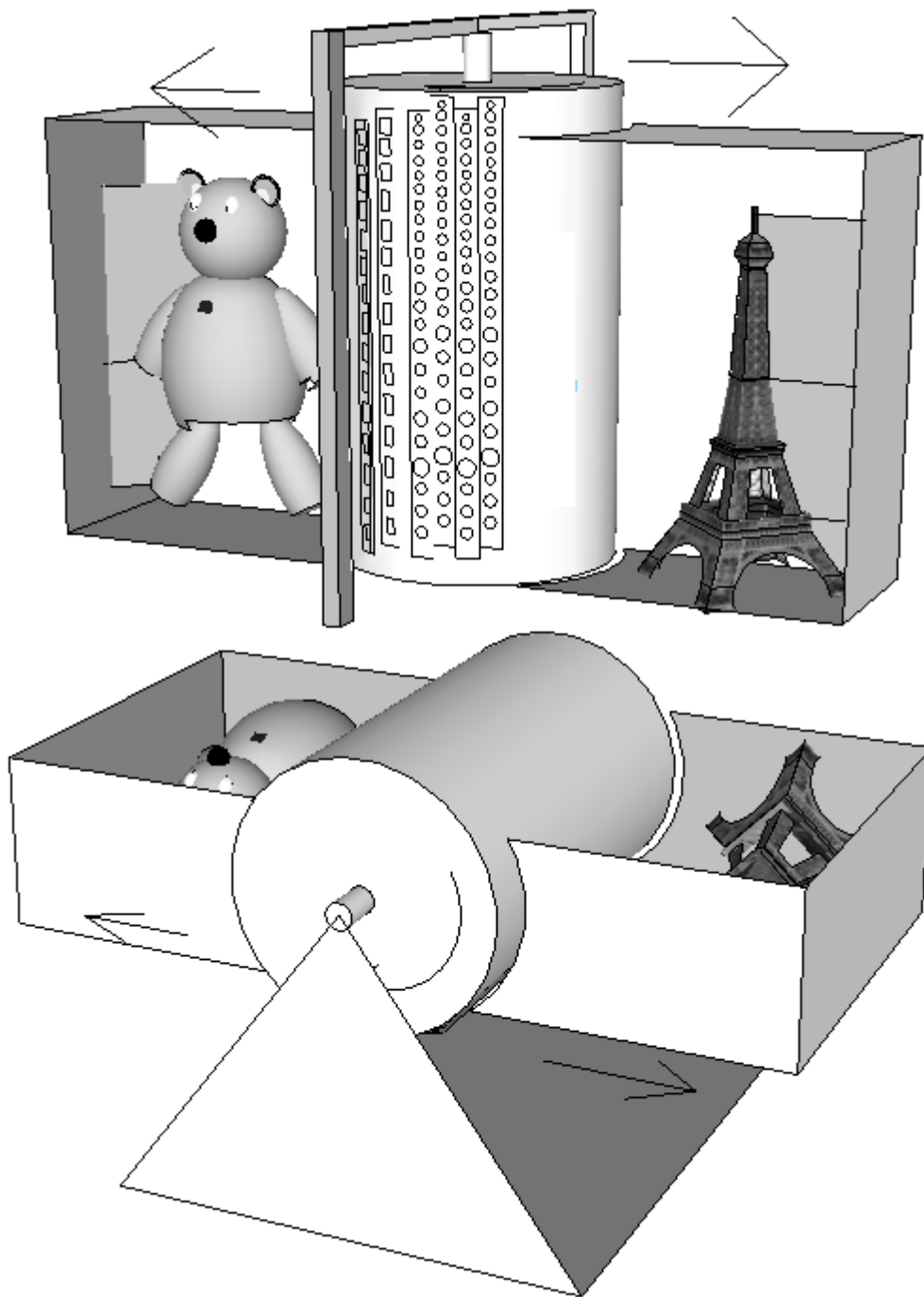
26. Verfahren zur Herstellung dreidimensionaler Objekte (3) mittels fester Kunststoffe, die aus Druckköpfen, vorzugsweise aus objektlangen Druckkopfleisten (4), gespritzt werden, dadurch gekennzeichnet, dass die Druckköpfe in einer rotierenden zylindrischen oder ellipsoiden Trommel (1) oder einer Kugel angebracht und dadurch gekennzeichnet, dass der bspw. in Granulatform vorliegende Kunststoff (6) vorzugsweise im Druckkopf (4) auf Fliesstemperatur erhitzt wird (10) und vorzugsweise alleinig durch die Zentrifugalkraft der Trommelrotation durch Löcher in der Lochplatte des Druckkopfes ausschliesslich dann gedrückt wird, wenn seine Viskosität durch schlagartige Erwärmung (bspw. durch Lichtbogen oder Heizplatte) am jeweiligen Loch der Lochplatte genügend abgesenkt wird (11).
27. Vorrichtung zur Herstellung dreidimensionaler Objekte (3) mittels fester Kunststoffe, die aus Druckköpfen, vorzugsweise aus objektlangen Druckkopfleisten (4), gespritzt werden, dadurch gekennzeichnet, dass die das Objekt haltende Basisplatte des Tisches die Form der vorzugsweise vertikal angebrachten und vorzugsweise zylindrisch gestalteten Trommelwand annimmt, sodass das Objekt stets schichtweise vorzugsweise in kreisrunden Schichtebenen erstellt wird. Eine plane Basisplatte oder gekrümmte Basisplatte mit plan erstellten Objektschichten ist auch umsetzbar. Jedes Objekt klebt mittels Supportstruktur an der sich von der Trommel distanzierenden Platte und liegt ggfls. schleifend (oder fest auf sich ausrollender Folie) mit Supportstruktur auf der unteren Platte auf.

## Zusammenfassung

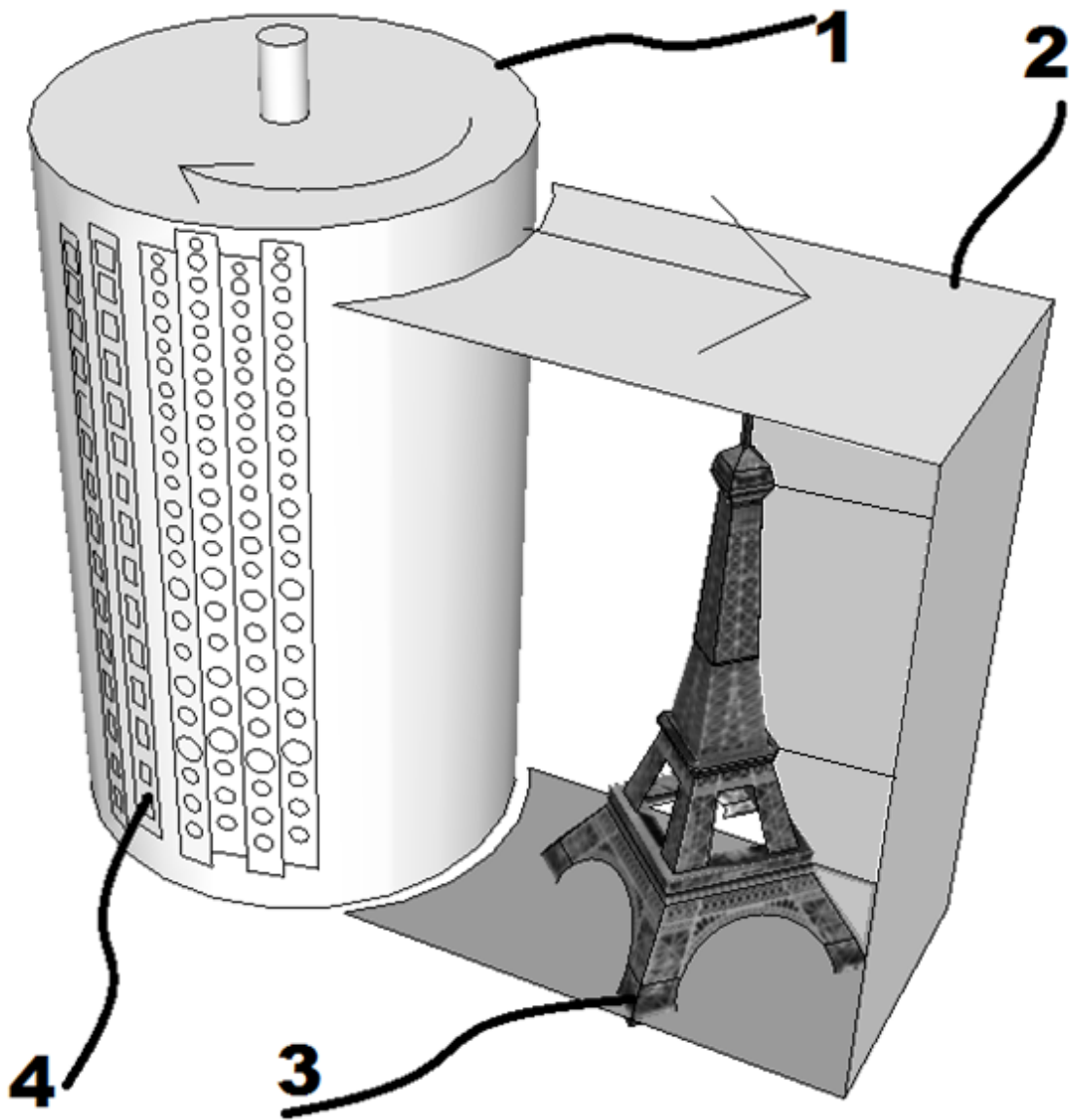
Die Erfindung betrifft ein Verfahren und eine Vorrichtung zur Herstellung dreidimensionaler Objekte mittels einer Trommel, in der Druckköpfe über die Drucklänge und hintereinander kaskadiert angebracht sind. Eine kontinuierliche Rotation des Druckkopfes (1) in einer Trommel erzeugt die erforderliche Zentrifugalkraft (Tropfengeschwindigkeit) um z.B. aufgeschmolzenes ABS-Granulat durch eine Lochplatte aus in der Trommel befindlichen Köpfen zu pressen. Das Druckmaterial wird im Druckkopf thermisch im Fluss gehalten, die Lochdurchmesser in der Lochplatte sind klein genug, dass das jeweilige Druckmaterial bei gegebener an die Fließfunktion angepasster Viskosität und auf das Druckmaterial wirkender Zentrifugalkraft nicht durch die Löcher in der Lochplatte entweicht. An jedem Loch stehen sich mindestens zwei stromleitende Platten oder Stäbe gegenüber, sodass ein Funkenschlag ausgelöst werden kann, dessen Lichtbogen das Druckmaterial schlagartig auf eine Temperatur erhitzt, die die Viskosität mindestens soweit absenkt, dass die Zentrifugalkraft das Druckmaterial nun durch das jeweilige Loch der Lochplatte im Druckkopf pressen kann. Denkbar wäre anstatt Lichtbogentechnik auch ein Heizelement.

Jeder Druckkopf kann unterschiedliche Materialien oder Farben spritzen, sodass Bilddruck ebenso möglich ist wie die Kombination unterschiedlicher Materialien, solange die Lochmaske an die fließbaren Materialien angepasst ist und die Viskosität durch Temperaturerhöhung schnell genug soweit absenkbar ist, dass das Material bei gegebener Zentrifugalkraft durch die Löcher pressbar ist.

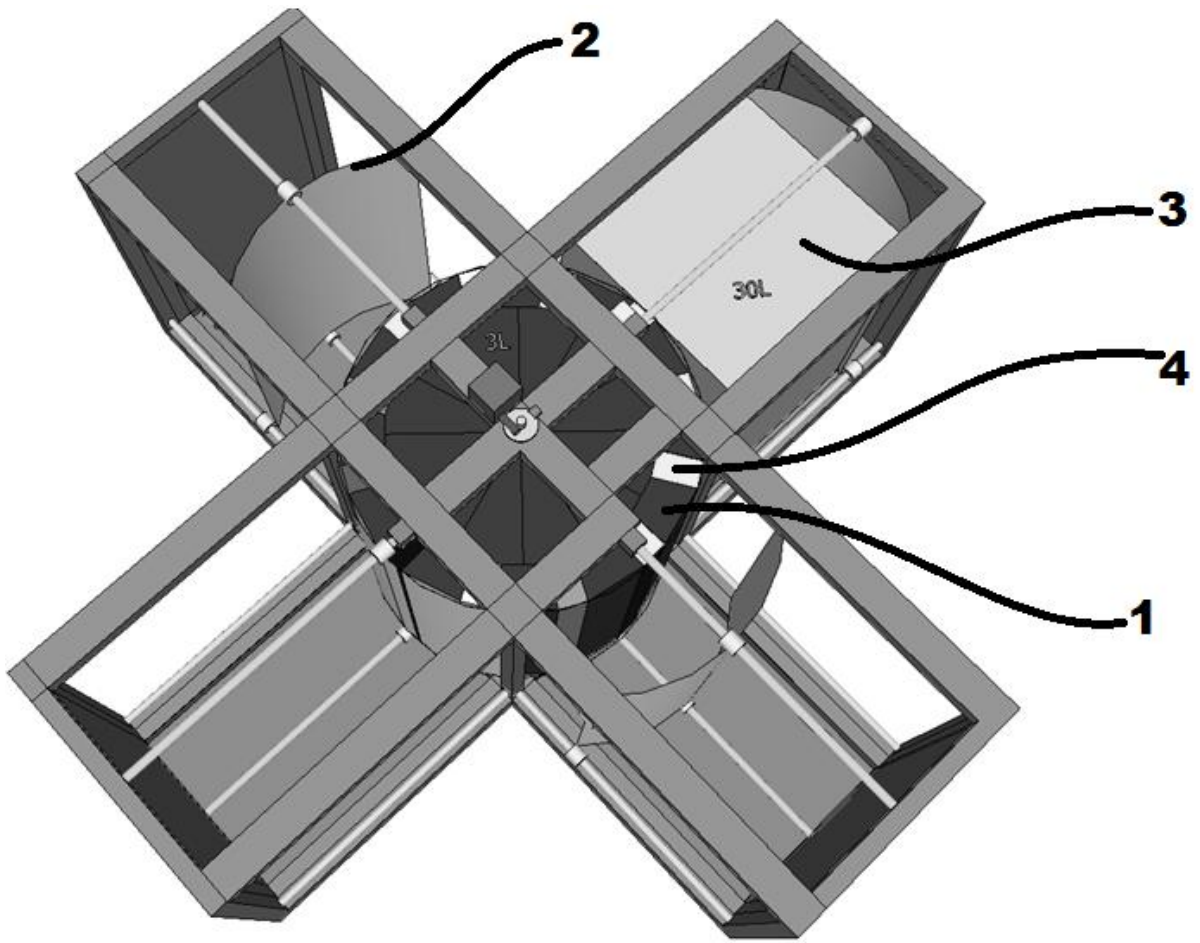
Die Erfindung betrifft ebenfalls eine Vorrichtung zur Durchführung des Verfahrens, bei dem die Druckertrommel zylindrisch ist und vertikal gelagert wird und die kontinuierliche Herstellung mehrerer Objekte mit unterschiedlichen Materialeigenschaften und Farben erlaubt (Fig. 2b), indem die Tischverfahrenebenen horizontal verlaufen.



Figur1

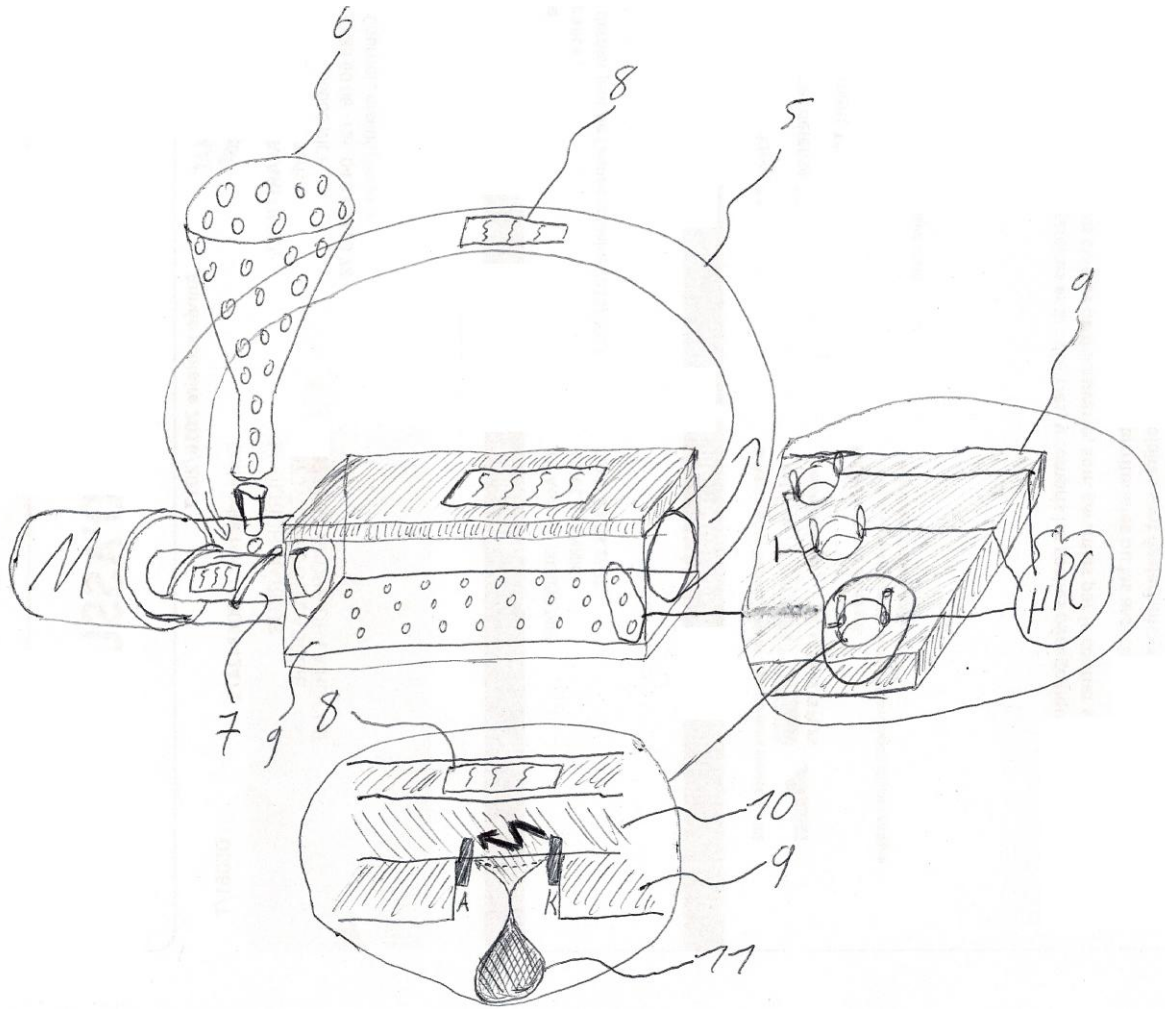


Figur 2a



Figur 2b





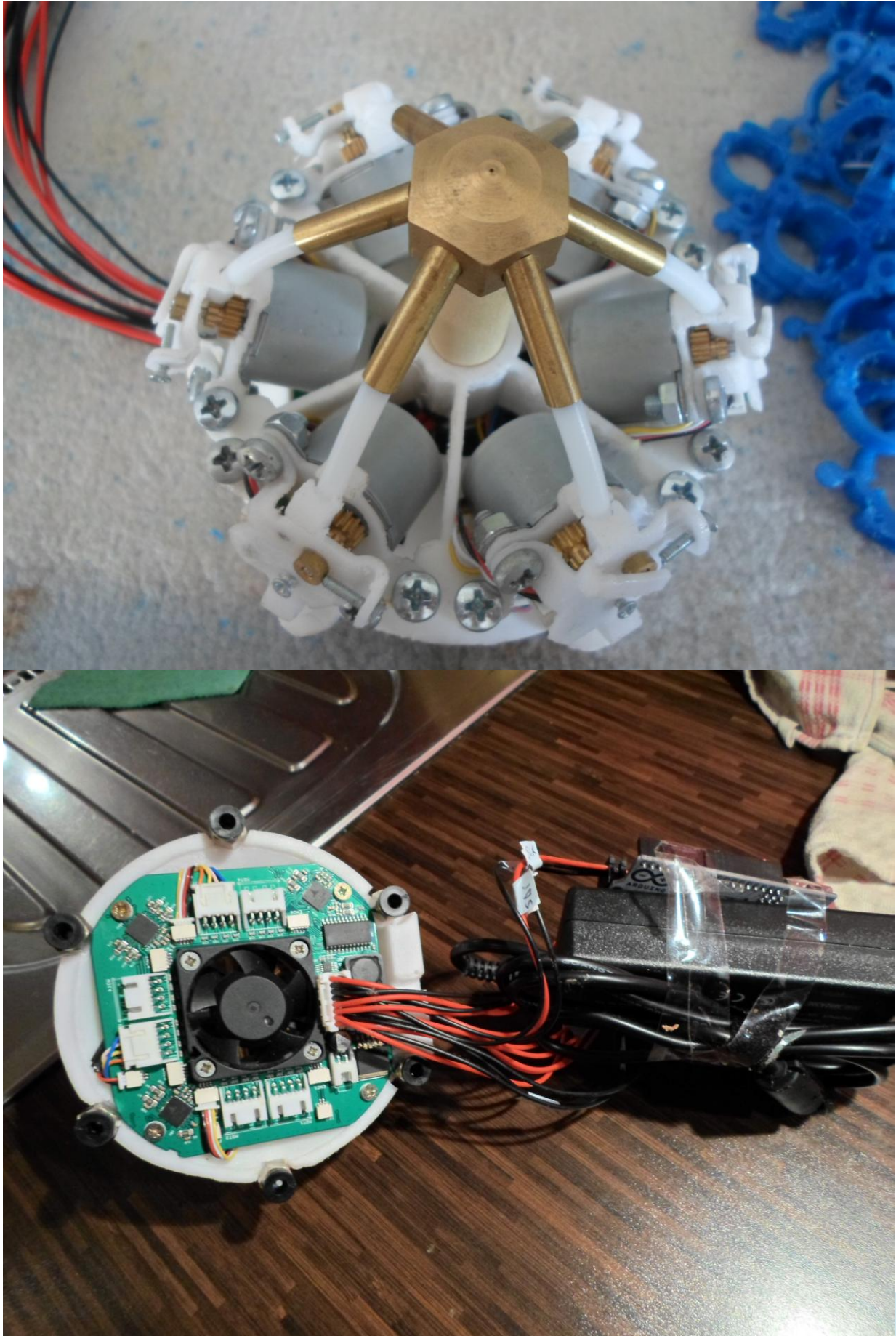
Figur 3

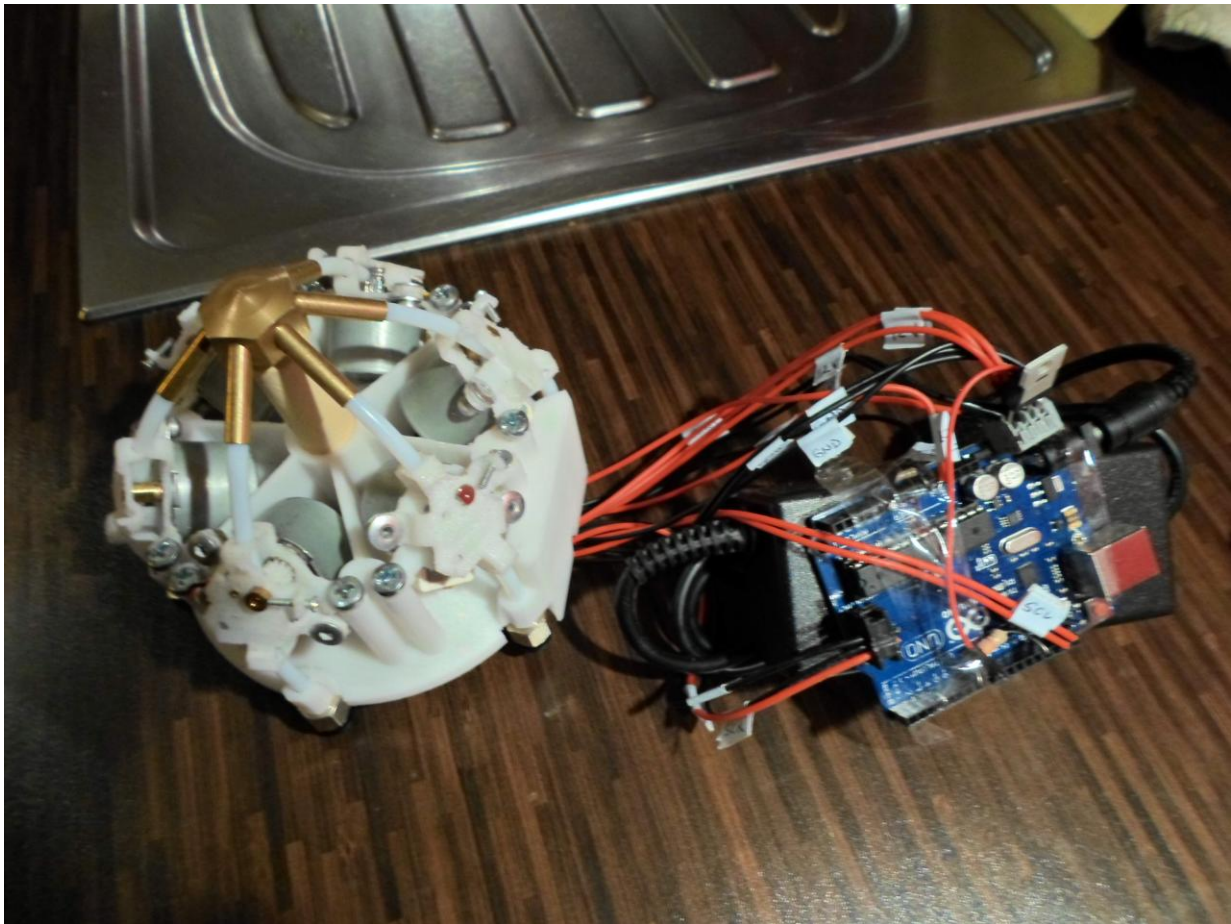
Printers



## Exhibit A6







## Exhibit A7

### Form-variable Düse für FDM Drucker

Die Erfindung betrifft ein Verfahren und eine Vorrichtung zur Herstellung dreidimensionaler Objekte mittels einer Form-variablen Düse für Filament-Drucker.

Die Vorrichtung zeigt eine modifizierte FDM Düse herkömmlichen Designs, die nun sowohl schnellen wie auch detailgetreuen Druck ermöglicht ohne höhere Druckgeschwindigkeit oder Rahmenstabilität des Druckers zu fordern, die Druckzeit jedoch weit mehr als halbiert.

#### Stand der Technik

FDM Drucker sind entweder schnell oder genau –oder teuer, denn hohe Druckgeschwindigkeit benötigt entsprechend dämpfende stabile Kastenkonstruktionen, starke Extruder und dennoch leichte Köpfe; und geringe Düsendurchmesser bringen exponentiell steigende Clogging-Probleme mit sich.

So hat sich im Konsumentenmarkt ein Kastendesign, eine 400µm Düse, ein Nema17 Stepper als Extruder Motor mit direkt angeschlossenem Hotend mit insgesamt bewegter Masse von ca 400gr und ein Bauvolumen von 1-2 Liter als „Standard“ durchgesetzt. Ca. 90% aller Konsumentendrucker besitzen diese Eigenschaften, daher konzentriert sich diese Schrift auf die Optimierung dieses riesigen Segmentes. Delta Drucker können hiervon jedoch ebenso profitieren.

### Die Problemstellung

Der Markt hat sich aufgrund obig angedeuteter Kriterien darauf eingerichtet, geplättete Bahnen mit einer Breite von über 400 µm aber unter 1mm mit einer Schichtdicke zwischen 50µm und 300µm als genügend detailgetreu zu definieren. Zwecks Wand- Decken- und Bodenstabilisierung muss nun mehrfach der gleiche Weg um eine Bahnbreite versetzt parallel gefahren werden. Untersuchungen haben gezeigt, dass formbestimmende Bahnen nur ca 10% der gesamten Druckzeit ausmachen, der Rest verteilt sich auf Verdickungen von Wänden, Böden, Decken, Supportstrukturen sowie Infill.

**Das Problem der langen Druckzeit entsteht also durch die Erstellung versetzter meist später unsichtbarer Parallelbahnen zwecks Formstabilisierung des Druckkörpers.**

### Die Aufgabe der Erfindung

Die Aufgabe der Erfindung besteht nicht in der Erhöhung der Kastenstabilität und nicht in der Erhöhung der Druckgeschwindigkeit, sonder einzig in der Verminderung der Produkterstellzeit. Diese Optimierung soll so kosteneffizient wie möglich für FDM Drucker-Hersteller sein, sodass ein Mini Servo sowie die modifizierte Düse für insgesamt 1-15\$ die gewünschte Druckzeitreduzierung um weit mehr als 50% herbeiführen.

**Die Aufgabe der Erfindung besteht also einzig in der Reduzierung der Parallelbahnen.**

### Offenbarung der Erfindung

Diese Aufgabe wird durch ein Verfahren und eine Vorrichtung mit den Merkmalen nach Ansprüchen 1 und 2 gelöst.

Beim dem Verfahren ist vorgesehen, dass eine nicht kreisrunde Düse sich zentriert um Z dreht.

Diese Idee ist spätestens seit der Patentschrift DE102015016823.1 bekannt, behandelt dort jedoch die Verarbeitung zähfließender Harze.

Die Bahndicke wird durch die X-Y Fahrgeschwindigkeit, Düseneingangsdurchmesser, Düsenstellung, Düsenausgangsform, Temperatur, Düsen-Boden-Distanz, Extruderdruck und die Materialeigenschaften des Filaments bestimmt, bspw die temperaturabhängige Viskositätsabsenkung, das Fließverhalten, und ob bspw. der Untergrund aufgeschmolzen wird.

Bei der vorgeschlagenen Vorrichtung ist vorgesehen, dass vorzugsweise ein Mini-Servo den Düsenkopf um 180° dreht. Der Kopf besteht aus drei Elementen: dem stehenden Träger-Rohr, dem drehenden Düsenhalter und der in den Düsenhalter einschraubbaren Düse, sodass abgenutzte Düsen kostenschonend ausgetauscht und verschiedene Düsenformen ausprobiert werden können, ohne den gesamten Kopf ersetzen zu müssen.

Vorteilhafte Ausgestaltungen sind in den Ansprüchen angegeben.

Durch die erfindungsgemäße Lösung werden die Nachteile des Stands der Technik eliminiert und die folgenden Vorteile erzielt:

1. Der Druckkopf fährt wesentlich weniger Parallelbahnen
2. Eine breite Bahn bietet mehr Stabilität als mehrere aneinandergedrückte Parallelbahnen.
3. Aus 2. ergibt sich uU. sogar eine Gewichts- und Materialreduzierung –mit weiterer Druckzeitverringerung
4. Eine breitere Bahn (in Boden oder Decke) ist glatter und optisch ansprechender als Parallelbahnen.

#### Beschreibung der Erfindung: Grundsätzlicher Aufbau mit wesentlichen erfindungsgemäßen Merkmalen

Der Düsenkopf soll um mindestens 180° drehbar sein. Hierfür reicht ein billiger Modellbau-Micro-Servo, der bereits ca 5Ncm aufbringt. Möglich und besser ist auch ein Getriebemotor mit Positionsgeber, sodass die Düse sich ohne Endstops drehen und bspw Kreise ohne Rücksprung (beim Standard-Servo wäre dies nach spätestens ca 270° nötig) erstellen könnte. Der Kopf besteht aus drei Elementen: dem stehenden Träger-Rohr, dem drehenden

Düsenhalter und der in den Düsenhalter einschraubbaren Düse, sodass abgenutzte Düsen kostenschonend ausgetauscht und verschiedene Düsenformen ausprobiert werden können, ohne den gesamten Kopf ersetzen zu müssen. Wie obig bereits geschildert erlauben unterschiedliche Filamente aufgrund ihrer Zusammensetzung auch unterschiedliche Schichthöhen und –breiten, sodass ein schneller Düsenwechsel mittels einer Schraubvorrichtung im Düsenhalter sinnvoll erscheint.

### Beschreibung der Zeichnungen und der bevorzugten Ausführungsform der Erfindung

Die vorliegende Erfindung wird nachfolgend beispielhaft und nicht einschränkend anhand von Zeichnungen näher erläutert. Es zeigen:

Figur 1: Darstellung verschiedener Vorrichtungen des Düsenkopfes

Figur 2: Darstellung der Ober- und Unterseite des Düsenkopfes

Figur 3: Darstellung unterschiedlicher Bahngeometrien

Figur 4: Darstellung des Verfahrens zur Erstellung formvariabler Druckbahnen

Figur 5: Darstellung einer Vorrichtung zur Drehung des Düsenkopfes

Figur 6: Darstellung der Vorrichtung in ihren einzelnen Elementen

Figur 7: Darstellung des Verfahrens zur zumeist einbahnigen Wanderstellung

In Figur 1 sind verschiedene Vorrichtungen des Düsenkopfes schematisch dargestellt.

Der Düsenausgang kann formgebend drei- vierseitig oder fünfseitig geschlossen sein. Je weniger Seiten das Filament stützen, umso präziser muss die Koordination von X-Y Fahrgeschwindigkeit, Düseneingangsdurchmesser, Düsenstellung, Düsenausgangsform, Temperatur, Düsen-Boden-Distanz, Extruderdruck und die Materialeigenschaften des Filaments sein.

In Figur 2 ist die Vorrichtung der Ober- und Unterseite des Düsenkopfes dargestellt

Gezeigt wird an der Oberseite das stehende Trägerrohr (4), über welches dem Düsenkopf das zu erhitzende Filament zugeführt wird, sowie die Unterseite des Düsenkopfes –hier gezeigt mit der fünfseitig geschlossenen Düse (5).

In Figur 3 sind unterschiedliche mögliche Bahngeometrien in Abhängigkeit vom Filamentfließverhalten, Extruderdruck, Düsen-Boden-Distanz und X-Y Fahrgeschwindigkeit

dargestellt. Angedeutet werden soll hier, dass je nach Filamentmaterial und Druckereinstellungen (Schichthöhe, Fahrgeschwindigkeit, Filament- und Bett- und Umgebungstemperaturen und Extruderwirkung) unterschiedliche Bahngeometrien zu erwarten sind, und dass die richtige Einstellung diejenige ist, die –bezogen auf die fünfseitig geschlossene Düse- das Filament die untere ausgesparte Düsenfläche füllen lässt (3) und diese Form über die zu druckende Schichtdicke weitgehend hält.

In Figur 4 wird das Verfahren zur Erstellung formvariabler Druckbahnen gezeigt. Der üblicherweise in den Druckkopf eingeschraubte selbst unbewegliche Düsenkopf (9) ist nun beweglich –preiswerterweise mittels Servos um mindestens 180° oder aber mittels Getriebemotors und Positionsgebers endlos drehbar. Letztere Anordnung könnte ein Objekt ohne Absetzen/Düsenkopfdrehung/Retraktion mit erhöhter x/y-Festigkeit drucken (bspw einen Zylinder), aber auch in Z nimmt die Festigkeit aufgrund der grossflächigen homogenen Aufschmelzung der Unterbahn um über 25-100% zu.

Die graduelle Bahnbreitenzunahme wird durch die graduell verstellbare Düsenstellung (9) von 0° auf 90° erreicht. Eine Bahnbreite von 2mm bietet in den meisten Fällen bereits eine ausreichende Wandstärke, auch Infill-strukturen sind nun meist mit einer einzigen Bahn erstellbar, sodass die Vorrichtung eine untere ausgesparte Düsenfläche von 0,4mm x 2mm aufzeigt.

In Figur 5 wird die Vorrichtung zur Drehung des Düsenkopfes aufgezeigt. Dargestellt wird hier zwecks kostengünstiger Umrüstung herkömmlicher Systeme ein Microservo (8) mit 5Ncm Stellmoment, 4,4gr Masse, 90ms Stellzeit für 60° und Gehäusemassen von ca 8x20x16mm (TxBxH). In den meisten Fällen wird der gesamte herkömmliche Druckkopf nach Umrüstung auf die schwenkbare Düse weder 5% grösser noch 5% schwerer. Das Perimeter-Verhältnis zwischen An- und Abtriebsrad (6 & 7) bestimmt das übertragende Stellmoment wie auch die Stellzeit. Die einfachste Umrüstung kann das Stellsignal aus dem PWM Fan-Signal holen, mit parallel geschaltetem Fan oder separat nicht über das Druckerboard gesteuertem Fan, zB manuell über Potentiometer.

In Figur 6 wird die Vorrichtung in ihren einzelnen Elementen dargestellt.

