(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 592 811 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **93114477.8**

(51) Int. Cl.5: **F04B 39/00**, F04B 39/10

(22) Date of filing: **09.09.93**

(30) Priority: **16.10.92 IT MI922385**

(43) Date of publication of application:
20.04.94 Bulletin 94/16

(84) Designated Contracting States:
DE FR GB

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(54) Valve device associated with the muffler of a motor-compressor unit.

(57) A valve device associated with the usual muffler (7) of a motor-compressor unit, for example of hermetically sealed type used in a refrigerator, comprises a valve plate (1) with usual apertures (2) communicating with a usual cylinder within which the piston of the motor-compressor unit moves, on said apertures (2) there being provided valve members. These latter each comprise an element (18) freely arranged in a corresponding seat (17) provided in the valve plate (1) in correspondence with a respective aperture (2) and movable at least within a portion (20) of said seat (17) against a pressing member (23), sectional planes (X, Y) parallel to each other and to one of the largest faces (15) of the valve plate (1) defining, in correspondence at least with the portion (17) in which the free element (18) moves, geometrical figures which enclose the same area and have the same form.

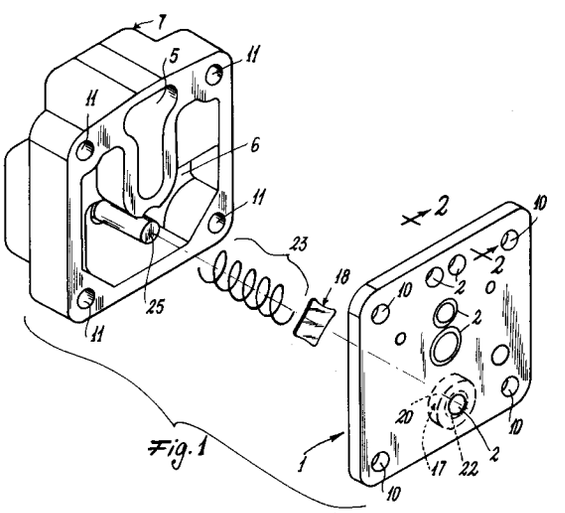

Fig. 1

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This invention relates to a valve device associated with the usual muffler of a motor-compressor unit, for example of hermetically sealed type used in a refrigerator, comprising a valve plate provided with usual apertures for connecting the chambers of said muffler to the usual cylinder within which the piston of the motor-compressor unit moves in known manner, said apertures being interceptable by corresponding valve members.

As is well known, said valve members are of various shapes and dimensions and are formed by very different methods. However these known arrangements require special operations to be carried out during assembly (such as fixing at least part of each valve member to the plate or deforming the valve member) which negatively affect the production cost of the complete valve plate and the time required for its construction. In addition, known valve members are often subjected to flexural stress, with the result that such members have to be constructed of particularly strong material, the cost and machining of which negatively influence the total production cost of the respective valve device and hence of the motor-compressor unit of which it forms part.

An object of the present invention is to provide a valve device for association with the muffler of a motor-compressor unit, which is of simple construction and is of lower production and installation cost than known analogous devices.

A further object is to provide a device in which the valve members are not subjected to mechanical stress such as to compromise their mechanical stability and their life.

A further object is to provide a device of the aforesaid type which can be at least partly constructed of different materials, allowing considerable versatility of choice and enabling the constructional cost of the device to be limited.

These and further objects which will be apparent to the expert of the art are attained by a device of the aforesaid type as described in the characterising part of the independent claim.

The present invention will be more apparent from the accompanying drawing, which is provided by way of non-limiting example and in which:

Figure 1 is an exploded view of a device according to the invention, associated with the usual muffler of a motor-compressor unit;

Figure 2 is a section on the line 2-2 of Figure 1.

With reference to said figures, the device according to the invention comprises a valve plate 1 provided with usual apertures or passages 2 passing through the body 3 of said plate, said apertures connecting the usual cylinder within which the corresponding compressor piston (not shown) moves, to usual chambers 5 and 6 provided in a known muffler 7. The plate 1 comprises through holes 10 for receiving usual fixing screws (not shown) by which the plate is fixed to the muffler 7, this latter being provided with a like number of holes 11 arranged coaxially with the holes 10 of said plate.

