

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
22 May 2020 (22.05.2020)



(10) International Publication Number
WO 2020/102552 A1

(51) International Patent Classification:

B32B 3/12 (2006.01) *C14C 9/00* (2006.01)
B32B 29/00 (2006.01) *D06M 23/16* (2006.01)
C07K 14/78 (2006.01)

(21) International Application Number:

PCT/US2019/061500

(22) International Filing Date:

14 November 2019 (14.11.2019)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

62/767,433 14 November 2018 (14.11.2018) US
62/782,277 19 December 2018 (19.12.2018) US

(71) Applicant: **BOLT THREADS, INC.** [US/US]; 5858 Horton Street, Suite 400, Emeryville, CA 94608 (US).

(72) Inventors: **WANG, Jessica**; c/o Bolt Threads, Inc., 5858 Horton Street, Suite 400, Emeryville, CA 94608 (US). **MUTALIK, Ritu, Bansal**; c/o Bolt Threads, Inc., 5858 Horton

Street, Suite 400, Emeryville, CA 94608 (US). **SMITH, Matthew, Jordan**; c/o Bolt Threads, Inc., 5858 Horton Street, Suite 400, Emeryville, CA 94608 (US). **SUBLER, Nicole, Elizabeth**; c/o Bolt Threads, Inc., 5858 Horton Street, Suite 400, Emeryville, CA 94608 (US). **MCKENZIE, La'Deva**; c/o BLC Leather Technology Centre, Ltd., Kings Park Road, Moulton Park, Northampton NN3 6JD (GB). **COLLINS, Isaac, Samuel**; c/o BLC Leather Technology Centre, Ltd., Kings Park Road, Moulton Park, Northampton NN3 6JD (GB). **FLOWERS, Karl**; c/o BLC Leather Technology Centre, Ltd., Kings Park Road, Moulton Park, Northampton NN3 6JD (GB). **ADDY, Victoria**; c/o BLC Leather Technology Centre, Ltd., Kings Park Road, Moulton Park, Northampton NN3 6JD (GB). **BAINBRIDGE, Jamie, McAusland**; c/o Bolt Threads, Inc., 5858 Horton Street, Suite 400, Emeryville, CA 94608 (US). **HEINRICH, Mitchell, Joseph**; c/o Bolt Threads, Inc., 5858 Horton Street, Suite 400, Emeryville, CA 94608 (US).

(74) Agent: **WIENS, Mayim et al.**; c/o Patent Administrator, Goodwin Procter LLP, 100 Northern Avenue, Boston, MA 02210 (US).

(54) Title: METHODS OF GENERATING MYCELIUM MATERIALS WITH IMPROVED PROPERTIES

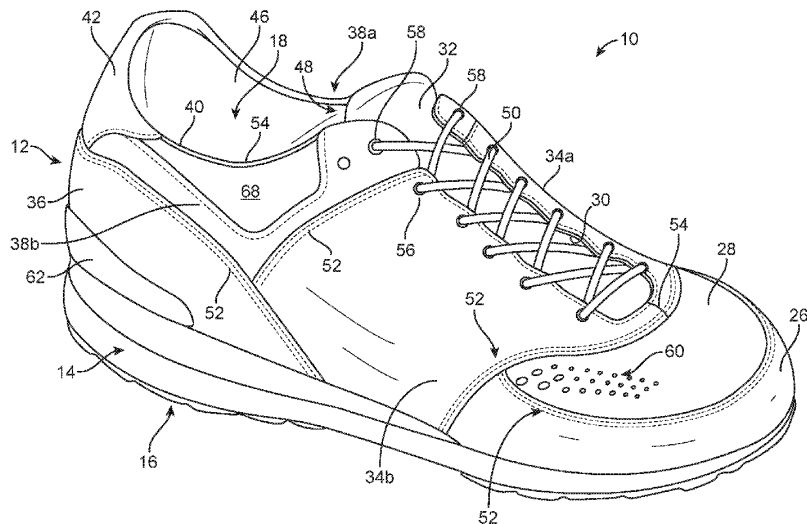


FIG. 1

(57) Abstract: Provided herein are compositions of mycelium material, and methods for production thereof. Also provided herein are articles of footwear includes an upper, a lasting board affixed with the upper to define an interior foot-receiving cavity therewith, and an outsole coupled with the upper opposite the lasting board. The upper includes at least a portion of a mycelium material that includes one or more proteins derived from an organism other than mycelium.

[Continued on next page]

(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, 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, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, 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:

— *of inventorship (Rule 4.17(iv))*

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))*