Der Kopf besteht aus drei Elementen: dem stehenden Träger-Rohr, dem drehenden Düsenhalter und der in den Düsenhalter einschraubbaren Düse, sodass abgenutzte Düsen kostenschonend ausgetauscht und verschiedene Düsenformen ausprobiert werden können, ohne den gesamten Kopf ersetzen zu müssen.

In Figur 7 wird das Verfahren zur zumeist einbahnigen Wanderstellung dargestellt.

Würde der herkömmliche Druckkopf in diesem Beispiel vier mal fahren müssen um eine stabile Wand zu erstellen, so druckt man mit der formvariable Düse nun mit einer einzigen Bahn einen stabileren Wandabschnitt, eine Zeitersparnis von 75% -vorausgesetzt Extruder und Heizelement bringen die notwendige Leistung.

Legende Zahlenbezeichnungen:

19. Filament, auslaufend, zu fließend (evtl. zu hohe Drucktemperatur)
20. Filament, zu starr (evtl. zu niedrige Drucktemperatur)
21. Filament, richtige Form, richtige Drucktemperatur
22. Filamenteinlas des Düsenkopfes (12)
23. Filamentauslas des Düsenkopfes, bahnformgebende Düsenform
24. Abtriebsrad am Düsenkopf, angetrieben vom Antriebsrad des Servos
25. Antriebsrad des Getriebemotors (zB Servo), zur Drehung des Düsenkopfes
26. Getriebemotor (zB Servo)
27. Düse, fest zum Düsenhalter (zB verschraubt)
28. Trägerrohr, stehend (zB verbunden mit x-y Achse)
29. Düsenhalter, drehend (gehalten von Trägerrohr und eingeschraubter Düse)
30. Düsenkopf, bestehend aus Träger-Rohr (10), Düsenhalter (11) und zB einschraubbaren Düse (9)



## Ansprüche

28. Verfahren zur Herstellung dreidimensional erstellter Objekte mittels eines FDM-Druckers, dessen Düsenkopf (12) drehbar ist  
dadurch gekennzeichnet,  
dass die drei- bis fünfseitige Öffnung des Düsenkopfes (Figur1) um dessen zentrale Z-Achse um mindestens 90° drehbar ist, von einem Servo oder positionsgebenden Getriebemotor angesteuert wird und daher graduell in variabler Weise computergesteuert und an die benötigte Wanddicke angepasst massive Bahnen mit Breiten von Düsenöffnungsbreite bis Düsenöffnungslänge erstellen kann.

29. Vorrichtung zur Herstellung dreidimensional erstellter Objekte mittels eines FDM-Druckers, dessen Düsenkopf (12) drehbar ist,  
dadurch gekennzeichnet,  
dass der Düsenkopf bei der bevorzugten Vorrichtung aus drei Elementen besteht: dem stehenden Träger-Rohr (10), dem drehenden Düsenhalter (11) und der in den Düsenhalter einschraubbaren Düse (9). Die kostengünstige Variante besteht aus einem Microservo (8) mit 5Ncm Stellmoment, 4,4gr Masse, 90ms Stellzeit für 60° und Gehäusemassen von ca 8x20x16mm (TxBxH), die höherpreisige aus einem Getriebemotor mit Positionsgeber, sodass Endlosdrehungen des Düsenkopfes Druckbahnen in x-y-Ebene ohne wie beim Servo nötige Rückdrehung erfolgen können.  
Die bevorzugte Vorrichtung weist eine einseitige Düsenöffnung von 0.4 x 2mm auf.

## Zusammenfassung

Die Erfindung betrifft ein Verfahren und eine Vorrichtung zur Herstellung dreidimensionaler Objekte mittels eines drehbaren Form-variablen Düsenkopfes (12) für Filament-Drucker.

Das Problem der langen Druckzeit entsteht durch die Erstellung versetzter meist später unsichtbarer Parallelbahnen zwecks Formstabilisierung des Druckkörpers.

Die Aufgabe der Erfindung besteht in der Reduzierung der Parallelbahnen.

Die Düsenoptimierung soll so kosteneffizient wie möglich für FDM Drucker-Hersteller sein, sodass ein Mini Servo sowie der modifizierte Düsenkopf für insgesamt 1-15\$ die gewünschte Druckzeitreduzierung um weit mehr als 50% herbeiführen. Der Düsenkopf besteht bei der bevorzugten Vorrichtung aus drei Elementen: dem stehenden Träger-Rohr (10), dem drehenden Düsenhalter (11) und der in den Düsenhalter einschraubbaren Düse (9), sodass abgenutzte Düsen kostenschonend ausgetauscht und verschiedene Düsenformen ausprobiert werden können, ohne den gesamten Kopf ersetzen zu müssen.

Die graduelle Bahnbreitenzunahme wird durch die graduell verstellbare Düsenstellung (9) von 0° auf 90° erreicht. Eine Bahnbreite von 2mm bietet in den meisten Fällen bereits eine ausreichende Wandstärke, auch Infill-strukturen sind nun meist mit einer einzigen Bahn erstellbar, sodass die Vorrichtung eine untere ausgesparte Düsenfläche von 0,4mm x 2mm aufzeigt.

In den meisten Fällen wird der gesamte herkömmliche Druckkopf nach Umrüstung auf die schwenkbare Düse weder 5% grösser noch 5% schwerer.

Figur 6:

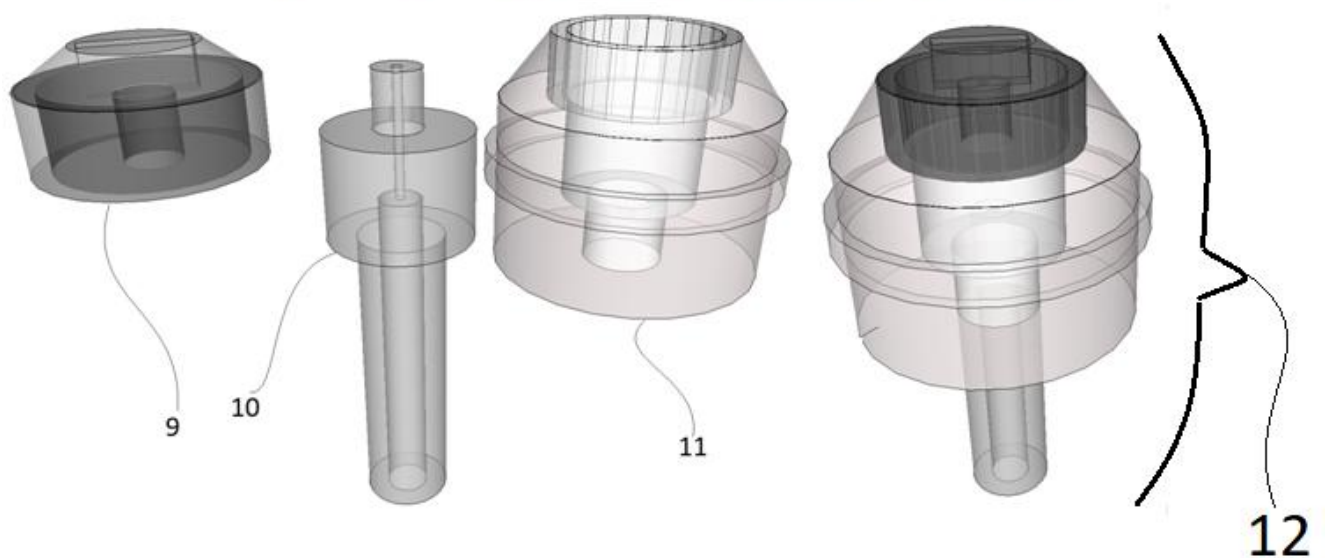
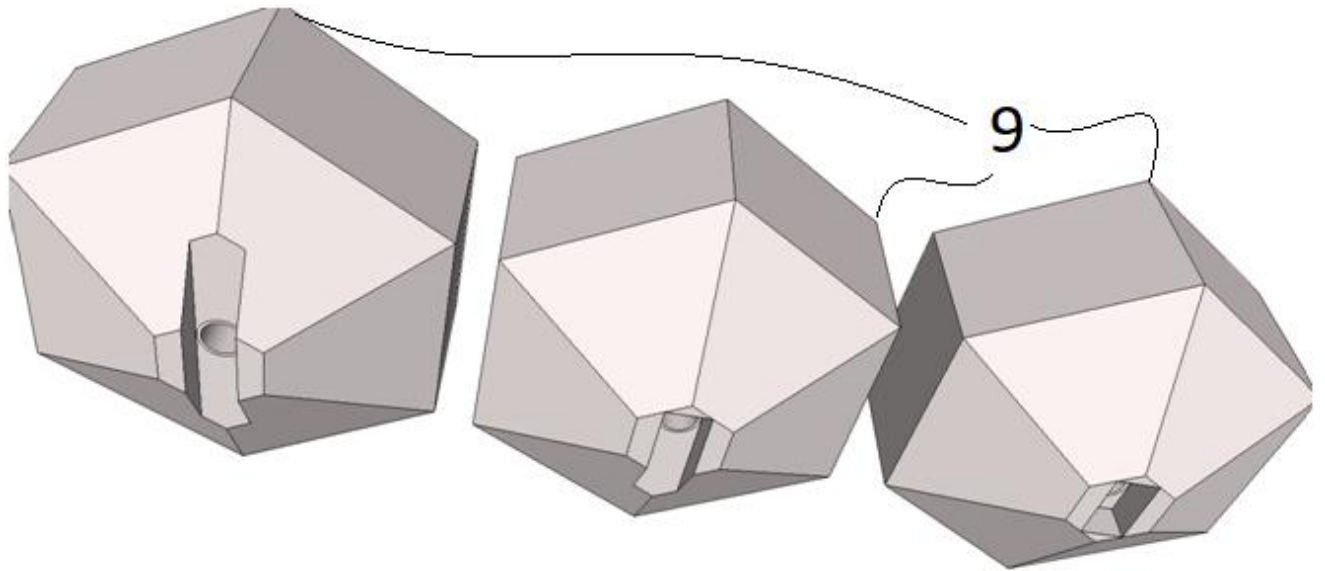


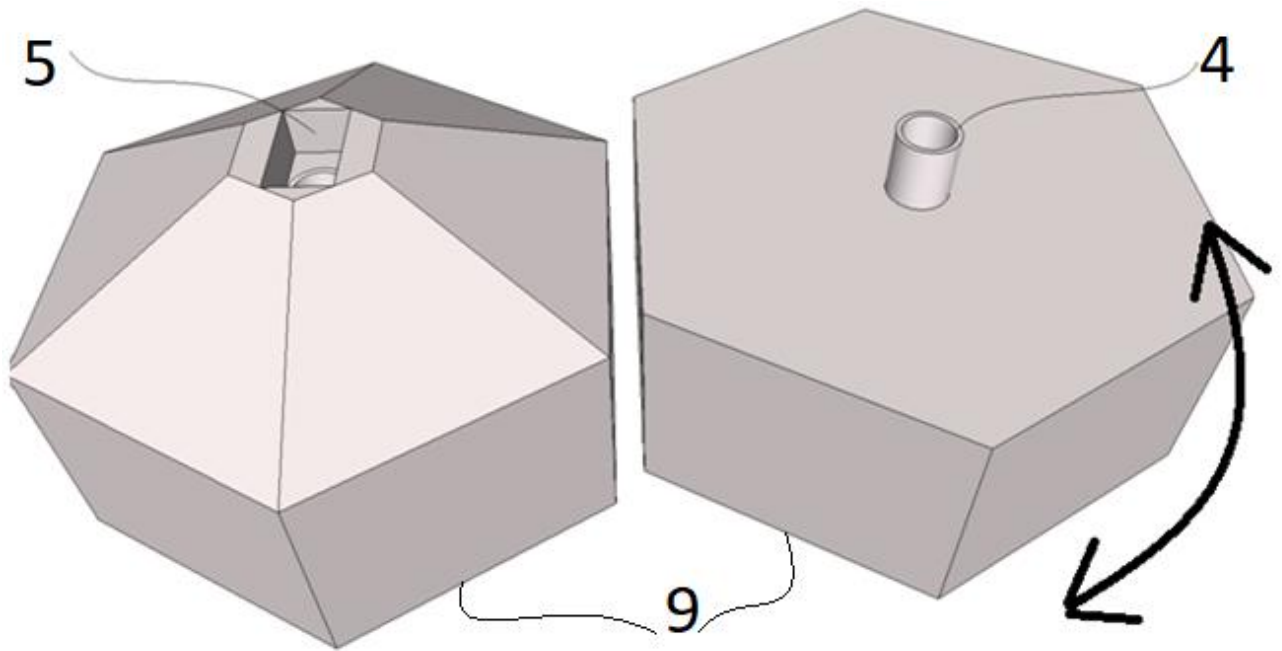
Figure 1-7:

Figure 1:



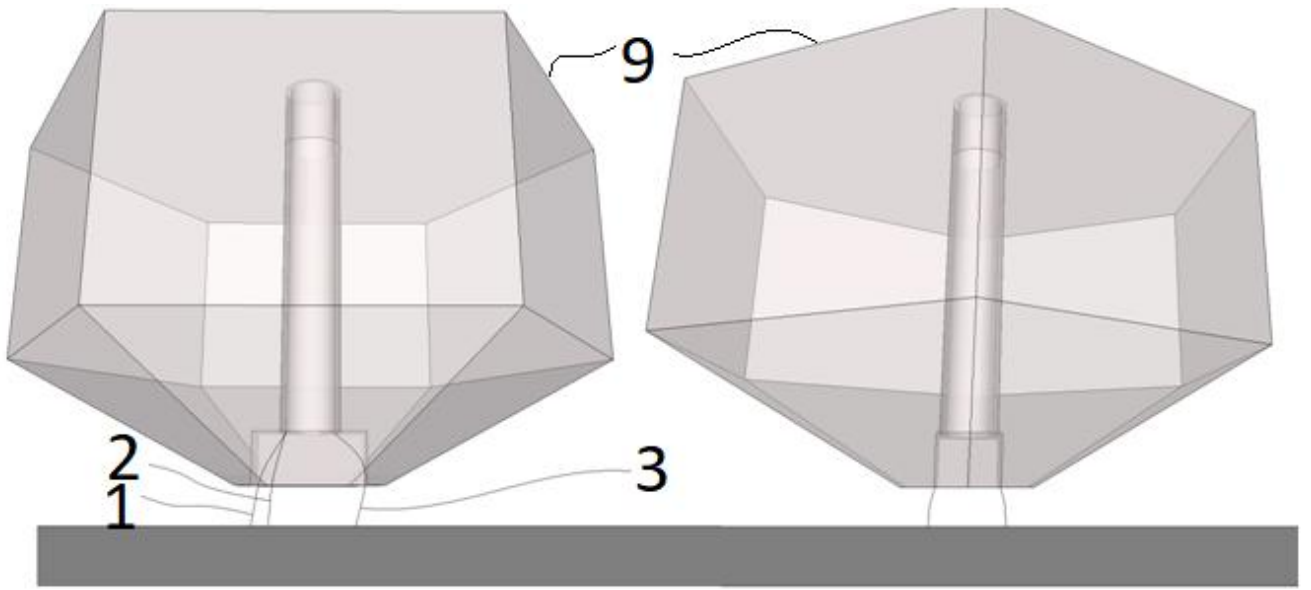
Genius  
Printers

Figur2:



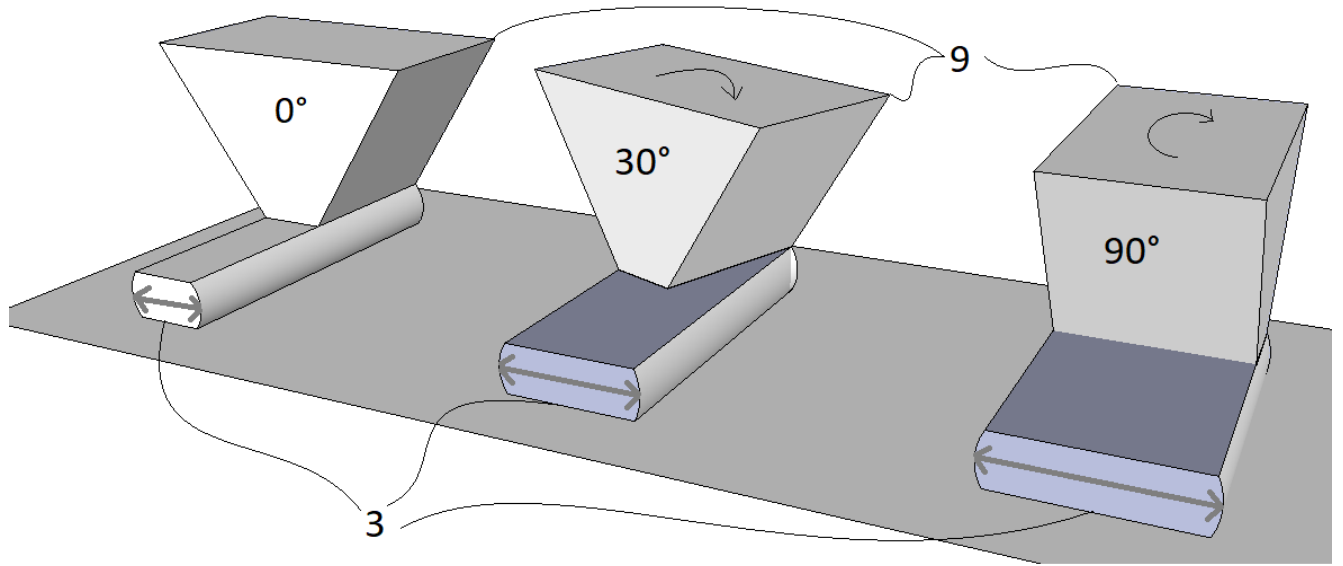
Genius  
Printers

Figur 3



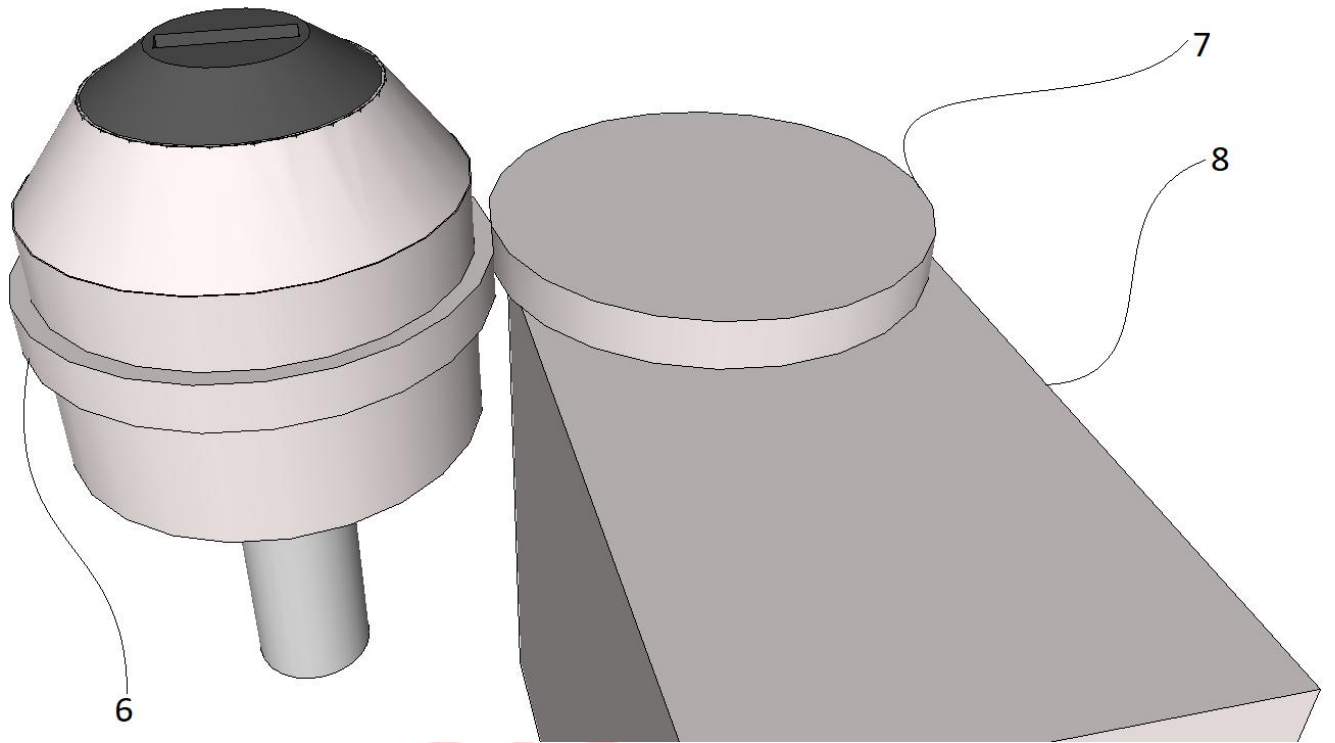
Genius  
Printers

Figur 4



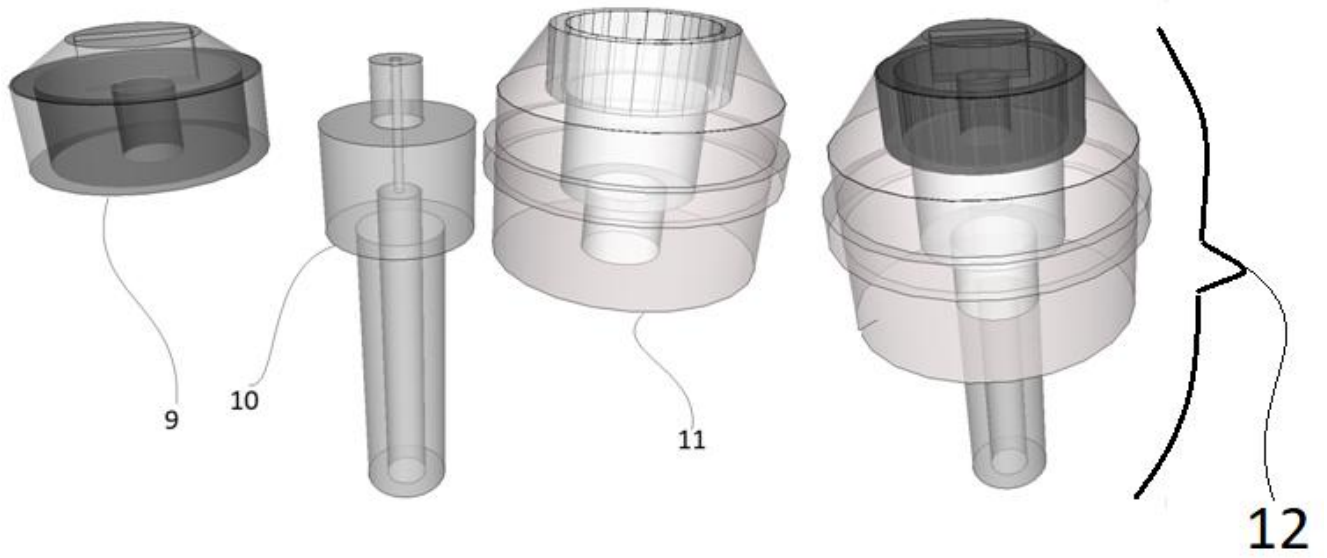
Genius  
Printers

Figur 5



Genius  
Printers

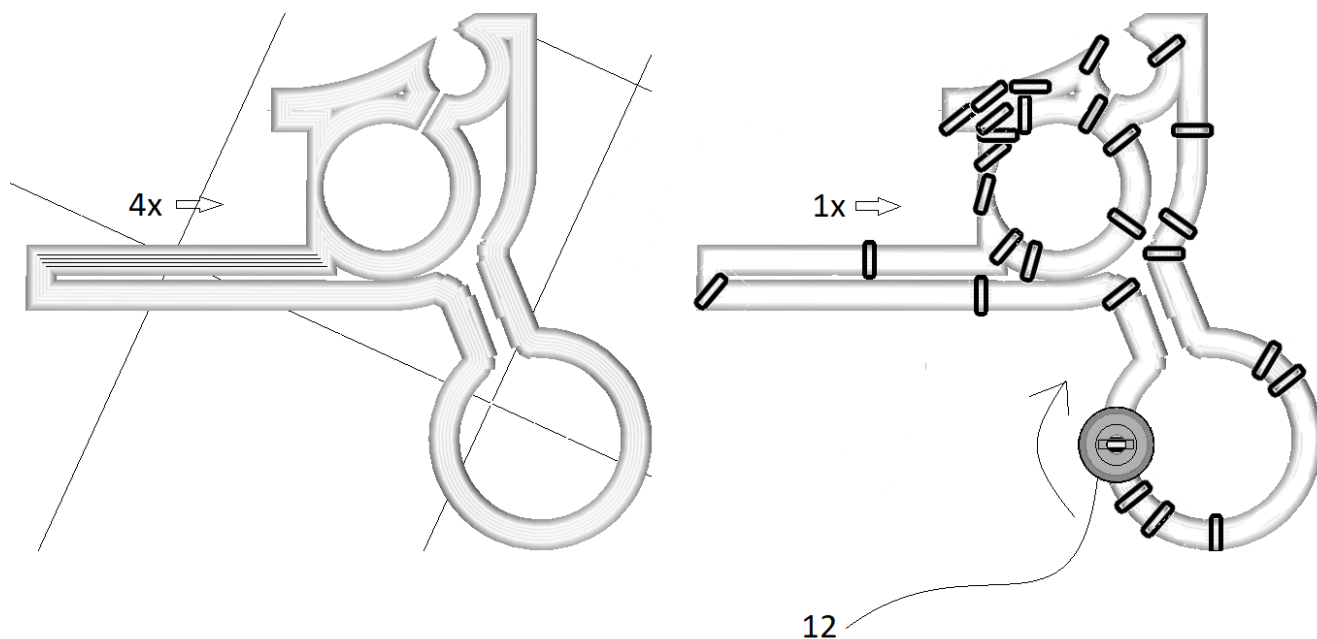
Figur 6



Genius  
Printers

Figur 7





## Exhibit A8

### Kontinuierlicher 3D- Pulver-Sinterdruck

Die Erfindung betrifft ein Verfahren und eine Vorrichtung zur schichtweisen Herstellung von dreidimensionalen Objekten, insbesondere gekrümmt geschichtet mittels einer Drucktrommel und kontinuierlicher Z-Tischabsenkung. Diese Methode erlaubt bislang unerreichte Druckzeiten.

#### Stand der Technik

Feste Körper 3D zu drucken beschäftigt die Industrie seit über 30 Jahren stark zunehmend. Dabei hat sich die Pulververfestigungs-Technologie für Industrieprodukte bisher durchgesetzt, CLIP ist eine seltene die Regel bestätigende Ausnahme.

Innerhalb der Pulververfestigungstechnologie spielt Laser Sintern (SLS) eine grosse Rolle. SLS, aber auch die Fusionstechnologie von HP und weitere Methoden nutzen fast ausnahmslos plane Ebenen, auf denen Schlitten fahren, die bspw. Walzen, Lampen und Druckköpfe hin und her und evtl auch noch quer ziehen. Dass hier keine grosse Verfahrensgeschwindigkeit erreicht werden kann, ist klar. Die derzeitige Schichterstellungszeit

liegt bei ca 10 Sekunden. Liefen die Sinterprozesse schneller ab, stellte die Schlittenverfahrzeit ein grosses Problem dar. Industrieproduktion benötigt aber wesentlich kürzere Schichterstellzeiten als heutzutage mit SLS Maschinen machbar ist. Daher soll hier eine Methode aufgezeigt werden, wie Pulververfestigung auch innerhalb von weniger als eine Sekunde pro Schicht machbar ist.

Würde der Schlitten nicht zurückfahren müssen sondern sich immer nur in eine Richtung bewegen und doch wieder am Ursprungsort ankommen, so müsste er rund laufen, bspw könnten Druckköpfe, Walzen und Lampen auch auf oder in einer Trommel fixiert sein. Die Patente DE102014019392.6 (SLA), DE102016002598.0 (SLS) sowie DE102016015617.1 (Granulat) nutzen bereits Trommeln zur Herstellung gekrümmter Schichten.



### Aufgabe dieser Erfindung

ist nun, die Trommel im Pulversinterbereich ohne Lasereinsatz zu nutzen und ganzflächig zu bestrahlen, sodass die Druckgeschwindigkeit weiter optimiert wird. Die Sintermethode ist dabei nicht Bestandteil der Erfindung, hier kann auf Literatur freier Patentschriften oder bald auslaufender wie bspw. „Radiation Sintering,, (U.S. Provisional Application No. 60/161,695, vom Oktober 26, 1999) verwiesen werden, die bereits Druckkopfeinsatz und Bestrahlung über die gesamte Druckbreite vorschlägt, genauso wie auf DE1997123892 und US09445670. Als am klarsten verständliche Schriften ragen Evoniks EP1740367B1 mit Prioritätsdatum April 2004 und EP1459871B1 mit Prioritätsdatum März 2003 deutlich heraus. Die letztgenannten Patente verwenden IR- und Mikrowellen respektive als Sinterenergie, mit vorauslaufenden Druckköpfen, die Absorptionsflüssigkeit auf den zu sinternden Teil spritzen, sodass ungesintertes, unbehandeltes, für Hinterschneidungen zur Stützung benötigtes Pulver im Druckbett später wiederverwendet werden kann.

Eine weitere sehr wichtige Aufgabe ist die Temperaturregelung. Diese kann bei luftwirbelnden, kreuz und quer fahrenden Schlitten mit dementsprechend grossem Luftvolumen oberhalb der obersten Schicht zum Kontroll-Alptraum werden, mit ein Grund, weshalb HP's Fusion Drucker so spät an den Markt ging und nun viele Wärmesensoren und bspw 20 Halogenlampen als Temperiereinheiten über das Druckbett verteilt eingebaut sind. Will man diesen Aufwand minimieren, so muss die Anzahl der Schlitten, deren Richtungsänderungen pro Schichterstellung und natürlich der Luftraum in der Maschine oberhalb des Druckbetts erheblich reduziert werden. Ausserdem sollte die Schichterstellzeit erheblich verkürzt werden, sodass Temperaturschwankungen minimiert werden.

## Offenbarung der Erfindung

Eine kontinuierliche Rotation des Druckkopfes bringt die erforderliche Geschwindigkeit um vielfach schneller zu drucken als bisher möglich ist.

Verglichen mit herkömmlichen Zweikreissystemen (erst wischen, dann sintern), bietet der Trommeldrucker grosse Vorteile. Konnte bisher kaum eine Schicht im Zehnhunderttakt erstellt werden, ist nun eine Schicht pro Sekunde möglich, evtl. auch mehrere. Die Trommel (8) kann zB. zylindrische, ellipsoide oder Kugelform annehmen, mehrere Trommeln sind kaskadierbar wie bereits in DE102016002598.0 gezeigt.

Die Aufgabe des Schnelldrucks mittels einer Drucktrommel (8) wird durch ein Verfahren und eine Vorrichtung mit den Merkmalen nach Ansprüchen 1 bis 9 gelöst.

Beim dem Verfahren des kontinuierlichen Schnelldrucks mittels einer Trommel (8) (mit optional schichtweise verschiedenen Materialien aus trommelinternen Pulverreservoirien) ist vorgesehen, dass der Schichtdruck teilkreisartig um die Trommelaussenwand erfolgt. Der Objektträger (Druckbett) (3) entfernt sich während einer Schichterstellung um eine Schichtdicke kontinuierlich. Wird das Pulver aus einem externen Reservoir (10) zur Trommel (8) geführt, besteht das Objekt nur aus einem Material. Erhält jede Schicht jedoch ihr Pulver aus trommelinternen Tanks, so können verschiedene Materialien schichtweise verbunden werden. Allerdings läge das ungesinterte Pulver vermischt im Druckraum und wäre wahrscheinlich unbrauchbar. Sinnvoll erscheint daher der HSS Trommeldrucker mit externer Pulverzufuhr, wobei unterschiedliche Materialeigenschaften (zB elektrische Leitfähigkeit) mittels unterschiedlicher Materialeigenschaften der Druckflüssigkeiten machbar sind. Der Druck erfordert keinerlei Supportstrukturen, erlaubt allerdings keine geschlossenen Objekte. Der Schlittenverfahrraum, der in herkömmlichen SLS/HSS Maschinen ähnlich gross dem des Bauraumes ist, macht nun kein Prozent des Bauraumes mehr aus, sodass die Temperaturschwankungsregelung (im Raum zwischen oberster Pulverschicht und Trommelaussenwand) von  $\pm 1\%$  der Sintertemperatur (bspw von PA12) nun problemlos erreichbar ist, weil

- die Druckkopf, Sinter- und Walzeneinheit nicht mehr in verschiedene Richtungen fährt, sondern nur noch in eine, und
- bezogen auf das Luftvolumen, das die SLS/HSS-Schlitten üblicherweise zum Verfahren benötigen, nun bezogen auf den Abstand zwischen oberster Pulverschicht und Trommelaussenwand sehr viel flacher gebaut werden kann, und

- weil die Trommel mehrere Walzen-, Druckkopf- und Wellenemittereinheiten hintereinander aufnehmen kann, sodass mehrere Schichten ortsversetzt erstellt werden, mit dem erwünschten Nebeneffekt, dass die Abkühlzeit verkürzt, der Sinterzeitraum jedoch sogar druckqualitätsverbessernd verlängerbar ist, die Schichterstellzeit sogar vergrößert werden kann, die Produkterstellzeit aber durch die ortsversetzt gleichzeitige Schichterstellung erheblich verkürzbar ist.  
Die extrem verkürzte Abkühlzeit durch die nächste sofort nachfolgende Walzen-, Druckkopf- und Wellenemittereinheit hat grosse Auswirkungen auf die Temperaturstabilität.

Das über gekühlte Walzen aufgebrauchte Pulver kann zur Kühlung der zuvor gesinterten Schicht genutzt werden, wie auch die Absorberflüssigkeitstemperatur sowie chemische Reaktionen verursacht durch den Auftrag der Flüssigkeit bis hin zur Verdampfungskühlung. Die Bestrahlungseinheit (Wellenemitter) sorgt auf der Absorber-besprühten Fläche durch Bestrahlung für eine Temperaturdifferenz von 10-20% der Sintertemperatur. Die Nachstrahlung beeinflusst nachfolgende Schichten je nach Objektform (Volumenkonzentration), sodass die via Druckkopf abzugebende Absorbermenge für die Folgeschichten angepasst/reduziert werden muss, damit die Temperatur stabilisiert bleibt.

Druckqualitätssteigernd folgt dem Druckkopf vorzugsweise mindestens eine weitere Druckkopfreihe, sodass weitere Materialeigenschaften entstehen, bzw damit die Möglichkeit besteht, eine Kühlung als „Sonderschicht“ für den Fall einzubauen, dass ein allfällig extrem kompaktes 3D Objekt zu viel Wärme speichern würde und daher gezwungenermassen abgekühlt werden muss, bspw mittels einer aus dem zweiten Druckkopf auf eben dieses Objekt verspritzten Alkohollösung, die mit oder ohne nachfolgende Bestrahlung Verdampfungskühlung erzeugt.

Zwecks Verhinderung der unerwünschten Ansinterung von neben Absorberflüssigkeit-bespritztem Pulver liegendem Pulver wird letzteres Pulver mittels mindestens eines dem Absorberflüssigkeit spritzenden Druckkopf nachfolgenden Druckkopfes bespritzt, bspw mit einer Alkohollösung, sodass die nachfolgende Bestrahlung dort Verdampfungskühlung erzeugte, während das nebenliegende mit Absorberflüssigkeit bespritzte Pulver schichtaufbauend wunschgemäss gesintert wird. Zwecks externer Pulverzufuhr wird eine Zuführungswalze mit 1-5 Reservoiren, bspw sternförmig ausgebildet, die je Kammer etwas mehr (zB 10%) Pulver enthält als für die Schicht notwendig ist. Abgeführt wird das überschüssige Pulver ins Abfuhrpulverreservoir mittels eines Abstreifers mit bspw. sternförmig ausgebildeter Abfuhrwalze.

Bei der Vorrichtung für dieses Verfahren ist vorgesehen, dass mindestens eine Pulververteilende rücklaufende Walze (12) im Druckbereich ständig Kontakt mit mindestens einer

Schicht (5,6,7) hat, möglich und sinnvoll sind aber mehrere zeitgleich und ortsversetzt erstellte Schichten.

Die liegende rotierende in XYZ fixierte Trommel weist einen Durchmesser und das Druckobjekt eine Schichtlänge von ca 1000mm auf, die Druckbreite wird mit 1000mm angegeben, die Schichterstellgeschwindigkeit wird auf eine Schicht pro zehn Sekunden eingestellt, abhängig von Materialvielfalt und Farbmischung kann auch schneller oder langsamer gedruckt werden.