In that plate face 15 which at least partly rests directly on the muffler 7, there is provided in correspondence with each aperture 2 a seat 17 for receiving a flat element 18 acting as the valve member associated with said aperture 2. The seat 17 comprises at least one cylindrical portion 20 in which the element 18 moves, and an annular recess 21 defining a raised edge 22 present about the mouth of the aperture 2 in the plate 1. The element 18 rests on this edge to close the aperture 2 during one stage in the operation of the motor-compressor unit.

The element 18 is subjected to the thrust action of a pressing element or member 23 defined by a helical compression spring mounted on a pin 25 associated with the muffler 7 and acting as a guide for the movement of the spring.

At least the portion 20 of the seat 17 is of regular section, ie is formed such that all the sectional planes X, Y which are parallel to each other and to the largest face 15 of the plate 1 define in correspondence with said portion geometrical figures which enclose the same area and have the same form. Specifically, in the embodiment shown in Figures 1 and 2 said planes X and Y (and every other plane parallel thereto) define circles in correspondence with the portion 20.

During compressor operation, the valve elements or members 18 move freely within their seats 17 (or within the portions 20) against the corresponding springs in a manner depending on whether the piston is in the suction or compression stage within the cylinder with which the plate 1 is associated. These elements are specifically guided during this movement by the wall 20A of the corresponding portion. This results in optimum intake or discharge of the fluid to be compressed, and on which the piston 3 of the motor-compressor unit operates.

Said members 18 are therefore not subjected to flexural stress, but only to forces directed along the axis K perpendicular to them.

The life of these members is therefore improved, as is the reliability of the motor-compressor unit.

One embodiment of the invention has been described. Other embodiments are however possible and achievable by the expert of the art on the basis of this description, these embodiments all falling within the scope of the present invention.

Claims

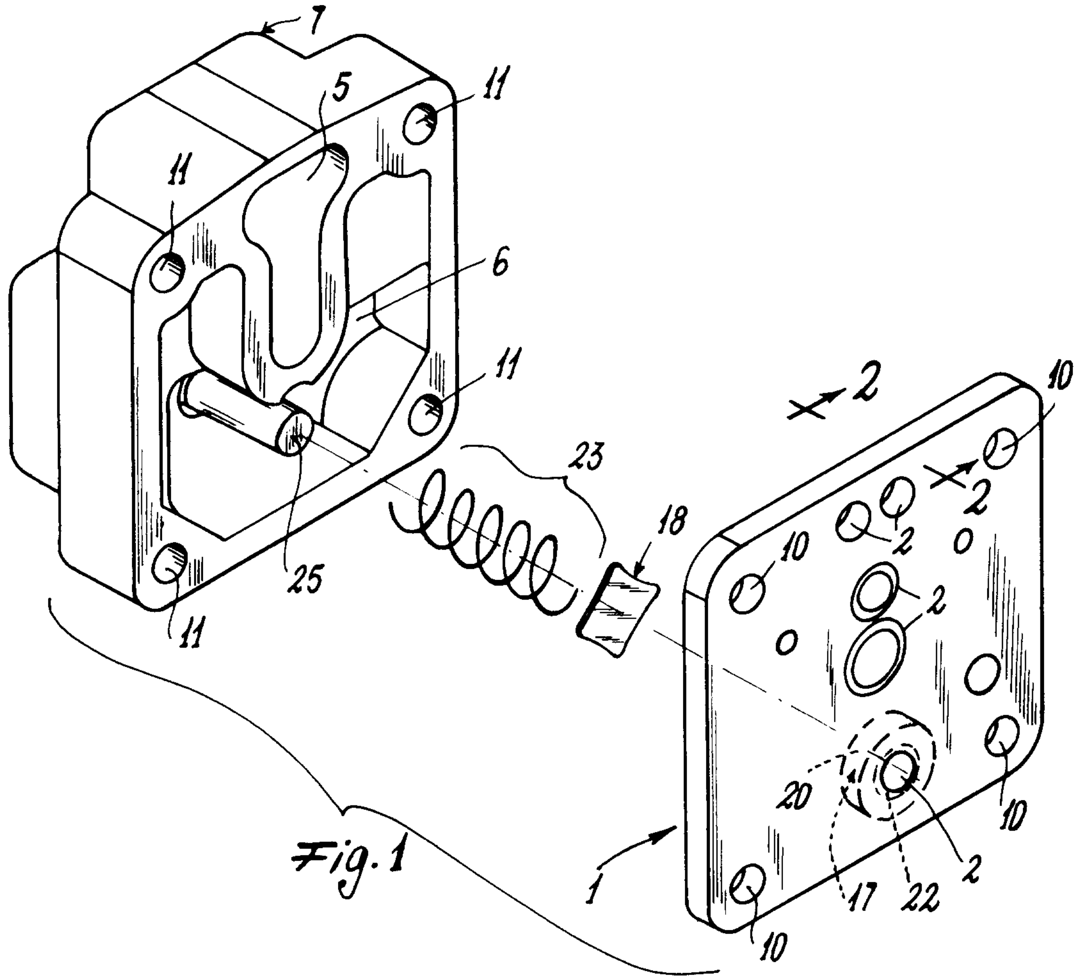
1. A valve device associated with the usual muffler of a motor-compressor unit, for example of hermetically sealed type used in a refrigerator. comprising a valve plate with usual apertures connecting the chambers in said muffler to a usual cylinder within which the piston of the motor-compressor unit moves in known manner, said apertures being interceptable by corresponding valve members, characterised in that said valve members each comprise an element (18) freely arranged in a corresponding seat (17) provided in the valve plate (1) in correspondence with a respective aperture (2), said element moving at least within a portion (20) of said seat (17) against a pressing member (23) arranged to maintain it in the position in which it intercepts the corresponding aperture (2), sectional planes (X, Y) parallel to each other and to one of the largest faces (15) of the valve plate (1) defining, in correspondence at least with the portion (17) in which the free element (18) moves, geometrical figures which enclose the same area and have the same form.

