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[Continued on next page]

(54) Title: VALVES, PRESSURE SENSING DEVICES, AND CONTROLLERS FOR HEATING APPLIANCES

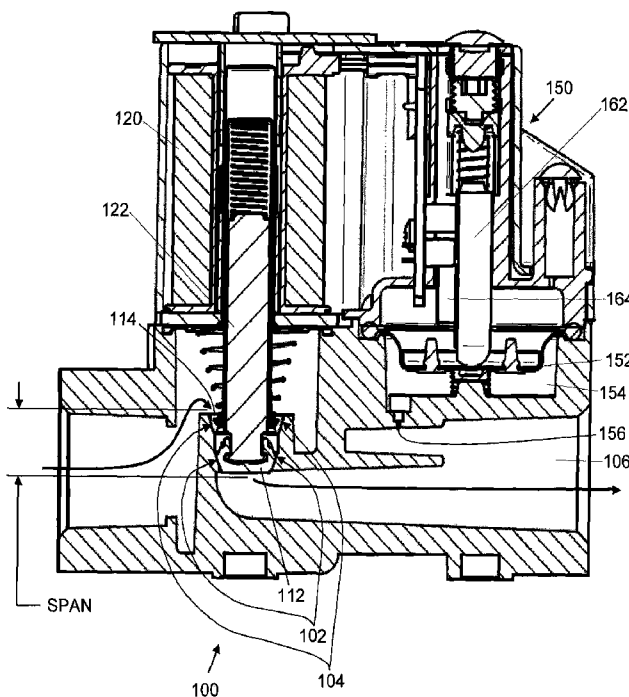


FIG. 1

(57) Abstract: A valve apparatus includes substantially co-aligned first and second valve seats and substantially co-aligned first and second valve members. The first valve member is moveable relative to the first valve seat between at least an open position in which the first valve member is spaced from the first valve seat and a closed position in which the first valve member is seated against the first valve seat. The second valve member is moveable relative to the second valve seat between at least an open position in which the second valve member is spaced from the second valve seat and a closed position in which the second valve member is seated against the second valve seat. An armature is operable for moving the first and second valve members, in response to a magnetic field generated by a coil.





SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG).

— 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))

Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

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

15 November 2012

Published:

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

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/022400**A. CLASSIFICATION OF SUBJECT MATTER*****F16K 17/16(2006.01)i, F16K 31/06(2006.01)i, F16K 37/00(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)

F16K 17/16; F16K 31/06; G08B 21/00; G05D 7/06; F16K 37/00; F16K 17/34; F16K 1/34

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: pressure, sensor, sensing, coil, armature, valve, seat, diaphragm, light, emitter

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 2009-0189101 A1 (TAKEDA TOMOHISA et al.) 30 July 2009 See paragraphs [0036]-[0049] and figures 1-2.	1-2 3-16, 19-39
A	US 2002-0044064 A1 (MASANORI MOGI) 18 April 2002 See abstract and figures 1, 7.	1-16, 19-39
A	US 05329956 A (MARRIOTT; WILLIAM D. et al.) 19 July 1994 See abstract and figures 1-2.	1-16, 19-39
A	US 2009-0260697 A1 (MEVIUS JASON S. et al.) 22 October 2009 See abstract and figure 1.	1-16, 19-39
A	US 6283145 B1 (FENN; GORDON) 04 September 2001 See column 3 line 22 - column 4 line 54 and figures 1-5.	1-16, 19-39

 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 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

"&" document member of the same patent family

Date of the actual completion of the international search

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Date of mailing of the international search report

19 SEPTEMBER 2012 (19.09.2012)

Name and mailing address of the ISA/KR

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2012/022400**Box No. 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.: 18
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:

Claim 18 refers to a multiple dependent claim that refers to other multiple dependent claims. Therefore, the meaning of the technical features to which it refers is vague and unclear

3. Claims Nos.: 17
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. 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:

1. Claims 1-20 directed to a valve apparatus.
2. Claims 21-35 directed to a pressure sensing apparatus for sensing a gas pressure within a gas appliance.
3. Claims 36-39 directed to a system for controlling a pressure in a pressurized volume within a valve apparatus.

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.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/022400

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