



- (51) International Patent Classification:
F16K 31/06 (2006.01)
- (21) International Application Number:
PCT/US2012/032364
- (22) International Filing Date:
5 April 2012 (05.04.2012)
- (25) Filing Language:
English
- (26) Publication Language:
English
- (30) Priority Data:
61/472,844 7 April 2011 (07.04.2011) US
13/439,409 4 April 2012 (04.04.2012) US
- (71) Applicant (for all designated States except US): **INDI-MET INC.** [US/US]; 1 Barker Avenue, Suite 320, White Plains, NY 10601 (US).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **MEHTA, Shreyas, R.** [US/US]; 1 Barker Avenue, Suite 320, White Plains, NY 10601 (US).
- (74) Agent: **CHEN, David**; IP Attorneys Group, LLC, 16 Oxford Road, 2nd Floor, Milford, CT 06460 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

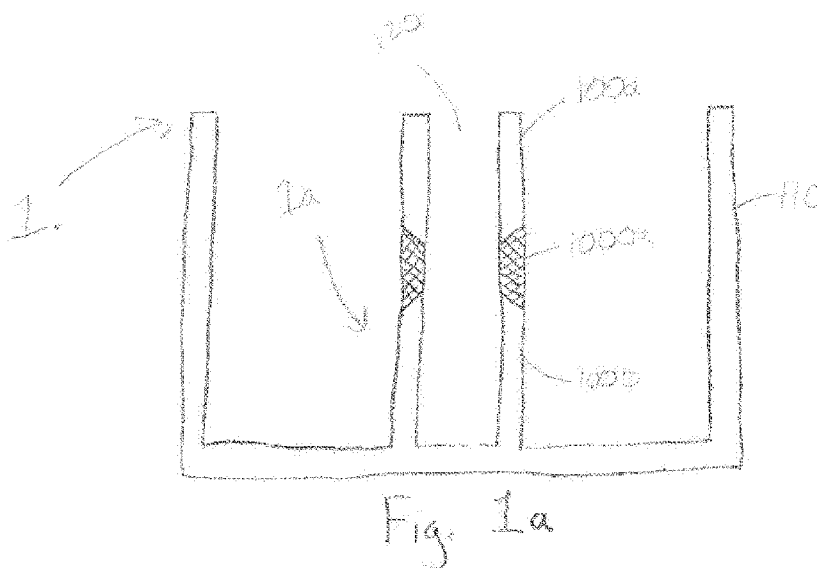
AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, 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, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, 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, ML, MR, NE, SN, TD, TG).

Published:
— with international search report (Art. 21(3))

(88) Date of publication of the international search report:
14 March 2013

(54) Title: SOLENOID HOUSING WITH ELONGATED CENTER POLE



(57) Abstract: The invention relates to a solenoid housing having an elongated center pole comprising a non-magnetic region thereon for allowing actuation of an armature in response to electric current and a method of the making said solenoid housing. The instant invention eliminates the need for a two-piece construction of the center pole, leading to a simplified fabrication process, increased performance of product solenoid housing, and increased operational lifetimes as well.



A. CLASSIFICATION OF SUBJECT MATTER***F16K 31/06(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)

F16K 31/06; F16K 31/02; H01F 7/20; F01L 9/02; A44B 9/00; H01F 7/08

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) & Keywords: solenoid, center, pole, recess

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 05986530 A (ANDREW H. NIPPERT et al.) 16 November 1999 See abstract, column 4 - column 5 and figure 1-7.	1,3 2,4-20
A	US 2008-0237520 A1 (KOUICHI SUGIYAMA et al.) 02 October 2008 See paragraph 19 - paragraph 39 and figures 1-7.	1-20
A	US 2009-0140189 A1 (TAKAHIRO KOKUBU et al.) 04 June 2009 See paragraph 14-17 and figures 1-3.	1-20
A	US 6640834 B1 (ERIC P. HAMKINS et al.) 04 November 2003 See claims 9-10, column 3 and figure 2.	1-20

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

* Special categories of cited documents:

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"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

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"&" document member of the same patent family

Date of the actual completion of the international search

22 OCTOBER 2012 (22.10.2012)

Date of mailing of the international search report

23 OCTOBER 2012 (23.10.2012)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
189 Cheongsu-ro, Seo-gu, Daejeon Metropolitan
City, 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

JUNG, JIN SOO

Telephone No. 82-42-481-3380



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/032364

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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