Bei einem Trommelperimeter von über drei Metern und einer benötigten Einbaubreite der 1 Meter langen Walzen-, Druckkopf- und Wellenemitereinheit (HSS Einheit) von 20cm werden 15 HSS Einheiten in die Trommel eingebaut. Der Abstand zwischen Trommelaussenwand und oberster Pulverschicht soll optimalerweise minimal sein und wird auf 1cm eingestellt, womit sich bei einem 1 Meter tief absenkbaaren gekrümmten Bett ein Bauvolumen von  $0,83\text{m}^3$  und ein Bauvolumen:Luftvolumen-Verhältnis (zwischen Trommelaussenwand und oberster Pulverschicht) von 83 ergibt. Walze wie auch Druckbett fahren während der 1 Meter langen Schichterstellung innerhalb von 10 Sekunden um eine Schichtdicke von  $100\mu\text{m}$  herunter, einstellbar sind jedoch auch Schichtdicken zwischen  $50$  und  $200\mu\text{m}$ .

Vorteilhafte Ausgestaltungen sind in den Ansprüchen angegeben.

Durch die erfindungsgemäße Lösung werden die Nachteile des Stands der Technik eliminiert und die folgenden Vorteile erzielt:

17. Kürzere Objekterstellzeiten durch kontinuierliche Rotation der Drucktrommel (8).
18. Bessere Temperaturkontrolle mit weniger Aufwand

#### Beschreibung der Erfindung: Grundsätzlicher Aufbau mit wesentlichen erfindungsgemäßen Merkmalen

Die Trommel (8) rotiert unbeschleunigt während des Drucks. Das Pulver (4) kann, wie herkömmlich, extern (10) zugeführt werden, was üblicher- aber nicht zwingenderweise, zum Schichtaufbau ohne Material- und Farbmischung führt. Es können so viele (Reservoir (4) bei Pulver-in-Trommel-System)-Walzen(2)-Druckkopf(1)-Wellenemitereinheiten [insgesamt gezeigt als (1)] kaskadiert werden wie in die Trommel (8) passen bzw wie sinnvoll erscheint. Wichtig für die kontinuierliche Absenkung (3) des Druckobjektes um eine Schichtdicke (5,6,7) pro Durchgang einer Bedruckungs- Bestrahlungs- Wischwalzeneinheit (1) ist, dass die Walze (12) kontinuierlich abgesenkt wird, also der Objektabsenkung (3) folgt. Die Trommelwinkelgeschwindigkeit (Schichterstellungszeit) hängt von der Sintergeschwindigkeit ab (Material, Ansprechverhalten auf die Wellenlänge, Energiedosis, etc).

Weitere Druckkopfreihen hinter der ersten sind für Kühlung und Objektseparierung vom Supportmaterial günstig. Die Temperaturregelbarkeit des Bauraumes ergibt sich hieraus, sie wird aber auch durch den Einsatz der Trommel dahingehend erleichtert, dass nun wesentlich weniger Luftvolumen in der Maschine oberhalb des Druckbettes existiert und die Abfolge der ausschliesslich einseitig gerichteten Schichterstellung um ein Vielfaches schneller erfolgt, sodass Temperaturschwankungen minimiert werden. Zwecks externer Pulverzufuhr (10) wird eine Zuführungswalze mit 1-5 Kammern, bspw sternförmig ausgebildet, die je Kammer etwas mehr (zB 10%) Pulver enthält als für die Schicht notwendig ist. Abgeführt wird das überschüssige Pulver ins Abföhrpulverreservoir mittels eines Abstreifers (11) mit bspw. sternförmig ausgebildeter Abföhrwalze.



Beschreibung der Zeichnungen und der bevorzugten Ausführungsform der Erfindung

Die vorliegende Erfindung wird nachfolgend beispielhaft und nicht einschränkend anhand von Zeichnungen näher erläutert.

Es zeigen:

Figur 1: Horizontal gelagerte Trommel (8) mit integrierter HSS Einheit zur gleichzeitigen ortsversetzten Erstellung mehrerer Schichten (5,6,7). Gezeigt wird hier die trommelexterne Pulverzufuhr (4) über Zuführungs/Abführungswalzen (10) mit anschliessender Speicherung überflüssigen abgestreiften (11) Pulvers nach der Schichterstellung. Die Druckobjektschichtung (9) verläuft gekrümmt gemäss Walzenbewegung (12) im Bauraum durch kontinuierliche Druckbettabsenkung (3).





Legende Zahlenbezeichnungen:

1. HSS-Einheit, bestehend aus (kühlender) Pulververteilerwalze, mindestens einer Absorberflüssigkeit verspritzenden Druckkopfreihe sowie einem auf die Druckflüssigkeit abgestimmten Wellenemitter, der den Sintervorgang einleitet
2. (leer)
3. Bauraum mit gekrümmtem Druckbett, sich kontinuierlich absenkend
4. Pulver Reservoir, Zuführreservoir kann auch oberhalb der ins Reservoir einbaubaren Zuführwalze liegen
5. Oberste aktuell sich bildende Schicht
6. Eine (multipler) mittlere(r) aktuell sich bildende(r) Schicht(en)
7. Unterste aktuell sich bildende Schicht
8. Liegende Trommel, rotierend, starr in XYZ, mit integrierten Druckeinheiten(1)
9. Schichtform gemäss Trommelform plus eine Schichtdicke an hinterer Objektkante
10. Externe Pulverzufuhr mit 1-5 Kammern in bspw sternförmig ausgebildeter Zuführungswalze, die je Kammer etwas mehr (zB 10%) Pulver enthält als für die Schicht notwendig ist
11. Abstreifer mit bspw. sternförmig ausgebildeter Abführwalze, die überschüssiges Pulver ins Abführpulverreservoir befördert.
12. Rücklaufende Walzenbewegung, mit zunehmender Distanz zur Trommel um eine Schichtdicke je Schichterstellung

## Ansprüche

30. Verfahren zur Herstellung dreidimensionaler Objekte mittels einer rotierenden zylindrischen oder ellipsoiden Trommel oder Kugel, in der sich mindestens eine Einheit aus einer absorptionsfähige Flüssigkeit verspritzenden Druck-Leiste, einer auf besagte Absorberflüssigkeit angepassten Wellenemmissionseinheit und einem Pulververteiler (zB rückwärtsdrehende Walze mit Abstreifer) anbringen lässt (herkömmliches HSS System, arbeitet meist mit Mikro-oder IR-Wellensendern).
31. Verfahren nach Anspruch 1,  
dadurch gekennzeichnet,  
dass sinterfähiges Pulver entweder aus internen Tanks (zB Kartuschen) vor jeder Pulververteiler-Walze ausgegeben wird oder extern auf den Anfangsbereich der zuletzt erstellten Schicht von der vorbeistreichenden an der Trommel fixierten vorzugsweise rücklaufenden Pulververteiler-Walze über die gesamte gekrümmte Schicht verteilt wird.
32. Verfahren nach Anspruch 1,  
dadurch gekennzeichnet,  
dass mehrere Schichten ortsversetzt gleichzeitig erstellbar sind, und dass die Schichten gemäss der Trommelform geformt werden, also gekrümmt aufgebaut werden.
33. Verfahren nach Anspruch 1,  
dadurch gekennzeichnet,  
dass die vorzugsweise rücklaufende Pulververteiler-Walze sich während der Schichterstellung kontinuierlich um die aktuell erstellte Schichtdicke von der rotierenden XYZ-stationären Trommel nach unten entfernt, während sich das Druckobjekt um eben diese Schichtdicke kontinuierlich absenkt, sodass der Abstand zwischen besagter Walze und Schicht konstant bleibt. Am Ende der Schichterstellung fährt besagte Walze wieder auf ihre Startposition nach oben.
34. Verfahren nach Anspruch 1,  
dadurch gekennzeichnet,  
dass der Schlittenverfahrraum, der in herkömmlichen SLS/HSS Maschinen ähnlich gross dem des Bauraumes ist, vorzugsweise nun kein Prozent des Bauraumes mehr ausmacht,

sodass die Temperaturschwankungsregelung (im Raum zwischen oberster Pulverschicht und Trommelaussenwand) von  $\pm 1\%$  der Sintertemperatur (bspw von PA12) nun problemlos erreichbar ist, weil

- die Druckkopf, Sinter- und Walzeneinheit nicht mehr in verschiedene Richtungen fährt, sondern nur noch in eine, und
- bezogen auf das Luftvolumen, das die SLS/HSS-Schlitten üblicherweise zum Verfahren benötigen, nun bezogen auf den Abstand zwischen oberster Pulverschicht und Trommelaussenwand sehr viel flacher gebaut werden kann.

35. Verfahren nach Anspruch 1,

dadurch gekennzeichnet,

dass die Temperaturschwankungsregelung (im Raum zwischen oberster Pulverschicht und Trommelaussenwand) von  $\pm 1\%$  der Sintertemperatur (bspw von PA12) nun problemlos erreichbar ist, weil die Trommel mehrere Walzen-, Druckkopf- und Wellenemittereinheiten hintereinander aufnehmen kann, sodass mehrere Schichten ortsversetzt erstellt werden, mit dem erwünschten Nebeneffekt, dass die Abkühlzeit verkürzt, der Sinterzeitraum jedoch sogar druckqualitätsverbessernd verlängerbar ist, die Schichterstellzeit sogar vergrößert werden kann, die Produkterstellzeit aber durch die ortsversetzt gleichzeitige Schichterstellung erheblich verkürzbar ist.

Die extrem verkürzte Abkühlzeit durch die nächste sofort nachfolgende Walzen-, Druckkopf- und Wellenemittereinheit hat grosse Auswirkungen auf die Temperaturstabilität.

Das über gekühlte Walzen aufgebraachte Pulver kann zur Kühlung der zuvor gesinterten Schicht genutzt werden, wie auch die Absorberflüssigkeitstemperatur sowie chemische Reaktionen verursacht durch den Auftrag der Flüssigkeit bis hin zur Verdampfungskühlung. Die Bestrahlungseinheit (Wellenemitter) sorgt auf der Absorber-besprühten Fläche durch Bestrahlung für eine Temperaturdifferenz von 10-20% der Sintertemperatur. Die Nachstrahlung beeinflusst nachfolgende Schichten je nach Objektform (Volumenkonzentration), sodass die via Druckkopf abzugebende Absorbermenge für die Folgeschichten angepasst/reduziert wird, damit die Temperatur stabilisiert bleibt.

36. Verfahren nach Anspruch 1,

dadurch gekennzeichnet,

dass dem Druckkopf mindestens eine weitere Druckkopfreihe folgt, sodass weitere Materialeigenschaften entstehen, bzw dass die Möglichkeit besteht, eine Kühlung als

„Sonderschicht“ für den Fall einzubauen, dass ein allfällig extrem kompaktes 3D Objekt zu viel Wärme speichern würde und daher gezwungenermassen abgekühlt werden muss, bspw mittels einer aus dem zweiten Druckkopf auf eben dieses Objekt verspritzten Alkohollösung, die mit oder ohne nachfolgende Bestrahlung Verdampfungskühlung erzeugte.

37. Verfahren nach Anspruch 7,

dadurch gekennzeichnet,

dass zwecks Verhinderung der unerwünschten Ansinterung von neben Absorberflüssigkeit-bespritztem Pulver liegendem Pulver letzteres Pulver mittels mindestens eines dem Absorberflüssigkeit spritzenden Druckkopf nachfolgenden Druckkopfes bespritzt wird, bspw mit einer Alkohollösung, sodass die nachfolgende Bestrahlung dort Verdampfungskühlung erzeugt während das nebenliegende mit Absorberflüssigkeit bespritzte Pulver schichtaufbauend wunschgemäss gesintert wird.

38. Vorrichtung nach Anspruch 1

dadurch gekennzeichnet,

dass die an der Schichterstellung jeweils aktiv beteiligten Pulver-verteilenden rücklaufenden Walze (12) im Druckbereich ständig Kontakt mit mindestens einer Schicht (5,6,7) hat, möglich und sinnvoll sind aber mehrere zeitgleich und ortsversetzt erstellte Schichten.

Die liegende rotierende in XYZ fixierte Trommel weist einen Durchmesser und das Druckobjekt eine Schichtlänge von ca 1000mm auf, die Druckbreite wird mit 1000mm angegeben, die Schichterstellgeschwindigkeit wird auf eine Schicht pro zehn Sekunden eingestellt, abhängig von Materialvielfalt und Farbmischung kann auch schneller oder langsamer gedruckt werden.

Bei einem Trommelperimeter von über drei Metern und einer benötigten Einbaubreite der 1 Meter langen Walzen-, Druckkopf- und Wellenemitereinheit (HSS Einheit) von 20cm werden 15 HSS Einheiten in die Trommel eingebaut. Der Abstand zwischen Trommelaussenwand und oberster Pulverschicht soll optimalerweise minimal sein und wird auf 1cm eingestellt, womit sich bei einem 1 Meter tief absenkbaaren gekrümmten Bett ein Bauvolumen von  $0,83\text{m}^3$  und ein Bauvolumen:Luftvolumen-Verhältnis (zwischen Trommelaussenwand und oberster Pulverschicht) von 83 ergibt. Walze wie auch Druckbett fahren während der 1 Meter langen Schichterstellung innerhalb von 10

Sekunden um eine Schichtdicke 100µm herunter, einstellbar sind jedoch auch Schichtdicken zwischen 50 und 200µm. Zwecks externer Pulverzufuhr wird eine Zuführungswalze mit 1-5 Kammern, bspw sternförmig ausgebildet, die je Kammer etwas mehr (zB 10%) Pulver enthält als für die Schicht notwendig ist. Abgeführt wird das überschüssige Pulver ins Abfuhrpulverreservoir mittels eines Abstreifers mit bspw. sternförmig ausgebildeter Abfuhrwalze.

## Zusammenfassung

Die Erfindung betrifft ein Verfahren und eine Vorrichtung zur schichtweisen Herstellung von dreidimensionalen Objekten mittels Pulvers, insbesondere gekrümmt geschichtet mittels einer Drucktrommel.

Beim Verfahren des kontinuierlichen Schnelldrucks mittels einer Trommel (8) (mit optional schichtweise verschiedenen Materialien aus trommelinternen Pulverreservoirien) ist vorgesehen, dass der Schichtdruck teilkreisartig um die Trommelaussenwand erfolgt. Der Objektträger (Druckbett) (3) entfernt sich während einer Schichterstellung um eine Schichtdicke kontinuierlich.

Die Temperaturschwankungsregelung (im Raum zwischen oberster Pulverschicht und Trommelaussenwand) von +-1% der Sintertemperatur (bspw von PA12) ist nun problemloser erreichbar, weil

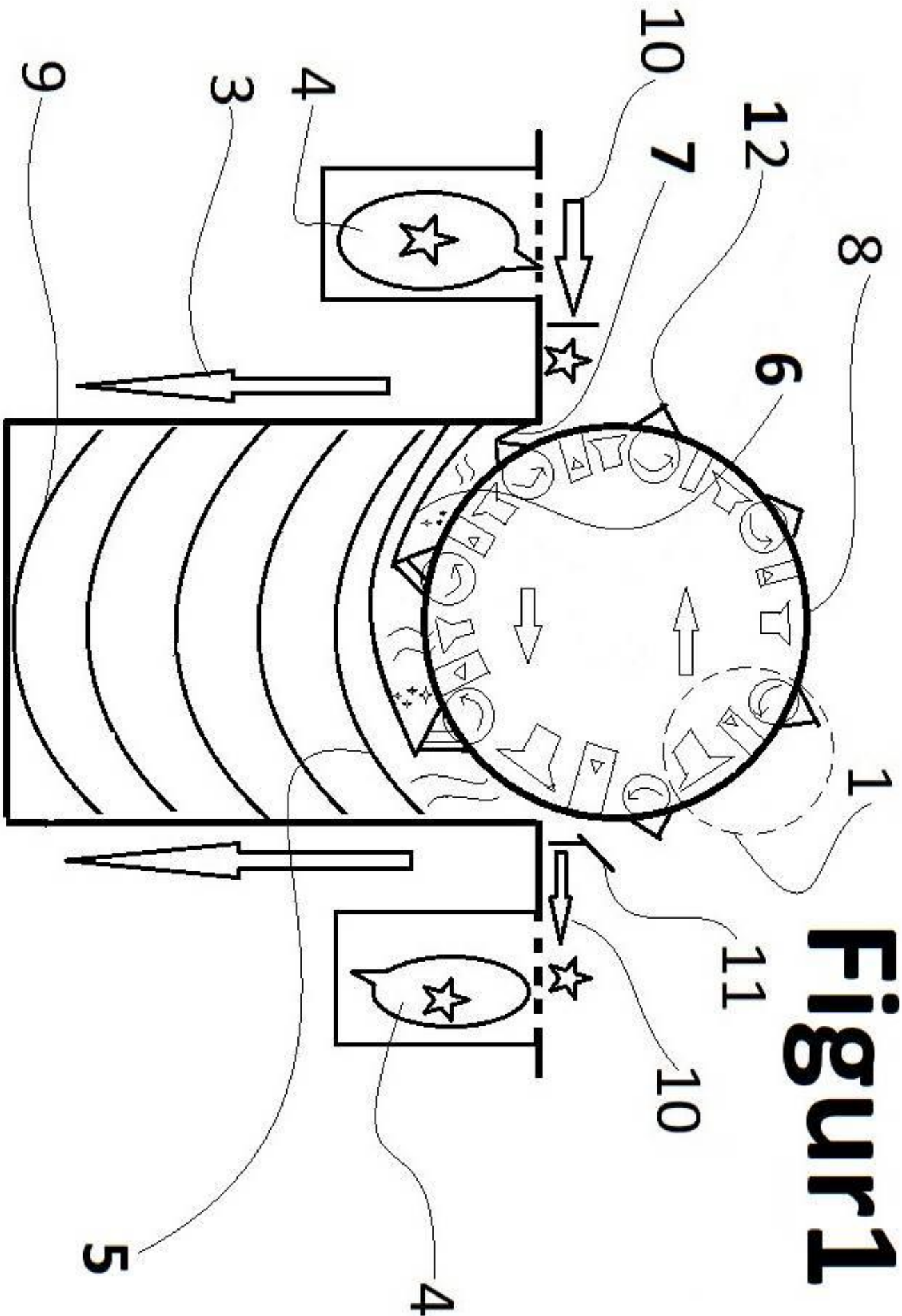
- die Druckkopf, Sinter- und Walzeneinheit nicht mehr in verschiedene Richtungen fährt, sondern nur noch in eine, und
- bezogen auf das Luftvolumen, das die SLS/HSS-Schlitten üblicherweise zum Verfahren benötigen, nun bezogen auf den Abstand zwischen oberster Pulverschicht und Trommelaussenwand sehr viel flacher gebaut werden kann, und weil
- die Trommel mehrere Walzen-, Druckkopf- und Wellenemitereinheiten hintereinander aufnehmen kann, sodass mehrere Schichten ortsversetzt erstellt werden, mit dem erwünschten Nebeneffekt, dass die Abkühlzeit verkürzt, der

Sinterzeitraum jedoch sogar druckqualitätsverbessernd verlängerbar ist, die Schichterstellzeit sogar vergrößert werden kann, die Produkterstellzeit aber durch die ortsversetzt gleichzeitige Schichterstellung erheblich verkürzbar ist. Die extrem verkürzte Abkühlzeit durch die sofort nachfolgende Walzen-, Druckkopf- und Wellenemittereinheit hat grosse Auswirkungen auf die Temperaturstabilität.

Figur: 1



Figuren:



# Figure 1

## **Certificate of Incorporation**

Genius Printers Corporation

Article I

The corporation name is Genius Printers Corporation (the “Corporation”)

Article II

The Corporation’s registered office located in Delaware, Sussex County, is:

16192 Coastal Highway

Lewes, Delaware 19958

The Corporation’s registered agent for this location is Harvard Business Services, Inc.

Article III

The Corporation’s primary purpose is the lawful activities in which corporations may be structured under General Corporation Laws in Delaware.

Article IV

The aggregate number of shares the Corporation is authorized to issue is One-Hundred Million (100,000,000) shares of capital stock which will be designated as “Common Stock” which will have a par value of \$0.00001 per share.

Article V

The affairs and business of the Corporation will be managed under or by the guidance of the Board of Directors. Written ballots for director elections are not necessary unless provided otherwise in the Corporation’s Bylaws. Furthermore, and without limitation of powers deliberated by Delaware state laws, the Corporation’s Board of Directors are specifically authorized to amend, make or repeal the Corporation’s Bylaws.

Distributions made by the Corporation may be made done so without any regard to “preferential rights” or “preferential dividends arrears amount,” as any like-terms may be used by the Corporation Code of Delaware.

Article VI

A director of the Corporation will not be personally liable, to the full extent of the General Corporation Laws of the state of Delaware, to the Corporation or to its stockholders for monetary damages for breach of fiduciary duty as a director. To the fullest extent permitted by law, the Corporation will indemnify any individual made a party to, or threatened to be made a party to any actions or proceedings, whether civil, criminal, investigative or administrative, for the reason that his/her testator or intestate was or is a director of the Corporation, or an officer of the Corporation, or serves or did serve at any other organization as an officer or director at the Corporation’s request, or by any predecessor of the Corporation.

Neither the repeal or amendment to Article VI, nor any provision of the Corporation’s Certificate of Incorporation that may be adopted, that may be inconsistent with Article VI, will reduce or eliminate the effects of Article VI in regards of any matter occurring, or any actions accruing, but for Article VI, would arise prior to any such repeal, amendment, or the adoption of inconsistent provisions.

Article VII

The Court of Chancery, located in the State of Delaware, shall be the exclusive forum, unless written consent is given by the Corporation for an alternate forum for:

- Proceedings brought on by the Corporation.
- Any claims of a breach of fiduciary duty owed by any officer or the Corporation, Corporation stockholders, or the Corporation itself.



- Any actions that may assert claim against the Corporation resulting pursuant to any General Corporation Law in the state of Delaware or to the Corporation's Certificate of Incorporation or their Bylaws.
- Any actions asserting claim against the Corporation that is governed by internal affairs policy.

Article VIII

The mailing address and name of the incorporator is as follows:

Markus Ulrich

1873 Rte de L'Abadie, 06730 St. Andre de la Roche, France

Executed: January 2<sup>nd</sup>, 2018.

/s/ Markus Ulrich, Incorporator



**By-Laws  
Of  
Genius Printers Corporation**

Article I

Offices

The Corporation could possibly have officers located both within the State of Delaware and without the state, and this decision will be at the discretion of the Corporation or the Board of Directors.

Article II

Records

The Corporation could store the records and books of the Corporation outside of the state of Delaware, except where prohibited by Delaware State Laws, at locations selected at the discretion of the Board of Directors.

Article III

Stockholders

1. Meeting Locations = All stockholder meetings will be held at dates, times and locations that will be determined by the President of the Corporation or the Board of Directors. Such information will be stated in meeting notices or in waivers. If no meeting place has been selected, the registered office in the State of Delaware will be the meeting location.
2. Annual Stockholder Meetings = The Corporation's annual stockholders meeting which will discuss election of Directors and other transactions that effect the operations of the Corporation. The selection of such a meeting location will be determined by the Board of Directors on a date no later than 120 days following the close of the fiscal year that is designated by the Board of Directors. Such location may or may not be located within the State of Delaware.
3. Special Meetings = Special stockholders meetings will be held and called in a manner that is in accordance with Delaware State Law. Special meetings will be called under special statutory provisions and will be called by resolution of the stockholders of outstanding shares that are entitled to vote on Corporation matters, Board of Directors, or by the President. The location of special meetings could be held at the Corporation's principle business office or at other locations, within the State of Delaware or without, and will be specified in notice. All business conducted at special meetings will be limited to the purposes stated in the notice which will also state the date, location, time and purpose of the meeting.
4. Meeting Notices = Except for where permitted by law, when stockholders in the Corporation are required to make actions at meetings, written notices will be given stating such required actions and will also contain meeting location, time and date information. Additionally, except for annual meetings, information will be given on whose direction is being issued. Notices will also contain the location of the stockholder's list that will be available for viewing, except for when the list is located at the meeting location. A copy of the notice will be delivered, either personally or via mail, no more than 60 days before the established meeting date and no sooner than 10 days before the established meeting date to each stockholder that is eligible to vote at the meeting. The stockholders address on record will be used when notices are mailed and the stockholder will be notified when the notice has been deposited in U.S. mail. Postage will be prepaid and will be directed to each stockholder, unless investors have submitted written request to the Secretary of the Corporation. In such a situation, the notice will be mailed to the requested address. Meeting notices for any meeting of stockholders will not be required to be given to any stockholder who attend the meeting, except for the purpose of objecting to transactions of any business due to a meeting being unlawfully called or convened, or who may submit a signed waiver of notice. Unless the Board of Directors, at the postponement of the meeting, sets a new record date for the postponed meeting, or unless

the postponed meeting is greater than 30 days, notices of the postponed meeting will not be required if the date, location and time of the meeting that is to be postponed is announced during the time the postponed meeting was to take place.

5. Stockholder List = The Corporation's officers that have control of the stock ledger will prepare, no later than 10 days prior to any meeting, a thorough list of the stockholders that are entitled to vote at such a meeting. The list will be listed in alphabetical order and will show the number of shares registered to each stockholder as well as their address. Lists will be available for examination for the purposes relevant to the scheduled meeting, during regular operating hours for a 10 day period, no less than, to the planned date at either a specified location in the notice or at the meeting location. The generated list will be kept at the location and time of the meeting, during the whole meeting period, and will be made available for inspection by all stockholders that attend the meeting.
6. Quorum = At all meetings, unless otherwise stated by Delaware State Law, or by the Corporation's Certificate of Incorporation, or by these stated Bylaws, there must be a minimum of majority-owning stockholders, either in person or by proxy, that are entitled to vote. At meetings where a quorum is not present, the holders, or their proxies, of majority stock may, from time to time, adjourn meetings without prior notice other than by announcement at the scheduled meeting. At adjourned meetings in which a quorum is present or represented, any business may be conducted that may have been conducted at the originally scheduled meeting. If the adjourned meeting is rescheduled for a period greater than 30 days, or if the rescheduled meeting time, date and location should differ from the time, date and location that was announced at the adjourned meeting, a notice of the new date, time and location will be sent to each stockholder on record that is entitled to vote.
7. Proxies = Proxies will be executed in writing by either the stockholder, or their attorney-in-fact.
8. Organization = The meetings will be called to order by the President and will also act as Chairman for the meetings. The stockholders or the Board of Directors may appoint any officer, stockholder, or Director of the Corporation to act as Chairman during the meetings in the absence of the President. The meetings secretary will be the Secretary of the Corporation. During the absence of the secretary, another person may be appointed to fulfill the secretary responsibilities by the presiding officer.
9. Stockholder Consent in Lieu of Meetings = Whenever the stockholders are required to vote in relation to corporate actions at a meeting, unless stated otherwise in the Certificate of Incorporation, such actions may be taken without a meeting, without prior notice and without a vote if consent is given in writing, stating such actions to be taken, signed, either via proxy or in person, by stockholders that hold majority stocks, and with the minimum number of votes necessary to authorize such actions at meetings to be taken in which they are entitled to vote were present and would have voted in person or via proxy. Quick notice will be given when corporate actions without at meeting by less than unanimous written consent shall be given stockholders that have not consented, but are eligible to vote on the topic at hand.
10. Voting = Unless stated otherwise in the Certificate of Incorporation or the Bylaws, stockholders at any stockholder meeting that have a right to vote will be entitled to one vote for each share of stock that they possess. Stockholders may vote either via proxy or in person. Any corporate action that will be taken by vote of stockholders, except where otherwise stated by the Delaware State Laws or the Certificate of incorporation, will be authorized by no less than a majority of the votes cast by the stockholders present, in person or via proxy, and that are entitled to vote. This excludes the election of directors. Directors can be elected as stated in Article IV, Section 1 of the Bylaws. Written ballots are not required on a matter, for the purposes of voting, unless ordered by the meetings Chairman.

#### Article IV

##### Directors

1. Removals = Stockholders that have majority shares of capital stock and that are entitled to vote at meetings, may remove any or all of the Directors from their offices, with or without cause, and so long as the meeting has been called for this purpose.
2. Term of Office, Number and Election of Officers = The Board of Directors will manage the affairs and business of the Corporation. The whole Board will be comprised of, and by, the number of Directors. This number will be no less than one Director and no more than nine. The total number of Directors may be fixed by a vote from the stockholders or the Board of Directors at any meeting, regular or special, and subject to provisions established in the Certificate of Incorporation. Initially, the Board will consist of only one Director. It is not necessary for the Directors to be stockholders. The Directors will be elected by stockholders at the Annual Stockholders meeting, except as outlined in Section 2 of Article IV. The elected individuals will serve their prospective office until their successors are elected and qualified. The phrase "entire Board" in the Bylaws will refer to the Directors of the Corporation if there were no vacancies.
3. Newly Created Directorships and Vacancies = Unless stated otherwise, vacancies that occur in the office of Director for any reason other than removal of a Director pursuant to Section 3 found in this Article, as well as newly created Directorship positions that may result in an authorization in an increase in the number of Directors, may be filled by a majority of the Directors then in office. In the event a Director is removed, or if vacancies occur contemporaneously in all offices, the resulting vacancy/vacancies will be filled by stockholders in the Corporation at a meeting called for such purposes. The elected Directors will hold their perspective positions until their successors have been elected and qualified.
4. Quorum = Unless otherwise stated by State of Delaware laws, or in the Bylaws, a majority of the Board of Directors will constitute a quorum for business transactions. The vote of the majority of Directors that are present at the meeting in which the quorum is present will be the act of the Board of Directors. A majority of the Board of Directors may adjourn any meeting to another date, time and location, regardless if the quorum is present or not.
5. Meeting Notices = Notices of special meetings of the Board of Directors, will be given no later than 24 hours prior to the meetings scheduled commencement time. The notice will be sent by the Secretary or the President and will state all necessary information, including date, time and location of the meeting. Notices will be hand-delivered to each Director or given orally, mail, or telegraphed to the Directors address. However, if the notice is less than 72 hours, mail will not be used as an option. If a notice is mailed, it will be considered as being given when received by the U.S. mail, postage prepaid. If the notice is telegraphed, it will be considered as being given when the contents of the notice has been transmitted to the telegraph service. Instructions will accompany the notice to inform the telegraph service to dispatch the message immediately. Meeting notices will not need to be given to any Director that has submitted, either before or after the meeting, a signed waiver of notice or who will attend the meeting, unless the Director will attend solely for the purpose of objecting at the start of the meeting, before any transactions have taken place because the meeting has not been called or convened lawfully. Adjourned meeting notices will include the date, time and location of the new meeting and will be given to all Directors that were not present at the adjourned meeting. The Directors that were present will not receive a notice unless changes have been made to the date, time or location for the new meeting.

6. Regular Meetings = Regular Board of Director meetings will be held either within the State of Delaware or without, on such dates as the Board determines. Except where directed by law, notices for regular meetings are not required.
7. Annual Meetings = The Annual Board of Directors meeting will either be conducted without notice immediately after and at the same location as the annual stockholders meeting, or as soon as possible after the annual stockholders meeting at a time and location the Board should determine.
8. Special Meetings = The Special Board of Directors meetings may be called by any two Directors on notice given to each Director or by the President. Such meetings will be held at the main Corporation business office or other locations that may or may not be in the State of Delaware. The notice sent for such a meeting will include the location, date and time as well as the purpose of the meeting.
9. Meeting Locations = Unless otherwise stated in the Bylaws, Board of Director meetings will be held at the Corporations main business office or other locations that may or may not be located in the State of Delaware.
10. Meeting Conduct = At each Board of Directors meeting, the President will act as the Chairman for the meeting. If the President is absent, a Director will be selected by the present Directors to serve as the Chairman. The Secretary will keep the minutes and the Chairman will determine the order of business.
11. Resignations = If a Director decides to resign their position, they will do so by submitting a written notice to the Corporation. The resignation will take effect on the time specified in the notice. If the notice does not state a specific time for the resignation to take effect, then the resignation will take effect immediately.
12. Committees of the Board = The Board of Directors may delegate an executive committee that will consist of at least one Director. All committees will serve at the inclination of the Board of Directors and will keep minutes of their meetings and report the information to the Board. One or more Directors could be appointed as alternated committee members. The alternates will replace any disqualified or absent committee member at any committee meetings. Additionally, if no alternate has been delegated and an original member of the committee has been disqualified or absent, the present members at the meeting that is not disqualified may universally designate another member of the Board of Directors to act in place of the absent or disqualified member. Unless otherwise stated by Delaware State Law, each committee can exercise all authority and powers of the Board of Directors in regards to all matters, to the extent provided in the resolution establishing it.
13. Consent to Action = If all members of the Board of Directors or a committee consent in writing, required actions or permitted actions may be completed without any type of meeting. The written consent will be filed with minutes of proceedings from the Board of Directors or a committee.
14. Committee Operations = The majority of the members of a committee will create a quorum for business transactions and a majority vote by all committee members in the presence of the quorum will be considered an act of the committee. Other rules and procedures will be adopted by each committee to determine the conduct of their activities.
15. Directors Compensation = A fixed amount will be determined by the Board for compensation to Directors. However, nothing within this Article should be interpreted to prevent any Director from serving within the Corporation in other capacities and receiving compensation for their work.
16. Meetings Conducted Other Than in Person = Unless stated otherwise by these Bylaws or the Certificate of Incorporation, members on any committee or of the Board of Directors may

participated in committee or Board of Director meetings via telephone or comparable methods so long as all members can hear each other. Participation in such a manner will constitute the member as being present for the meeting.

#### Article V Officers

1. Term of Office, Number and Election of Officers = Officers of Corporation will consist of a President, Secretary and Treasurer. If the Board of Directors so wishes, there can also be a Chief Executive Officer, one or more Vice Presidents, Chief Financial Officer, Chairman of the Board, General Managers, Director of Corporate Development, Assistant Financial Officers, as well as Assistant Secretaries. Each officer will be elected annually by the Board of Directors at their annual meeting which is held immediately preceding the Annual Stockholders Meeting. The elected individuals will hold their positions until a successor is elected and qualified. Two or more offices may be held by the same person. Occasionally, the Board of Directors may appoint officers and agents in the best interest of the Corporation. Officers may devote less than 100 percent of their working time to their activities.
2. Assistant Financial Officers = During the absence of the Treasurer, the Assistant Financial Officers will assume all duties and functions that the Treasurer may hold if they were present and able.
3. Treasurer = The Treasurer will have custody and care of corporate funds and related financial records and will perform all duties that are related to the Treasurers position. The Treasurer will have all powers, authority and duties as assigned by the Board or by the President. Treasurer will also keep accurate and thorough accounts of all disbursements and receipts for the Corporation in records that are the property of the Corporation and will deposit all funds and other negotiable instruments and valuables to the credit of and in the name of the Corporation in such institutions as directed by the Board of Directors. Treasurer will be responsible for disbursing Corporation funds when directed by the Board and will provide the Board with accurate and thorough records of all transactions as well as the financial position of the Corporation.
4. Assistant Secretaries = During the absence of the Secretary, the Assistant Secretaries will assume all duties, responsibilities and functions that the Secretary would lawfully do if they were present.
5. Secretary = The Secretary will record the proceedings of stockholders meetings and Board of Director meetings in the books and will maintain their safekeeping. They can also sign all stock certificates for the Corporation in conjunction with the President and will be responsible for the safekeeping of the Corporation seal that will be affixed to any instrument of the Corporation, when authorized by the Board. The Secretary will also maintain the transfer books for the Corporation's capital stock as well as the stock books that will contain the stockholders names and address and the number of shares they hold. The transfer books and stock books will be made available during normal business hours for the purposes of inspection by stockholders as well as for the transfer of stock. The Secretary will keep the Directors and stockholders informed of respective meetings. They will also perform such duties and have such authority as required by the Bylaws of the Corporation, by law or such as delegated by the Board or the President.
6. Vice President = The Vice President will be assigned with duties and powers at the discretion of the Board of Directors. The Board will appoint only one Vice President and the selected individual will perform all duties and will have the powers of the President in their absence.
7. President = The President will serve as the chief executive officer and operating officer of the Corporation and will supervise at all Board of Directors and stockholders meetings. They will

have active and general management of the affairs and business of the Corporation and will enforce all orders and resolutions of the Board. The President will have the authority and duties as delegated by the Board. They will ensure that all statements, reports, certificates, books and other records for the Corporation are kept, maintained and filed in accordance with Delaware state law. The President will call all meetings in accordance with the Bylaws of the Corporation. They may execute, deliver and sign all mortgages, deeds, contracts, bonds or other instruments as authorized by the Board of Directors, with the exception of situations where such actions will be delegated by the Board or the Bylaws of the Corporation to a different officer or where required by law to be signed by other individuals. The President may sign certificates of stock for the Corporation in conjunction with other officers. He or she can appoint, remove, discharge, employ and fix the compensation rates for all agents, employees, servants and clerks, other than the appointed or elected officers, subject to the Board of Directors approval. The President except where stated otherwise by Delaware state law, will have powers and duties as delegated by the Board of Directors in addition to the powers and duties specifically given him or her in these Bylaws.

