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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
19 May 2022 (19.05.2022)

WIPO | PCT

(10) International Publication Number
WO 2022/103391 A1

(51) International Patent Classification:
C30B 15/14 (2006.01) *C30B 29/06* (2006.01)

(21) International Application Number:
PCT/US2020/060097

(22) International Filing Date:
12 November 2020 (12.11.2020)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant: **GLOBALWAFERS CO., LTD.** [CN/CN]; No. 8 Industrial East Road 2, Science-Based Industrial Park, Hsinchu (TW).

(72) Inventors: **BHAGAVAT, Sumeet S.**; 501 Pearl Drive, St. Peters, Missouri 63376 (US). **DAGGOLU, Parthiv**; 501 Pearl Drive, St. Peters, Missouri 63376 (US). **MEYER, Benjamin Michael**; 501 Pearl Drive, St. Peters, Missouri 63376 (US). **RYU, JaeWoo**; 501 Pearl Drive, St. Peters, Missouri 63376 (US).

(74) Agent: **SCHUTH, Richard A.** et al.; Armstrong Teasdale LLP, 7700 Forsyth Blvd., Suite 1800, St. Louis, Missouri 63105 (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, 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).

Published:
— *with international search report (Art. 21(3))*

(54) **Title:** INGOT PULLER APPARATUS HAVING A HEAT SHIELD DISPOSED BELOW A SIDE HEATER AND METHODS FOR PREPARING AN INGOT WITH SUCH APPARATUS

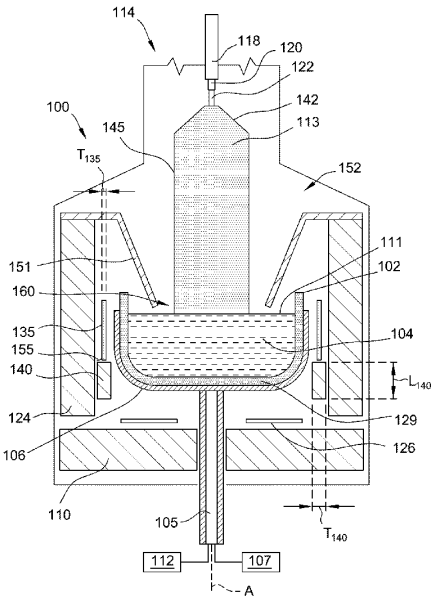


FIG. 2

(57) **Abstract:** Ingot puller apparatus having a heat shield disposed below a side heater and methods for preparing an ingot in such ingot puller apparatus are disclosed. In some embodiments, the side heater is relatively short. The side heater may be fully above a floor of the crucible when the crucible is in its lowest position in the ingot puller.

WO 2022/103391 A1