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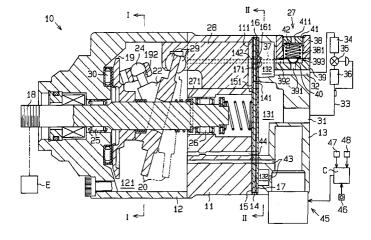
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## (54) By-pass device in variable displacement compressor

(57) A by-pass device in a variable displacement compressor has a by-pass passage, a valve body and a deformable separator. The by-pass passage interconnects a discharge pressure region with a crank chamber for releasing refrigerant from the discharge pressure region to the crank chamber. The valve body is arranged in the by-pass passage for opening and closing the by-pass passage. The deformable separator separates a

back pressure region from the by-pass passage without sliding. The valve body is urged from a side of an opened position where the valve body is spaced from a valve seat toward a side of a closed position where the valve body contacts with the valve seat by pressure applied from the back pressure region to the separator. The valve body is moved from the closed position to the opened position by deforming the deformable separator.

FIG. 1





## **EUROPEAN SEARCH REPORT**

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|  | Citation of dog.   | CLASSIFICATION OF THE  |  |   |  |  |  |
|--|--|--|--|---|--|--|--|
| Category   | Citation of document with indicatio of relevant passages   | п, where арргорпате,   | Relevant<br>to claim   | APPLICATION (Int.Cl.7)                    |  |  |  |
| Y  | PATENT ABSTRACTS OF JAP<br>vol. 012, no. 120 (M-68<br>14 April 1988 (1988-04-<br>& JP 62 247186 A (TOYOD<br>LTD), 28 October 1987 (            | 5),<br>14)<br>A AUTOM LOOM WORKS   | 1-8,10,  | F04B27/18                                 |  |  |  |
| Υ  | * abstract *   |  | 9  |   |  |  |  |
| Y  | PATENT ABSTRACTS OF JAP<br>vol. 2000, no. 07,<br>29 September 2000 (2000<br>& JP 2000 111177 A (TOY<br>WORKS LTD), 18 April 20<br>* abstract * | -09-29)<br>OTA AUTOM LOOM  | 1-8,10,  |   |  |  |  |
| Υ  | EP 1 033 490 A (KABUSHI<br>JIDOSHOKKI SEISAKUSHO;<br>6 September 2000 (2000-<br>* paragraph [0062] *   | KABUSHIKI KAISHA)  | 9  |   |  |  |  |
| A  | PATENT ABSTRACTS OF JAP vol. 018, no. 563 (M-16 27 October 1994 (1994-1 & JP 06 200875 A (TOYOT LTD), 19 July 1994 (199 * abstract *           | 93),<br>0-27)<br>A AUTOM LOOM WORKS  | 1  | TECHNICAL FIELDS SEARCHED (Int.CI.7) F04B |  |  |  |
|  | The present search report has been dr  | awn up for all claims  |  |   |  |  |  |
| Place of search  |  | Date of completion of the search   |  | Examiner                                  |  |  |  |
|  | Munich   | 26 July 2005   | 1 11   | stas, N                                   |  |  |  |
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EP 04 01 1301

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26-07-2005

|    | atent document<br>d in search report |   | Publication date |          | Patent family member(s) | Publication date   |
|----|--------------------------------------|---|------------------|----------|-------------------------|--------------------|
| JP | 62247186                             | Α | 28-10-1987       | JP<br>JP | 1912349<br>6031614      | 09-03-1<br>27-04-1 |
| JP | 2000111177                           | Α | 18-04-2000       | EP<br>US | 0992747<br>6250094      | 12-04-2<br>26-06-2 |
| EP | 1033490                              | Α | 06-09-2000       | JP<br>EP | 2000249051<br>1033490   | 12-09-2<br>06-09-2 |
| JP | 06200875                             | Α | 19-07-1994       | NONE     |                         | <br>               |
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