

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
5 April 2007 (05.04.2007)

PCT

(10) International Publication Number
WO 2007/038091 A3

- (51) **International Patent Classification:**
A61M 5/142 (2006 01)
- (21) **International Application Number:**
PCT/US2006/036498
- (22) **International Filing Date:**
18 September 2006 (18 09 2006)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
60/720,405 26 September 2005 (26 09 2005) US
60/720,411 26 September 2005 (26 09 2005) US
60/721,267 28 September 2005 (28 09 2005) US
- (71) **Applicant (for all designated States except US):** M2 MEDICAL A/S [DK/DK], Mesterlodden 42, DK-2820 Gentofte (DK)
- (72) **Inventors:** MERNOE, Morten, Hostvej 21, DK-2920 Charlottenlund (DK) WENGER, Mitchell, 1111 S Wabash #2701, Chicago, IL 60605 (US) CAUSEY, James, 642 Azure Hills Drive, Simi Valley, CA 93065 (US) KIRSCHEN, Todd, 1622 N Mountain View Pl, Fullerton, CA 92831 (US)
- (74) **Agents:** HAWKINS, Michael, T. et al, Fish & Richardson P C, P O Box 1022, Minneapolis, MN 55402-1022 (US)

- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM, AT, AU, AZ, BA, **BB**, BG, **BR**, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HN, **HR**, HU, **ID**, IL, IN, IS, **JP**, KE, KG, KM, KN, KP, **KR**, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, **PH**, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, 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, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, **BJ**, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

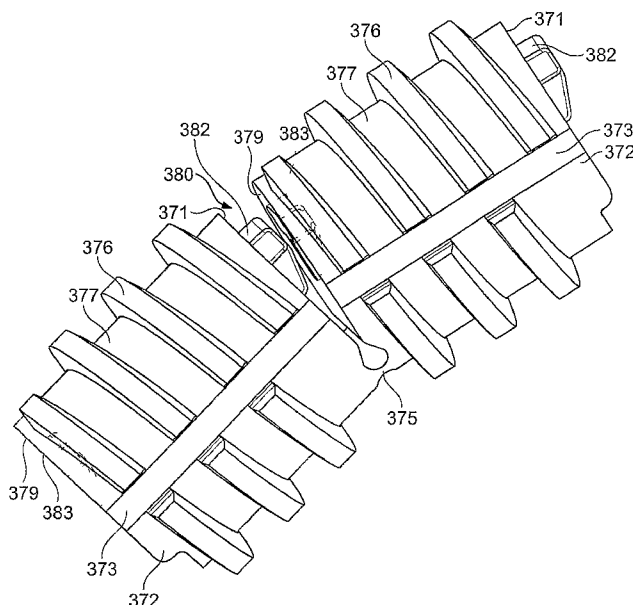
Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) **Date of publication of the international search report:**
18 October 2007

[Continued on next page]

(54) Title: PORTABLE INFUSION PUMP HAVING A FLEXIBLE PUSHROD WITH HINGED PORTIONS



(57) **Abstract:** Some embodiments of a medical infusion pump system include a pump device having a flexible pushrod that can adjust from a curved configuration to a generally straight configuration. The flexible pushrod is part of a drive system of the pump device so that the flexible pushrod can be controllably and incrementally advanced toward a medicine reservoir to incrementally dispense the medicine therein. In particular embodiments, the flexible pushrod may comprise an anti-rotation mechanism (373) an anti-torsion mechanism (380), or a combination thereof.

WO 2007/038091 A3



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/036498

A CLASSIFICATION OF SUBJECT MATTER INV. A61M5/142 ADD. A61M5/315		
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		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical search terms used) EPO-Internal		
C DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate of the relevant passages	Relevant to claim No
A	WO 2004/056412 A2 (M2 MEDICAL AS [DK]; MERNOEE MORTEN [DK]; LYNGSIE MICHAEL GORM [DK]) 8 July 2004 (2004-07-08) page 13, line 13 - page 14, line 25; figures 10-15 -----	1-11, 20-26
D Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> 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	"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	
"E" earlier document but published on or after the international filing date	"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	
"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)	"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	
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	
"P" document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the International search 2 March 2007	Date of mailing of the international search report 13/08/2007	
Name and mailing address of the ISA/ European Patent Office, P B 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel (+31-70) 340-2040, Tx 31 651 epo nl, Fax (+31-70) 340-3016	Authorized officer Krassow, Heiko	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2006/036498

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

see additional sheet(s)

Remark on Protest

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-11 and 20-26

Claims 1-11, and 20-26, essentially define an infusion pump system comprising

- 1) a pump housing and a drive system including a pushrod movable to apply a dispensing force to dispense medicine,
- 2) the pushrod including rod segments that are interconnected by hinge portions so that the pushrod is adjustable from a curved to a non-curved shape,
- 3) the pushrod including an anti-rotation mechanism, and
- 4) the pushrod including an anti-torsion mechanism.

2. claims: 12-19

Claims 12-19 essentially define an infusion pump system comprising the combination of features 1), 2) and 3) of group I), and

- 3) the an anti-rotation mechanism including two or more longitudinal channels extending through the rod elements.

3. claims: 27-37

Claims 27-37 essentially define an infusion pump system comprising the combination of features 1) and 2) of group I), and

- 3) the pushrod including an anti-elongation mechanism.

4. claims: 38-45

Claims 38-45 essentially define an infusion pump system comprising the combination of features 1) and 2) of group I), and

- 3) the hinge portions comprising a flexible wire.

5. claims: 46-52

Claims 46-52 essentially define an infusion pump system comprising the combination of features 1) and 2) of group I), and

- 3) the hinge portions comprising a hinge protrusion and a hinge receiver cavity that form a snap hinge assembly (cf. claim 47).

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2006/036498

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2004056412	A2	08-07-2004	
		AU 2003287926 A1	14-07-2004
		CN 1738656 A	22-02-2006
		EP 1583571 A2	12-10-2005
		JP 2006511263 T	06-04-2006
		US 2005273059 A1	08-12-2005
