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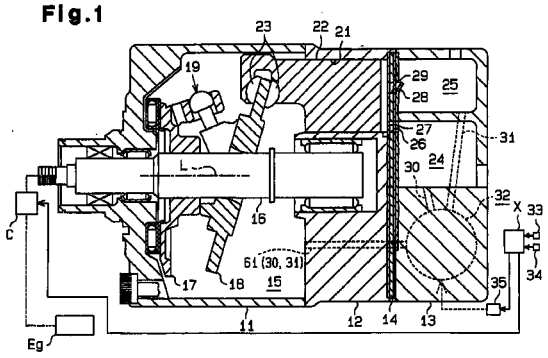
(54) Displacement control valve for variable displacement type compressors

(57) A control valve for a variable displacement type compressor includes a movable body (43) supported by the housing (38) such that the movable body (43) moves in the housing (38). The movable body (43) includes a first valve hole (46) that forms part of a bleed passage (30). A first valve body (41) adjusts the opening of the first valve hole (46). The first valve body (41) abuts against the movable body (43) such that the first valve hole (46) is closed. A second valve hole (49) extends in the housing (38) and forms part of a supply passage (31). A second valve body (48) adjusts the opening of the second valve hole (49). The second valve body (48) is movable integrally with the movable body (43). When the movable body (43) is located at an initial position, the second valve body (48) closes the second valve hole (49). However, when the first valve body (41) separates the movable body (43) from the initial position while abutting against the movable body (43), the second valve body (48) is moved to open the second valve hole (49). In this control valve, the first valve hole (46) and the second valve hole (49) are never open at the same time. Furthermore, the control valve controls the compressor displacement with high accuracy and an responsiveness.

Fig.1



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EUROPEAN SEARCH REPORT

Application Number
EP 00 10 4150

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
D,A	US 5 332 365 A (TAGUCHI YUKIHIKO) 26 July 1994 (1994-07-26) * abstract * * column 4, line 66 - column 8, line 52 * * column 13, line 23 - column 15, line 33; figures 1-3,7 *	1,3-9,13	F04B27/18
A	EP 0 498 552 A (SANDEN CORP) 12 August 1992 (1992-08-12) * abstract * * column 19, line 26 - column 32, line 44; figures 3-6 *	1,4-9,13	
A	US 4 606 705 A (PAREKH DINESH V) 19 August 1986 (1986-08-19) * abstract * * column 2, line 12 - column 4, line 59 * * figures *	1,4-9	
A	US 4 860 549 A (MURAYAMA KOJI) 29 August 1989 (1989-08-29) * abstract * * column 5, line 37 - column 6, line 36 * * figure 2 *	1,4-6,8,9	TECHNICAL FIELDS SEARCHED (Int.Cl.7) F04B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	21 November 2000	Kolby, L

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21-11-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5332365 A	26-07-1994	JP 5099136 A	20-04-1993
		AU 659217 B	11-05-1995
		AU 2620792 A	08-04-1993
		CA 2080066 A,C	08-04-1993
		EP 0536989 A	14-04-1993
		US RE35672 E	25-11-1997
EP 0498552 A	12-08-1992	JP 4252877 A	08-09-1992
		JP 4262074 A	17-09-1992
		AU 639385 B	22-07-1993
		AU 1049692 A	30-07-1992
		CA 2060130 C	13-08-1996
		CN 1064731 A,B	23-09-1992
		DE 69200356 D	06-10-1994
		DE 69200356 T	16-02-1995
		KR 9703250 B	15-03-1997
		SG 9590720 A	01-09-1995
		US 5242274 A	07-09-1993
US 4606705 A	19-08-1986	NONE	
US 4860549 A	29-08-1989	JP 7084865 B	13-09-1995
		JP 63150477 A	23-06-1988
		AU 591006 B	23-11-1989
		AU 8262687 A	16-06-1988
		KR 9310465 B	25-10-1993

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82