



- (51) International Patent Classification: **A61M 37/00** (2006.01) **A61K 9/00** (2006.01)
- (21) International Application Number: PCT/US2017/027879
- (22) International Filing Date: 17 April 2017 (17.04.2017)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 62/329,464 29 April 2016 (29.04.2016) US
- (71) Applicant: **KIMBERLY-CLARK WORLDWIDE, INC.** [US/US]; 2300 Winchester Road, Neenah, Wisconsin 54956 (US).
- (72) Inventors: **BAKER, Andrew T.**; 2300 Winchester Road, Neenah, Wisconsin 54956 (US). **ROSS, Russell F.**; 2300 Winchester Road, Neenah, Wisconsin 54956 (US). **GADS-**
- BY, Elizabeth Deibler**; 2300 Winchester Road, Neenah, Wisconsin 54956 (US).
- (74) Agent: **BRENNAN, Patrick E.** et al.; Armstrong Teasdale LLP, 7700 Forsyth Blvd., Suite 1800, St. Louis, Missouri 63105-1847 (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, 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,

(54) Title: MICRONEEDLE ARRAY ASSEMBLY, DRUG DELIVERY DEVICE AND METHOD FOR ADMINISTERING LIQUID ACROSS A BROAD AREA AT LOW PRESSURE

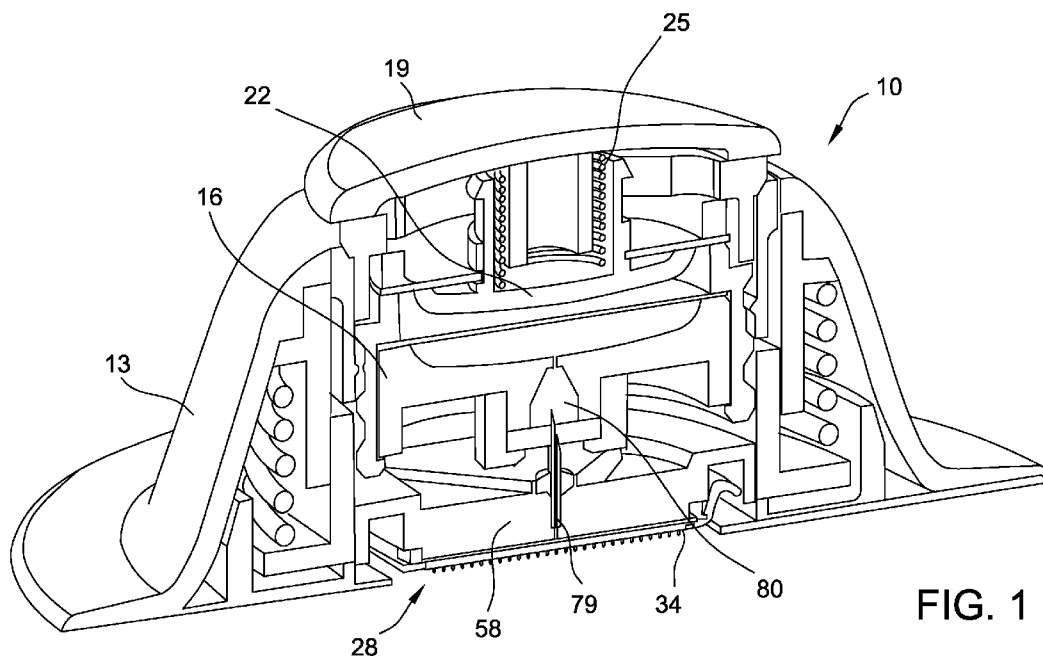


FIG. 1

(57) Abstract: A uniformity control membrane can be securely engaged against an upstream side of a microneedle array and configured so that resistance to flow through the uniformity control membrane is substantially greater than the resistance to flow through the microneedle array. These differences in flow resistance can facilitate uniform administration of a liquid formulation into the patient's skin across a broad area and at a relatively low pressure, such as by way of capillary action. The administration of the liquid formulation into the patient's skin across the broad area can result from the liquid formulation being administered by way of at least a majority of the microneedles of the microneedle array.



