

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
16 June 2022 (16.06.2022)



(10) International Publication Number
WO 2022/124982 A1

(51) International Patent Classification:

B28B 1/00 (2006.01) **B29C 64/214** (2017.01)
B29C 64/209 (2017.01) **B33Y 30/00** (2015.01)
B29C 64/241 (2017.01) **B33Y 10/00** (2015.01)

(21) International Application Number:

PCT/SG2021/050631

(22) International Filing Date:

20 October 2021 (20.10.2021)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

10202012256X 08 December 2020 (08.12.2020) SG

(71) Applicants: **NANYANG TECHNOLOGICAL UNIVERSITY** [SG/SG]; 50 Nanyang Avenue, Singapore 639798 (SG). **CES_SDC PTE. LTD.** [SG/SG]; 171 Chin Swee Road, #12-01, CES Centre, Singapore 169877 (SG).

(72) Inventors: **LI, Mingyang**; c/o Nanyang Technological University, 50 Nanyang Avenue, Singapore 639798 (SG). **WENG, Yiwei**; c/o Nanyang Technological University, 50 Nanyang Avenue, Singapore 639798 (SG). **WONG, Teck Neng**; c/o Nanyang Technological University, 50 Nanyang Avenue, Singapore 639798 (SG). **TAN, Ming Jen**; c/o Nanyang Technological University, 50 Nanyang Avenue,

Singapore 639798 (SG). **TAN, Jun Shyong**; c/o CES_SDC PTE. LTD., 171 Chin Swee Road, #12-01, CES Centre, Singapore 169877 (SG).

(74) Agent: **CHINA SINDA INTELLECTUAL PROPERTY PTE LTD**; 133 Cecil Street, #12-01A, Keck Seng Tower, Singapore 069535 (SG).

(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, 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,

(54) Title: APPARATUS AND METHOD FOR CONCRETE ADDITIVE MANUFACTURING

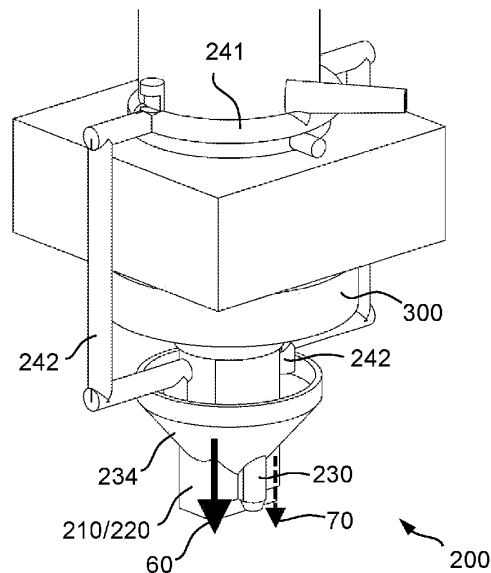


FIG. 3A

(57) Abstract: An apparatus and method for concrete additive manufacturing is disclosed in which the apparatus includes a housing coupleable to an actuator. The housing defines a main nozzle defining a main axis, in which the main nozzle is configured to extrude a flowable concrete material to form a concrete extrudate. The housing defines a first peripheral nozzle disposed adjacent to the main nozzle, with the first peripheral nozzle being configured to extrude a first bonding agent to form a first bonding agent extrudate. The housing is configured to be moveable by the actuator to undergo a movement along a curvilinear printing path, in which the movement includes a translational movement concurrent with a rotational movement about the main axis.

WO 2022/124982 A1

[Continued on next page]

TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
KM, ML, MR, NE, SN, TD, TG).

Published:

- *with international search report (Art. 21(3))*
- *in black and white; the international application as filed
contained color or greyscale and is available for download
from PATENTSCOPE*