



(51) International Patent Classification:

F16J 1/00 (2006.01) *F15B 15/14* (2006.01)
F16J 10/02 (2006.01) *F16F 9/32* (2006.01)
F04B 33/00 (2006.01)

(21) International Application Number:

PCT/EP2012/000913

(22) International Filing Date:

27 February 2012 (27.02.2012)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

11075033.8 25 February 2011 (25.02.2011) EP

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(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.

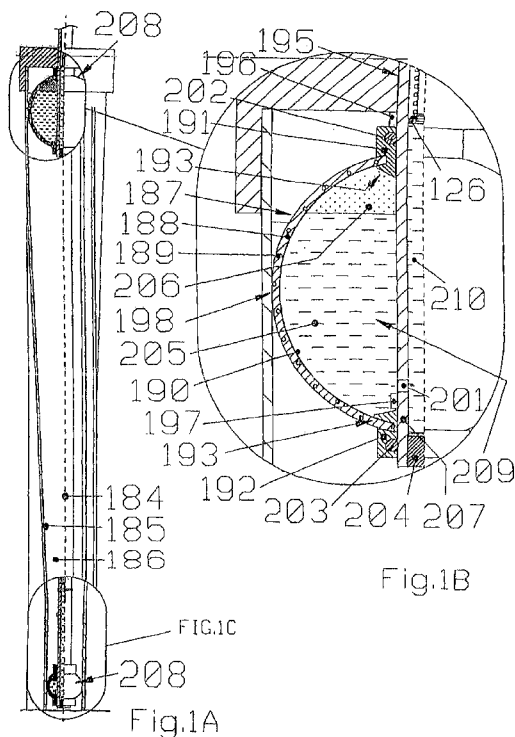
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, 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).

Declarations under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

[Continued on next page]

(54) Title: PISTON - CHAMBER COMBINATION - VANDERBLOM MOTOR



(57) Abstract: A piston-chamber combination comprising a chamber (186) which is bounded by an inner chamber wall (185) and comprising a piston inside said chamber to be engagingly movable relative to said chamber wall at least between a first-longitudinal position (208) and a second longitudinal position (208') of the chamber, said chamber (186) having cross-sections of different cross-sectional areas, said piston comprising a container (208, 208') which is elastically deformable and is produced to have a production-size of the container in the stress-free and undeformed state thereof in which the circumferential length of the piston is approximately equivalent to the circumferential length of said chamber (186) at said second longitudinal position (208'), the container being expandable from its production size in a direction transversally with respect to the longitudinal direction of the chamber thereby providing for an expansion of the piston from the production size thereof during the relative movements of the piston from said second longitudinal position (208') to said first longitudinal position (208), the container being elastically deformable to provide for different cross-sectional areas and circumferential lengths of the piston. This is accomplished by the combination comprises means for introducing fluid from a position outside (210) said container (208, 208') into said container, thereby enabling pressurization said container, and thereby expanding said container and displacing said container between second and first longitudinal positions of the chamber (186).



- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

(88) Date of publication of the international search report:
4 April 2013

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))*

(15) Information about Correction:

Previous Correction:
see Notice of 3 January 2013

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2012/000913

A. CLASSIFICATION OF SUBJECT MATTER

INV. F16J1/00 F16J10/02 F04B33/00 F15B15/14 F16F9/32
ADD.

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)

F16J F04B F15B F16F

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 practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2008/006147 A1 (BLOM NICOLAAS V D [DK] VAN DER BLOM NICOLAAS [DK]) 10 January 2008 (2008-01-10)	1-3, 5-28, 32-34, 104-113
Y	paragraphs [0108] - [0112], [0123], [0125] - [0127] figures 9A, 9B, 9C, 9D, 10A, 10B, 10C -----	4
Y	US 3 853 368 A (EICHELSHEIM A) 10 December 1974 (1974-12-10) column 5, lines 57-62 figures 2, 3 -----	4
Y	DE 29 04 805 A1 (SCHROEDER WERNER) 14 August 1980 (1980-08-14) page 7, lines 1-6 page 8, lines 8-12 figure ----- -/-	4

☒ 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

"&" document member of the same patent family

Date of the actual completion of the international search

26 November 2012

Date of mailing of the international search report

28/01/2013

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2012/000913

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 57 177409 A (HINO MOTORS LTD) 1 November 1982 (1982-11-01) abstract; figures 1-4 -----	4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2012/000913

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.:
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 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:

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 fees, this Authority did not invite payment of additional fees.
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.:

1-28, 32-34, 104-113

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-28, 32-34, 104-113

Piston-chamber combination comprising an actuator-piston having an elastically deformable container of which the volume can be expanded or reduced by introducing or exiting a fluid from the container and a chamber having a channel for fluid communication at positions adjacent the actuator-piston.

2. claims: 29-31

Constructional details regarding a crank that can be coupled to the actuator piston.

3. claims: 35-39

Constructional details regarding the shape of the chamber.

4. claims: 40-45

Constructional details regarding shock absorbers.

5. claims: 46-49

Constructional details regarding pumps for pumping a fluid.

6. claims: 50-82, 114-133

Constructional details regarding motors that can be attached to the actuator piston.

7. claims: 83-103

Actuator piston comprising substantially stiff but bendable support members.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2012/000913

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2008006147	A1	10-01-2008	NONE
US 3853368	A	10-12-1974	NL 7215364 A 15-05-1974 US 3853368 A 10-12-1974
DE 2904805	A1	14-08-1980	NONE
JP 57177409	A	01-11-1982	JP 57177409 A 01-11-1982 JP 61024230 B 10-06-1986