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(54) Compensator valve for freezers

(57) A pressure compensator valve (5, 10) for freezers or refrigerators which connects the freezer preservation compartment to the external environment, characterised by being formed from a blade-like valving element (12) subjected on one side to the pressure in the preservation compartment (2) and on the other side to the pressure of the external environment, said blade-like valving element controlling the intercommunicating passageway (5, 10) within which it is interposed, in the sense of at least reducing the pressure difference.

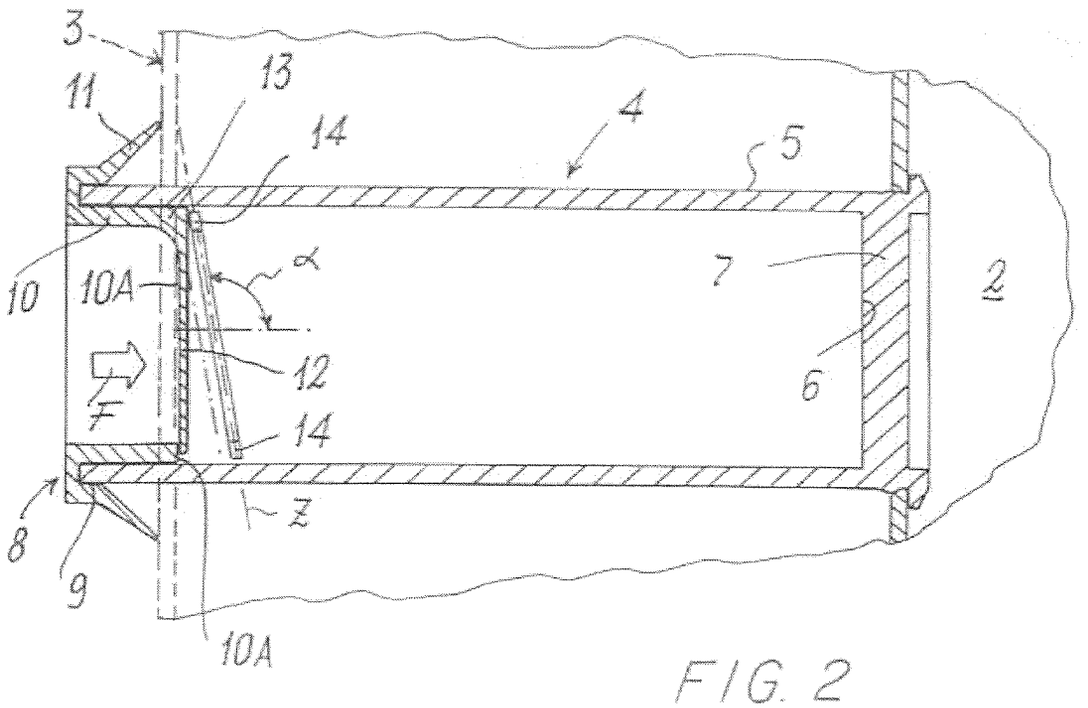

FIG. 2

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Description

[0001] The present invention relates to a compensator valve for freezers or refrigerators, to compensate the pressure difference between the external environment and the preservation compartment of the freezer or refrigerator.

[0002] The pressure difference between the external environment (at atmospheric pressure) and the preservation compartment (at lower pressure) opposes the opening of the door which closes said compartment, making this operation relatively fatiguing.

[0003] To reduce such fatigue, solutions have already been devised for compensating (i.e. annulling) this difference. A known solution, described in Japanese Patent Application No. 04146344 filed on 12/05/92 and published on 22/11/93 comprises a conduit connecting the preservation compartment to the external environment. The conduit is positioned within the door and contains a valve linked to the (rotatable) handle which firstly opens the valve and then, on termination of its travel, opens the door.

[0004] This known solution has its main drawback in its relative constructional complexity and hence cost, resulting in considerable economical disadvantage in consideration of the mass of freezers or refrigerators produced.

[0005] The main object of the present invention is to provide a compensator valve which can be considered automatic in the sense of not comprising any linkages and not depending on the opening of the door.

[0006] This and further objects which will be more apparent from the ensuing detailed description are attained by a compensator valve in accordance with the technical teachings of the accompanying claims.