WO 2017/189258 A3

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))*
- *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))*

**(88) Date of publication of the international search report:**

07 December 2017 (07.12.2017)

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2017/027879**A. CLASSIFICATION OF SUBJECT MATTER**

A61M 37/00(2006.01)i, A61K 9/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

A61M 37/00; A61M 5/00; A61M 5/30; G01N 1/00; A61M 35/00; A61K 9/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models  
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) &amp; Keywords: microneedle, membrane, resistance, flow, pressure drop

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2013-0165861 A1 (ROSS, R. F.) 27 June 2013 See claims 1-14; paragraphs [0051]-[0143].	1-10, 15-23
Y		11-14
Y	WO 2015-168210 A1 (KIMBERLY-CLARK WORLDWIDE, INC.) 05 November 2015 See claims 1-16; paragraphs [0073]-[0074].	11-14
A	US 2008-0257071 A1 (WIMBERGER-FRIEDL, R. et al.) 23 October 2008 See the whole document.	1-23
A	US 2006-0184139 A1 (QUIGLEY, K. W. et al.) 17 August 2006 See the whole document.	1-23
A	US 2007-0043320 A1 (KENANY, S. A.) 22 February 2007 See the whole document.	1-23

 Further documents are listed in the continuation of Box C. See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search

30 October 2017 (30.10.2017)

Date of mailing of the international search report

**30 October 2017 (30.10.2017)**

Name and mailing address of the ISA/KR

International Application Division  
Korean Intellectual Property Office  
189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea

Facsimile No. +82-42-481-8578

Authorized officer

LEE, Dong Wook

Telephone No. +82-42-481-8163





**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2017/027879**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2013-0165861 A1	27/06/2013	EP 2563450 A2	06/03/2013
		EP 2563450 B1	26/07/2017
		EP 2563451 A2	06/03/2013
		EP 2563452 A2	06/03/2013
		EP 2563453 A2	06/03/2013
		EP 2563453 B1	08/02/2017
		EP 2563454 A2	06/03/2013
		EP 2563455 A1	06/03/2013
		JP 2013-524985 A	20/06/2013
		JP 2013-524986 A	20/06/2013
		JP 2013-524987 A	20/06/2013
		JP 2013-529100 A	18/07/2013
		JP 2013-532997 A	22/08/2013
		JP 2016-055196 A	21/04/2016
		JP 5860032 B2	16/02/2016
		JP 5860033 B2	16/02/2016
		JP 5860453 B2	16/02/2016
		JP 5868953 B2	24/02/2016
		JP 5871907 B2	01/03/2016
		KR 10-2013-0058012 A	03/06/2013
		KR 10-2013-0058703 A	04/06/2013
		KR 10-2013-0058704 A	04/06/2013
		KR 10-2013-0094213 A	23/08/2013
		KR 10-2013-0094214 A	23/08/2013
		US 2011-0270221 A1	03/11/2011
		US 2012-0187814 A1	26/07/2012
		US 2013-0144217 A1	06/06/2013
		US 2013-0144257 A1	06/06/2013
		US 2013-0150822 A1	13/06/2013
		US 2013-0158505 A1	20/06/2013
		US 2017-0143949 A1	25/05/2017
		US 9522262 B2	20/12/2016
		US 9522263 B2	20/12/2016
		US 9526883 B2	27/12/2016
		US 9545507 B2	17/01/2017
		US 9586044 B2	07/03/2017
		WO 2011-135530 A2	03/11/2011
		WO 2011-135530 A3	15/03/2012
		WO 2011-135531 A2	03/11/2011
		WO 2011-135531 A3	15/03/2012
		WO 2011-135532 A2	03/11/2011
		WO 2011-135532 A3	15/03/2012
WO 2011-135533 A2	03/11/2011		
WO 2011-135533 A3	12/04/2012		
WO 2012-020332 A2	16/02/2012		
WO 2012-020332 A3	18/05/2012		
WO 2012-046149 A1	12/04/2012		
WO 2015-168210 A1	05/11/2015	EP 3137153 A1	08/03/2017

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2017/027879**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		JP 2017-514574 A	08/06/2017
		KR 10-2016-0146842 A	21/12/2016
		US 2017-0120025 A1	04/05/2017
US 2008-0257071 A1	23/10/2008	EP 1960105 A1	27/08/2008
		JP 2009-517650 A	30/04/2009
		WO 2007-060580 A1	31/05/2007
US 2006-0184139 A1	17/08/2006	EP 1846086 A1	24/10/2007
		EP 1846086 B1	20/10/2010
		US 8328768 B2	11/12/2012
		WO 2006-088529 A1	24/08/2006
US 2007-0043320 A1	22/02/2007	WO 2006-086742 A2	17/08/2006
		WO 2006-086742 A3	29/11/2007