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(54) Refrigeration device

(57) A refrigeration device, particularly for vending machines, comprising refrigeration means (2) that comprise a refrigeration element (2a) and ventilation means (3) that are designed to force the air through the refrigeration element (2a), the refrigeration means (2) being adapted to move between an active position, in which they are accommodated within a housing (5) formed in an upward region by a lower surface (6) supported by a containment frame (12), and an extraction position, in which they are at least partially arranged outside the housing (5). The device further comprises at least one sealing gasket (7), which in the active position is arranged between the lower surface (6) and the upper edge (8) of the refrigeration means (2), and being provided with means (9) for the relative movement of the upper edge (8) with respect to the lower surface (6) along a direction that is substantially perpendicular to the plane of arrangement of the sealing gasket (7).

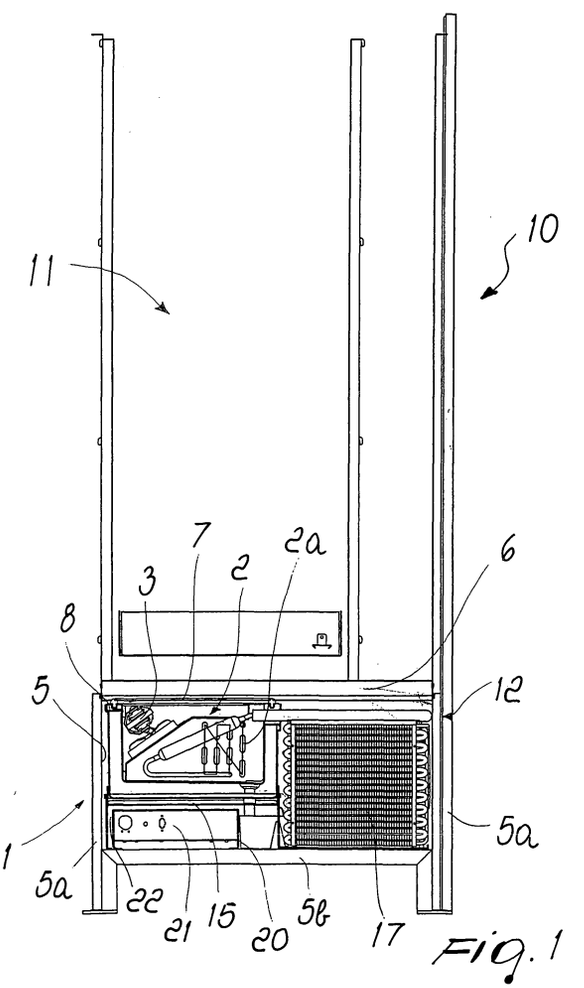

Fig. 1

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Description

[0001] The present invention relates to a refrigeration device particularly suitable for vending machines.

[0002] Vending machines are known which have, at a lower portion of the containment frame, a region for housing a refrigeration device that is adapted to circulate refrigerated air inside the containment frame, so as to allow the products to be dispensed, contained inside the refrigeration chamber formed inside said frame (and usually above the housing region), to be preserved at the optimum temperature.

[0003] These refrigeration devices generally comprise refrigeration means, which are constituted by ventilation means, associated with a refrigeration element crossed by a liquid refrigerant, and by a control unit.

[0004] In currently commercially available vending machines, the control unit is often interposed between the refrigeration means and the front panel for accessing the containment frame (and the housing region) and this inevitably causes difficulties for extracting the refrigeration means, which are usually mounted on substantially horizontal sliders.

[0005] Moreover, in order to avoid leakage and escape of refrigerated air from the refrigeration means, on the edge of the refrigeration element that lies upwardly during use a gasket is provided, which is designed to be interposed, when the refrigeration means are accommodated at its housing region, between said device and the lower panel of the refrigeration chamber.

[0006] Currently, in order to allow the gasket to undergo deformation so as to ensure airtightness, the guides that form the sliders are slightly inclined: in this manner, by pushing the refrigeration device toward the housing region, the device moves slightly upwardly, so as to allow, during insertion, a compression of the gasket against the downward-facing surface of the lower panel.

[0007] Although these embodiments are currently widely used, they have proved to be scarcely practical in use.

[0008] Extraction and insertion of the refrigeration means within the housing region in fact entail a sliding of the gasket against the lower surface of the lower panel that, in the long run, inevitably causes deterioration of such gasket.

[0009] This occurs both during insertion of the refrigeration means and most of all during disengagement, since often the gasket can be stuck or otherwise clings firmly to the lower surface of the lower panel. Accordingly, in such conditions horizontal sliding can damage the gasket irreparably.

[0010] Moreover, these devices often operate irregularly because of jamming caused by excessive sliding of the gasket.

[0011] In addition to the drawbacks described above, it is evident that any arrangement of the control unit in front of the refrigeration means causes further difficulties during extraction of said refrigeration device. In this case it is in fact necessary first of all to move the control unit and then extract the refrigeration means.

[0012] The aim of the present invention is to eliminate or at least reduce drastically the drawbacks noted above in known types of refrigeration devices particularly for vending machines.

[0013] Within this aim, an object of the present invention is to provide a refrigeration device that can be extracted and inserted practically and effectively within the respective housing region, allowing direct access from the front panel without having to move the vending machine.

[0014] Another object of the invention is to provide a refrigeration device that can offer better reliability and tightness with respect to currently commercially available devices.

[0015] Another object of the invention is to provide a refrigeration device that allows to inspect rapidly and practically the control unit as well.