2. A device as claimed in claim 1, characterised in that the pressing member is a compression spring (23) associated with a support pin (25) for the muffler (7).

3. A device as claimed in claim 1, characterized in that the seat (17) for each free element (18) comprises an annular recess (21) provided about a raised edge (22) of the aperture (2) in which said element lies, this latter resting on said edge to intercept said aperture.

4. A device as claimed in claim 1, characterised in that the form of the geometrical figures defined by the sectional planes (X, Y) is that of a circle.

5. A device as claimed in claim 1, characterised in that the wall (20) of the seat (17) in which the free element (18) moves also acts as a guide for the movement of this latter against the pressing member (23).


7
5
11
11
6
11
23
18
25
11
10
2
2
2
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2
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20
10
17
22
2
1
10

Fig.1

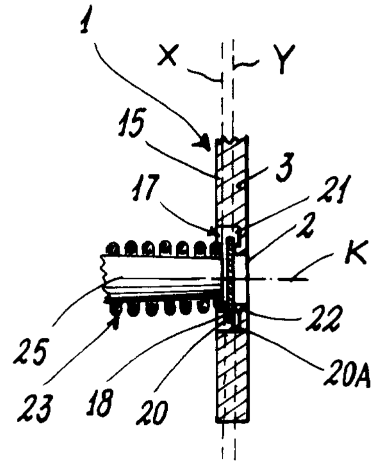
1
X
Y
15
3
17
21
2
K
25
22
23
18
20
20A

Fig. 2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 93 11 4477

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.5)
X	DE-A-40 00 275 (EMPRESA BRASILEIRA DE COMPRESSORES) * column 4, line 68 - column 5, line 29; figures 5,6 *	1-5	F04B39/00 F04B39/10
A	US-A-1 939 801 (WELLS) * page 1, line 40 - line 76; figures 1-3 *	1-5	
A	US-A-2 176 691 (SIMONS) * page 1, right column, line 7 - line 55; figures 1,2 *	1-5	
A	FR-A-1 357 621 (HINTZE) * page 2, left column, line 42 - right column, line 7; figures 1,2 *	1-5	
A	DE-C-921 606 (SCHULZE) * figures 1,2 *	1	
A	PATENT ABSTRACTS OF JAPAN vol. 9, no. 264 (M-423)(1987) 22 November 1985 & JP-A-60 111 073 (SANWA SEIKI) 17 June 1985 * abstract *	1-5	

TECHNICAL FIELDS SEARCHED (Int.Cl.5)

F04B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	17 January 1994	BERTRAND, G

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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