

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
21 July 2022 (21.07.2022)



(10) International Publication Number
WO 2022/154911 A1

(51) International Patent Classification:

E21B 7/15 (2006.01) *E21C 37/18* (2006.01)
E21B 7/14 (2006.01) *E21D 9/08* (2006.01)
E21C 37/16 (2006.01) *E21D 9/10* (2006.01)

(21) International Application Number:

PCT/US2021/062682

(22) International Filing Date:

09 December 2021 (09.12.2021)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

17/248,177 12 January 2021 (12.01.2021) US
17/449,456 29 September 2021 (29.09.2021) US

(71) Applicant: **EARTHGRID PBC** [US/US]; 2625 Alcatraz
Avenue #111, Berkeley, California 94705 (US).

(72) Inventor: **HELMING, Troy Anthony**; 5741 Buena Vista
Avenue, Oakland, California 94618 (US).

(74) Agent: **SZEPESI, Judith**; 99 Almaden Boulevard, Suite
575, San Jose, California 95113 (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

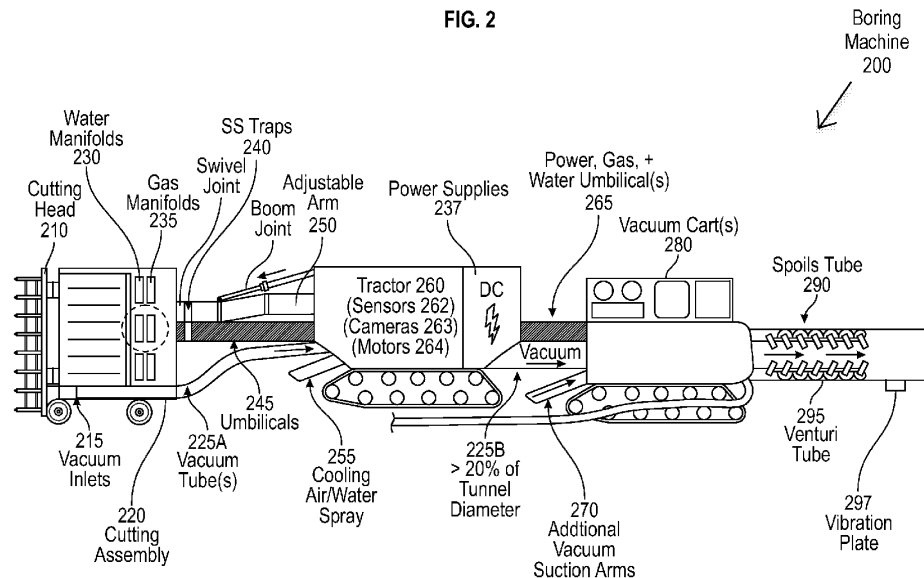
kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, 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: TUNNEL BORING SYSTEM

FIG. 2



(57) Abstract: A plasma tunnel boring machine including a plurality of plasma torches on the cutting head, and a plurality of nozzles on the cutting head to provide a stream to cool an area while the plasma torches are active, and a tractor providing propulsion to the cutting head, the tractor to move the cutting head to cut a tunnel.