[0007] The invention will be more apparent from the following detailed description of a preferred embodiment thereof provided by way of nonlimiting example and illustrated in the accompanying drawings, in which:

Figure 1 is a partly sectional schematic view of the rear wall of a freezer with the compensator valve of the invention incorporated;

Figure 2 shows the valve of the invention in axial section.

[0008] In the figures the reference numeral 1 indicates overall a freezer which in the illustrated example is specifically of front-opening type. The freezer presents the conventional preservation compartment 2 defined by conventional heat insulated walls, of which the rear wall 3 is shown enlarged in Figure 1, it being that wall in which the compensator valve 4 of the present invention is preferably located.

[0009] The valve 4 comprises a tubular body 5 made of preferably rigid engineering polymer, for example ABS, which passes from one side to the other of the rear wall 3 and is incorporated into this wall. One of the ends of said body comprises an end wall 6 provided with a series of more or less minuscule apertures 7 which connect the interior of the tubular body 5 to the preservation compartment 2. Over its other end (the end projecting from the rear wall 3) there is elastically drawn an element 8 made of elastic material, for example natural or synthetic rubber, thermoplastic elastomers or the like. For this purpose the elastic element 8 presents an annular groove 9 and a cylindrical central part 10 penetrating into the tubular body 5. To provide a necessary and suitable seal, the elastic element 8 presents a conventional conical sealing edge 11 which, when in use, rests and presses against the outer side of the rear wall 3.

[0010] According to the most important aspect of the present invention, the elastic element 8 presents at the end or base of its cylindrical central part 10 a thin blade-like valving element in the form of a circular tongue 12 connected along a small peripheral region, at 13 in the drawing, to said cylindrical central part 10, whereas its remaining periphery rests, when in the configuration prior to its mounting, on the inner (end) contour 10A of the cylindrical part 10. At a certain small distance from the edge of the tubular body 5 on which the elastic element 8 is mounted, there are positioned two stops 14 in the form of two ribs shaped as a circular arc (less than a semicircle) which emerge from the inner wall of the tubular body 5 and are contained within a plane Z forming a given angle α (for example of about 100'I) with the axis of the tubular body 5. The tongue 12 rests when in its operative state against the two circular arc-shaped stops 14 of the tubular body 5 to completely close the passage cross-section of the tubular body 5.

[0011] To achieve the operative state, the circular tongue 12 has merely to be pushed with a force F to cause it to pass, by virtue of its deformability, beyond the two stops 14 so that they abut against them.

[0012] When under (pressure) equilibrium conditions the tongue 12 intercepts the passage cross-section of the cylindrical part 10, by sealedly resting against the two ribs 14.

[0013] When the pressure in the compartment 2 falls below the external pressure, the tongue 12 deflects towards the right (with reference to Figure 2) to separate, at its free end, from the stops 14 against which it rested, so leaving between the compartment 2 and the external environment a free passageway which (at least partly) compensates the two different pressures.

[0014] The scope of the invention includes any other location of the valve unit described and represented in detail in Figure 2. For example the unit can be located in the roof or in the side walls of the compartment 2, or even in the relative door.

[0015] The freezer can also be of chest type.

Claims

1. A pressure compensator valve (5, 10) for freezers

or refrigerators which connects the freezer preservation compartment to the external environment, **characterised by** being formed from a blade-like valving element (12) subjected on one side to the pressure in the preservation compartment (2) and on the other side to the pressure of the external environment, said blade-like valving element controlling the intercommunicating passageway (5, 10) within which it is interposed, in the sense of at least reducing the pressure difference.

2. A valve as claimed in claim 1, wherein the passageway comprises a tubular body (5) passing through a wall (3) or door of the freezer or refrigerator and communicating with the preservation compartment (2) via a rigid end wall (6) provided with at least one aperture (7), the blade-like valving element (12) being flexibly connected to an elastic element (8) coupled to the tubular body (5) on the external environment end.

3. A valve as claimed in claim 2, wherein the blade-like valving element is a flat tongue (12) forming part of the elastic element (8) and arranged to intercept stops (14) in the form of circular arc-shaped ribs integral with the inner wall of the tubular body (5).

4. A valve as claimed in claim 3, wherein said stops (14) present a predetermined inclination to a plane perpendicular to the tubular body (5).