8. Removals = Each officer will hold their office until a successor has been elected and qualified, subject to his or her early and unforeseen death. Any agent or officer of the Corporation can be removed, with or without cause, at any given time by vote of a majority of the Board conducted at a Board of Directors meeting that has been called for such purposes.
9. Transfer of Duties = The powers and duties of any officer may be transferred, whole or in part, by the Board of Directors to any other officer or person, notwithstanding provisions stated within these Bylaws, unless prohibited by Delaware state law.
10. Officer Compensation = The Board of Directors will determine the compensation or salary for officers.
11. Resignations = At any time, Corporation agents or officers can submit their resignation, in writing, to the Secretary, Board of Directors or to the President. The effective date of resignation will be the date stated in the written submission. However, if no date is specified in the submitted resignation, the effective date will be immediately on the date the resignation is received and accepted.
12. Vacant Positions = If a vacancy should become available in the office of the President, Treasurer or Secretary, the Board of Directors will select a successor to fill the vacancy for the remaining term of service. The Board of Directors will fill vacancies in other officer positions for the remaining term of service.

#### Article V

##### Contracts, Checks and Shares

1. Checks and Shares = Officers or agents that have been delegated to do so, may sign negotiable instruments.
2. Contracts = Unless specified otherwise by the Board of Directors, all Corporation contracts will be executed under the Corporation name by the Vice President or President.

#### Article VI

##### Stock Related Provisions

##### Stockholders and Certificates

1. Transfer of Stock = Upon surrender to the transfer agent or the Corporation a certificate of shares that has been endorsed or that is accompanied with proof of assignment, succession or authorization to transfer, a new certificate will be issued to the entitled person, cancel the previous certificate and then record the transaction in the Corporation's books.

2. Registered Stockholders = The Corporation is entitled to treat holders of any shares as the holder in fact and, accordingly, will not be bound to recognize any other claim to those shares by any other individual, with or without notice thereof, except where expressly covered by Delaware state laws.
3. Record Date = For the purpose of determining a stockholders entitlement to notice of votes at stockholder meetings or any adjournment of such a meeting, or to express their agreement or disagreement regarding any proposals without any meeting or for the purpose of determining what stockholders are entitled to receipt of payment from any dividends or any other type of distribution or rights to any allotments or for any other action, determined by the Board, a record date that will not be more than 60 days and not less than 10 days before the scheduled meeting date, and no more than 60 days before any other planned action.

## Article VII

### General Provisions

1. Seal = The inscription "Corporate Seal, Delaware" will be included on the Corporation seal, along with the Corporation's name and the organization year.
2. Dividends = As permitted by law, the Board of Directors will have full authority and discretion, in accordance with provisions found in the Certificate of Incorporation and the terms of other corporate documentation or binding instruments upon the Corporation, to determine what, if any, distributions or dividends that will be paid, declared or made. Prior to the payment of any dividends, any funds may be set aside out of the Corporation that are available for dividend payments such as sums as delegated by the Directors and as they think would be proper as a reserve to meet contingencies, or for repairing property or maintaining property, equalizing dividends, or for purposes as directed by the Board that are in the interest of the Corporation. The Directors have the authority to abolish or modify any established reserve in the manner it was created.
3. Voting Shares in Other Corporations = Unless stated otherwise by the Board, the shares in other corporation, which are held by the Corporation, will be voted and represented solely by the President or by proxies appointed to the President.
4. Indemnification = Any person who has, or is threatened to be made a party to a proceeding by any reason of the fact that they:
  - Are or were an officer, employee, director or agent of the Corporation.
  - While serving as an officer, director, agent or employee of the Corporation, was or is serving at the request of the Corporation as an officer, director, agent, employee or any other related function of another corporation, joint venture, partnership, trust or any other enterprise, to the maximum extent allowed in accordance with the Revised Statutes of Delaware state law. Such right will be a contract right and will run to the benefit of any officer or director that is elected and accepts the position, or elects to continue service as an officer or director for the Corporation while Article VII is in effect. The mentioned rights stated above will not be exclusive of any other right that an individual may be entitled, may have or may acquire under any bylaw, statute or via resolution of stockholders or director agreements or likewise.

The term "proceeding" will refer to any pending, threatened or completed action or suit, whether criminal, administrative, civil or investigative, appeals related to any such action or suit, and any investigation or inquiry that could possibly lead to such actions. Officers or directors of the Corporation will not be liable to the Corporation or any of its stockholders for any monetary damages that may result from a breach of fiduciary duty at that position, except for:



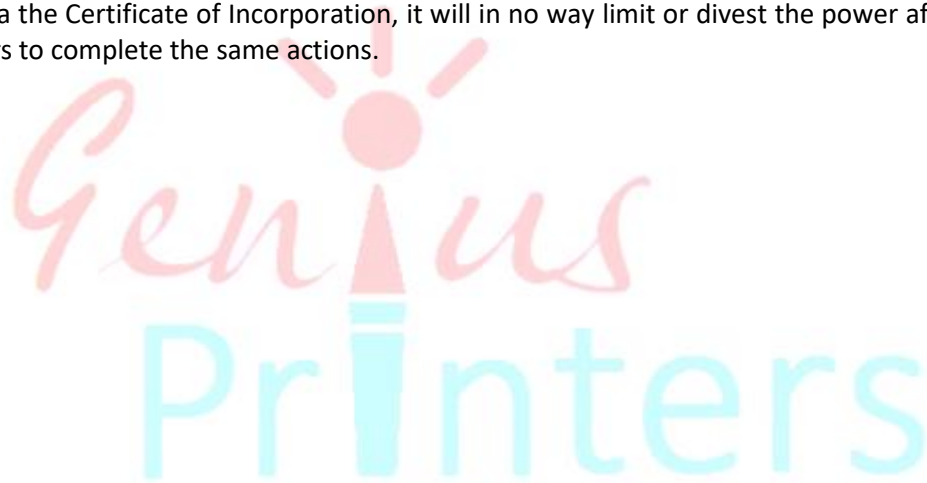
- Omissions or acts that involve deliberate misconduct actions, fraud or intentional violations of law.
- Payment of distributions that are in violation of Revised Statutes of Delaware state law.

Any amendment or repeal of Article VII done so by stockholders will be prospective only and will not affect any limitation on the liability of a director or officer of the Corporation that may result from an omission or act that occurs before the time of such an amendment or repeal. Additionally, when directors and officers of the Corporation are not personally liable, as stated in the guidelines established in Article Vii, officers and directors will not be personally liable to the stockholders or the Corporation to the extent as permitted by any laws enacted in a future date, including but not limited to, any amendments to state of Delaware's Revised Statutes.

#### Article VIII

##### Amendments

New Bylaws could be adopted by the stockholders of the Corporation and the current Bylaws may be repealed, altered, amended or adopted by the stockholders or the Board of Directors via the Certificate of Incorporation at any regular meeting of the Board of Directors or the stockholders meetings, or at special meetings so long as notice is given of such alterations, repeals, adoptions or amendments. If the authority to amend, adopt or repeal Bylaws is deliberated upon the Board of Directors via the Certificate of Incorporation, it will in no way limit or divest the power afforded to the stockholders to complete the same actions.



## Employment Contract

This Agreement is made on 31 January, 2018 between:

Genius Printers UG whose recorded office located at Schillerstr. 4, 41561 Kaarst, Germany

And

Markus Ulrich who is located at 1873 Rte de L'Abadie, 06730 St. Andre de la Roche, France (Employee)

### 1. Interpretation

1.1 In regards to this contract, the following terms will hold the following meanings:

Confidential – any information which is confidential, any trade secrets or commercially sensitive information that is not considered public domain information, other than through wrongful disclosure by the Employee, and that belongs to Genius Printers, whether recorded or stored electronically or physically, and relates to, without any limitations, the business methods, marketing plans, management systems, finances, strategic plans, business opportunities, both new and maturing, process, marketing efforts, designs, inventions or similar to that of Genius Printers, or to that in which Genius Printers is required to place a certain level of confidentiality to any party.

Employment – the Employee's employment are in accordance with established terms found within this agreement.

Termination Date – the date on which the Employee's employment ceases.

### 2. Duration and Appointment

2.1 Genius Printers will employ the Employee under the terms of this agreement in which the Employee will work under.

Employment will begin on 1 February, 2016 and will continue until terminated by either party in notice that is in accordance with the following provisions.

The Employee's probationary period will be the first six-months of employment. During this time, Genius Printers may terminate the employment after giving a two-week notice. Genius Printers may extend the probationary period at their discretion.

Previous employment with any other employer will not count towards the Employee's continuous employment period that will begin on 01-02-2018.

### 3. Place of Work

1873 Rte de L'Abadie, 06430 St. Andre de la Roche, France will be the Employee's ordinary workplace. Genius Printers may select other locations in order to meet business needs and to ensure the Employees' proper performance.

### 4. Duties

The Employee will perform the duties of business manager, designer or any role that Genius Printers may require to meet the business needs of the Company, the Employee's skills, experience and qualifications.

In-depth details of Employee duties will be covered at the beginning of employment.

### 5. Salary

The Employee will begin employment with the annual salary of 30,000 €. The salary will be paid in equal monthly installments and will accumulate from day-to-day.

The Employee will receive an annual salary review, the first will be conducted on 01-02-2019.

The Employee acknowledges and agrees that Genius Printers may deduct from his basic salary, or other amounts, at any given time any amounts that the Employee may owe to Genius Printers.

Such amounts include, but is not limited to, unauthorized expenses, annual leave overpayment and outstanding loans.

#### 6. Work Hours

The Employee agrees and acknowledges that they will work 29 hours per week.

##### Overtime

Overtime may be required from time to time as it may be necessary for the proper performance of his duties. The Employee acknowledges and agrees that he will not receive any additional payments for the additional worked hours.

Both parties agree that the Employee will have a normal working time that could exceed 48 hours in a seven day time span. The Employee agrees and acknowledges that the limits to his working hours will not apply and that his average working time could possibly exceed 48 hours within a seven day period. If the Employee wishes to withdraw from this agreement, they may do so by submitting their request three months in advance.

#### 7. Injury / Sickness

If the Employee is absent from work due to injury or sickness, he will inform Genius Printers immediately and will provide regular updates of his recover, as well as his expected return to duty date.

If the Employee's absents will last for more than three days, he must submit a self-certification to Genius Printers. If the absents will last from more than seven days, the Employee will have to obtain and submit medical certification from his doctor to Genius Printers.

Employee will receive statutory sick pay for any period of absence due to injury or sickness, so long as the Employee meets the above requirements. For sick pay purposes, the qualifying days for statutory sick pay are Monday thru Friday.

#### 8. Holidays

8.1 The holiday year for Genius Printers begins 01-01-2018 to 31-12-2018.

The Employee is entitled to 28 holiday days during any year. Additionally, he will be entitled to the normal banking and public holidays as they are recognized in the country of Germany.

Unless the Employee has written consent from Genius Printers, he will not carry over more than 3 holiday days from a previous year into the next. The carried-over days must be used prior to 4 January of the new holiday year.

The Employee will be entitled pay in lieu of accrued holiday days in which he is entitled to but has not taken upon termination. The formula used to determine the amount of pay is  $1/260$  of the normal salary rounded to the nearest half day.

#### 9. Conflict of Interest

The Employee will not take any paid or unpaid work for any other firm or organization apart of GPUG without prior written consent.

#### 10. Information Considered Confidential

The Employee acknowledges and accepts that he will have access to confidential information during the time of his employment.

Except for under the normal and proper course of fulfilling his duties, the Employee agrees that he will not, during his employment or at any time thereafter, indirectly or directly use any confidential information for his own benefit, or disclose, or allow to be disclosed any information that is considered confidential without prior written authorization from GPUG.

The Employee acknowledges and agrees to do his best to safeguard Confidential Information at all times and to prevent unlawful publication or disclosure of such information.

Restrictions on the Employee's use of Confidential Information will not apply to the following:

- Such information that comes into the public domain under no fault, or not caused by any actions of the Employee.
- Any protected disclosure that has been made in accordance with Employment Rights Act.
- Any information the Employee has acquired except through the normal performance of his duties or for Genius Printers.
- Any information that is required to be disclosed by the Employee due to an order by a court or other types of knowledgeable authority or any regulatory authority or, in some manner, required by law.

#### 11. Employment Termination

Genius Printers may terminate employment of the Employee with a one-month in advance written notice.

The Employee may terminate their employment by submitting a written notice at least two months in advance.

Genius Printers reserves the right to terminate employment immediately and without the above mentioned notice by paying the basic salary, minus taxes, insurance and deductions, in lieu of part or all of the notice period. Payment will not include holiday entitlements the Employee would have received if they worked the entire notice period.

#### 12. Collective Agreement

Employment will not be affected by any collective agreements as there are none.

#### 13. Agreement Entirety

Both parties, Genius Printers and the Employee, agree and accept that all provisions in this agreement establish the entire agreement and the understanding between the two that supersedes any prior communications, discussions, agreements or arrangements that might have occurred regarding employment.

#### 14. Grievance and Discipline

The Employee is subject to, and will be held to, Genius Printer's grievance and disciplinary policies. Copies of such policies can be obtained from Genius Printers. These policies are not contractual and are not considered as part of the contract for employment. Genius Printers may enforce a two-week suspension in order to conduct a disciplinary investigation in the event allegations should arise against the Employee. The Employee will receive their usual benefits and pay during the suspension period.

#### 15. Data Protection

A copy of Genius Printer's data protection policy has been provided to the Employee. The Employee agrees to process personal data in accordance with Genius Printers policies regarding such matters.

The Employee agrees that any of the personal or sensitive data that relates to the Employee and has been collected by Genius Printers, will be held by Genius Printers, or their agents or third parties, either by manual means or by computer, and will be used for administrative, management and operational purposes for the Employee's employment or in regards to Genius Printers business or obligated needs.

#### 16. Variation

Unless recorded in writing and signed on behalf by both parties, no other variation of this agreement will be binding or valid.

#### 17. Third Party Rights

Rights of Third Parties will not apply to this Employment Agreement and rights will be limited to the Employee, Genius Printers and each Group GPUG.

18. Principal Jurisdiction and Law

The Laws of Germany will govern this agreement. Each party involved submits, irrevocably, for the purposes in relation to this agreement to the exclusive jurisdiction held by the courts of Germany.

Signed \_\_\_\_\_

Dated \_\_\_\_\_

For and On Behalf of Genius Printers (GPUG)

I agree and acknowledge that I have read this employment contract. I further understand, agree and will abide by all terms and conditions of employment as stated in the above contract.

Signed \_\_\_\_\_

Dated \_\_\_\_\_

Name of Employee: Markus Ulrich

Signed \_\_\_\_\_ Dated \_\_\_\_\_

For and on behalf of GPUG

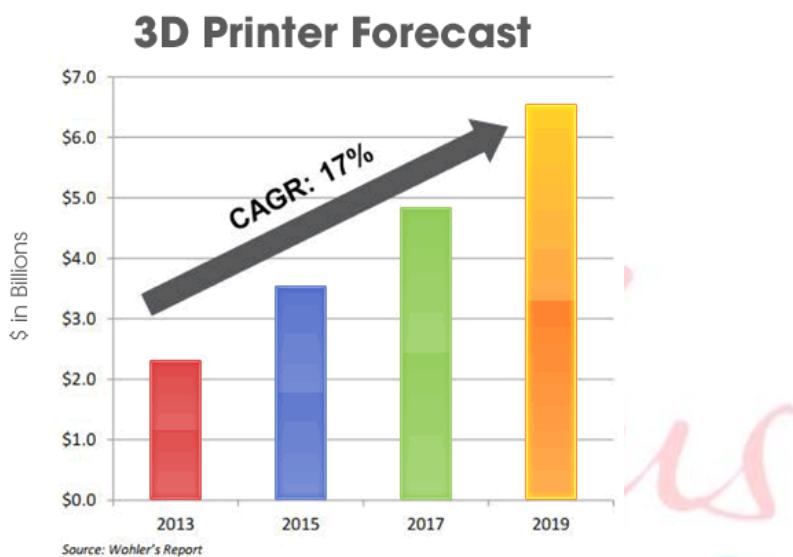
I acknowledge and agree that I have read this contract of employment. Further, I understand, agree to and will abide by all the terms and conditions of employment as set out above.

Signed \_\_\_\_\_ Dated \_\_\_\_\_

Name of Employee: Markus Ulrich

## Business Plan – Exhibit 12

Wohlers Associates forecasts the 3D printing industry will continue to post strong double-digit growth over the next several years, reaching \$6 billion by 2017 and \$10.8 billion by 2021. It took the 3D printing industry 20 years to reach \$1 billion in size. In five additional years, the industry generated its second \$1 billion. It is expected to have been doubled again, to \$4 billion, in 2016.



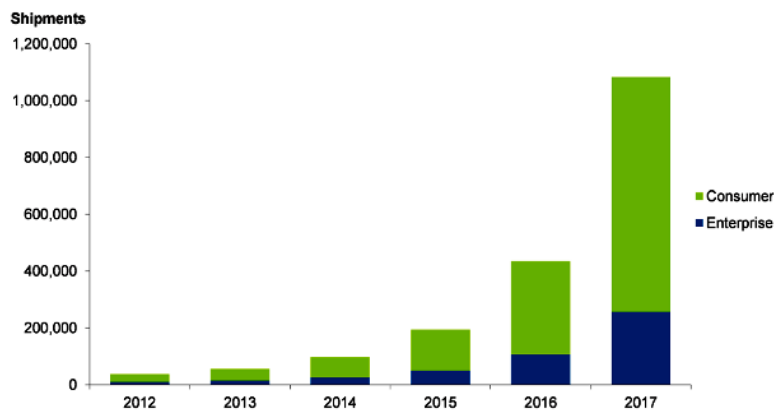
The market for 3D printing products and services in 2012 grew 28.6% (CAGR) to \$2.204 billion. This is up from \$1.714 billion in 2011, when it grew 29.4%. The average annual growth (CAGR) of the industry over the past 25 years is an impressive 25.4%. The CAGR is 27.4% over the past three years (2010–2012).

<sup>1</sup> Wohlers Associates, *Wohlers Report 2013: Additive Manufacturing and 3D Printing State of the Industry* (Fort Collins, Colorado: Wohlers Associates, 2013. ISBN 0-9754429-9-6)

According to a new research study from International Data Corporation (IDC), the worldwide 3D printer market will experience tremendous unit and revenue growth from 2012 to 2017, with compound annual growth rates (CAGRs) of 59% and 29%, respectively.

Genius Printers is directly targeting the rapid growth in the consumer and industrial grade printer market.

Gartner research director Pete Basiliere projects consumer market printer shipments will “rise 123.3% from 2016 to 2017 and by 149.3% from 2016 to 2017” as 3D printing continues to move toward mainstream adoption.



Source: Gartner Research by Pete Basiliere - February 14, 2014

Echoing Gartner’s extremely fast growth projections for consumer grade printer sales is the [Wohler’s Report 2016](#) release which notes that much of the growth in 3D printing over the next few years will be driven by “sales of under \$5,000 personal 3D printers.”

Also, in an April 2016 press release Juniper Research [writes](#) that sales of consumer 3D printers will exceed 1 million units by 2018, rising from just over an estimated 44,000 in 2014.

### Growth of the Industry

AM Worldwide Revenue, Market Forecast and Opportunity: Please read this article taken from “3D Print Company”:

Apr 4, 2017 | By Julia

**Wohlers Associates** Inc, the leading consultant firm in the 3D printing industry, has just released its 22nd annual report, the Wohlers Report 2017. According to the highly anticipated report, the additive manufacturing industry grew by 17.4% in 2016, and 97 manufacturers produced and sold 3D printing systems.

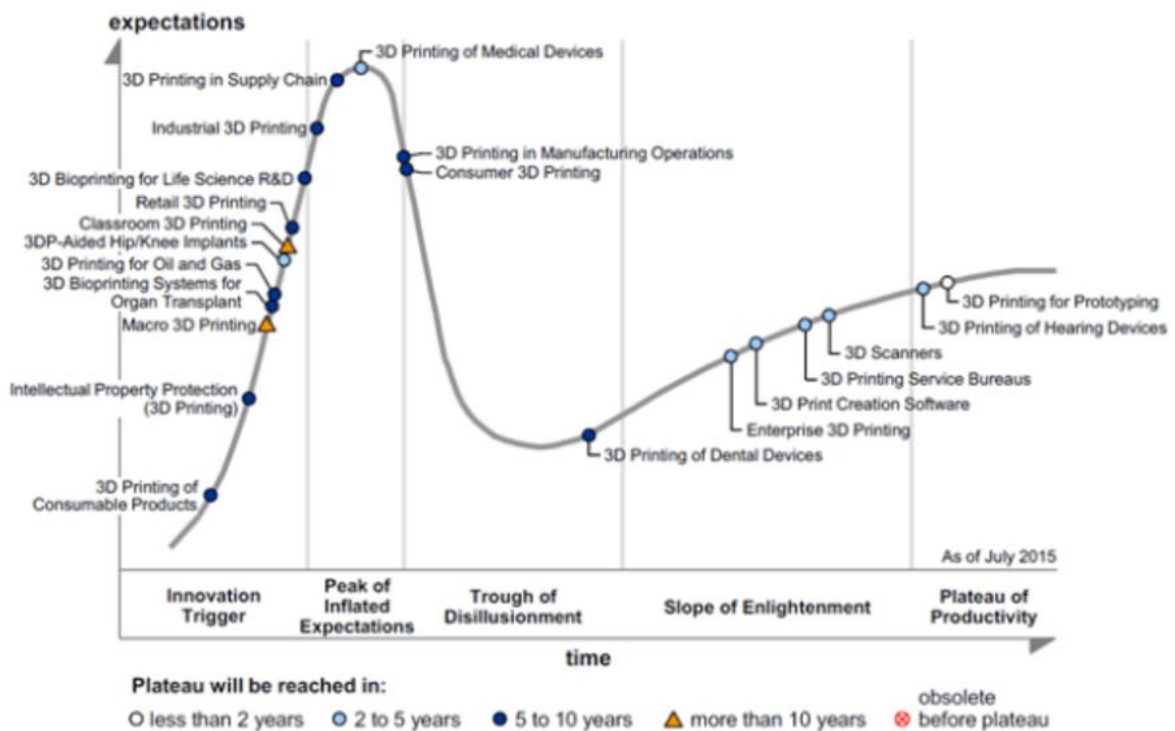
Wohlers is widely considered the undisputed authority on additive manufacturing worldwide. For this year’s Wohlers Report, input was collected from 100 service providers, 61 industrial system manufacturers, and 19 producers of third-party materials and inexpensive desktop 3D printers.

The report findings were relatively optimistic but perhaps surprising to some. According to Wohlers Report 2017, the 3D printing industry grew by 17.4% in worldwide revenues in 2016, which was down from 25.9% growth in 2015.

Wohlers representatives say that much of the downturn came from declines by the two largest manufacturers in the industry. Together, those two companies represent \$1.31 billion (or 21.7%) of the additive manufacturing industry, which is itself currently worth \$6.063 billion. If these two companies were excluded from the analysis, the industry would have grown by 24.9% in 2016.

On the other hand, the number of manufacturers is steadily skyrocketing. In 2016, 97 companies produced and sold 3D printing systems, which is up from 62 companies in 2015 and 49 in 2014. According to Wohlers, these manufacturing companies are providing interesting products and, more importantly, unprecedented competition in the additive manufacturing industry. The new wave of

development and commercialization is consequently putting increased pressure on established players in 3D printing systems production.



Source: Gartner (July 2015)

Gartner's Hype Cycle applied to the 3D printing industry in 2015 indicated that consumer 3D printing still hadn't reached the trough of disillusionment, but was well on its way.











The following extract has been chosen from an article published by "3D Printing Industry", written by Dayton Horvath, the Research Associate and practice lead on Lux Research's Materials Design and Manufacturing coverage area. He conducts primary research and market analyses on technological developments in additive manufacturing and printable materials. Areas of particular interest to Dayton include 3D printed composites:

Despite its decades long history, selective laser sintering (SLS) continues to have undeveloped potential to form high quality production parts that are difficult to make using other 3D printing methods. One of the largest challenges to 3D printing of production quality plastic parts is poor mechanical properties commonly observed as reduced strength in the z-axis. In contrast, SLS as a printing technology inherently provides more mechanically isotropic parts. Additionally, the powder bed in SLS printing acts as a natural support structure for parts, enabling geometries that are



difficult to print with FFF or SLA as well as vertical “nesting” of parts. However, SLS suffers from materials limitations due to the limited number of commercially available thermoplastic powders. Furthermore, SLS equipment development has lagged behind other technologies and the closed materials platform many large SLS printer manufacturers use further restricts new material adoption.

## Selective Laser Sintering System Providers

Company	Price (x 1000)	Available Materials	Open materials?	Max Temp.
 3D SYSTEMS	\$270 - \$850	PA; glass filled PA; fiber filled PA; TPE	No	
	\$250 - \$800	PA 12; glass, aluminum, or carbon-fiber filled PA 12; PA 11; TPE-A; PS; <b>PEEK</b>	No	<b>385°C</b>
 Service Provider	Service Provider	PEKK using EOS Printers	No	<b>385°C</b>
	>\$250	PA; glass, mineral or carbon fiber filled PA	<b>Yes</b>	220°C
	>\$250	PS; coated sand	unknown	
	\$100	PA 12	<b>Yes</b>	200°C
	\$17.5	none	<b>Yes</b>	190°C
	\$15	PA 12 and TPU	No	195°C
	\$10	PA 11 and PA 12	No	
	\$5	PA 12	No	

Lux Research Analyst Insight, “*The hidden challenges and promise of selective laser sintering for plastic 3D printing*”



TABLE KEY: PA = polyamide; TPE = thermoplastic polyethylene; PEEK = polyetheretherketone; PEKK = polyetherketoneketone; TPU = thermoplastic polyurethane

Progress in overcoming the limitations of current SLS printing technology can be observed in the table above, showing the technical specifications of some of the leading SLS printers on the market. Specifically, the bold text shows how some companies have begun to tackle challenges related to equipment cost, materials diversification, and temperature restrictions.

However, broader adoption of SLS printing will require materials developers, printer manufacturers, and part manufacturers to work together and emulate the vertical integration that has helped propel the successful metal powder bed technologies in aerospace and medical applications to date. New materials commercialization is up to materials providers and printer manufacturers partnering to deliver materials properties that can compete with their conventionally manufactured analogs.

In addition to the limited number of printable plastic powders, there are several equipment limitations for current SLS printers. Due to the early use of nylons in SLS, most printers installed to date only reach a maximum sintering temperature of 200°C and as a result cannot sinter high performance polymers (with EOS and Oxford Performance Materials as notable exceptions).

Additionally, most systems use oversimplified temperature control systems that hinder accuracy as well as ultimate print speed. Carl Deckard predicted that similar to the surge in FFF printer innovation and design that allowed for a more complete range of printer price points and capabilities, in the next five years SLS printers will experience an overhaul in their design that will remove the constraints on temperature, speed, and cost of earlier models.

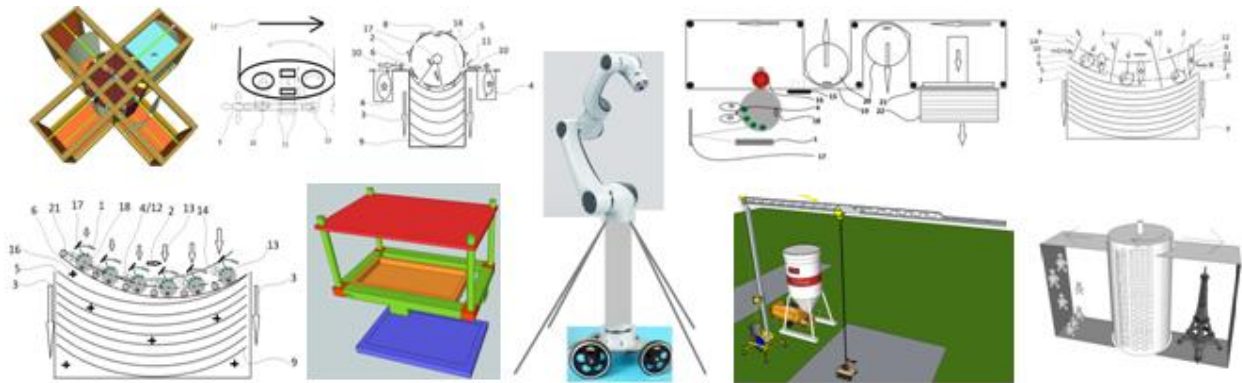
Such technical innovation will require investment in the promise of SLS and support from both materials suppliers and product manufacturers, and there are already notable signs of support at the equipment level.

The final limitation for new materials adoption in SLS printing is the closed business model used by the major SLS printer manufacturers. Companies like 3D Systems require that customers use the company's materials on its SLS systems and it offers only a limited range of materials. However, broader adoption of SLS printing will require materials developers, printer manufacturers, and part manufacturers to work together and emulate the vertical integration that has helped propel the successful metal powder bed technologies in aerospace and medical applications to date.

Companies interested in materials development and supply should explore novel thermoplastic powder production methods to expand the range of thermoplastics for SLS, either through partnerships with startups like Structured Polymers or via internal development. Printer developers have an opportunity to differentiate themselves through cheaper, faster, and higher processing temperature equipment. Most importantly, product designers and manufacturers should consider SLS printing for custom products that require better isotropic properties than FFF or SLA currently offers, and should work with materials and printer developers to drive materials and process capabilities towards desired product specifications



## The Project, Pictures:



Genius Printers has a basket full of ideas and patent specifications. The company could engage in nearly any 3d printing field, from light curing to powder sintering to new areas like molten granulate jetting. To explain the depth and scope of possibilities, most licensed specifications and fields of application are shown below and explained in more detail in this section.

SLA: Peeling mechanism

Licensed Item: The vat tilting mechanism that is used to separate the polymerized layer from the vat. Unlike hinged systems widely used in the industry, the vat can be moved horizontally or vertically or in a trigonometric combination thereof, by moving every vat corner separately, mostly sequentially, enabling a very smooth but fast separation

Number on file at DPMA, German Patent Office: 10201411433.7

Gel-Printer

Licensed Item: The Robot arm on a moving platform with external recalibration process after each platform movement, pressing hot resin out of a cooled and turnable duckbill valve in order to produce wide/thick walls as well as fine detailed objects.

Number on file at DPMA, German Patent Office: DE102015016823

Resin jetting drum printer

Licensed Item: The resin drum printer that could jet resin to the outside, out of cartridges installed inside the drum in order to print multi (color) material in an un-accelerated way, thus allowing for much higher speed, targeted for 5-50 layers/second.

Number on file at DPMA, German Patent Office: DE102014019392

Powder sintering technologies

Licensed Item: A compilation of three different SLS technologies, using a) a drum dispersing powder in multiple sections around the drum, where each section also sinters the distributed powder. A continuous curved layer production allowing object printing circa ten times faster than current SLS printers; b) a planar layer production, where the electro-chargeable powder is transferred within a laser printer-like device onto a foil that is pressed by a heat stamp onto the object, transferring the

whole layer in one stroke. Vertically driving drums produce intervals, so that the continuous print concurs with the heat stamp without any loss of time. Wetted foils allow for the processing of non electro-chargeable powders. A multi (color) material printer; c) laser printer-cartridge-system from (b) sits inside a continuously rotating drum and transfers powder directly to the outside onto the curved object layer, where every laser-printer unit inside the drum has its own sinter unit. A continuous curved layer production allowing multi (color) material object printing circa ten times faster than current SLS printers

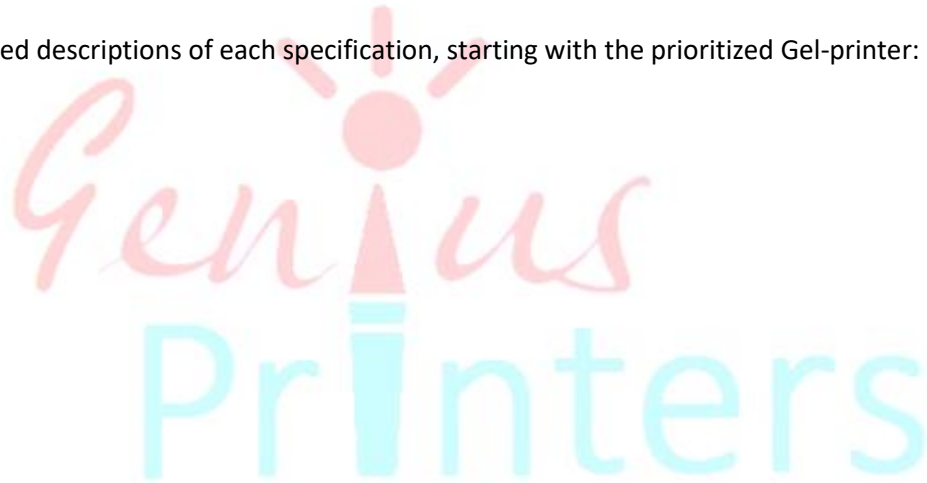
Number on file at DPMA, German Patent Office: DE102016002598

#### Molten granulate jetting

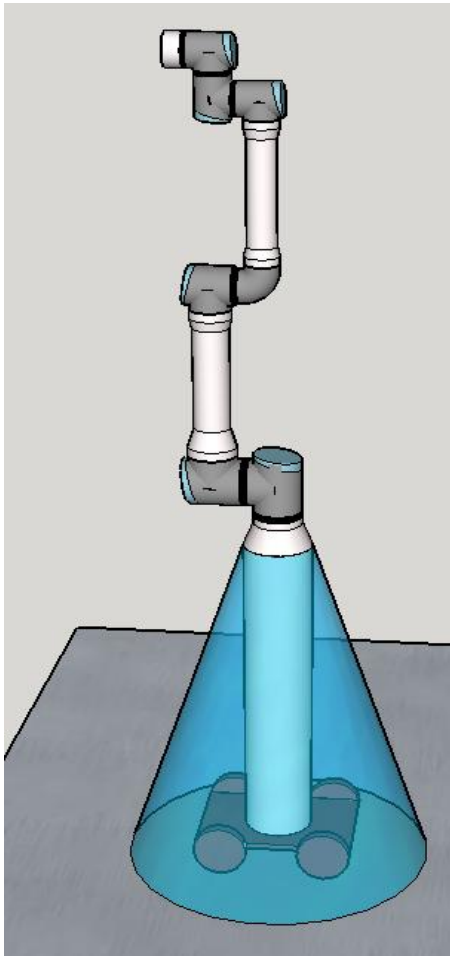
Licensed Item: A print technology that uses granulate for plastic injection moulding machines in order to facilitate the acceptance of 3d printers in this vast mass producing market segment. Heated granulate is melted in standard atmospheric conditions and conveyed in a loop inside a rotating drum, passing the printhead that consists of a perforated sheet with holes too tiny to let the plasticized mass go through. Each hole has a heating unit to heat the plastic up instantaneously (ie via spark between anode/cathode), reducing the plastic's viscosity to allow the centrifugal forces to press the plastic droplet through the heated hole of the perforated sheet. A technology to replace current injection moulding machines, allowing complex structures unthinkable to do with today's injecting machines.

Number on file at DPMA, German Patent Office: DE102016015617

More detailed descriptions of each specification, starting with the prioritized Gel-printer:



# Gel-Printer



**Licensed Item:** The Robot arm on a moving platform with external recalibration process after each platform movement, pressing hot resin out of a cooled and turnable duckbill valve in order to produce wide/thick walls as well as fine detailed objects.

Number on file at DPMA, German Patent Office:  
DE102015016823

The Genius Printers Team believes that it is in the best interest of investors to bring to life one idea after the other, starting with the Gel printer.

The idea behind this printer is to generate huge structures, like i.e. real scale animals or oversized shopping articles for museums, shops, restaurants, etc, or real scale cars for design departments of automobile manufacturers, scaled yacht models or architecture-models.

Gel (ie aliphatic urethane triacrylate/tpo mixtures) with viscosities over 300kcps are heated up to ie 60°C for easy conveyance with a screw pump and pressed though a turnable duckbill valve and then cooled down quickly using Peltier-elements in order for the resin wall to regain stiffness. This allows for huge wall diameters as well as quite detailed prints with cross section areas between 1-100mm<sup>2</sup> and printing speeds of ca 10cm/s, building objects of a mass of 100kg within ca 3-50hours.

