



(51) International Patent Classification:

A61M 15/00 (2006.01) *A61M 11/00* (2006.01)
A61K 9/00 (2006.01) *A61M 11/06* (2006.01)
A61K 9/12 (2006.01) *A61M 11/08* (2006.01)

(21) International Application Number:

PCT/US2018/054721

(22) International Filing Date:

05 October 2018 (05.10.2018)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

62/569,901 09 October 2017 (09.10.2017) US
 62/639,911 07 March 2018 (07.03.2018) US

(71) Applicant: **PEARL THERAPEUTICS, INC.** [US/US];
 200 Cardinal Way, Redwood City, California 94063 (US).

(72) Inventors: **SHERWOOD, Jill**; 10201 Lobley Hill Lane,
 Raleigh, North Carolina 27613 (US). **DEATON, Dan**;
 9720 Horton Road, New Hill, North Carolina 27562 (US).
HIMEL, Denny; 135 Sterlindaire Drive, Cary, North Car-
 olina 27511 (US). **FOSTER, Brian**; 1484 Big Leaf Loop,
 Apex, North Carolina 27502 (US). **FERRITER, Matthew**;
 107 Wolfs Trail, Chapel Hill, North Carolina 27516 (US).
DWIVEDI, Sarvajna, Kumar; 409 Whisper Lane, Red-

wood City, California 94065 (US). **KING, Michael, L.**;
 3602 Randolph Road, Durham, North Carolina 27705 (US).
HAMLIN, Fred; c/o Cambridge Consultants Inc., 745 At-
 lantic Avenue, Boston, Massachusetts 02111 (US). **SHEE-
 HY, Robert, V., Jr.**; 38 Pine Bough Avenue, North At-
 tleboro, Massachusetts 02760 (US). **LIBBY, Gerard**; 100
 Cummings Center, Suite 233G, Beverly, Massachusetts
 01915 (US). **NEGI, Vipul**; 100 Cummings Center, Suite
 233G, Beverly, Massachusetts 01915 (US). **WOODARD,
 Kyle**; 100 Cummings Center, Suite 233G, Beverly, Massa-
 chusetts 01915 (US).

(74) Agent: **BARRETT, Jared, M.** et al.; Seed Intellectual
 Property Law Group LLP, Suite 5400, 701 Fifth Avenue,
 Seattle, Washington 98104-7064 (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.

(54) Title: DRUG DELIVERY SYSTEMS AND RELATED METHODS

(57) Abstract: Systems and methods for isolating and/or desiccating a portion of a drug deliv-
 ery tract of a drug delivery apparatus to reduce water vapor content therein are provided. For
 example, there is provided a metered dose inhaler for delivering aerosolized medicament or
 other matter to a user. The aerosolized medicament or other matter may be discharged from
 a discharge passageway within the inhaler into an inhalation passageway for inhalation by a
 user, and the inhaler may comprise a seal member operative to selectively isolate the discharge
 passageway from the inhalation passageway and external environment during inactivity. The
 inhaler may further comprise a desiccant material arranged to withdraw moisture from the iso-
 lated discharge passageway. In other instances, desiccant material may be arranged to withdraw
 moisture from the discharge passageway of the inhaler without isolating the discharge passage
 during inactivity.

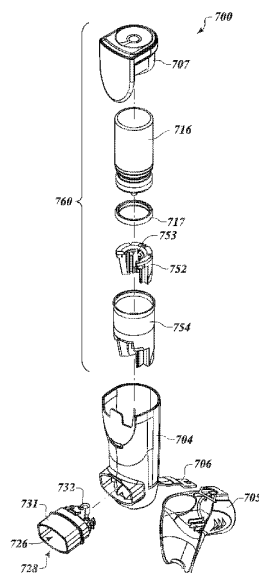


FIG. 20

(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:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

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