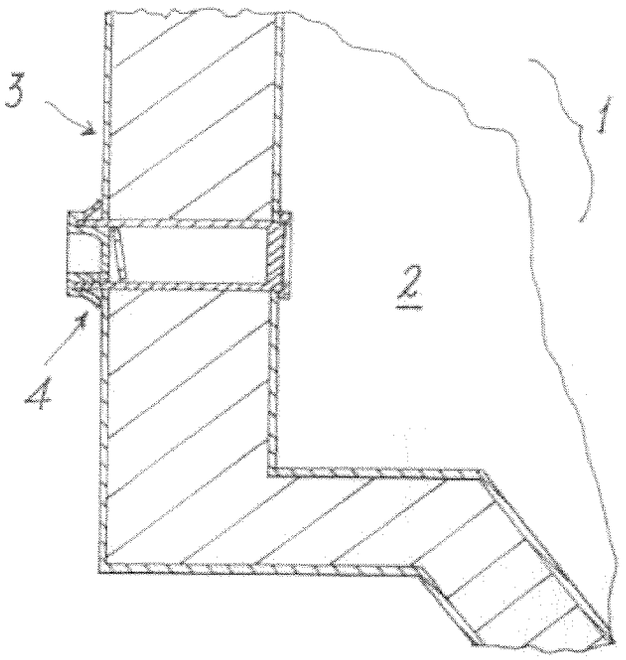

FIG. 1

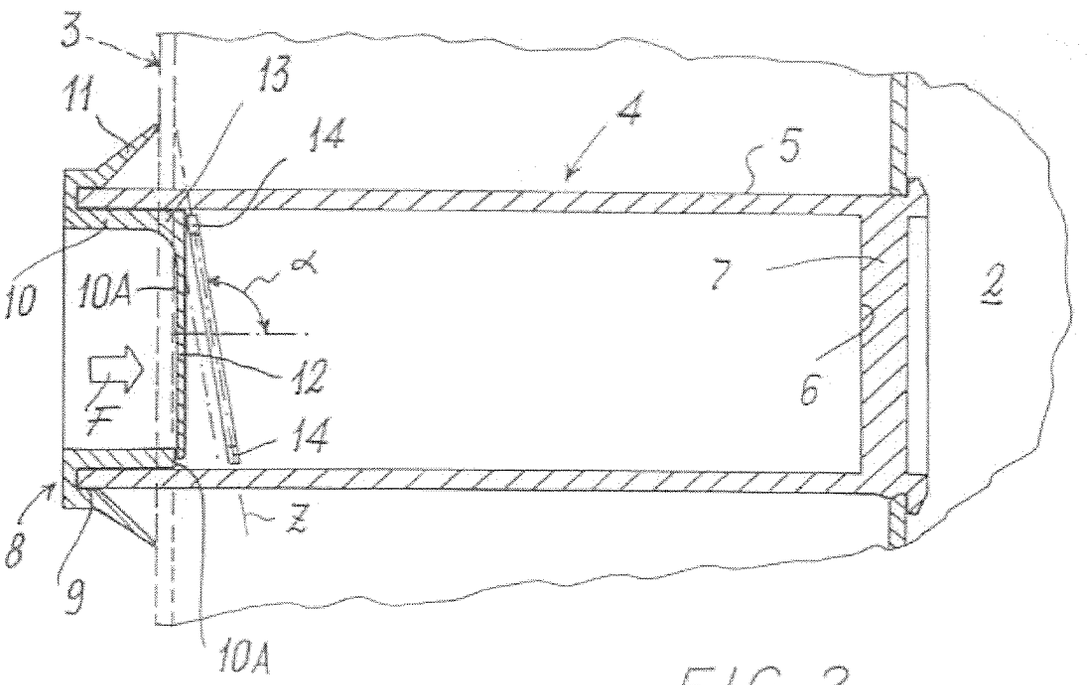

FIG. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 05 10 0212

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)
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A	* page 8, paragraph 9 - page 9, paragraph 3; figure 2 *	3,4	
X	EP 0 030 046 A (SILVANA, MACCARI) 10 June 1981 (1981-06-10)	1	
A	* page 6, line 26 - line 22; figures 1,2 *	2	
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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

F25D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	13 April 2005	Zanotti, L

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 05 10 0212

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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