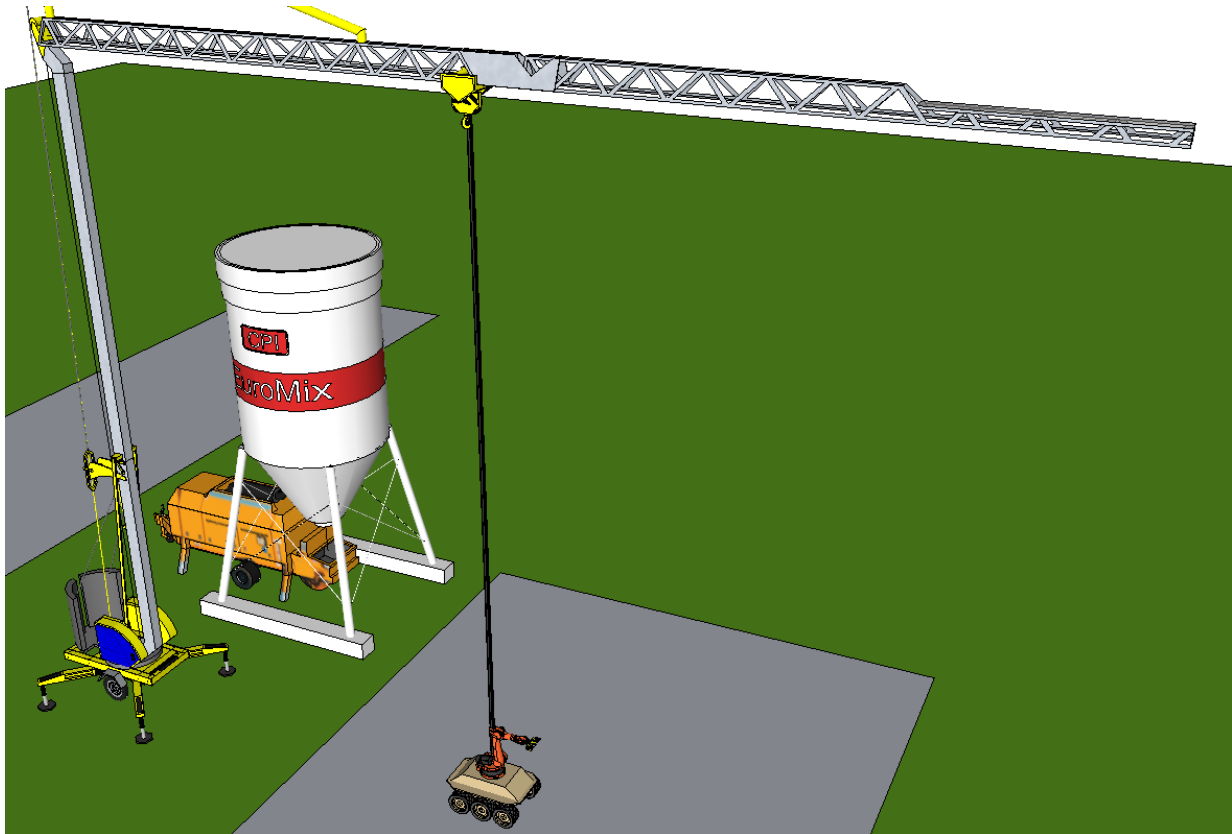
Contrary to current designs, precision is not obtained by expensive internal mechanical robo-arm accuracy, but by recalibration once the moving platform has gained its next

position from where the robot arm can produce the next section of the object, like an auto-crane that drives to its next working environment and needs to rest and stabilize the crane by supporting stands before loads can be taken.

Autocalibration is done before and after each platform movement by letting the robo-head aim towards a fixed measuring device inside the laboratory printing room, enabling position detection to a precision of up to 50µm, precise enough for structures >10m<sup>3</sup>.

As cheaper robo-arms with accuracies of +-100µm can be chosen, cost of these printers will come down significantly, allowing for margins of 70% compared to Massivit's printer –enabling structures of undefined sizes relative to Massivit's fixed size of 1.8x1.5x1.2m, a huge advantage of the Genius Printer over its competitor.

**Business estimation: R&D of this Gel Printer will cost ca 50k\$ for a first working prototype, with ¼ Million\$ at the high end estimate for starting a small series production incl. SW. Each machine would cost ca 50k\$ (purchasing components and SW) and sell for less than Massivit's price (300k\$) while offering open volumes. A market of well over 100 worldwide printers is envisionsable, scalability is very easy due to the purchasing of just a few industry standard components (moving platform/robo-arm/distance measuring unit)**



The same principle as for big gel printed objects applies to 3D house-printing: singularities are avoided by a moving robot. Huge supporting structures similar to caged systems known from FDM printers shouldn't be used for house printing. A Chinese company uses a 12 ton steel structure, whereas the Genius Printers system only needs a crane delivering the wall building material via a hose (flow rate ca  $100\text{cm}^3/\text{s}$ =ca 15 tons/day, and a crane will be needed anyways for the roof structure. Genius Printers team believes that House printers should be collaborative robots, they need to tell the worker when to insert electricity wires and water tubes, window frames and reinforcing steel; the ceilings will be concrete-poured like before. This way the house printer will find acceptance within the construction community, and allows for organic optical structures which is unusual/too expensive before. The printer will also use a similar flexible nozzle system allowing for fast as well as detailed printing.

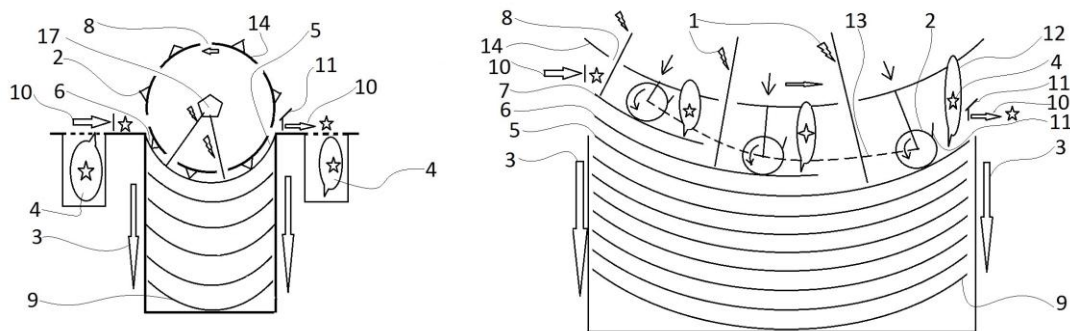
**Business estimation: R&D of this house Printer will cost ca 100k\$ for a first working prototype, with 1/2 Million\$ at the high end estimate for starting a small series production. Each machine would cost ca 100k\$ (purchasing components and SW) and sell for at least 500k\$. A market of well over 1000 worldwide printers is envisionable, offering a gain of several 100million\$. Scalability is very easy due to the purchasing of just a few industry standard components (moving platform/robo-arm/distance measuring unit)**

# Powder sintering technologies

Licensed Item: A compilation of three different SLS technologies, using a) powder bed fusion: a drum dispersing powder in multiple sections around the drum, where each section also sinters the distributed powder. A continuous curved layer production allowing object printing circa ten times faster than current SLS printers; b) a planar layer production, where the electro-chargeable powder is transferred within a laser printer-like device onto a foil that is pressed by a heat stamp onto the object, transferring the whole layer in one stroke. Vertically driving drums produce intervals, so that the continuous print concurs with the heat stamp without any loss of time. Wetted foils allow for the processing of non electro-chargeable powders. A multi (color) material printer; c) laser printer-cartridge-system from (b) sits inside a continuously rotating drum and transfers powder directly to the outside onto the curved object layer, where every laser-printer unit inside the drum has its own sintering unit. A continuous curved layer production allowing multi (color) material object printing circa ten times faster than current SLS printers

Number on file at DPMA, German Patent Office: DE102016002598

Explanation of model a):



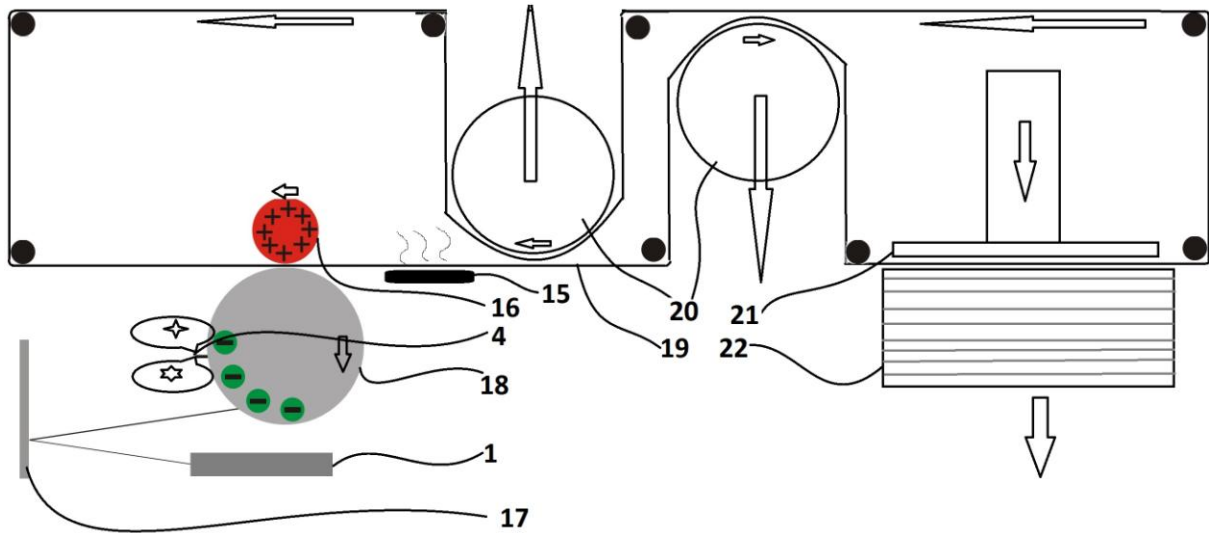
The curved layer bed lowers continuously for ie 50µm per layer during the time that each powder distributing slide feeder which is sitting outside the rotating drum is also lowering for the same distance. The drum diameter and sinter unit behind each feeder define the number of layers that are simultaneously built. Powder could be distributed from cartridges inside the drum in front of each feeder, or outside the drum at the layer starting edge, both methods would need a reservoir at the layer end's edge, whereas the latter method could allow for different materials (coloring wouldn't make much sense due to high powder loss rate when all powder is collected in one reservoir), enabling ie strengthening or conductive layers. A combination of both methods is also possible for cheaper build cost with just one or two integrated cartridges.

This machine is much simpler and less expensive than the current reference machine, HP's Fusion, and it is at least a magnitude faster than current powder bed fusion machines.

**Business estimation: the SLS market will grow fast to a multi-billion one. Machine cost is a major portion of the built object's cost. Faster machines can reduce build cost significantly. This is why this drum SLS printer should sell several 1000 times at prices of ca 100k\$ with production cost of ca 20k\$, leaving a gain of several 100million\$.**



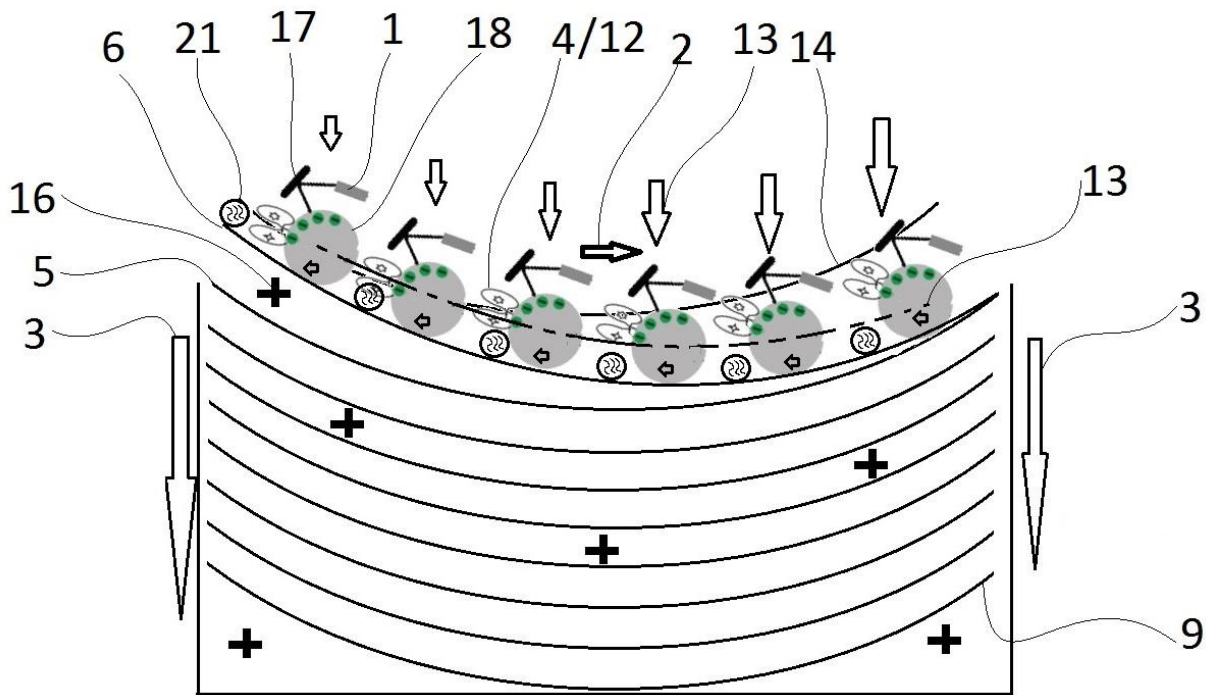
Explanation of model b):



Either a wetted foil or an electrostatic one receives a layer from a unit we already know from the 2d laser printer market. Multi or single pass systems allow for multimaterial/color-mixed powder use. The layer may need to be pre-sintered a bit to stick to the foil, before it is pressed as a whole onto the object by a heat stamp. Known print rates of one page per 30 seconds give an indication of build speed, assuming the heat stamping doesn't take longer than the foil printing process. The transformation from continuous foil printing to incremental stamping is achieved by foil-way-prolonging and reducing drums.

**Business estimation: HP's Fusion is the current reference machine. Model (b) is capable of offering coloring like Fusion and multi material properties that surpass Fusion's capacities in most ways. Fusion has to emulate material properties, model (b) can mix any material that has equal properties concerning the heat stamp process if it can stick to the foil and is pulverizable. This is why model (b) should sell several 1000 times at prices of ca 100k\$ with production cost of ca 30k\$, leaving a gain of well over 100million\$.**

Explanation of model c):



The curved layer bed lowers continuously for ie 50 $\mu$ m per layer during the time that each powder distributing slide feeder which is sitting inside each rotating drum's "laser printer unit" (known from model (b) is also lowering for the same distance, printing each layer directly onto the object. In case the powder doesn't stick reliably onto the object, a wetting drum in front of each printing unit may need to roll over the object .

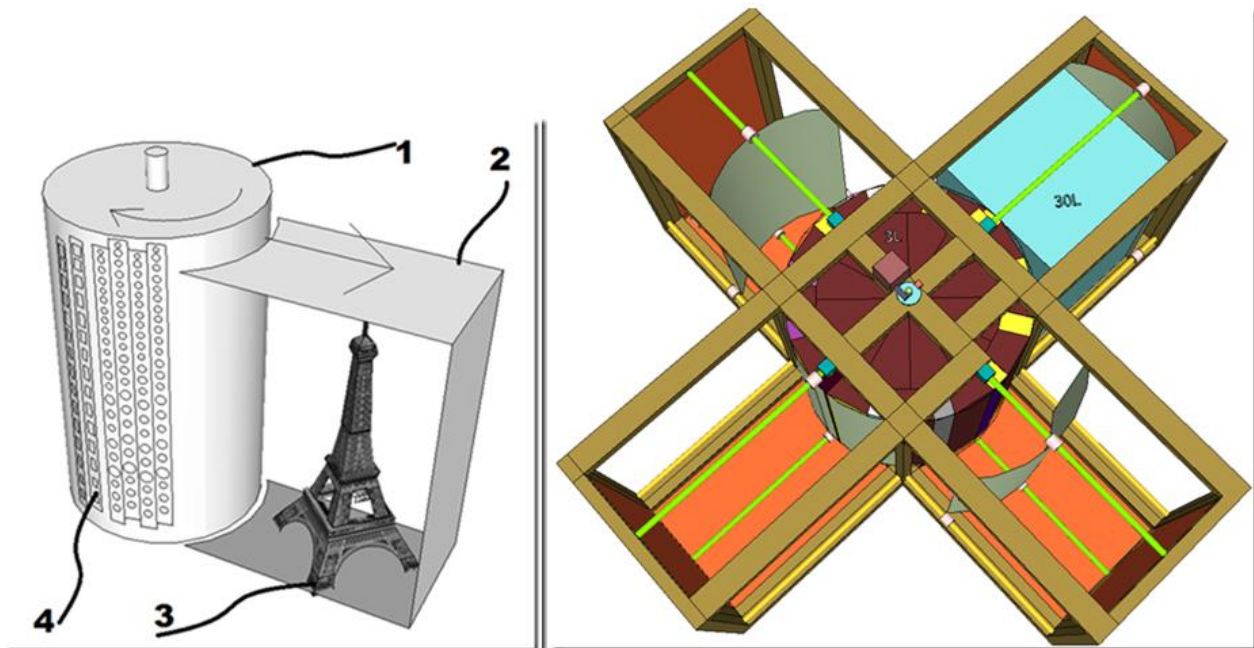
The drum diameter and sinter unit after each feeder define the number of layers that are simultaneously built. Powder is distributed from cartridges inside the drum in front of each feeder, allowing for different materials/colors, enabling ie strengthening or conductive or colored layers. This machine is still a bit simpler and less expensive than the current reference machine, HP's Fusion, while allowing for a much larger variety of material properties, and it is at least a magnitude faster than HP's Fusion machine (40 pages/minute=1200cm/60sec=20cm/s; layer length=40cm: 2sec/layer; distance between each laser unit is 10cm: 0.5sec/layer=20 times faster than HP's Fusion)

**Business estimation: HP's Fusion is the current reference machine. Model (c) is capable of offering coloring like Fusion and multi material properties that surpass Fusion's capacities in most ways. Fusion has to emulate material properties, model (c) can mix any material that has equal properties concerning the sinter process if it can stick to the object (ie wetting binder where necessary) and is pulverizable. With a printing speed of 2 layer/sec this model (c) should sell several 1000 times at prices of ca 100k\$ with production cost of ca 40k\$, leaving a gain of well over 100million\$.**

## Resin jetting drum printer

Licensed Item: The resin drum printer that could jet resin to the outside, out of cartridges installed inside the drum in order to print multi (color) material in an unaccelerated way, thus allowing for much higher speed, targeted for 5-50 layers/second.

Number on file at DPMA, German Patent Office: DE102014019392



The problem of ac/de-celerating Cartesian printing systems delaying and accuracy-worsening the printing process is solved by an unaccelerated rotating drum with a multitude of different color/material properties containing resin cartridges installed inside the drum, jetting to the outside onto curved layers. Different objects on differently sized platforms allow for continuous printing around the clock, with automated post-processing possibilities not known in today's 3d printing world, as quite every printer builds inside a caged system, whereas this system prints to the outside.

Today's jetting heads print with speed of ca 5m/s, enabling for 5 layers per second for this type of printer. Trust Moore, and the drum printer will be able to do 10-50 layers/second in the near/mid term future. It will be the fastest printing technology known so far.

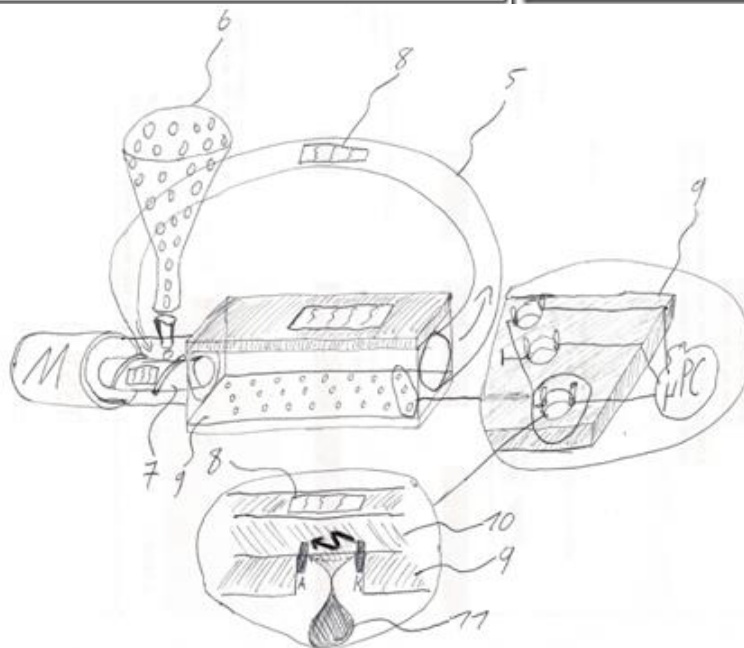
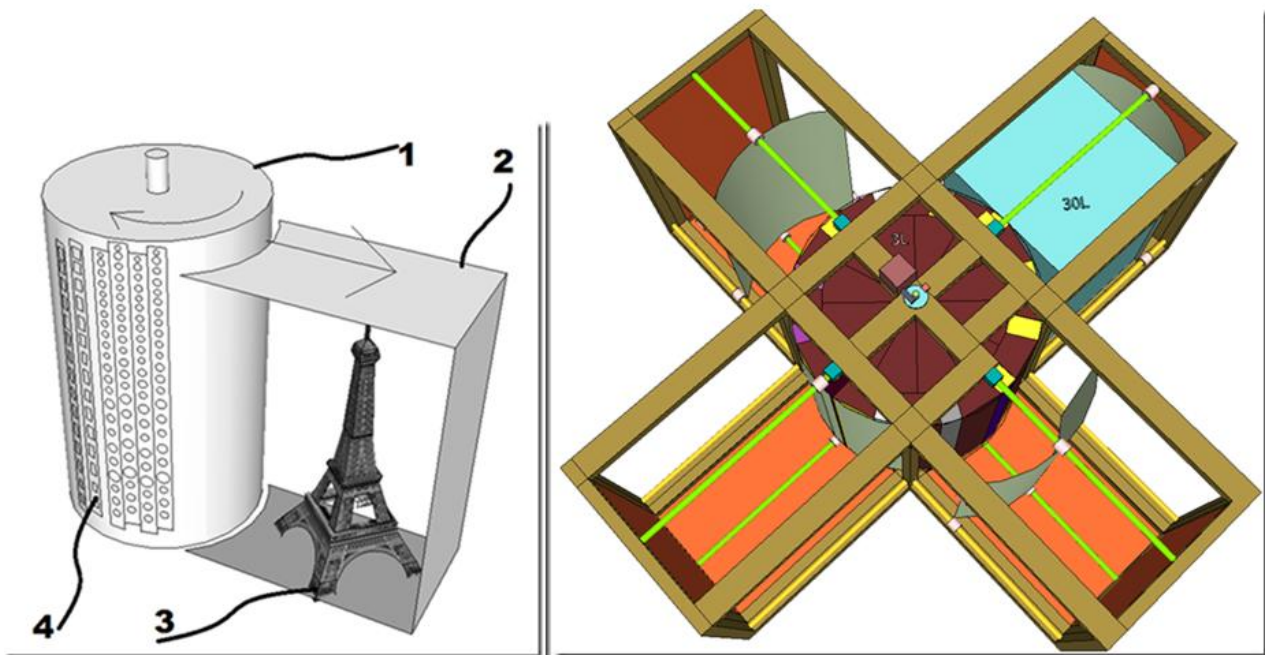
The disadvantage of using only non-functional micro-viscous resins <10cps should be overcome by using heads handling up to 100cps (ie from TTP/England) or by advanced material science enabling functional resins despite <10cps.

**Business estimation: Objet's Polyjetters are the current reference machine. Our Resin drum printer is capable of offering coloring and multi material properties like Objet, while the multi-platform versions offer much more productivity, as the system doesn't need to be halted for taking out the objects. This is why the drum printer should sell several 1000 times at prices of ca 50k\$-500k\$ (different sizes) with production cost of ca 20k\$-100k\$, leaving a gain of well over 100million\$.**

## Molten granulate jetting

Licensed Item: A print technology that uses granulate for plastic injection moulding machines in order to facilitate the acceptance of 3d printers in this vast mass producing market segment. Heated granulate is melted in standard atmospheric conditions and conveyed in a loop inside a rotating drum, passing the printhead that consists of a perforated sheet with holes too tiny to let the plasticized mass go through. Each hole has a heating unit to heat the plastic up instantaneously (ie via spark between anode/cathode), reducing the plastic's viscosity to allow the centrifugal forces to press the plastic droplet through the heated hole of the perforated sheet. A technology to replace current injection moulding machines, allowing complex structures unthinkable to do with today's injecting machines.

Number on file at DPMA, German Patent Office: DE102016015617



The task of this project is to assure current injection moulding companies that 3D printers are capable of replacing injection moulding machines in the near/mid term future. It is mostly a problem of material science, where current printed materials don't give the same functional quality than does the moulded material. So the Genius Printers Team took the method-follows-function way and chose to invent a technology that can handle material currently used by moulders, like ie ABS granulate. While the polymer structure mustn't be destroyed, the viscosity has to be lowered very fast to a point where centrifugal forces press the polymer through the orifice (the plastic above the orifice has to be spark-heated).

So this is the fourth invention where a drum is used: Again consumables (granulate) and print head rest inside the drum, and a curved layer is built towards the outside. And like the resin drum printer this design offers automated 24/7 processing on multiple platforms (optionally of different sizes). And again only the drum's diameter restricts the number of different color/materials, as long as each printhead can spark-heat the each flowing granulate. Material compositions may allow for quite every known properties. The material science task we see here is to find out how to spark-heat what polymer to what non-destructive temp, and on the machine building side: what orifice and heat-timing works best at what centrifugal force, how to handle green state cooling, droplet wave forms, droplet forms and firing sequences... this is quite an undiscovered area, but well worth the studies, as replacing the primitive forms available by today's moulds, unrestricted undercuts of complex three-dimensional structures allow for a disruptive design change of all injection moulded parts we use today –which is quite every object we see around us!

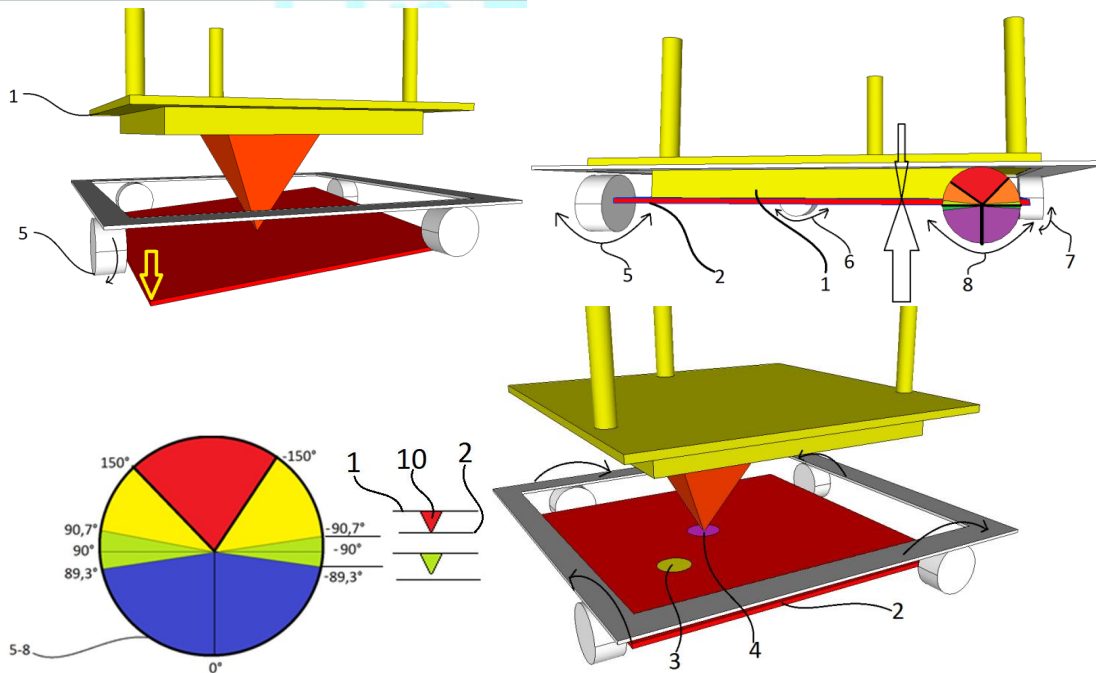
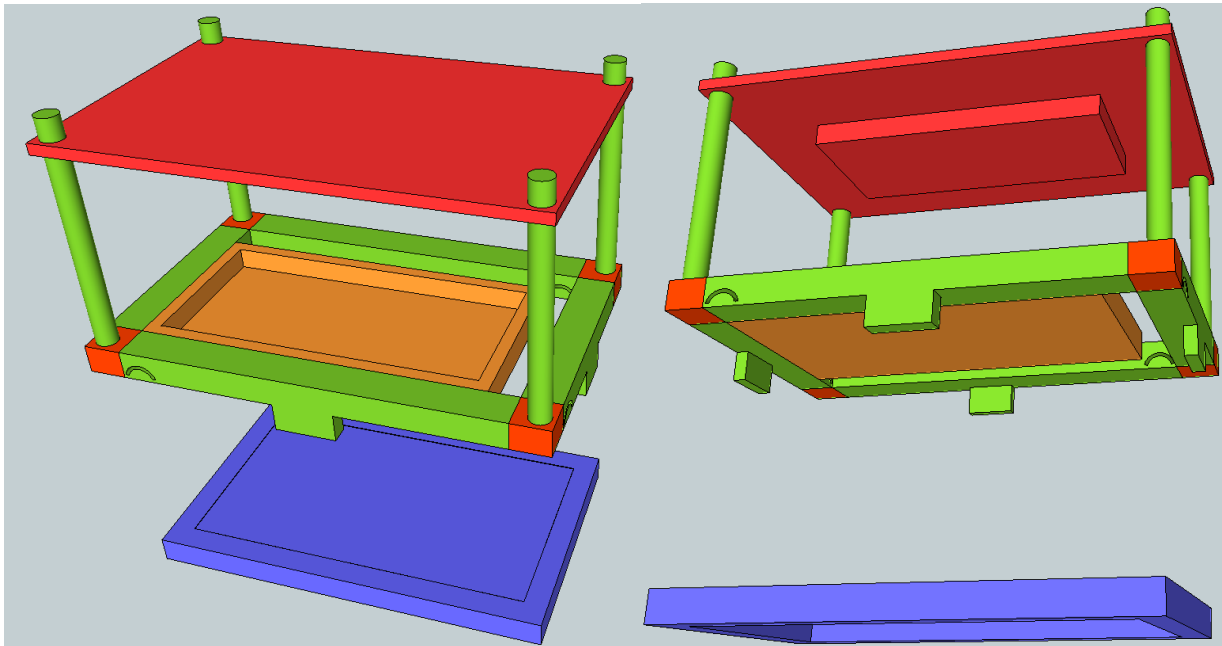
**Business estimation: A few functional material printing is still quite unknown to the 3D printing industry (concerning ie ABS-like function). The proof of usability of mouldable granulate in 3D printers will trigger the point from where on quite every part we touch will be 3D printed. This is why the molten granulate jetter should sell several 1000 times at prices of ca 100k\$ -1mio\$ (different versions form single platform of small size to multi platform of sizes producing objects of 1m3) with production cost of ca 20k\$-200k\$, leaving a gain of well over several 100million\$.**

Printers

# SLA: Peeling mechanism for daylight printer

Licensed Item: The vat tilting mechanism that is used to separate the polymerized layer from the vat. Unlike hinged systems widely used in the industry, the vat can be moved horizontally or vertically or in a trigonometric combination thereof, by moving every vat corner separately, mostly sequentially, enabling a very smooth but fast separation

Number on file at DPMA, German Patent Office: 102014114333



Daylight resin printers are well known today, with the cheapest, the ONO, working with a smartphone, having been sold over 10000 times already. But peeling problems grow exponentially with at least the build surface.

The idea here with the Genius Printers Daylight Resin Printer Series is to overcome this problem using the already patent granted peeling mechanism. This way -the Team believes- the object volume can grow 100-fold, allowing for really usable sizes even within the industry, from 1L to even 100L. As the resolution of monitors and their brightness and contrast steadily improve –reaching 8k in the near term future- objects with voxel sizes of less than  $200000\mu\text{m}^3$  ( $60\times 60\times 50\mu\text{m}$ ) for an object of 100L of outer dimensions ( $60\times 30\times 60\text{cm}$ ) are within reach. As the industry standard will move from 4k to 8k, 4k monitors will become cheap, so there will be a chance to produce a wide range of daylight printers with different resolutions and build sizes, for the consumer market ( $<1000\text{\$}$ ) to the industrial user ( $>10\text{k}\text{\$}$ )

**Business estimation: SLA printers, especially DLP types, are well known, selling on average for  $>1\text{k}\text{\$}$  for 1L of build size. The Genius Printers Daylight Series could offer consumer printers that are easy to produce and upscale, and use the same technology to enter the industrial market with properties that sell for much higher than  $10\text{k}\text{\$}$  today. This is why at least 3 different version of our daylight resin printers should sell several 1000 times at prices of ca  $1\text{k}\text{\$}$  - $10\text{k}\text{\$}$  with production cost of ca  $0.2\text{k}\text{\$}$ - $1\text{k}\text{\$}$ , leaving a gain of well over 10million $\text{\$}$ .**

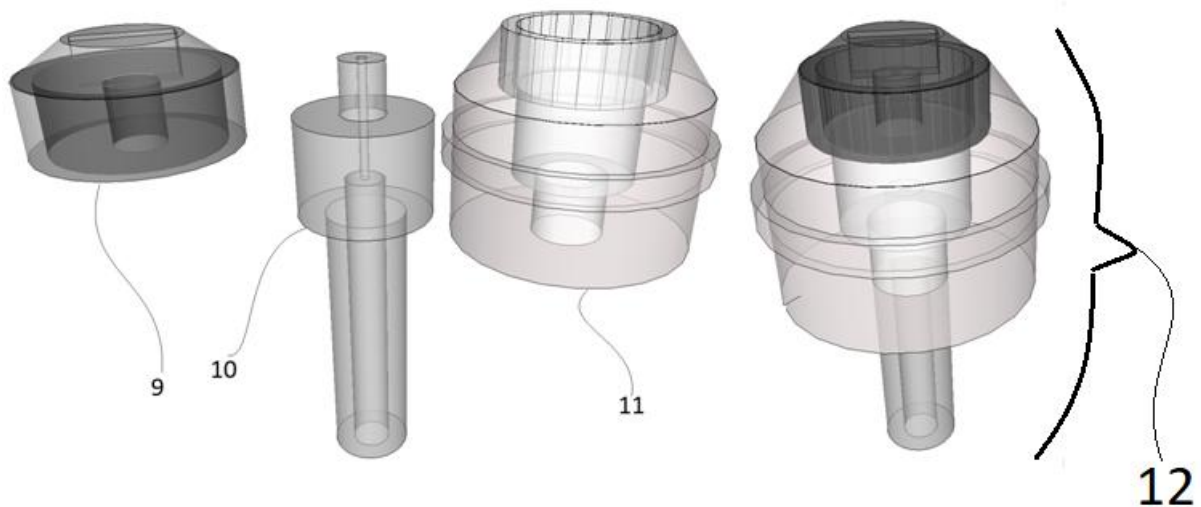
## FDM: 6 filament nozzle

Licensed Item: Licensed Item: A print technology that uses an FDM printhead. Load (filament pressure) control by tmc chips; Filament movement control by AMS hall sensor chips (blue circle) and knurled shaft held by ball bearing,

Stepper steps= $2.18\mu\text{m}$  filament movement, ams detection= $1.15\mu\text{m}$ , so nearly 2 bits per stepper step. Print length ca  $19\times 2.18\mu\text{m}$ = ca  $41\mu\text{m}$  resolution for filament mix (ca 25 steps=1 printed mm), theoretical filament pushing force $>4\text{kg}$ ! ( $88\text{mNm}$  stepper pull-in torque on a dia 4mm extruder wheel), interlocking extruder wheels (orange circles) biting into the filament

**Business estimation: FDM printers are well known, selling on average for  $0.3\text{-}3\text{k}\text{\$}$ . This is why our special printhead should sell  $> 100000$  times at prices of ca  $0.2\text{k}\text{\$}$  with production cost of ca  $0.05\text{k}\text{\$}$ , leaving a gain of well over 10million $\text{\$}$ .**

## FDM: Variable print width nozzle

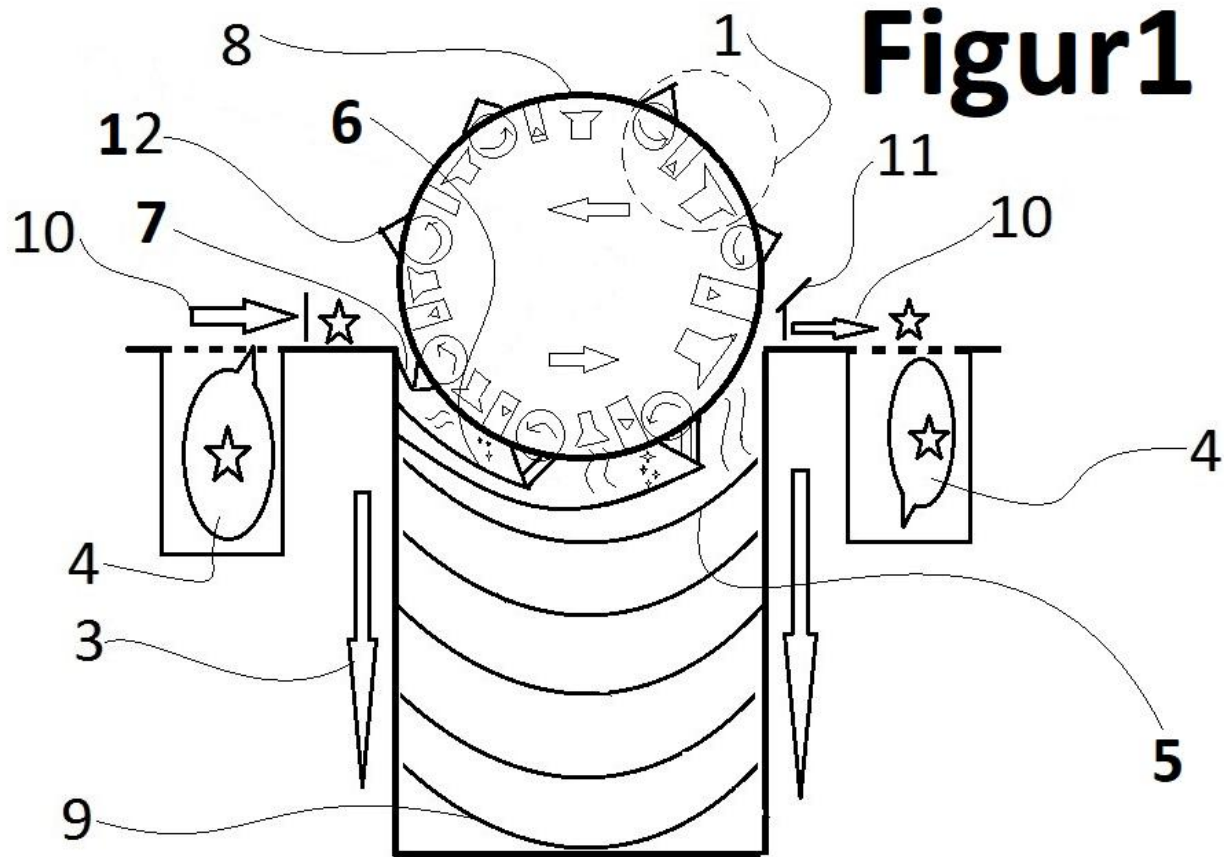


Licensed Item: The variable nozzle derives from the Gel printer and its method can also be applied to FDM printers, enabling much faster prints  
Number on file at DPMA, German Patent Office: DE102017012061

**Business estimation:** FDM printers are well known, the nozzle can easily be implemented into every modern FDM printer by the manufacturer, this is why our special nozzle should sell several 150000 times at prices of ca 0.1k\$ -with production cost of ca 0.02k\$, leaving a gain of ca 10million\$.

