

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
14 April 2022 (14.04.2022)



(10) International Publication Number
WO 2022/076902 A1

(51) International Patent Classification:
B22F 1/02 (2006.01) *B22F 10/20* (2021.01)
B22F 10/00 (2021.01)

(21) International Application Number:
PCT/US2021/054293

(22) International Filing Date:
08 October 2021 (08.10.2021)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
63/089,405 08 October 2020 (08.10.2020) US

(71) Applicant: **TRIO LABS, INC.** [US/US]; 133 Southcenter
Ct Ste 900, Morrisville, North Carolina 27560 (US).

(72) Inventors: **STEEGE, Adam T. C.**; 1008 Navigon Drive,
Durham, North Carolina 27713 (US). **PURCHASE, Ken
G.**; 302 Bradson Road, Morrisville, North Carolina 27560
(US). **ADAMS, Eric Edward**; 12 Twin Lakes Drive, Pitts-
boro, North Carolina 27312 (US).

(74) Agent: **ZHANG, Yuanjia** et al.; Orrick, Herrington & Sut-
cliffe LLP, 2050 Main Street, Suite 1100, Irvine, California
92614-8255 (US).

(81) Designated States (*unless otherwise indicated, for every
kind of national protection available*): AE, AG, AL, AM,
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ,
CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO,
DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,
HR, HU, ID, IL, IN, IR, IS, IT, JO, JP, KE, KG, KH, KN,
KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD,
ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO,
NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW,

(54) Title: METHOD AND APPARATUS FOR DIGITAL FABRICATION AND STRUCTURE MADE USING THE SAME

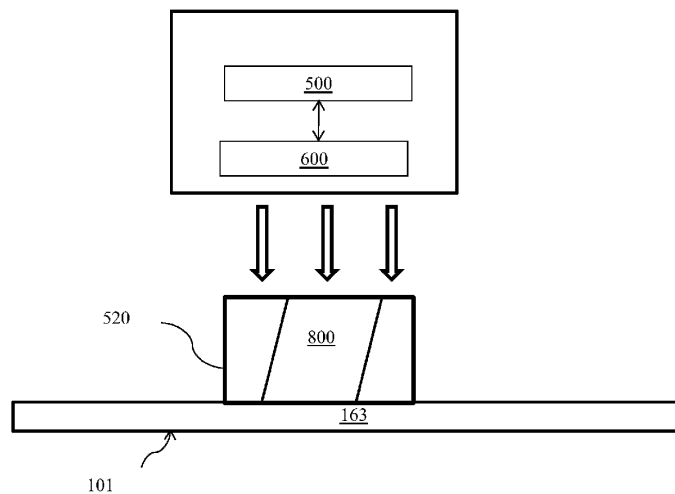


Fig. 30

(57) **Abstract:** A fabrication device includes a build surface to receive layers of material for production of a 3-dimensional solid representation of a digital model and an imaging component to bind respective portions of the build material into cross sections representative of portions of data contained in the digital model. The device can include a system to recirculate and/or homogenize material prior to use in the fabrication process. The device can include a system for controlling the density of the printed part. An exemplary object made by the fabrication device can include a powder composite component using any of a variety of powder materials. The exemplary object can be further post-processed to produce a high precision metal or ceramic component. The fabrication device can include a selective deposition unit for selectively depositing a supplemental build material at high resolution. The fabrication device can include an imaging unit with extended usage life.

[Continued on next page]

WO 2022/076902 A1

SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

Published:

— *with international search report (Art. 21(3))*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*