

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
31 October 2019 (31.10.2019)



(10) International Publication Number
WO 2019/209260 A1

(51) International Patent Classification:
A61M 5/315 (2006.01) *A61M 5/31* (2006.01)

(21) International Application Number:
PCT/US2018/029019

(22) International Filing Date:
24 April 2018 (24.04.2018)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant: **W. L. GORE & ASSOCIATES, INC.**
[US/US]; 555 Paper Mill Road, Newark, DE 19711 (US).

(72) Inventors: **CULLY, Edward, H.**; 940 N. Sinagua Heights Drive, Flagstaff, AZ 86004 (US). **GUNZEL, Edward, C.**; 341 Autumn Hill Drive, Oxford, PA 19363 (US). **SCOTTI, Christine, M.**; 4 Fairvalley Court, Newark, DE 19711 (US).

(74) Agent: **JOHNS, David, J.** et al.; W. L. Gore & Associates, Inc., 551 Paper Mill Road, P.O. Box 9206, Newark, DE 19714-9206 (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, 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,

(54) Title: MEDICAL DELIVERY DEVICES WITH INHIBITED OXYGEN PERMEATION

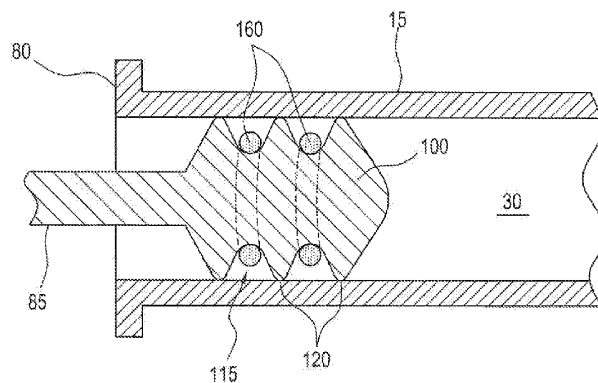


FIG. 7

(57) Abstract: The present disclosure relates to medical devices such as syringes, auto-injectors, and pens that inhibit oxygen permeation into the fluid chamber. The medical device includes a lubricant-free (*e.g.*, silicone) or a siliconized barrel having an interior surface defining a fluid chamber, an elastomeric stopper, and a plunger rod. In one embodiment, at least a portion of the interior surface of the barrel is reduced to increase the interference fit between the stopper and the barrel. In another embodiment, the stopper may include a plurality of ribs and a valley between each pair of ribs may include a ring member provided in each of the valleys. The ring member includes an oxygen-absorbing, an oxygen-adsorbing material, or both, to bind any oxygen that permeates into the syringe, auto-injector, or pen. In yet another embodiment, the stopper may include a barrier coating including an oxygen barrier material to inhibit or prevent oxygen permeation.

[Continued on next page]

WO 2019/209260 A1

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))*
- *of inventorship (Rule 4.17(iv))*

Published:

- *with international search report (Art. 21(3))*