## HSS: Drum printer





Licensed Item: The HSS drum printer is the fastest powder printer  
Number on file at DPMA, German Patent Office: 102018

**Business estimation: HP's Fusion is the current reference machine. With a printing speed of > 1 layer/sec this model should sell several 10000 times at prices of ca 100k\$ with production cost of ca 20k\$, leaving a gain of well over 100million\$.**

# Business Plan-FAQ (incl. Terms and Financial Plans):

## 3D printing with Genius Printers

In the beginning of the offer-evaluation everybody has very similar thoughts and thus similar questions, trying to find out if this investment is an interesting one for him/her. This is why we insert a FAQ section giving you our answers, perspectives and vision.

Q: Why do you think the world needs these printer technologies? There are many others already on the market. What makes them different? Isn't there already enough technology out there?

A: The Genius Printers series uses patent pending technologies that –as we believe- are superior to what the market offers today. Everybody only shows the nice printed parts –and doesn't tell you how many tries it needed to arrive there. Because 3d printing is difficult. There are many reasons for this simple truth. One is, the filament doesn't stick to the platform on FDMs, or the object cracks, or the filament shows tiny threads. Or the nozzle is clogged. The temperature might vary, or dozens of other issues spoil your print. Besides that an FDM print will hardly reach SLA quality.

But SLA also has its specific problems: The object doesn't stick to the platform, mirrors get dirty, calibration issues, lasers or other light sources lose power, the vat changes its properties, so the light energy varies –and the print will fail eventually. DLP cant grow the build size without bad resolution or multiple or moving expensive DLP chips.

SLS isn't much better: Most powders don't work with the one and only setting you found ideal for your machine, doing fine only for the powder you currently sinter. Color, apart from HP's Fusion: no chance. Material mixing: Will hardly work. And prints take a long time, increasing build cost, retarding market penetration.

House printing is still in its infancy, showing huge machines, singularity issues and unflexible cage designs destroying the design freedom 3D printing should be good for in the first place.

And nobody uses functional plastic having the same properties as injection moulded granulate.

Machine maintenance is complicated, object handling and post processing too –and of course the whole process still is too expensive.

So there are the main problems: Cost of machine (and maintenance) and consumables, build time, material properties and color, paired with longevity and accuracy issues.

The Genius Printers Development Team has identified all these problems and found a solution for nearly every possible incident. But there wont be one Swiss army knife-like printer. Instead we created many different technologies to overcome current restrictions.

Q: Why one more 3D printer producer? What is the special feature of your printers / print methods?

A:

1. Because there is no robot arm on a moving platform on the market.
2. Because there is no flexible nozzle on the market.
3. Because there is no drum printer on the market, neither for resin nor for powder.
4. Because there is no SLS printer ten times faster than HP's Fusion on the market.
5. Because there is no competitor for HP's Fusion (multicolor/material) on the market.

6. Because there is no cheap big printer (<1000\$ for 10L build volume) with high resolution on the market, not even with a low resolution.
7. Because there is no functional granulate-processing printer on the market.

The Genius printer team thinks that every printing technology presented has a chance on the market. The printers allow for creating objects that cannot be produced with today's machines, or at least not for the same price or within the same build time. **Every machine is an improvement within its market segment.**

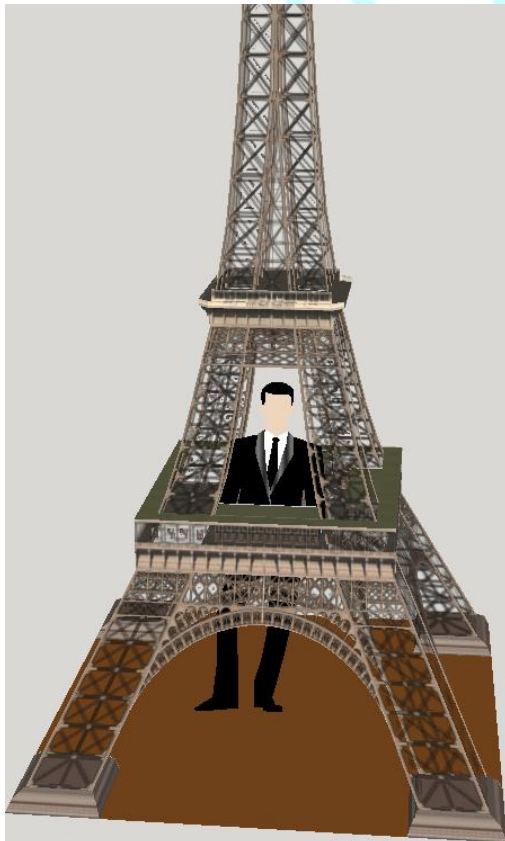
Q: How do you sell?

A: License deal or own production, both ways may be interesting, depending on resources in each technology (also material science), and production capacities including maintenance and repair teams and sales outposts. Every success starts with working prototypes. This is where Genius Printers will set the focus. During every small series production we will get a feeling of what it takes to scale up production, and if it could be outsourced to ie China. For the moment China already plays an important role for our samples production, and mass production wouldn't be a big step for most parts.

Q: What is your strategy?

A: Our focus is on manufacturing high-quality 3D printers that are both cost effective and fast printing, and are targeted towards the educational, home and mostly the professional markets.

The GP-series will be optimized for use with our material initially and will enable the users to produce accurate, low-cost prototypes quickly. The Company's near/mid-term goal is to produce a varying range of 3D printers that will be able to utilize a variety of materials. It is our belief that our first generation of 3D printers, the GP Gel1, will give the industrial user an affordable introduction to the latest in 3D printing technology for XXL volume never seen before as mass produced commercial machines.



Imagine the Eiffel Tower in scale 1:50, a 6m high structure done in 2 parts to be transportable by a lorry. Remember all these boring exhibition stands? On our stand we will serve the astounding visitor from inside our tower.

After the successful production of the Gel1, it is our intent to distribute on the European market initially with an established goal of optimizing our distribution strategy before further investments are made in additional facilities. The Company currently does not have an industrial site. Once an infrastructure is established for returns, support and R&D, and we have established ourselves effectively in the EU market, we plan to replicate our strategy in the U.S. market.

The further production of the Gel1 will be conducted in China. Once a proven distribution infrastructure has been established in the EU market, we will seek entry into the most interesting other western markets.

It is one of our objectives to develop a more cost-effective solution for every printing technology, which we feel is a weakness within the 3D printing industry.

It is our belief that the current systems are cost-prohibitive for many industries, educational markets and the professional user. Machines that are professional-grade are usually shared between many different users. It is our objective to develop a 3D printer system that has more or at least the same capabilities as the current high-end systems but with a price tag that makes it more cost effective for users so they are able to purchase a system for use within the own educational and professional environments. Our printers will be targeted towards the professional, home and educational markets. We believe that professional and educational environments are already familiar with the 3D model creation and have the proficiency that will enable them to use our printer technology. It is our intent to attract these market areas by placing emphasis on our reliable engineering, design and the straight-forward usability of our printers.

Our strategy is for early establishment into the 3D printing market as a brand that is known for high quality manufacturing and products. Furthermore, we plan to target the home user market in 2019 with a 3D printer model that can be mass produced while at the same time meeting the consumers' expectations and needs (daylight resin 4k/8k printer).

Every technology we offer has its specific market, in the following section we will discuss the only consumer-product we plan, the Genius Printers Daylight Resin printer, ranging from volumes of 10L 4k resolution (30x20x17cm; 75µm x 75µm x 75µm per voxel) for consumers to over 100L 8k resolution (60x30x56cm; 75µm x 75µm x 75µm per voxel) for the industry.

**Our competitive advantages for the daylight resin printer will include:**

- A system that is designed with an emphasis on scalable manufacturing by utilizing a design that incorporates mostly injection molded components,
- A innovative design that sets our product apart from our competitors,
- Early targeting of reliable and affordable systems designed for our manufacturing model,
- Delivering a consistent, reliable product quickly in worldwide markets,
- Achieving greater reliability for our consumers by delivering a simplified product that is void of untested components,
- Early targeting of markets that are unsaturated between the low end, \$1,000 (10L version), and higher ends, \$10,000 (100L),
- Providing the consumer with an alternative to high-cost professional machines that still provide the essential commercial features, however, arrives in a manageable, user friendly and effective package,
- The ability to meet high-volume orders much faster than our competitors due to the system's simplicity. ONO is well profitable at 99\$, the larger versions wont cost much more on the material side, and the **GeniusPrinters team has already quite a lot experience with peeling mechanisms using excenter motors and linear motors** a huge advantage over the ONO Team that cant use the peeling patent that is licensed to GeniusPrinters.

**Products:**

Our personal 3D daylight resin printer is our low end/mid-range model for the educational, professional and consumer markets. Genius Printers will also feature professional grade design features that will maintain an affordable price:

- Professional Grade Multi-jetting Device – a new commercial-grade 3D printer that utilizes MEMS technology to enable the mass production of cost effective plastic parts. The machine will be designed for advanced commercial and workshop use and will take the form of a white goods appliance, from a tiny washing machine to a very large refrigerator.
- Packaged resin/powder Supplies – Our printers will utilize cartridges. The cartridges will be moisture sealed, may include sensors and may include moving components.

- Web-Based Printable 3D Model Repository – We will maintain an online database that will contain high quality 3D printable files. The determination if the file will be free or at cost has not been made at this time.
- Cartridge Loading System – A method used for simplifying or automating the material replenishment process found within a 3D printer where moving parts that are either inside of the 3D printer or the cartridge itself are activated when a microchip, such as an erasable programmable read only memory chip, recognizes the need for the process.
- SLS/SLA (drum)-technologies as have been shown, as well as granulate and gel processing, where machine design has been partly started, but for confidentiality reasons we cant show the machines here.

**Advantages of Genius Printers:**

- High quality components.
- High quality injection molded case.
- Optimized for low cost, fast models.
- Potentially safer for educational environments due to mostly non-toxic material residue and restricted access to moving parts that could cause injury.
- Customers can quickly receive replacement systems with our optimized returns infrastructure.

**Disadvantages of Genius Printers:**

- Unknown brand name.
- Lack of compatibility with FDM printers.
- Modifications cannot be easily made to the machine without voiding the warranty.

**Revenues and Customers:**

Our plan is to sell and market our products under the “Genius Printers” brand in the educational, home and professional markets.

Opportunities in this market include:

- A high and under-specified industry growth rate.
- A low penetration of low cost professional market.
- A wider scope for marketing exists due to greater applications within the creative industry.

Our plan for our sales strategy is to focus on an approach that is directed towards meeting a wide range of customer needs by providing 3D content-to-print that will include: traditional prototyping, print-on-demand services, 3D printing and rapid manufacturing. Revenue will be generated through the following avenues:

- Sales and lease of printers and printing materials through our website.
- Extended support plans.
- Distribution through authorized re-sellers.
- Eventual sales of re-furbished Genius Printers 3D printers.
- Extended warranties.
- Business-to-business sales to creative business and educational institutions.

Our initial sales focus will be in the U.S. and Europe markets with our initial target base consisting of:

Home Users:

- Hobbyist
- General
- Home studio
- Home workshop
- Home office

Creative Customers:

- Jewelers
- Fashion
- Product designers
- Industrially designed houses
- Artist
- Furniture design
- Metal working
- Cast making

Professional Customers:

- Prosthetics
- Engineering
- Advertising
- Architectural practices
- General practices
- Doctors
- Marketing
- Dental Practices

Educational Customers

- PHD/Research
- Middle/High school
- Pre-school/nursery
- Higher education/undergraduate

**Intellectual Property**

Part of our success will depend on our ability to protect our core technology and our intellectual property. We will rely upon a combination of patents, trademarks, trade secrets that will include “know-how”, copyrights, confidentiality procedures, and patent applications, employ disclosure, non-disclosure agreements with third parties and other contractual rights to establish and protect our proprietary rights. We plan to file patents on our common law trademarks and hardware designs once we have received adequate funding.

**Manufacturing**

The Genius Printers personal 3D printer will most probably be manufactured through a third-party. As of now, there are no plans for Genius Printers on-site mass-manufacturing in the EU –apart of prototypes. The relationships we establish with specialist engineering firms will determine how successful the manufacture of our Genius Printers will be. One or more relationships with these manufacturers may be required in order to manufacture and deliver our parts. Our current design for the gel printer utilizes machined parts, steel formed parts and injection molding. There are some elements to our printer that will need to be injection molded, most notably is the head’s outer shell which will require a high level of finishing. Other internal components that will require injection molding will be less costly to manufacture since they will not require a high level of finish.

**Distribution and Marketing**

Distribution

From our first distribution facility, located near Nice, France, we intend to distribute fully assembled machines, which will be tested prior to shipment, directly to our customers and distribution partners, with sales mostly deriving from exhibition-presentations. Once a predetermined sales benchmark has been reached, we will plan to employ a direct sales organization that will include sales people operating in various locations of the world who will establish relationships with existing and potential customers. It is our belief that a direct sale relationship with customers is a necessary building block

for the success of our Company. We will establish a strong collective aspect to the relationship we have with our customers by emphasizing, and expanding on, our lines of communication with them. It is our goal to achieve this, in part, through an emphasis on direct sales.

We are also planning on using authorized dealers, distributors and sales agents to supplement our product sales in locations where our direct sales staff does not operate. Additionally, we plan on distributing our products from retail locations in the near future. However, the location has not been confirmed at this time.

#### Marketing

We believe that trade show attendance will allow us to showcase our products and will provide the initial momentum for building interest in our brand in the market place. We also plan on establishing a presence at key design and creative-based events.

We are also planning on lending a specific number of our printers to strategic media outlets, namely those who focus on emerging new technologies.

We will also produce a series of video advertisements to post onto the Youtube channel for our company. These professionally produced advertisements will provide insight to our customers on who we are and the values our company holds.

#### Industry

According to the ATSM T42 committee, “3D Printing” is defined as the fabrication of objects through the disposition of material using a nozzle, print head, or other printer technology. However, this term is used synonymously with additive manufacturing. Particularly, it is related with machines that provide lower overall function capabilities, lower price, or both.

#### 3D Printer Applications

By using a special class of machine technology, 3D printers allow users to create a physical modeling of a design. These types of systems use data created in CAD, CT and MRI scans, or 3D digitized data to produce models using an additive approach. Many companies use 3D printing models to test their products, accelerate product development and improve time to market. This has led to users providing reports of quick pay-back times since they have accelerated their product development and reduced design flaws by utilizing extensive design testing and verification.

The types of end users and organizations that use 3D printers is varied. Current applications and markets include:

- Tooling
- Prototyping
- Architecture
- Metal casting
- Dental
- Direct part production
- Medical

Included in the medical applications, prototyping is currently being used to create accurate models of bones, internal organs and skulls for providing accurate pre-operative evaluations and for designing prostheses.

#### Personal 3D Printers

Over recent years, the market for personal 3D printers has been expanding. We believe that there are more than 100 companies and teams developing personal 3D printer across the globe. Through this expansion, machine reliability and print quality has considerably increased and many new printers on the FDM market are equipped with dual extruders, heated build platforms and automatic jam detection. In spite of this expansion however, we believe that little innovation, beyond basic improvements, has occurred. Mr. Ulrich’s 6 filament FDM printhead will be a big improvement for color and multi-material printing. Most SLA/FDM printers are using outdated reference design of 3D systems and improving upon it.

The manufacturing of a 3D printer is a difficult and complex process. Many startups have not given adequate attention to the importance of the design of their machines for manufacturing purposes. This is one of the key reasons why little innovation has been seen in recent years in the 3D FDM printer industry.

Consumers are expecting a 3D printer that is as reliable as that of most consumer electronics. However, it is our belief that most vendors overstate the reliability of their machines and their ease of use, while at the same time, downplaying the technical issues their product possess.





### Market Challenges

- Hobbyist may be looking for cheaper models, placing quality lower on their list of priorities.
- Customers could purchase a printer that is closer to their area; U.S. customers could receive a printer faster from locally based competitors.
- The high price point may make one-off items more cost effective through a printing service.
- Print shops like Shapeways parts are generating a higher quality of print.
- Low priced machines will saturate the market.
- The marketplace will be congested for the next few years.

### Competition

With the 3D printing industry being new, the market is currently overflowing with a large amount of competitors entering into it. During this turbulent time in the market, competitor, supplier and customer relationships are constantly being redefined and create the need for competitive forces to be reassessed on a regular basis.

The greatest competition to us is other AM companies that are entering into the personal and to a lesser extend professional 3D printer marketplace. These companies hold patents that could possibly cause the most disruption to the 3D printing industry. Due to the high barriers involved with the “professional” market, competitor companies for home printing, especially of Chinese provenance, are typically concerned with selling machines that hold little brand equity with a community that is driven by the “home” market. The acquisition of Makerbot by Stratasys demonstrates the value of having such a brand within this market: Stratasys (afawk) wrote off the whole investment. Makerbot is positioned to enter the low-end professional market because of its high price point and brand recognition that has been obtained by being one of the first manufactures to develop consumer-level 3D printers. Ford Motors installed a Makerbot Replicator 2 on the desk of every engineer. Still Makerbot-staff has been laid off significantly. The daylight printer would be a huge competitor, offering much better print quality for half the price with nearly double the build volume (10L for our smallest version compared to 5.7L for their Rep2+, 1000\$ compared to over 2500\$ for their 2+ version).

### Regulations by Governments

We must obtain CE marking in order to sell our products with the European Economic Area. This marking is used to establish that we abide by requirements that have been established by applicable EU directives and indicates our compliance with EU legislation of a product. This marking represents our conformity with EU directives legal requirements that may apply to our products. Our products will abide by the principles of the Low Voltage Directive, a safety regulation that establishes that a product may be used safely in EU countries. In addition to the CE marking, we plan to gain a Federal Communication Commission marking for our 3D printer. This marking indicates that our printers’ electromagnetic interference is under the approved limits set by the FCC. It is mandatory for all electronic products that are sold in the U.S. to have this marking, as prescribed by Part 15 of FCC regulation.

We will also be subject to a variety of U.S. federal and state laws and regulations, as well as many foreign laws and regulations, that concern companies that conduct business on the internet. Many of these laws and regulations are still being developed and tested in court systems and could be interpreted in a manner that would be harmful to the Company’s’ business. These laws and regulations could potentially involve consumer protection, taxation, electronic contracts, protection of minor’s competition and online payment services.

In order to guide our business operations accordingly, we will be relying on legal and operational compliance programs and local counsel. At this time, we do not anticipate the cost of EU, U.S. and foreign law compliance as having a material financial impact on our financial or business condition or

our operations, but no guarantees are offered that new tariff and regulatory legislation will not have a negative effect on our future business operations.

#### Location of Production

It is our goal that a small series production of Genius Printers Gel printer be achieved in 2018 with a minimal sized team. Assembly operations will be conducted ie in France, and many components will be coming from China.

Until now, Mr. Ulrich has paid for all expenses with his own funds and has not charged GPUG. For further development, a team will be created ie in France with a support office and distribution operations established in the U.S. in 2019 or 2020.

Q: Sales: How many? Chances?

A: The market is fast growing, and there is a demand for the proposed technologies. Margins are still quite high (>50) for many companies, with consumables producing most gain. As our technologies need at least modified ingredients or compositions, we control the consumables business for our printers. A sales scenario is shown below, **not even considering consumables**. In general we believe we can have a share of at least 1-5% in a multi-billion\$ market with our new technologies.

Q: So what is your preferred prioritization for building prototypes and eventually selling printers?

A: The below show table marks all printers from prototype phase to TRL9 (technology readiness level) and every version of each technology from 2018 to 2023. Multi-table versions of SLA/SLS Drum printers are not shown as they will enter the market after 2023.



## Technology Readiness Levels

- TRL 0: Idea.** Unproven concept, no testing has been performed.
- TRL 1: Basic research.** Principles postulated and observed but no experimental proof available.
- TRL 2: Technology formulation.** Concept and application have been formulated.
- TRL 3: Applied research.** First laboratory tests completed; proof of concept.
- TRL 4: Small scale prototype** built in a laboratory environment ("ugly" prototype).
- TRL 5: Large scale prototype** tested in intended environment.
- TRL 6: Prototype system** tested in intended environment close to expected performance.
- TRL 7: Demonstration system** operating in operational environment at pre-commercial scale.
- TRL 8: First of a kind commercial system.** Manufacturing issues solved.
- TRL 9: Full commercial application,** technology available for consumers.

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year	type	version	trl	sales#	@\$/ machine	material cost/ machine	gain per position	man years that year that position at 50k/m-y	cash flow
2018	gelrobo	proto1+2	0-6	0	0	70000	-70000	2	-170000
2018	gelrobo	gel1	8	5	250000	50000	1000000	2	730000
2019	houserobo	proto 1+2	0-4	0	0	100000	-100000	2	530000
2019	gelrobo	gel1	9	10	250000	50000	2000000	3	2380000
2019	daylight resin	proto 10L	0-5	0	0	50000	-50000	2	2230000
2019	daylight resin	proto 30L	0-5	0	0	50000	-50000	1	2130000
2019	daylight resin	proto 100L	0-5	0	0	50000	-50000	1	2030000
2020	houserobo	house1	7	2	500000	150000	700000	2	2630000
2020	gelrobo	gel1	9	50	250000	50000	10000000	4	12430000
2020	daylight resin	dl10L	9	100	1000	300	70000	2	12400000
2020	daylight resin	dl30L	9	50	5000	700	215000	1	12565000
2020	daylight resin	dl100L	9	10	10000	1000	90000	1	12605000
2020	sls drum	proto slsd	0-3	0	0	100000	-100000	2	12405000
2021	houserobo	house1	9	10	500000	100000	4000000	4	16205000
2021	gelrobo	gel1	9	100	250000	50000	20000000	5	35955000
2021	daylight resin	dl10L	9	500	1000	300	350000	2	36205000
2021	daylight resin	dl30L	9	200	5000	700	860000	2	36965000
2021	daylight resin	dl100L	9	50	10000	1000	450000	1	37365000
2021	sls drum	slsd	4-7	10	100000	30000	700000	3	37915000
2021	sla drum	protoslslad	0-3	0	0	100000	-100000	3	37665000
2021	slslaserstamp	protoslslst	0-3	0	0	100000	-100000	2	37465000
2021	sls drumlaser	protoslslsl	0-3	0	0	100000	-100000	2	37265000
2021	granulate jet	protogranjet	0-3	0	0	200000	-200000	2	36965000
2022	houserobo	house1	9	50	500000	100000	20000000	5	56715000
2022	gelrobo	gel1	9	500	200000	50000	75000000	10	131215000
2022	daylight resin	dl10L	9	1000	1000	300	700000	3	131765000
2022	daylight resin	dl30L	9	200	5000	700	860000	2	132525000
2022	daylight resin	dl100L	9	50	10000	1000	450000	1	132925000
2022	sls drum	slsd	9	10	100000	30000	700000	2	133525000
2022	sla drum	protoslslad1-30L	4-7	2	50000	10000	80000	1	133555000
2022	slslaserstamp	protoslslst	4-7	2	100000	30000	140000	1	133645000
2022	sls drumlaser	protoslslsl1-30L	4-7	2	100000	30000	140000	1	133735000
2022	granulate jet	protogranjet	4-7	2	150000	30000	240000	1	133925000
2023	houserobo	house1	9	200	500000	100000	80000000	5	213675000
2023	gelrobo	gel1	9	1000	200000	50000	150000000	10	363175000
2023	daylight resin	dl10L	9	5000	1000	300	3500000	4	366475000
2023	daylight resin	dl30L	9	2000	5000	700	8600000	3	374925000
2023	daylight resin	dl100L	9	500	10000	1000	4500000	2	379325000
2023	sls drum	slsd	9	50	100000	30000	3500000	2	382725000
2023	sla drum	slad1-30L	9	50	50000	10000	2000000	2	384625000
2023	slslaserstamp	slslst	9	50	100000	30000	3500000	2	388025000
2023	sls drumlaser	slslsl1-30L	9	50	100000	30000	3500000	2	391425000
2023	granulate jet	granjet 30L	9	50	150000	30000	6000000	2	397325000

Q: What is your Financial Planning?

A: Schedule:

Building up the team:

0.-3. Month: 1 allrounder (Hardware)

3.-9. Month: 1 allrounder, 1 programmer, 1 sales, 1 support, 1 test/packing, 1 lab

after 9. Month: 1 allrounder, 1 programmer, 1 sales, 1 support, 1 test/packing, 1 lab, 1 designing.

The production team should grow from 7-10 in 2018 to 13-20 in 2019, 18-30 in 2020, 30-40 in 2021, 35-50 in 2022 and ca 40-100 in 2023.

**Capital requirements and financing plan in Euro:**

Capital requirement			
Investment	Start of year 1	End of year 1	
PCs, Periphery, Office Equipment	1,000	15,000	
Personnel (CEO&Team)	1,000	160,000	
Components	30,000	10,000	
Goods and materials storage	1,000	9,000	
Rent	0	0	
Launch, affiliate program	0	0	
Legal Advice Contracts / Policies	0	1,000	
<b>Sum Investments</b>	<b>33,000</b>	<b>195,000</b>	<b>228,000</b>
formation expenses			
	GPC/GPUG		
Founding	1,000	0	
Notary	2,000	0	
business registration	1,000	0	
<b>Sum formation expenses</b>	<b>4,000</b>	<b>0</b>	<b>4,000</b>
<b>Total capital needed year 1</b>	<b>37,000</b>	<b>95,000</b>	<b>232,000</b>
Financing			
Equity, VC, \$	50000	200000	
<b>Total financing minimum, \$</b>	<b>250,000</b>		

**The Goal:**

The target is to the lesser extent a margin optimization but more the achievement of gaining the largest possible market share. The high prices currently obtainable on the market enable a potential price decline by 50% without jeopardizing the company. The 3D printer market, however, would experience extreme demand at prices of about 100-1000 €/L object overall dimensions, a market share of 5% for all printers would be conceivable. With annual sales like shown in the forecast, Genius Printer's sales would take it to one of the leading 3D printer manufacturers in its class. This is the goal in order for the company to be listed on a stock exchange by end of 2022.

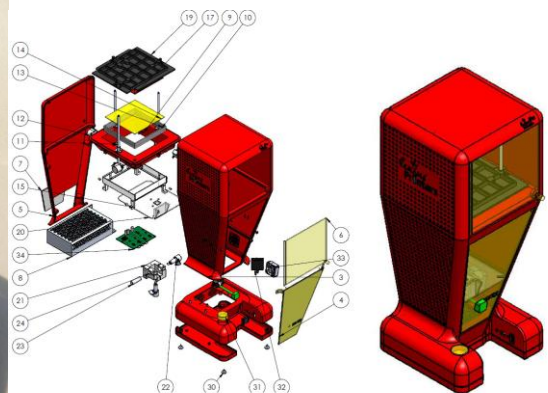
**Product development goals:**

The first generation of the gel printer might only work with one material/color. Early 2019 the next generation (multi color) as well as the daylight resin printer will follow. While the first daylight printer generation will have been designed exclusively for the consumer market, type 2 (30L) can already be of interest to business people, type 3 (100L) is certainly an office printer that can already be used for mass production.

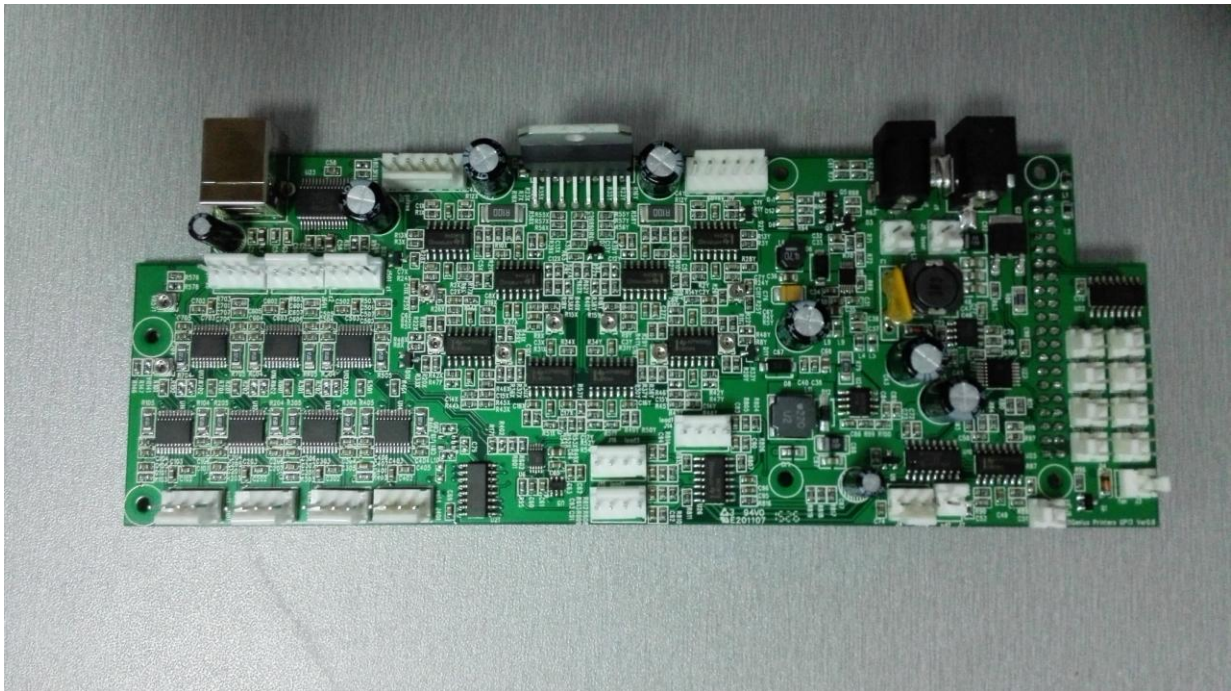
Why can GPC achieve the goal?

Behind GPC stands the former founder and managing director of News-Net Börseninformationssysteme GmbH, Freiburg. News-Net aggregated various high performance data feeds in real time from 1992-2004, and filtered, linked, sorted and visualized the processed data in various forms. The demanding requirements of the customers (banks and stock exchanges) with merciless understanding of service make GPC confident to meet the requirements for a successful business, pioneering the industry professionally and efficiently. The mastery of essential areas such as Lean Management, feature planning, team building and leadership, as well as presentation and representation has already been successfully demonstrated. News-Net's Exit was the business sale to a Handelsblatt subsidiary of the Holtzbrinck Group. The exit for stockholders of GPC is possible via share sale at the time of an IPO/listing at a marketplace. The GPC team has decades of market experience as a broker and trader, as well as in machine construction and team motivation, and constantly innovating the markets.

Many patents have been registered by Markus Ulrich, we are quite confident that many will follow and that we will prosper from Mr. Ulrich's insight into the 3D printing market and its ever diversifying technologies. Mr. Ulrich had already shown that he is capable of inventing and writing about new technologies, that he can design and build machines. As example for his capability, his SLA machine is shown here:

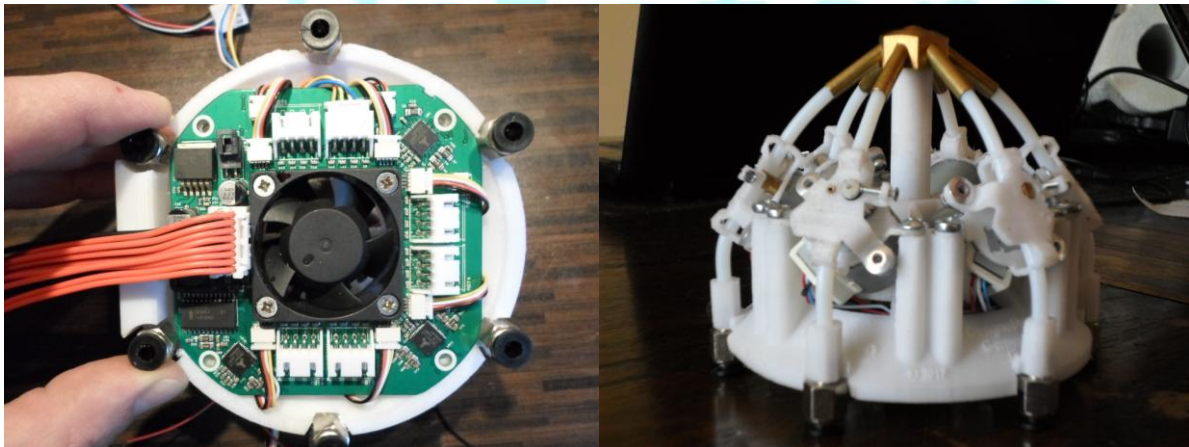


It is a triangulated platform cooperating auto-leveled with a quadrangulated vat using Mr. Ulrich's unique peeling technology deriving from patent DE102014114333.



Genius

Another example showing this inventor's capacities is a 6filament FDM print-head that is not yet on the market:



This printhead is load driven contrary to today's time managed prints. This new way allows for faster printing. Filament movement is monitored in 6.5µm steps, loads control temperatures, overloads are detected and handled automatically. Real color mixing CMY or RGB in combination with black, white and support material- or the use of up to 6 different materials in one print- will offer a new world to the FDM printing market. This is why we are convinced that Mr. Ulrich's further patents will be convertible into real machines with features unreached by today's industry.

Chances of GPC's success, is there still space for a newcomer?

Genius Printers Corporation is convinced that if the concept is right, it can outperform and overrun the existing competitors within a few years.

Q: What are your Terms?

A: Terms of Service/Privacy Policy:

Effective Date – January, 2018

## Overview

This ecommerce website is operated by GeniusPrinters. Throughout the site, the terms “we”, “us” and “our” refer to GeniusPrinters. The terms “you” and “your” refer to you, the person or entity using the site and purchasing any Service or product. GeniusPrinters offers this website, including all information, products, tools and services available from this site to you, the user, conditioned upon your acceptance of all terms, conditions, policies and notices stated here.

By purchasing something from us, you engage in our “Service” and agree to be bound by the following terms and conditions (“Terms of Service”, “Terms”), including those additional terms and conditions and policies referenced herein and/or available by hyperlink., including without limitation our Privacy Policy, our Return Policy, and our Website Terms of Use. These Terms of Service apply to all users of the site, including without limitation users who are browsers, vendors, customers, merchants, and/or contributors of content.

Please read these Terms of Service carefully before accessing or using our website. By accessing or using any part of the site, you agree to be bound by these Terms of Service. If you do not agree to all the terms and conditions of this agreement, then you may not access the website or use any services. If these Terms of Service are considered an offer, acceptance is expressly limited to these Terms of Service.

Any new products, features or tools which are added to the current store shall also be subject to these Terms of Service. You can review the most current version of the Terms of Service at any time on this page. We reserve the right to update, change or replace any part of these Terms of Service by posting updates and/or changes to our website. It is your responsibility to check this page periodically for changes. Your continued use of or access to the website following the posting of any changes constitutes acceptance of those changes.

## Online Store Terms

By agreeing to these Terms of Service, you represent that you are at least the age of majority in your state or province of residence, or that you are the age of majority in your state or province of residence and you have given us your consent to allow any of your minor dependents to use this site.

You may not use our products for any illegal or unauthorized purpose nor may you, in the use of the Service, violate any laws in your jurisdiction (including but not limited to copyright laws).

You must not transmit any worms or viruses or any code of a destructive nature.

A breach or violation of any of the Terms will result in an immediate termination of your account and/or access to the site.

## General Conditions

We reserve the right to refuse service to anyone for any reason at any time.

You understand that your content (not including credit card information), may be transferred unencrypted and involve (a) transmissions over various networks; and (b) changes to conform and adapt to technical requirements of connecting networks or devices. Credit card information is always encrypted during transfer over networks.

You agree not to reproduce, duplicate, copy, sell, resell or exploit any portion of the Service, use of the Service, or access to the Service or any contact on the website through which the service is provided, without express written permission by us.

The headings used in this agreement are included for convenience only and will not limit or otherwise affect these Terms of Service.

#### Accuracy, Completeness and Timeliness of Information

We are not responsible if information made available on this site is not accurate, complete or current. The material on this site is provided for general information only and should not be relied upon or used as the sole basis for making decisions without consulting primary, more accurate, more complete or more timely sources of information. Any reliance on the material on this site is at your own risk.

This site may contain certain historical information. Historical information, necessarily, is not current and is provided for your reference only. We reserve the right to modify the contents of this site at any time, but we have no obligation to update any information on our site. You agree that it is your responsibility to monitor changes to our site.

#### Modifications to the Service and Prices

Prices for our products are subject to change without notice.

We reserve the right to modify or discontinue the Service (or any part or content thereof) or any product without notice at any time.

We shall not be liable to you or to any third-party for any modification, price change, suspension or discontinuance of the Service.

#### Products or Services (if applicable)

We have made much effort to display as accurately as possible the colors and images of our products that appear at the store. We cannot guarantee that your computer monitor's display of any color will be accurate.

We reserve the right, but are not obligated, to limit the sales of our products or Service to any person, geographic region or jurisdiction. We may exercise this right on a case-by-case basis. We reserve the right to limit the quantities of any products or Services that we offer. All descriptions of products or product pricing are subject to change at any time without notice, at our sole discretion. We reserve the right to discontinue any product at any time. Any offer for any product or service made on this site is void where prohibited.

#### Accuracy of Billing and Account Information

We reserve the right to refuse any order you place with us. We may, in our sole discretion, limit or cancel quantities purchased per person, per household or per order. These restrictions may include orders placed by or under the same customer account, the same credit card, and/or orders that use



the same billing and/or shipping address. In the event that we make a change to or cancel an order, we may attempt to notify you by contacting the e-mail and/or billing address/phone number provided at the time the order was made. We reserve the right to limit or prohibit orders that, in our sole judgment, appear to be placed by dealers, resellers or distributors.

You agree to provide current, complete and accurate purchase and account information for all purchases made at our store. You agree to promptly update your account and other information, including your email address and credit card numbers and expiration dates, so that we can complete your transactions and contact you as needed.

#### Optional Tools

We may provide you with access to third-party tools which we neither monitor nor have any control over. You acknowledge and agree that we provide access to such tools "as is" and "as available" without any warranties, representations or conditions of any kind and without any endorsement. We shall have no liability whatsoever arising from or relating to your use of optional third-party tools. Any use by you of optional tools offered through the site is entirely at your own risk and discretion and you should ensure that you are familiar with and approve of the terms on which tools are provided by the relevant third-party provider(s).

#### Third-Party Links

Certain content, products and services available via our Service may include materials from third-parties.

Third-party links on this site may direct you to third-party websites that are not affiliated with us. We are not responsible for examining or evaluating the content or accuracy and we do not warrant and will not have any liability or responsibility for any third-party materials or websites, or for any other materials, products, or services of third-parties.

We are not liable for any harm or damages related to the purchase or use of goods, services, resources, content, or any other transactions made in connection with any third-party websites. Please review carefully the third-party's policies and practices and make sure you understand them before you engage in any transaction. Complaints, claims, concerns, or questions regarding third-party products should be directed to the third-party.

#### User Comments, Feedback and Other Submissions

If, at our request, you send certain specific submissions (for example contest entries) or without a request from us you send creative ideas, suggestions, proposals, plans, or other materials, whether online, by email, by postal mail, or otherwise (collectively, 'comments'), you agree that we may, at any time, without restriction, edit, copy, publish, distribute, translate and otherwise use in any medium any comments that you forward to us. We are and shall be under no obligation (1) to maintain any comments in confidence; (2) to pay compensation for any comments; or (3) to respond to any comments.

We may, but have no obligation to, monitor, edit or remove content that we determine in our sole discretion are unlawful, offensive, threatening, libelous, defamatory, pornographic, obscene or otherwise objectionable or violates any party's intellectual property rights or these Terms of Service.

You agree that your comments will not violate any right of any third-party, including copyright, trademark, privacy, personality or other personal or proprietary right. You further agree that your

comments will not contain libelous or otherwise unlawful, abusive or obscene material, or contain any computer virus or other malware that could in any way affect the operation of the Service or any related website. You may not use a false e-mail address, pretend to be someone other than yourself, or otherwise mislead us or third-parties as to the origin of any comments. You are solely responsible for any comments you make and their accuracy. We take no responsibility and assume no liability for any comments posted by you or any third-party.

#### Personal Information

Your submission of personal information through the store is governed by our Privacy Policy.

#### Errors, Inaccuracies and Omissions

Occasionally there may be information on our site or in the Service that contains typographical errors, inaccuracies or omissions that may relate to product descriptions, pricing, promotions, offers, product shipping charges, transit times and availability. We reserve the right to correct any errors, inaccuracies or omissions, and to change or update information or cancel orders if any information in the Service or on any related website is inaccurate at any time without prior notice (including after you have submitted your order).

We undertake no obligation to update, amend or clarify information in the Service or on any related website, including without limitation, pricing information, except as required by law. No specified update or refresh date applied in the Service or on any related website, should be taken to indicate that all information in the Service or on any related website has been modified or updated.

#### Prohibited Uses

In addition to other prohibitions as set forth in the Terms of Service, you are prohibited from using the site, its content, or any product you purchase from GeniusPrinters: (a) for any unlawful purpose; (b) to solicit others to perform or participate in any unlawful acts; (c) to violate any international, federal, provincial or state regulations, rules, laws, or local ordinances; (d) to infringe upon or violate our intellectual property rights or the intellectual property rights of others, including without limitation copyright and similar intellectual property rights; (e) to harass, abuse, insult, harm, defame, slander, disparage, intimidate, or discriminate based on gender, sexual orientation, religion, ethnicity, race, age, national origin, or disability; (f) to submit false or misleading information; (g) to upload or transmit viruses or any other type of malicious code that will or may be used in any way that will affect the functionality or operation of the Service or of any related website, other websites, or the Internet; (h) to collect or track the personal information of others; (i) to spam, phish, pharm, pretext, spider, crawl, or scrape; (j) for any obscene or immoral purpose; or (k) to interfere with or circumvent the security features of the Service or any related website, other websites, or the Internet. We reserve the right to terminate your use of the Service or any related website for violating any of the prohibited uses.

#### Software License

##### GeniusPrinters User Agreement

This is a legally binding agreement between you and GeniusPrinters. If you want to use GeniusPrinters hardware or software, you must agree to these Terms of Service. Please read this summary, and the full terms below, carefully. By clicking on the "I Agree" button in the software, you acknowledge that you have read, understood, and agree to these terms. Don't click on this button unless you are using

GeniusPrinters' software and hardware personally or have the authority to enter into an agreement for your company.

From time to time, GeniusPrinters may change or amend these terms. If we do, we will notify you, either through the user interface, in an email notification, or in some other reasonable way. If you keep using the software or hardware after the change becomes effective, you are agreeing to the changed terms.

The agreement between you and GeniusPrinters described in this document starts when you purchase, download, or install any GeniusPrinters hardware or software and it lasts until GeniusPrinters provides you with notice that you are in breach of any of the terms. If GeniusPrinters terminates the agreement, you must delete any GeniusPrinters software—but some of the terms of the agreement, such as the limitation on warranties, will remain in effect.

We provide GeniusPrinters software exclusively for use with authorized GeniusPrinters hardware. Use of GeniusPrinters software with third-party hardware is not allowed under this agreement or supported by GeniusPrinters. We have the right under this agreement to gather automated reports of such unlicensed usage and to use technological measures to prevent the use of GeniusPrinters software with unauthorized devices.

If we ever have a disagreement arising out of or relating to this agreement or any alleged breach, it will be resolved by arbitration administered by the American Arbitration Association under its Commercial Arbitration Rules, and judgment on the award rendered by the arbitrator[s] may be entered in any court having jurisdiction thereof. If any part of this agreement is found to be contrary to law, then that provision will be construed as nearly as possible to reflect the intention of the parties, with the other parts of the agreement remaining unchanged.

GeniusPrinters believes its products work as intended, but you should not use any GeniusPrinters hardware or software in any situations where health or safety might be at risk. In addition, GeniusPrinters makes no representations regarding the fitness of GeniusPrinters' hardware or software for the design or construction of parts or components that may be subject to additional regulation in your jurisdiction, such as toys, weapons, or medical devices. In particular, GeniusPrinters does not sell any product or service intended or approved for use in the diagnosis of disease or other conditions, or in the cure, mitigation, treatment, or prevention of disease, in man or animals. In no event shall GeniusPrinters be liable for any death or bodily injury that you suffer, or that you cause to any third party, in connection with your use of GeniusPrinters products for such purposes. In addition, GeniusPrinters products should not be used by untrained or underage users. GeniusPrinters disclaims any express or implied warranty of fitness for such usage.

During installation, GeniusPrinters software demands from you to opt in to the collection of diagnostic information regarding your use of GeniusPrinters' software or hardware in order to help our engineers improve GeniusPrinters' products. You agree that GeniusPrinters may collect, maintain, and use information about the operation of GeniusPrinters' hardware and software, such as hardware serial numbers, print and galvanize times, laser and plate power levels, and 3D model sizes. No models, 3D geometry, or personal information will be collected without your additional and explicit consent.

#### GeniusPrinters Software

GeniusPrinters software is licensed, not sold. That means that GeniusPrinters owns all of the rights in the software it is allowing you to use, except for components such as open source libraries that have their own licenses and rules. By allowing you to use it, it does not mean we are transferring ownership to you. You may not break our software down to analyze it, modify it, use it with non-GeniusPrinters products, or redistribute it without our consent. You may not rent, lease, or copy the software to

others. You may not use our software with non-GeniusPrinters hardware. In short, you agree to respect any and all copyrights and patents that apply to the software.

Software distributed by GeniusPrinters is not covered under the limited hardware warranty. GeniusPrinters software is provided to you on an “as-is” basis. That means that GeniusPrinters and its suppliers disclaim all express, implied, or statutory warranties for any licensed software, including merchantability, fitness for a particular purpose, title, and non-infringement. If applicable law requires any warranties for the licensed software, any such warranty is limited to 90 days from the date of purchase, download, or installation—whichever is earliest.

If you have questions regarding this agreement, or wish to obtain additional information, please send an e-mail to our support department through our contact page.

### Return Policy

GeniusPrinters accepts returns for refunds or exchanges, subject to the following:

#### 30 Days

You can return purchased items to GeniusPrinters within 30 days of the date they were shipped to you. After 30 days, we do not accept returns. See our Warranty Policy for warranty service and procedures.

#### Return to Manufacturer Authorization

Before returning an item, contact us at [support@GeniusPrinters.com](mailto:support@GeniusPrinters.com), to explain the reason for the return, the details of your original order, and whether you want a refund or an exchange. As appropriate, we will issue you an RMA number, which you need to include in the package for the returned item, along with a copy of the original order information. We do not accept returned items for which an RMA has not been issued.

#### Condition

The item must be unused, undamaged, complete with all parts and accessories, in the same condition you received it, and in its original packaging. Consumables, such as resin and resin tanks, will not be accepted if packaging is opened.

#### Shipping

Pack the item according to our instructions to prevent damage in transit. In case of a return for repair covered by our 90 day warranty within our shipping zones, GeniusPrinters will cover the cost of shipping. For other returns, insure the package for its value, as you will be responsible for damage in transit. Use a shipping service that allows you to track the package. You are responsible for paying all shipping and insurance costs for the return shipment. If you are seeking an exchange, you will also be responsible for all costs of shipping the new item to you.

#### Extraterritorial Returns

GeniusPrinters is not responsible for any return shipping costs and any incidental fees or tariffs outside of our warranty and shipping zones indicated on our shipping page. You should familiarize yourself with your region’s customs policies and shipping providers.

### Upon Receipt

Once your return is received and inspected, we will send you an email to notify you that we have received your returned item and whether your request for refund or exchange has been approved. We may charge a fee for missing or used accessories.

### Restocking Fee

For non-defective items, GeniusPrinters charges a restocking fee equal to 10% of the original purchase price of each item returned. This fee will be deducted from your refund, or if you have requested an exchange, the fee will need to be received by GeniusPrinters before the new item is shipped.

### Refund

If a refund is approved, a credit will automatically be applied to your credit card or original method of payment. This refund amount may take some time to show in your records, so before contacting GeniusPrinters, please check with your credit card company, bank, or other payment service.

### Exchange

If an exchange is approved, we will ship the new item to you, after payment of any applicable restocking and shipping fees.

### Exclusive Limited Warranty

GeniusPrinters' warranty obligations for all hardware products sold by GeniusPrinters on this site are limited to the terms set forth below:

GeniusPrinters warrants GeniusPrinters-branded hardware products against defects in materials and workmanship under normal use for a period of (1) ninety (90) days from the date of retail purchase by the original end-user purchaser. If a hardware defect arises and a valid claim is received within the Warranty Period, at our sole option and to the extent permitted by law, GeniusPrinters will either (1) repair the hardware defect at no charge, using new or refurbished replacement parts, (2) exchange the product with a product that is new or reconditioned by GeniusPrinters or that has been manufactured from new or serviceable used parts and is at least functionally equivalent to the original product, or (3) refund the purchase price of the product. GeniusPrinters may request that you replace defective parts with new or refurbished user-installable parts that GeniusPrinters provides in fulfillment of its warranty obligation. A replacement product or part, including a user-installable part that has been installed in accordance with instructions provided by GeniusPrinters, assumes the remaining warranty of the original product. When a product or part is exchanged, any replacement item becomes your property and the replaced item becomes GeniusPrinters' property. Parts provided by GeniusPrinters in fulfillment of its warranty obligation must be used in products for which warranty service is claimed. When a refund is given, the product for which the refund is provided must be returned to GeniusPrinters and becomes GeniusPrinters' property.

### Exclusions from and Limitation to Warranty

This Limited Warranty applies only to hardware products manufactured by or for GeniusPrinters that can be identified by the "GeniusPrinters" trademark, trade name, or logo affixed to them. The Limited Warranty does not apply to any non-GeniusPrinters hardware products or any software, even if packaged or sold with GeniusPrinters hardware. Manufacturers, suppliers, or publishers, other than GeniusPrinters, may provide their own warranties to the end user purchaser, but GeniusPrinters, in so

far as permitted by law, provides their products “as is”. Software distributed by GeniusPrinters with or without the GeniusPrinters brand name (including, but not limited to system software) is not covered under this Limited Warranty. Refer to the Terms and Conditions for the software for details of your rights with respect to its use.

GeniusPrinters does not warrant that the operation of the product will be uninterrupted or error-free. GeniusPrinters is not responsible for damage arising from failure to follow instructions relating to the product's use.

This warranty does not apply: (a) to damage caused by use with non-GeniusPrinters products; (b) to damage caused by accident, abuse, misuse, flood, fire, earthquake, or other external causes; (c) to damage caused by operating the product outside the permitted or intended uses described by GeniusPrinters; (d) to damage caused by service (including upgrades and expansions) performed by anyone who is not a representative of GeniusPrinters; (e) to a product or part that has been modified to alter functionality or capability without the written permission of GeniusPrinters; (f) to consumable parts, unless damage has occurred due to a defect in materials or workmanship; (g) to cosmetic damage, including but not limited to scratches, dents; or (h) if any GeniusPrinters serial number has been removed or defaced. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE. GENIUSPRINTERS'S RESPONSIBILITY FOR HARDWARE DEFECTS IS LIMITED TO REPAIR OR REPLACEMENT SERVICE AS DETERMINED BY GENIUSPRINTERS IN ITS SOLE DISCRETION.

#### Disclaimer of Warranties; Limitation of Liability

Except as explicitly provided in these Terms, we do not guarantee, represent or warrant that your use of our service or any GeniusPrinters product will be uninterrupted, timely, secure or error-free. We do not warrant that the results that may be obtained from the use of the service or the product will be accurate or reliable. You agree that from time to time we may remove the service for indefinite periods of time or cancel the service at any time, without notice to you.

You expressly agree that your use of, or inability to use, the service is at your sole risk. The service and all products and services delivered to you through the service are (except to the extent otherwise expressly stated by us) provided 'as is' and 'as available' for your use, without any representation, warranties or conditions of any kind, either express or implied, including all implied warranties or conditions of merchantability, merchantable quality, fitness for a particular purpose, durability, title, and non-infringement.

ALL EXPRESS AND IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES AND CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN TIME TO THE TERM OF THIS LIMITED WARRANTY. NO WARRANTIES, WHETHER EXPRESS OR IMPLIED, WILL APPLY AFTER THE EXPIRATION OF THE LIMITED WARRANTY PERIOD. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THIS LIMITATION MAY NOT APPLY TO YOU. No GeniusPrinters reseller, agent, or employee is authorized to make any modification, extension, or addition to this warranty. If any term is held to be illegal or unenforceable, the legality or enforceability of the remaining terms shall not be affected or impaired.

EXCEPT AS PROVIDED IN THIS WARRANTY AND TO THE EXTENT PERMITTED BY LAW, GENIUSPRINTERS IS NOT RESPONSIBLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION OR ANY OTHER REASON, OR UNDER ANY OTHER LEGAL THEORY, INCLUDING BUT NOT LIMITED TO LOSS OF USE; LOSS OF REVENUE; LOSS OF ACTUAL OR ANTICIPATED PROFITS (INCLUDING LOSS OF PROFITS ON CONTRACTS); LOSS OF THE USE OF MONEY; LOSS OF ANTICIPATED SAVINGS; LOSS OF BUSINESS; LOSS OF OPPORTUNITY; LOSS OF

GOODWILL; LOSS OF REPUTATION; LOSS OF, DAMAGE TO OR CORRUPTION OF DATA; OR ANY INDIRECT OR CONSEQUENTIAL LOSS OR DAMAGE HOWSOEVER CAUSED, INCLUDING THE REPLACEMENT OF EQUIPMENT AND PROPERTY, ANY COSTS OF RECOVERING, PROGRAMMING, OR REPRODUCING ANY PROGRAM OR DATA STORED OR USED WITH GENIUSPRINTERS PRODUCTS AND ANY FAILURE TO MAINTAIN THE CONFIDENTIALITY OF DATA STORED ON THE PRODUCT. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

#### Obtaining Warranty Service

Please access and review the online help resources referred to in the documentation accompanying this hardware product before requesting warranty service. If the product is still not functioning properly after making use of these resources, please contact GeniusPrinters at [support@GeniusPrinters.com](mailto:support@GeniusPrinters.com). You must assist in diagnosing issues with your product and follow GeniusPrinters' warranty processes.

GeniusPrinters may restrict service to the fifty states of the United States of America and the District of Columbia, and provide warranty service (i) by sending you prepaid way bills (and if you no longer have the original packaging, GeniusPrinters may send you packaging material) to enable you to ship the product to GeniusPrinters' repair service location for service, or (ii) by sending you new or refurbished customer-installable replacement product or parts to enable you to service or exchange your own product ("DIY Service"). Upon receipt of the replacement product or part, the original product or part becomes the property of GeniusPrinters and you agree to follow instructions, including, if required, arranging the return of original product or part to GeniusPrinters in a timely manner. When providing DIY Service requiring the return of the original product or part, GeniusPrinters may require a credit card authorization as security for the retail price of the replacement product or part and applicable shipping costs. If you follow instructions, GeniusPrinters will cancel the credit card authorization, so you will not be charged for the product or part and shipping costs. If you fail to return the replaced product or part as instructed, GeniusPrinters will charge the credit card for the authorized amount.

Service options, parts availability, and response times may vary. Service options are subject to change at any time. In accordance with applicable law, GeniusPrinters may require that you furnish proof of purchase details and/or comply with registration requirements before receiving warranty service. Please refer to the accompanying documentation for more details on this and other matters on obtaining warranty service.

GeniusPrinters will maintain and use customer information in accordance with the GeniusPrinters Privacy Policy. THE CONTENTS OF YOUR PRODUCT WILL BE DELETED AND THE STORAGE MEDIA REFORMATTED IN THE COURSE OF WARRANTY SERVICE. Your product will be returned to you configured as originally purchased, subject to applicable updates.

#### Indemnification

You agree to indemnify, defend and hold harmless GeniusPrinters and our parent, subsidiaries, affiliates, partners, officers, directors, agents, contractors, licensors, service providers, subcontractors, suppliers, interns and employees, harmless from any claim or demand, including reasonable attorneys' fees, made by any third-party due to or arising out of your breach of these Terms of Service or the documents they incorporate by reference, or your violation of any law or the rights of a third-party.

#### Severability

In the event that any provision of these Terms of Service is determined to be unlawful, void or unenforceable, such provision shall nonetheless be enforceable to the fullest extent permitted by applicable law, and the unenforceable portion shall be deemed to be severed from these Terms of Service, such determination shall not affect the validity and enforceability of any other remaining provisions.

#### Termination

The obligations and liabilities of the parties incurred prior to the termination date shall survive the termination of this agreement for all purposes.

These Terms of Service are effective unless and until terminated by either you or us. You may terminate these Terms of Service at any time by notifying us that you no longer wish to use our Service, or when you cease using our site.

If in our sole judgment you fail, or we suspect that you have failed, to comply with any term or provision of these Terms of Service, we also may terminate this agreement at any time without notice and you will remain liable for all amounts due up to and including the date of termination; and/or accordingly may deny you access to our Service (or any part thereof).

#### Miscellaneous Terms

##### Entire Agreement

These Terms of Service and any policies or operating rules posted by us on this site or in respect to The Service constitutes the entire agreement and understanding between you and us and govern your use of the Service, superseding any prior or contemporaneous agreements, communications and proposals, whether oral or written, between you and us (including, but not limited to, any prior versions of the Terms of Service). The failure of us to exercise or enforce any right or provision of these Terms of Service shall not constitute a waiver of such right or provision. Any ambiguities in the interpretation of these Terms of Service shall not be construed against the drafting party.

##### Changes to Terms of Service

You can review the most current version of the Terms of Service at any time at this page. We reserve the right, at our sole discretion, to update, change or replace any part of these Terms of Service by posting updates and changes to our website. It is your responsibility to check our website periodically for changes. Your continued use of or access to our website or the Service following the posting of any changes to these Terms of Service constitutes acceptance of those changes.

##### Applicable Law

To the maximum extent permitted by law, These Terms of Service and any separate agreements whereby we provide you Service or products shall be governed by the laws of Delaware, U.S.A. without reference to conflicts of law principles, and you and we hereby consent to the exclusive jurisdiction and venue of courts in Delaware, U.S.A. in all disputes arising out of or relating to the use of the Service.

##### Force Majeure

Neither party shall be responsible for failure or delay of performance if caused by: an act of war, hostility, or sabotage; act of God; electrical, internet, or telecommunication outage that is not caused



by the obligated party; government restrictions (including the denial or cancellation of any export or other license); or other event outside the reasonable control of the obligated party. Each party will use reasonable efforts to mitigate the effect of a force majeure event.

#### Actions Permitted

Except for actions for nonpayment or breach of a party's proprietary rights, no action, regardless of form, arising out of or relating to the Agreement may be brought by either party more than one year after the cause of action has accrued.

#### Relationship of the Parties

GeniusPrinters and you agree that no joint venture, partnership, employment, or agency relationship exists between you and GeniusPrinters as a result of these Terms of Service or your use of the Service or purchase of any product.

#### Compliance with Laws

GeniusPrinters will comply with all applicable U.S. state and Federal laws in its provision of the Service and products you purchase on this site.

#### Severability

If any part of these Terms of Service is determined to be invalid or unenforceable pursuant to applicable law including, but not limited to, the warranty disclaimers and liability limitations set forth above, then the invalid or unenforceable provision will be deemed superseded by a valid, enforceable provision that most closely matches the intent of the original provision and the remainder of these Terms of Service shall continue in effect.

#### Notices

Notice shall be sent to the contact address set forth here (as such may be changed by notice given to the other party), and shall be deemed delivered as of the date of actual receipt. To GeniusPrinters: GeniusPrinters, Lewes, DE 02143, Attention: Legal. GeniusPrinters may give telephonic notice to you by calls to appropriate numbers on record in GeniusPrinters' account information for you.

#### Entire Agreement

Unless otherwise expressly stated herein, these Terms of Service constitute the entire agreement between you and GeniusPrinters with respect to the Service and any product you purchase from GeniusPrinters and supersedes all prior or contemporaneous communications, proposals and agreements, whether electronic, oral or written, between you and GeniusPrinters. GeniusPrinters objects to and rejects any additional or different terms proposed by you, including those contained in your purchase order, acceptance or website. GeniusPrinters' failure to object elsewhere to any provisions of any subsequent document, communication, or act of you shall not be deemed a waiver of any of the terms hereof. GeniusPrinters' obligations hereunder are neither contingent on the delivery of any future functionality or features of the Service nor dependent on any oral or written public comments made by GeniusPrinters regarding future functionality or features of any product.

#### Assignment

You will not assign or transfer your rights and obligations under these Terms of Service, including any assignment or transfer by reason of merger, reorganization, sale of all or substantially all of its assets, change of control or operation of law, without GeniusPrinters' prior written consent. GeniusPrinters may assign or transfer this agreement to any successor.

#### Export

You agree to comply with all applicable export laws.

#### Authority

You represent and warrant to you have full power and authority to enter into any agreement to purchase a product under these Terms of Service and that these Terms of Service are binding upon you and enforceable in accordance with their terms.

#### Contact Information

Questions about these Terms of Service should be sent to us through [support@GeniusPrinters.com](mailto:support@GeniusPrinters.com).

GeniusPrinters ships to the locations indicated in the shipping table. We do not ship to PO boxes. The price of shipping is not included in the advertised price of GeniusPrinters products. Shipping is added based on your products, shipping choices and location during checkout.

Unless otherwise specified, you are responsible for estimating and covering any duties, taxes, fees and/or other costs associated with shipment to your country. Upon checkout, duties and taxes may be estimated and charged. GeniusPrinters is not responsible for additional fees or costs nor are we responsible for communicating with your local authorities to facilitate transit. We cannot give you an estimate on these costs beforehand.

By purchasing this product for shipment outside of the United States, you acknowledge and assume responsibility to conform with local laws and regulations while importing and using the product. You acknowledge that GeniusPrinters is not responsible for regulatory compliance within your country. GeniusPrinters is not responsible for the cost of replacement of any product held indefinitely by your local authorities.

#### Delivery

We ship items as soon as possible. Estimated delivery dates are indicated for each product in the Store. GeniusPrinters may or may not ship on national USA holidays. Given uncertainties in shipping, product availability, and circumstances outside our control (weather etc.) we cannot guarantee exact shipping dates.

When completing an order, you should receive an e-mail confirming your order shortly after completing your transaction. If you do not receive the e-mail, please check your spam or junk folder before contacting GeniusPrinters. Tracking information will be emailed once the order's shipping information is generated. If you have any questions about the delivery of a specific item please contact us through our web form.

#### Returns

GeniusPrinters accepts returns for unopened, unused, undamaged products within 30 days of the shipment date. Returns must be authorized by GeniusPrinters. The Return Policy provides detailed information about options and procedures for returning your purchase.

#### Warranty

GeniusPrinters offers a 90 day warranty for the printer and the plater shipped to the countries listed above. Warranty services are specified in the table above and in the full warranty terms.

#### Privacy Policy

GeniusPrinters is committed to protecting your privacy. This Privacy Policy applies to our websites that link to it, including [www.GeniusPrinters.com](http://www.GeniusPrinters.com), and to our online store (collectively, the “Websites”). This statement governs our data collection, processing and usage practices. By using the Websites, you consent to the data practices described in this Privacy Policy.

#### Changes to this Privacy Policy

We may update this Privacy Policy from time-to-time by posting a new version online. You should check this page occasionally to review any changes. We will provide notice of any changes by posting the revised Privacy Policy on our Websites. Your continued use of the Websites and/or continued provision of Personal Information to us will be subject to the terms of the then-current Privacy Policy.

#### Contact Us

If you have any questions about this Privacy Policy or our treatment of the information you provide us, please write to us by email at [support@GeniusPrinters.com](mailto:support@GeniusPrinters.com) or by mail to GeniusPrinters, Inc., Lewes, DE 01234, Attn: Privacy.

#### Information We Collect

You are free to explore the Websites without providing any information about yourself. When you visit the Websites or register for our store, we request that you provide Personal Information about yourself, and we collect Navigational Information.

#### Personal Information

“Personal Information” means any information that you voluntarily submit to us and that identifies you personally, including contact information, such as your name, e-mail address, company name, address, phone number, and other information about yourself or your business. Personal Information can also include information about any transactions, both free and paid, that you enter into on the Websites.

#### Navigational Information

“Navigational Information” means information about your computer and your visits to this website such as your IP address, geographical location, browser type, referral source, length of visit and pages viewed. Please see the “Navigation Information” section below.

#### Information About Children

The Websites are not intended for or targeted at children under 13, and we do not knowingly or intentionally collect information about children under 13. If you believe that we have collected information about a child under 13, please contact us at support@GeniusPrinters.com , so that we may delete the information.

#### Data Collection

During installation, GeniusPrinters software asks you to agree to the collection of diagnostic information regarding your use of GeniusPrinters' software or hardware in order to help our engineers improve GeniusPrinters' products. You agree that GeniusPrinters may collect, maintain, and use information about the operation of GeniusPrinters' hardware and software, such as hardware serial numbers, print times, laser power levels, and 3D model sizes. No models, 3D geometry, or personal information will be collected without your additional and explicit consent.

#### How We Use Information We Collect

We use the information we collect only in compliance with this Privacy Policy.

#### We Never Sell Personal Information

We will never sell your Personal Information to any third party.

#### Use of Personal Information

In addition to the uses identified elsewhere in this Privacy Policy, we may use your Personal Information to: (a) improve your browsing experience by personalizing the Websites; (b) send information (other than marketing communications) to you which we think may be of interest to you by post, email, or other means; (c) send you marketing communications relating to our business or the businesses of carefully-selected third parties which we think may be of interest to you, and (d) provide other companies with statistical information about our users – but this information will not be used to identify any individual user. In addition, we may share data with trusted partners to contact you based on your interest to receive such communications, help us perform statistical analysis, send you email or postal mail, or provide customer support. Such third parties are prohibited from using your Personal Information except for these purposes, and they are required to maintain the confidentiality of your information.

#### Use of Navigational Information

We use Navigational Information to operate and improve the Websites. We may also use Navigational Information alone or in combination with Personal Information to provide you with personalized information about GeniusPrinters.

#### Customer Testimonials and Comments

We post customer testimonials and comments on our Websites, which may contain Personal Information. We obtain each customer's consent via email prior to posting the customer's name and testimonial.

#### Use of Credit Card Information

If you give us credit card information, we use it solely to check your financial qualifications and collect payment from you. We use a third-party service provider to manage credit card processing. This

service provider is not permitted to store, retain, or use information you provide except for the sole purpose of credit card processing on our behalf.

#### Service Providers

We employ other companies and people to provide services to visitors to our Websites on our behalf and may need to share your information with them to provide information, products or services to you. Examples may include removing repetitive information from prospect lists, analyzing data, providing marketing assistance, processing credit card payments, and providing customer service. In all cases where we share your information with such agents, we explicitly require the agent to acknowledge and adhere to our privacy and customer data handling policies.

#### Security of your Personal Information

We use a variety of security technologies and procedures to help protect your Personal Information from unauthorized access, use or disclosure. When sensitive Personal Information (such as a credit card information) is collected on our store, it is protected by our third-party e-commerce provider.

#### Social Media Features

Our Websites include Social Media Features, such as the Facebook Like button and Widgets, such as the “Share This” button or interactive mini-programs that run on our sites. These Features may collect your IP address, which page you are visiting on our sites, and may set a cookie to enable the Feature to function properly. Social Media Features and Widgets are either hosted by a third party or hosted directly on our Websites. Your interactions with these Features are governed by the Privacy Policy of the companies providing them.

#### External Websites

Our Websites provide links to other websites. We do not control, and are not responsible for, the content or practices of these other websites. Our provision of such links does not constitute our endorsement of these other websites, their content, their owners, or their practices. This Privacy Policy does not apply to these other websites, which are subject to any privacy and other policies they may have.

#### Public Forums

We may offer publicly accessible message boards, blogs, and community forums. Please keep in mind that if you directly disclose any information through our public message boards, blogs, or forums, this information may be collected and used by others. We will correct or delete any information you have posted on our servers if you so request, as described in “Opting-Out and Unsubscribing” below.

#### Retention of Personal Information

We retain Personal Information that you provide us as long as we consider it potentially useful in contacting you about our company, products or services. We retain information about our customers for as long as we need it to provide service to the customer. We will delete this information from our servers at an earlier date if you so request, as described in “Opting-Out and Unsubscribing” below.

#### International Transfer of Information

To facilitate our global operations, we may transfer and access Personal Information from around the world, including the United States. This Privacy Statement shall apply even if we transfer Personal Information to other countries.

#### Corporate Events

If we (or our assets) are acquired by another company, whether by merger, acquisition, bankruptcy or otherwise, that company would receive all the Visitor Information and other information gathered by GeniusPrinters on the Websites.

#### Compelled Disclosure

We reserve the right to use or disclose your Personal Information if required by law or if we reasonably believe that use or disclosure is necessary to protect our rights or to comply with a law, court order, or legal process.

#### Navigational Information

#### Cookies

We use “cookies” to help you personalize your online experience. A cookie is a text file that is placed on your hard disk by a Web server. Cookies are not used to run programs or deliver viruses to your computer. Cookies are uniquely assigned to you, and can only be read by a web server in the domain that issued the cookie to you. One of the primary purposes of cookies is to provide a convenience feature to save you time. The purpose of a cookie is to tell the Web server that you have returned to a specific page. For example, if you personalize pages on our Websites, or register for our store, a cookie helps us to recall your specific information on subsequent visits.

When you return to the same Website, the information you previously provided can be retrieved, so you can easily use the features that you customized. You have the ability to accept or decline cookies. Most Web browsers automatically accept cookies, but you can usually modify your browser setting to decline cookies if you prefer. If you choose to decline cookies, you may not be able to fully experience the interactive features of the Websites. We keep track of the pages you visit on the Websites, in order to determine what parts of our store and the Websites are the most popular. This data is used to deliver customized content and advertising on the Websites to visitors whose behavior indicates that they are interested in a particular subject area.

#### Log Files

GeniusPrinters may also collect anonymous demographic information, which is not unique to you, such as your ZIP code, age, gender, preferences, interests and favorites using log files. There is also information about your computer hardware and software that is automatically collected by GeniusPrinters. This information can include: your IP address, browser type, domain names, access times and referring website addresses. This information is used by GeniusPrinters for the operation of the service, to maintain quality of the service, and to provide general statistics regarding use of the GeniusPrinters website. For these purposes, we do link this automatically-collected data to Personal Information such as name, email address, address, and phone number.

#### Opting-Out and Unsubscribing

#### Reviewing, Correcting and Removing Your Personal Information

If you provide us with your Personal Information, you have the following rights with respect to that information:

- To review the user information that you have supplied to us
- To request that we correct any errors, outdated information, or omissions in user information that you have supplied to us
- To request that your user information not be used to contact you
- To request that your user information be removed from any solicitation list that we use
- To request that your user information be deleted from our records
- To opt out of being solicited by the Websites or third parties

To exercise any of these rights, please contact us at [Privacy@GeniusPrinters.com](mailto:Privacy@GeniusPrinters.com) or by mail to GeniusPrinters, Lewes, DE 01234, and Attention: Privacy. We will promptly change, correct, or delete your information.

#### To Unsubscribe From Our Communications

You may unsubscribe from our marketing communications by clicking on the “unsubscribe” link located on the bottom of our emails, or by sending us an email us at [Privacy@GeniusPrinters.com](mailto:Privacy@GeniusPrinters.com) , or by sending us postal mail to GeniusPrinters, Lewes, DE 01234, and Attention: Privacy. Customers cannot opt out of receiving transactional emails related to their account with us or our store.

# CV of Managing Director/CEO –Exhibit 13



## Curriculum Vitae

### Personal information

First name(s) / Surname(s)

**Markus Ulrich**

Address

1873 Rte de l Abadie, 06730 St André de la Roche (France)

Telephone(s)

0033954458634

E-mail(s)

[markus@geniusprinters.com](mailto:markus@geniusprinters.com)

Nationality

German

Date of birth

30 November 1965

### Occupational field

**Financial Industry**

### Work experience

Dates

07 November 1990 - 16 August 1994

Occupation or position held

Stock Broker

Main activities and responsibilities

Consulting UHNW clients. Researching buy opportunities. Analysing US companies. Trading for clients. Compliance for Frankfurt branch.

Type of business or sector

Financial Industry

Dates

17 August 1994 - 04 October 1997

Occupation or position held

Branch Manager for Freiburg Branch of an investment consulting company

Main activities and responsibilities

Consulting UHNW clients. Researching buy opportunities. Analysing US companies. Trading for clients. Compliance for Freiburg branch clients. Private Placements Reg S. Compliance for securities. Marketing for branch. Teaching the brokers. Preparing them for Series S Licence. Buying stock information systems and data. Teaching all brokers in all German associated branches on how to use trading systems. Writing articles for newspapers and magazines, i.e. Börse Online.

Type of business or sector

Financial Industry



Dates	10 July 1992 - 16 May 2005
Occupation or position held	Founder and CEO of News Net Börseninformationssysteme GmbH, business sold to a Handelsblatt subsidiary after 13 years.
Main activities and responsibilities	Feature planning of all applications, presentation to key customers (banks, stock exchanges, large portals, i.e. Düsseldorfer Börse; Bayerische Börse, Bremer Börse, Web.de, Bluewin (largest Swiss portal), SAP, MAN, Mannesmann and many more), teaching the staff, compliance with exchanges. 1996 exclusively producing for Microsoft MSN to build a stock information system for the German market. Working with compliance departments of the banks to create appropriate applications and interfaces. Support to key clients for their client's portfolios. Aggregating more data feeds. Preparing contracts and SLAs for clients and subcontractors. Planning support tools for staff. Training internal and external support personnel. Negotiating SLAs and chargebacks with data providers and clients. Writing articles for newspapers. Demonstrating our software during competitions (Test winner at Handelsblatt 1996). Negotiation and sale of the business to a daughter of Handelsblatt. Consulting new owner until 2008.
Name and address of employer	News Net Börseninformationssysteme GmbH Am Prediger Tor 1, 79098 Freiburg (Germany)
Type of business or sector	Financial Industry
Dates	13 November 2003 - 08 September 2008
Occupation or position held	Trustee for Family Office in Basle (Switzerland)
Main activities and responsibilities	Analysing international stock markets, investments/trading in stocks, later also commodities. Compliance for Family Office. Daily trading volume around 20-50 mio \$.
Name and address of employer	privately for Family Office, 3007 Bern (Switzerland)
Type of business or sector	Financial Industry
Dates	24 January 2007 – today
Occupation or position held	Company Advisor, Founder of Genius Printers (2012) and Genius Things (2016)

Main activities and responsibilities	<p>Building a 3D laser galvo resin printer. Building a DLP printer before. Preparing a mass production of the first 6 filament FDM print-head, available in 2018.</p> <p>During his managing career at News Net Börseninformationssysteme GmbH, Mister Ulrich was responsible for sales and supervision of the technological development. He studied mechanical engineering at Dortmund University and already built various machines for many sectors. He is in charge of the whole development of the printers that he designed, defining the different printer size types, deciding electronics parts for the PCB, working closely with the software programmers, and he is responsible for the first marketing efforts to sell the products. Mister Ulrich is the inventor of various procedures and technologies to enable fast and accurate 3D printing with bottom-up Laser Galvo Resin printers, FDM multiple filament print heads, highly viscous resin robot arm printers, low viscous resin drum printers, consumer and industrial size daylight resin 4k/8k printers, molten functional granulate printers as well as different SLS printing technologies. His patents are pending or granted or published or still unpublished (with the latest patent publication in July 2018 so far) and exclusively licensed to GPUG as far as concerning the 3D printing market.</p>
Name and address of employer	Markus Ulrich, 1873 Rte de l'Abadie, 06730 St. André de la Roche, France
Type of business or sector	North American Industry Classification System Naics: 334118 Standard Industrial Classification Sic:3577, 3D Printer

Genius  
Printers

# Pro-Forma Combined Financial Statements – Exhibit 99.2

GENIUS PRINTERS UG (HAFTUNGSBESCHRÄNKT)

INTRODUCTION AND BASIS OF PRESENTATION

FOR PRO FORMA COMBINED FINANCIAL STATEMENTS

The following pro forma combined financial statements give effect to the acquisition of Genius Printers UG (haftungsbeschränkt) (“GPUUG”, “Genius Printers UG”) by Genius Printers Corporation (“GPC”) by Share Exchange Agreement dated January 31, 2018, GPC acquired 100% of the stock capital of Genius Printers UG in exchange for 50,000,000 common shares representing 100% of its total issued and outstanding shares at the time (the “Exchange”). The combination is accounted for as a reverse merger.

The following unaudited pro forma combined financial statements are presented to illustrate the estimated effects of the Exchange. The following pro forma combined balance sheet includes the balance sheets of GPC as of January 31, 2018 and Genius Printers UG as of January 31, 2018, as if the acquisition of Target occurred on each date, respectively, for the balance sheets and as of the first day of each year presented for the statements of operations.

The pro forma combined balance sheet and statement of operations should be read as follows:

- (i) for GPC, financial statements for the period from inception in January 2018 to the month ended January 31, 2018; and
- (ii) for Genius Printers UG, unaudited financial statement for the period from inception in January 2018 to the month ended January 31, 2018.

GENIUS PRINTERS CORPORATION

PRO FORMA COMBINED BALANCE SHEET

	GPC January 31, 2018	GPUG January 31, 2018		Pro-Forma Adjustments	Pro-Forma Combined
<b>ASSETS</b>					
<b>CURRENT ASSETS</b>					
Cash and cash equivalents	\$ -	\$ 0		\$ 0	\$ 0
Deposit	-	0		0	0
	<u>-</u>	<u>0</u>		<u>0</u>	<u>0</u>
Machinery	-	1000		-	1000
	<u>-</u>	<u>1000</u>		<u>\$ 0</u>	<u>\$ 1000</u>
<b>LIABILITIES</b>					
<b>CURRENT LIABILITIES</b>					
Accounts payable and accrued liabilities	\$ 0	\$ 0		\$ -	\$ 0
Loans payable - director	0	998.66		-	998.66
	<u>0</u>	<u>998.66</u>		<u>-</u>	<u>998.66</u>
<b>STOCKHOLDERS' DEFICIT</b>					
<b>CAPITAL STOCK</b>					
Authorized 100,000,000 common shares \$0.00001 par value;					
0 issued and outstanding	0	1.33	(B)	0	1.33
			(D)	(0)	
ADDITIONAL PAID IN CAPITAL	0	0	(C)	(0)	0
			(D)	(0)	
RETAINED EARNINGS (DEFICIT)	<u>0</u>	<u>0</u>	(D)	<u>0</u>	<u>0</u>
	<u>(0)</u>	<u>1.33</u>		<u>0</u>	<u>1.33</u>
	<u>\$ -</u>	<u>\$ 1000</u>		<u>\$ 0</u>	<u>\$ 1000</u>

The accompanying Shares are an integral part of these pro forma financial statements

PRO FORMA COMBINED STATEMENT OF OPERATIONS

	GPC Year Ended January 31, 2018	GPUG Period Ended January 31, 2018	Pro Forma
<b>Expenses and other items:</b>			
Amortization	\$ -	\$ -	\$ -
Research and development	-	-	-
Consulting	-	-	-
Legal and accounting	-	-	-
General and administrative	-	-	-
<b>Total expenses and other items</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Net Loss</b>	<b>\$ (0 )</b>	<b>\$ (0 )</b>	<b>\$ (0 )</b>
<b>Loss per Share – basic and diluted</b>	<b>\$ (0.00 )</b>	<b>\$ (0.00 )</b>	<b>\$ (0.00 )</b>
<b>Shares used in calculating basic and diluted loss per share</b>	<b>0</b>	<b>0</b>	<b>0</b>

The accompanying Shares are an integral part of these pro forma financial statements

Genius  
Printers

Genius Printers Corporation

PRO FORMA CONSOLIDATED SHARES TO FINANCIAL STATEMENTS

NOTE 1 – Pro Forma Adjustments

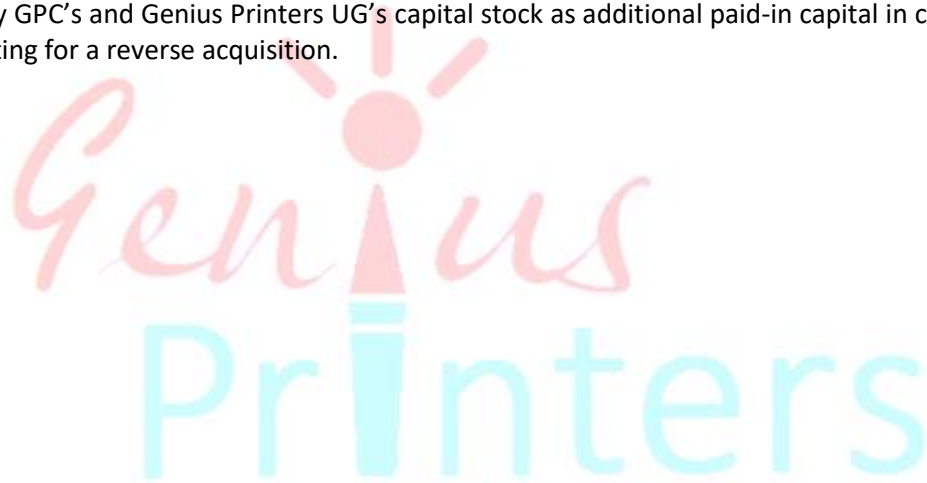
The pro forma adjustments to the consolidated balance sheet give effect to the acquisition of Genius Printers UG as if the transactions had occurred at GPC's respective balance sheet date of the most recent audit.

Derived from the balance sheet of GPC as of January 31, 2018 and the period then ended.

Derived from the balance sheet of Genius Printers UG as of January 31, 2018 and the period then ended.

Pro forma adjustment to reflect the issuance of 50,000,000 common shares of GPC for 100% of outstanding shares of Genius Printers UG. Stock capital was recorded to be paid in February 2018.

To reclassify GPC's and Genius Printers UG's capital stock as additional paid-in capital in connection with the accounting for a reverse acquisition.



# Regulation S Subscription And Investor Representation Agreement

## Part 1

### 1.1 Subscription

Intending to be legally bound, the undersigned hereby subscribes, irrevocably, for \_\_\_\_\_ shares of common stock, Shares, of the Genius Printers Corporation, a Delaware corporation in formation, the Company, for an combined purchase price of \$\_\_\_\_\_, at 0.00001 cents per share.

## Part 2

### Closing

“Closing” of the sale and purchase of the Shares will occur in a simultaneous manner with the acceptance by the Company of the subscription of the undersigned, as demonstrated by the Company’s execution of this Subscription Agreement.

## Part 3

### a. Investor Warranties and Representations

- A. The undersigned is acquiring the Shares for his/her own account, not as an agent or nominee, for the purposes of investment only and with no intent resale or distribute the Shares, in part or whole, to another party or person, and no other person or party has indirect or direct beneficial interest in these Shares. Additionally, the undersigned does not have any undertakings, contracts, arrangements or agreements with any party or person to sell, grant or transfer these Shares to any such entity, with respect to the Shares the undersigned has subscribed to.
- B. The undersigned has the full authority and power to enter into, execute and deliver this Agreement. This Agreement is considered a valid and legal obligation of the undersigned.
- C. The Undersigned is not subscribing for the Shares as a result of any advertisement, notice, article or any other form of published communication in any printed media, broadcast, seminar, or any form of solicitation for subscription by any person known to the undersigned in connection with this investment.
- D. It is the understanding of the undersigned that the Company is bound by no obligation to register the Shares under the Securities Act of 1933 or to assist the undersigned in doing so or complying with the securities laws of any state of the United States or any foreign jurisdiction.
- E. The undersigned is; experienced in investments as of the kind described within this Agreement, able to protect its own interests in connection with transactions described in this Agreement, through their own experience, the experience of their officers, a professional advisor, able to afford the loss of this investment in its entirety.
- F. The undersigned agrees and acknowledges that they understand that this offering and sale of Shares is proposed to be exempt from the Securities Act registration requirements. Therefore, in addition to other warranties and representations the undersigned has made, they further warrant and represent to and agrees with the Company as follows:
  - That the undersigned realizes the exemption may not be present if the undersigned is acquiring the Shares with the intent of holding them for a determinable period, a rise in the market, or to sale the Shares if the market does not rise. The undersigned agrees and acknowledges they have no such intentions.
  - That the undersigned is financially able to bear the risks involved with this investment, has the means to provide for their current needs and contingencies and has no need to liquidate in regards of this investment in the Company.

- That the undersigned has the financial knowledge and experience that enables them to be capable of evaluating the risks and merits concerning an investment into these Shares. They also represent they have not been organized for the purpose of acquiring these Shares.
  - That the undersigned has been provided with the opportunity of a reasonable time frame prior to the date hereof to gather any information concerning this offering of Shares, the Company and any other information to the extent that the Company may possess or can acquire within reason and without unreasonable expense and effort.
- G. The undersigned has reviewed all of the Company's filings under the Securities Act of 1934 in a thorough manner.
- H. The undersigned is not relying on agents of the Company, or the Company itself, in regards of economic considerations that are involved with this investment and have relied solely on their own advisors.
- I. There have been no warranties or representation made to the undersigned by the Company, any of the Company's employees, officers, agents, affiliates or subsidiaries of the Company, other than those contained within this offering, and in subscribing for these Shares, the undersigned is only relying on the representations contained within this offering.
- J. Local Law Compliance: The resale of these Shares during the "Distribution Compliance Period", as described in Regulation S, Rule 902(f), will only be made in accordance with exemptions granted from Regulation S registration requirements. Any sales conducted outside of the United States will be done so in a manner that is in accordance with securities laws that may be held in such jurisdictions. The undersigned will not sell or offer to sell these Shares in any jurisdiction without first gaining required consent to do so.
- K. Regulation Exemption: The undersigned understands that the Shares being offered and sold are done so in a manner that is reliant upon exemptions from U.S. federal and state securities laws and that the Company is relying upon the accuracy and truth of the warranties, representations, acknowledgments, understandings and agreements of the investor set forth within this offering in order to determine the applicability of any such exemptions and the appropriateness of the investor to obtain these Shares. Therefore, the undersigned warrants, agrees and represents that:
- The undersigned is not a U.S. person, as described below, and is an affiliate of the Company, as defined by the Securities Act, Rule 501(b), and is not acquiring the Shares for any account that benefits a U.S. person. A U.S. person is one of the following:
    1. Natural person that is a resident within the United States of America
    2. Corporation or partnership incorporated or organized under the United States of America laws
    3. An estate in which the administrator or executor is a U.S. person, or a trust in which the trustee is a U.S. person
    4. An agency of a foreign entity, or a branch there of, located in the United States of America
    5. Discretionary accounts, or accounts of this nature and other than estates or trusts, that is held by a dealer or organization that is incorporated or resides within the United States of America
    6. A partnership or corporation if it is incorporated or organized under a foreign jurisdictions laws, and formed by a U.S. person for the sole purpose of investing in Shares or securities that are not registered under the Securities Act, unless incorporated or organized and owned by accredited investors that are not natural persons, trusts or estates, as defined in the Securities Act, Rule 501(a)



- The undersigned was outside of the United States at the original time of contact regarding this Agreement and the execution date and delivery of this Agreement.
  - The undersigned will not sell, pledge, offer or transfer in any fashion the Shares within the United States or a U.S. person during the period following the issuance date of any Shares and ending on the anniversary of that date, unless permitted by Regulation S.
  - After expiration of the restricted period, the undersigned will sell, pledge, offer or otherwise transfer the acquired Shares only after being registered with Securities Act or after obtaining an exemption from the Securities Act registration requirements, and in accordance with applicable foreign and state securities laws.
  - The undersigned was not within the United States engaged in and prior to the restricted period's expiration date, will not engage in any hedging transactions or shore selling of the Shares. This includes, but not limited to, any put, call or other option transactions, equity swaps, or option writing.
  - The undersigned, or any person acting in behalf of the undersigned, will not engage in any direct selling transactions or efforts to a U.S. person regarding these Shares and the Investor, and any persons or entities acting in behalf of the Investor, have complied with and will comply with the Securities Act, Regulation S, Offering Restrictions requirements.
  - There has been no pre-arrangement made with the buyer located within the United States or with a U.S. person in regards to transactions contemplated within this Agreement and are not part of any plans or schemes to elude the Securities Act registration requirements.
  - The undersigned, nor any entity or person acting on their behalf, has carried out or undertaken any activities for the purpose of conditioning the market within the United States, U.S. possession or U.S. territories, for any of the Shares discussed within this Agreement. The undersigned further agrees not to cause any advertisements to be published in any periodical or newspaper, public place, and not to issue any circulars regarding these Shares, unless such advertisements include the required statements as described in Regulation S, and only offshore, not within the U.S. or its territories, and in accordance with applicable local securities laws.
  - All certificates representing the Shares will be endorsed with a legend that follows along with any applicable state or federal legends that may be required:
    1. "THE SECURITIES ARE BEING OFFERED TO INVESTORS WHO ARE NOT U.S. PERSONS (AS DEFINED IN REGULATION S UNDER THE SECURITIES ACT OF 1933, AS AMENDED ("THE SECURITIES ACT")) AND WITHOUT REGISTRATION WITH THE UNITED STATES SECURITIES AND EXCHANGE COMMISSION UNDER THE SECURITIES ACT IN RELIANCE UPON REGULATION S PROMULGATED UNDER THE SECURITIES ACT."
    2. "TRANSFER OF THESE SECURITIES IS PROHIBITED, EXCEPT IN ACCORDANCE WITH THE PROVISIONS OF REGULATION S, PURSUANT TO REGISTRATION UNDER THE SECURITIES ACT, OR PURSUANT TO AVAILABLE EXEMPTION FROM REGISTRATION. HEDGING TRANSACTIONS MAY NOT BE CONDUCTED UNLESS IN COMPLIANCE WITH THE SECURITIES ACT."
  - The undersigned consents to the Company making a notation on Company records or giving instructions to any transfer agents of the Company so as the restrictions on transfer of Shares as set forth in Part 2.
- L. The undersigned is an accredited investor, as described in the Securities Act, Rule 501 of the General Rules and by reason of Rule 501(a)(3).

- M. The undersigned understands and agrees that investing in these Shares is a speculative investment that involves a risks and the potential loss of the investment in its entirety.
- N. The overall commitment to the investments by the undersigned that are not readily marketable is not disproportionate to the net worth of the undersigned and any such investment in the Shares will not cause an excessive commitment.
- O. The undersigned has received all records, books, documents and any other information regarding the investment by the undersigned into the Company that the undersigned has requested.
- P. The undersigned warrants and confirms to the Company that all information provided by the undersigned to the Company, including but not limited to, information on the Investor Questionnaire that is attached or has be previously provided to the Company is correct and accurate as of the date posted.
- Q. The undersigned is not relying on any information, warranty, or representation, other than that information that has been provided in this agreement, by any officer, director, representative, or stockholder of the Company in regards to making a determination of investment in these Shares. The undersigned has consulted their personal counsel, to an extent the undersigned has deemed necessary, with their advisers as to the legal, tax, financial and related topics regarding an investment into these Shares and has based their decision to invest into these Shares in a manner that is appropriate and agreeable to the undersigned.
- R. The undersigned is aware and acknowledges that no state or federal agency has made any findings or determinations regarding the fairness of this investment, have not made any endorsement of these Shares or the Company and have not guaranteed any investment or insured any investment into these Shares or any investments made by the Company
- S. The undersigned understands and acknowledges that the price of these Shares being offered bear no relation to the assets, net worth or book value of the Company and were and arbitrary determination by the Company. Additionally, the undersigned understands and acknowledges that a substantial risk is present that further dilution on this investment in the Company may occur.

#### Part 4

The Company warrants and represent to the undersigned the following:

##### 4.1

##### Authority

- A. The Company has the requisite authority and corporate power to enter into and perform Company obligations under this Agreement and to issue Shares.
- B. By the Company executing and delivering this Agreement, and the consummation by it of the contemplated transactions thereby have been duly approved by all necessary corporate actions with no further consent or approval of the Board of Directors, stockholders or the Company needed.
- C. This Agreement has been properly executed delivered by the Company and is considered a legal, valid and binding obligation of the Company enforceable against the Company in accordance with said terms, unless such enforceability would be limited by applicable insolvency, bankruptcy, or similar actions and laws that apply, or affecting generally the enforcement of creditors' remedies and rights or by other equally affective principles of general application.

##### 4.2

##### Organization of the Company

The Company is a corporation properly organized that validly exist and in good standing under the State of Delaware laws. The Company has all requisite power and authority to own, operate and lease its properties and to conduct business in a manner that would best serve the Company.

#### 4.3

##### No General Advertising or Solicitation Regarding this Transaction

Neither affiliates of the Company, any person acting on the Company's or their behalf, nor the Company itself:

- Has conducted any solicitation, as defined in Regulation D, Rule 502(c), or advertising regarding these Shares, or
- Made any sales or offers of sales of any security or solicited any offers to purchase any securities under any circumstances that would require Common Stock registration in accordance with the Securities Act.

#### 4.4

##### No Integrated Offering

Neither affiliates of the Company, any person acting on the Company's or their behalf, nor the Company itself, indirectly or directly, have made any sales or offers of sales of any securities or generally advertised any offers to purchase any securities, other than this Agreement, under any circumstances that would require Common Stock registration in accordance with the Securities Act, other than private offerings the Company is currently conducting within the United States along with this offering.

#### 4.5

##### Valid Issuances / Registration Exemption

These Shares are being sold and issued in accordance with the terms and on the bases of the warranties and representations set forth by the undersigned within this Agreement and will be issued accordingly by the Company accordance with Regulation D, Section 4(2), Regulation S, and any state laws that may apply. When the Shares have been paid for, they will be duly and validly issued and no assessable. Neither the Company's performance of its obligations under, nor the sales of the Shares prior to this Agreement will result in the imposition or creation of liens, claims, charges or other related encumbrances upon any assets of the Company or the Shares, or enable other stockholders of Common Stock in the Company to preemptive or otherwise subscribe to or acquire other securities or the Common Stock from the Company. These Shares will not subject the undersigned to any personal liability by reason of ownership.

#### 4.6

##### No Conflict

This Agreement, its execution, delivery and performance thereof, by the Company and the consummation by the Company of the transactions purposed herein, including but not limited to, the issuance of Shares, will not result in:

- any violations of the Certificate or Company By-Laws,
- conflict with, or constitute a default, on an event that with lapse of time or with notice or both would result in default under, or given to others any rights of amendment, termination cancellation of, acceleration of any material agreement, instrument, indenture or any "lock-up", or similar circumstances of any underwriting or like agreement in which the Company is a party to,
- or result in any violation of state, local, federal or foreign law, regulation, order, rule, decree or judgment, including federal and state securities regulations and laws, that are applicable to the Company or any property or asset of the Company is bound, except for defaults, conflicts, cancellations, accelerations, terminations, amendments and violations as would not, in aggregate or individually, have an adverse effect on the operations, business, prospects, properties or condition of the Company, financial or otherwise, Nor is the Company otherwise in conflict with, violation of, or in default under any of the aforementioned circumstances.

The business transactions of the Company is not and will not be conducted in a manner that is in violation of any ordinance, law or regulation of any governmental organization, except for possible violations that either in aggregate or singly will not have an adverse material effect on the operations, business, properties, prospects, or conditions of the Company, financial or otherwise. The Company is not required by any law, rule or regulation to obtain any authorization, consent, or order of, many any registration or filing with, any governmental organization or court to be able to deliver, execute or perform any obligations obtained under this Agreement or the sell and issue of the Common Stock in accordance with the terms herein, with the exception of the SEC, NASD or state securities filings that may be required to be made by the Company prior to the Closing, any registration statement that may be filed prior hereto, and any approval required by shareholders that may be applicable to companies whose common stock trades on OTCBB, Over The Counter Bulletin Board; so long as, for purposes of the representation made in this sentence, the Company is relying upon and assuming the accuracy of the related agreements and representations of the undersigned.

#### 4.7

##### No Untrue or Misleading Communication

To the knowledge of the Company, the Company, any persons representing the Company, and other persons offering to sell or selling the Shares, if any, in connection with the purposed transactions in this Agreement, have at no time made any oral or written communication in relation to this offer or sale of the same which contained any false, untrue or misleading statements of material fact or intentionally omitted to state any material fact that would be necessary in order to make the statements not misleading, in relation to the circumstances under which they were made.

#### Part 5

#### 5.1

##### Notices

Any demand, notice or other communication which any party thereof may be required, or may elect, to give to anyone interested shall be sufficiently given if:

- Postage prepaid and deposited in a United States mailbox, certified mail, registered mail, return receipt requested, and addressed to the address provided within this Agreement.
- Delivered in person to the provided address.

#### 5.2

##### Indemnity

The undersigned agrees to hold harmless and indemnify the Company, its directors, officers, affiliates and employees, their successors and assigns each other person, if applicable, against any liability, claim, loss, expense and damage whatsoever, including but not limited to, any and all expenses reasonable incurred in preparing against litigations, defending against litigations or investigating involved with litigations that happen or are threatened to happen or any claims arising out of or based upon false warranty, representation, a breach, or failure of the undersigned to comply in accordance with any agreement made by the undersigned, or in any other document that may be furnished by the undersigned in connection with this transaction.

#### 5.3

##### Counterparts

Execution of this Agreement may occur through the use of separate signature pages or in a number of counterparts or by facsimile, of which, each counterpart will constitute a binding agreement on all parties, regardless that all parties are not signatories to the same counterpart. It is authorized for signatures to be facsimiles.

#### 5.4

##### Modifications

This Agreement, and any provisions, cannot be modified, terminated, or discharged unless an instrument in writing, which is signed by the party in which the change, waiver, termination or discharge is sought.

5.5

Entire Agreement

The documents referenced within the Agreement, and the Agreement itself, contain the entirety of the agreement between the parties and no covenants, agreements or other representations, except as stated or referenced therein and herein.

5.6

Binding Effect

This Agreement will be binding upon and inure to the benefit of the parties and their executors, heirs, legal representatives, successors, administrators and assigns, except where otherwise stated. If the undersigned represents more than one person, the obligation of the undersigned will be several and joint and the warranties, representations, acknowledgments and agreements contained in this Agreement will require to be made by and binding to each person and their executors, heirs, legal representatives, successors, administrators and assigns.

5.7

Applicable Laws

This Agreement will be construed in accordance with and governed by the laws of the state of New York and without creating conflicts of law principles.

5.8

Pronouns

The use of masculine pronouns "him" or "his", or like terms, within this Agreement will be construed to include the feminine and neuter genders as well. The use of singular pronouns will be construed to also include the plural.

5.9

Assignability

The undersigned is not authorized to assign or transfer this Agreement.

As witnessed, the undersigned has executed this Agreement on the \_\_\_\_ day \_\_\_\_\_ of 2018.

Investment Amount: \$ \_\_\_\_\_

Investor: \_\_\_\_\_

By: \_\_\_\_\_

Taxpayer Identification Number: \_\_\_\_\_

Subscription Acceptance

(To be completed by the Company only)

The Company hereby accepts the application above for subscription for Shares on behalf of the Company.

Date: \_\_\_\_\_, 2018

By: \_\_\_\_\_

Name: Markus Ulrich

Title:

CEO

## Investor Questionnaire

### A. General Information

1. Printed Name of Investor(Full): Individual \_\_\_\_\_  
Name of Corporation, Trust, Partnership,  
Custodial Account, Other: \_\_\_\_\_  
First Middle Last
2. Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
3. Point-of-Contact Name: \_\_\_\_\_  
Title: \_\_\_\_\_
4. Telephone Number: \_\_\_\_\_
5. E-Mail Address: \_\_\_\_\_
6. Fax Number: \_\_\_\_\_
7. Permanent Address: \_\_\_\_\_  
(Only if different from above) \_\_\_\_\_  
\_\_\_\_\_
8. Authorized Signatory: \_\_\_\_\_  
Title: \_\_\_\_\_  
Telephone Number: \_\_\_\_\_  
Fax Number: \_\_\_\_\_
9. Taxpayer Identification Number: \_\_\_\_\_  
(U.S. Investors Only)

### B. Accredited Investor Status

The Investor warrants and represents that they are an accredited investor as described in the Securities Act of 1933, Regulation D, Rule 501, and has checked the applicable boxes next to the categories in which the Investor qualifies as an accredited investor:

#### Individuals:

- A natural person with individual income, less spouse's income, that exceeds \$200,000, or joint income with spouse that exceeds \$300,000, in each of the two past years and expects to reach the same income level in the current year.

- A natural person with an individual net worth, or joint net worth including spouse, which exceeds \$1 million. For this purpose, net worth refers to the excess of total assets at a fair market value. This includes your home and its furnishings, automobiles, as well as your spouses, over total liabilities.

Organizations:

- An insurance company as described in the Securities Act, Section 2(13).
- A bank as described in the Securities Act, Section 3(a)(2), savings and loan association, or other like institution as described in the Securities Act, Section 3(a)(5)(A), whether acting in a fiduciary or individual capacity.
- An investment company that is registered in accordance with the Investment Company Act of 1940. Please contact \_\_\_\_\_ for additional information. (If checked, provide contact information.)
- An organization as defined in the Internal Revenue Code, Section 501(c)(3), Massachusetts or similar business trust, a corporation, or partnership that is not formed for the specific purpose of obtaining Shares, that has total assets that exceed \$5 million.
- A broker or dealer that is registered in accordance with the Securities Exchange Act of 1934, Section 15.
- A natural person with individual income, less spouse's income, that exceeds \$200,000, or joint income with spouse that exceeds \$300,000, in each of the two past years and expects to reach the same income level in the current year.
- An established plan that is maintained by a state, its subdivisions, or any other instrumentality or agency of a state for the benefit of their employees, only if the plan has total assets that exceed \$5 million.
- A business development company as described in the Investment Company Act, Section 2(a)(48).
- An benefit plan for employees that falls within the meaning of ERISA if the decision to invest in the Shares is made by a plan fiduciary, as described in Section 3(21) of ERISA, that is either a savings and loans association, bank, insurance company or registered investment adviser, or the plan has total assets that exceed \$5 million, or a self-directed plan with investment decisions that are made solely by individuals that are in fact accredited investors.
- A private business development company as described in the Investment Advisers Act of 1940, Section 202(a)(22). Contact \_\_\_\_\_ (If checked, please provide contact information.)
- A trust that has total assets that exceed \$5 million, that is not formed for the sole purpose of acquiring these Shares, and whose purchase is directed by a person with financial and business matters knowledge and experience as to make them capable of properly evaluating the risks of this investment, the purchase of the Shares, and the merits of the Company.
- An entity in which all equity owners are accredited investors as determined by these paragraphs, including grantor trusts. (For this purpose, beneficiaries of trusts are not equity owners, however, the grantor of a grantor trust is an equity owner.)

- A business investment company that is licensed by the Small Business Administration under the Small Business Investment Act of 1958, Section 301(c) or (d).

C. Supplement Information for Entities

1. Furnish the following information if the Investor is not a natural person. (Natural persons may skip this section of the questionnaire):

Legal form of the entity (partnership, corporation, etc.): \_\_\_\_\_

Organizational Jurisdiction: \_\_\_\_\_

2. Was the Investor formed for the sole purpose of acquiring Shares of the Company?

Yes

No

If answered yes to question #2, contact \_\_\_\_\_ at \_\_\_\_\_  
(Please provide point of contact and phone number.)

3. Is the decision to participate an individual decision of the partners, shareholders or other equity holders, or those with beneficial interest in the Investor?

Yes

No

If answered yes to question #3, contact \_\_\_\_\_ at \_\_\_\_\_  
(Please provide point of contact and phone number.)

4. (A) Please indicate whether or not the Investor is, or is acting on behalf of:
- Employee benefit plan as described in ERISA, Section 3(3), whether or not the plan is subject to ERISA
  - An entity that is deemed to hold assets of such an employee benefit plan in accordance with 29 C.F.R. 2510.3-101.

Yes

No

(B) If the Investor is such an employee benefit plan, or acting on behalf of such a plan, or holds the assets of such a plan, is the Investor subject to ERISA?

Yes

No

(C) If the Answer to 4(B) is "Yes", and the Investor is investing insurance company general account assets, indicate the percentage of the Investors' assets the purchase of these Shares will be subject to ERISA. \_\_\_\_\_%



5. On a consolidated basis with its subsidiaries, does the amount invested by the Investor for Shares in the Company exceed 40% of the Investors total assets?

- Yes  
 No

If answered yes to question #5, contact \_\_\_\_\_ at \_\_\_\_\_  
(Please provide point of contact and phone number.)

6. (A) Is the Investor a private investment company that is not registered in accordance with the Investment Company Act, Section 3(c)(1) or 3(c)(7)?

- Yes  
 No

(B) If the answer for 6(A) is "Yes", was the Investor formed before April 30, 1996?

- Yes  
 No

If the answer to both 6(A) and 6(B) were "Yes", please contact \_\_\_\_\_ at \_\_\_\_\_  
(Please provide point of contact and phone number.)

7. (A) Is the Investor a partnership, grantor trust, or a S-Corporation the purpose of U.S. federal income tax?

- Yes  
 No

(B) If the answer to 7(A) was "Yes", indicate whether or not:

- i. More than 50% of the value of the ownership interest of any beneficial owner in the Investor is attributed to the Investors' interest in the Company, or may at any time during the term of the Company, directly or indirectly?

- Yes  
 No

- ii. The main focus behind the Investors' participation in the Company is to permit the Partnership to meet U.S. Treasury Regulation, Section 1.7704-1(h)(3) 100 partner limitations.

- Yes  
 No

If the answer to either question above is "Yes", please contact \_\_\_\_\_ at \_\_\_\_\_  
(Please provide point of contact and phone number.)

8. If the tax year ends on a date other than December 31, please annotate that date below:

\_\_\_\_\_  
(Date)

D. Related Parties

1. To the best of the Investors' knowledge, do they control, or is the Investor controlled by any other investor within the Company?

- Yes  
 No

If the answer to this question is "Yes", please list the name(s) of the related investor(s):

\_\_\_\_\_

2. Will any other persons have a beneficial interest in the Shares that will be acquired, other than partners, shareholders or other beneficial equity interest owners in the Investor?

- Yes  
 No

If the answer to this question is "Yes", please contact \_\_\_\_\_ at \_\_\_\_\_ . (Please provide a point of contact and phone number.)

The Investor understands and agrees that the provided information will be used and relied upon by the Company for eligibility determination of the Investor to purchase Shares in the Company. The Investor further agrees to notify the Company if any warranty or representation found within this Subscription Agreement and Investor Questionnaire should become untrue as soon as possible. Additionally, the Investor agrees to provide any requested additional information that may be required to substantiate the Investor's status as an accredited investor, or to further determine the eligibility of the Investor to purchase these Shares. The Investor also agrees to hold harmless and indemnify the Company, its officers, directors, agents, shareholders and representatives, as well as their respective affiliates and successors, against and from any damage, liability, or loss due to a breach of any warranty, agreement or representation of the Investor found herein.

Individual Signature:

\_\_\_\_\_

Individual Printed Name:

\_\_\_\_\_

Name of Entity:

\_\_\_\_\_

By (Signature):

\_\_\_\_\_

Title and Printed Name:

\_\_\_\_\_