[0016] Another object of the present invention is to provide a refrigeration device that has a very simple structure, is highly durable, easy to use and competitive in terms of production cost, so that its application is advantageous also from an economical standpoint.

[0017] This aim and these and other objects that will become better apparent hereinafter are achieved by a refrigeration device, particularly for vending machines, according to the invention, comprising refrigeration means that comprise a refrigeration element and ventilation means that are designed to force the air through said refrigeration element, said refrigeration means being adapted to move between an active position, in which they are accommodated within a housing formed in an upward region by a lower surface supported by a containment frame, and an extraction position, in which they are at least partially arranged outside said housing, characterized in that it comprises at least one sealing gasket, which in the active position is arranged between the lower surface and the upper edge of the refrigeration means, the refrigeration device being provided with means for the relative movement of the upper edge with respect to the lower surface along a direction that is substantially perpendicular to the plane of arrangement of the sealing gasket.

[0018] According to another aspect, the present invention provides a refrigeration device comprising a first supporting device for refrigeration means which comprise a refrigeration element and ventilation means designed to force the air through said refrigeration element, the first supporting device being supported slidingly by a containment frame in order to move between an active position, in which it is accommodated within a housing formed by the containment frame, and an extraction position, in which it is at least partially arranged outside the housing, characterized in that it comprises a second supporting device for a control unit, which is slidingly supported by the containment frame in order to move between a position for insertion within a respec-

tive housing and an inspection position.

[0019] Further characteristics and advantages of the invention will become better apparent from the description of some preferred but not exclusive embodiments of a refrigeration device particularly for vending machines, according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a sectional view of a vending machine that has, at a lower portion, a refrigeration device according to invention;
Figure 2 is a perspective view of the first supporting device;
Figure 3 is an enlarged-scale view of a detail of the perspective view of Figure 2; and
Figure 4 is a further enlarged-scale view of the lifting means supported by the first supporting device.

[0020] In the examples of embodiments that follow, individual characteristics, given in relation to specific examples, may actually be interchanged with other different characteristics that exist in other examples of embodiments.

[0021] Moreover, it is noted that anything found to be already known is understood not to be claimed and to be the subject of a proper disclaimer.

[0022] With reference to the figures, a refrigeration device, generally designated by the reference numeral 1, is advantageously associable with a vending machine 10.

[0023] The refrigeration device 1 is provided with refrigeration means 2, which are generally constituted by a refrigeration element 2a and by ventilation means 3, which are designed to force the air through the refrigeration element 2a and then convey it, through a delivery duct not shown in the figures, into a refrigeration chamber 11 formed inside the vending machine 10.

[0024] In greater detail, the refrigeration means 2 are adapted to move between an active position (shown in the figures), in which they are accommodated within a housing 5, and an extraction position, in which they are at least partially arranged outside said housing 5.

[0025] Conveniently, the housing 5 is formed at a lower portion of containment frame 12 of the vending machine 10.

[0026] In particular, said housing 5 is formed laterally by side walls 5 a of the containment frame 12, downwardly by a lower end face 5b of the containment frame 12, and upwardly by a lower surface 6, which is supported by the containment frame 12 and generally also forms the footing of the refrigeration chamber 11.

[0027] Usually, the vending machine 10 is provided with a front closure panel, which is pivoted to one of the side walls 5a so as to allow the user to access the refrigeration chamber 11 and the housing 5.

[0028] According to the present invention, the refrigeration device 1 is provided with at least one sealing gasket 7, which is arranged between the lower surface 6 and an upper edge 8 of the refrigeration means when the refrigeration means 2 are in the active position.

[0029] Moreover, the refrigeration device 1 is provided with means for moving the upper edge 8 of the refrigeration means 2 with respect to the lower surface 6, which as a consequence of the intervention of the user, in this case of the person in charge of maintaining the vending machine 10, move the upper edge 8 with respect to the lower surface 6 substantially at right angles to the plane of arrangement of the sealing gasket 7.

[0030] Conveniently, the lower surface 6 and the upper edge 8 lie on a plane that is substantially horizontal during use and accordingly the sealing gasket 7, which is interposed between them, likewise lies on a horizontal plane.

[0031] This advantageously allows the relative movement means to be constituted by means 9 for lifting the refrigeration means 2 when they are in the active position.

[0032] Accordingly, said lifting means 9 are adapted to move the upper edge 8 of the refrigeration means toward the lower surface 6 or away from it, so as to at least partially compress the sealing gasket 7 interposed between them, by moving along a substantially vertical direction.

[0033] In greater detail, advantageously there is a first supporting device 15 for the refrigeration means 2, which is slidingly supported by the containment frame 12 in order to move between an active position, in which it is accommodated within the housing 5 formed by the containment frame 12, and an extraction position, in which it is arranged at least partially outside said housing 5.

[0034] In particular, the lifting means can be associated with at least one actuation lever system 13, which can be rotatably supported by the first device 15 for supporting the refrigeration means 2.

[0035] Conveniently, as shown in the figures, the sealing gasket 7 lies at a peripheral portion of the upper edge 8 of the refrigeration means 2.

[0036] With reference to the embodiment shown in the figures, the side walls 5a (or, in a fully equivalent manner, the lower end face 5b) of the containment frame 12 may support two guides, which can be slidingly engaged by a slider, which constitutes the first supporting device 15, so as to allow the refrigeration means 2 to move between the active position and the extraction position.

[0037] Conveniently, the first supporting device 15 can be provided with a pulling handle 16, so as to facilitate insertion (and extraction) of the refrigeration means 2 with respect to the respective housing 5 by the maintenance technician.

[0038] Moreover, the first supporting device 15 may also support a condenser 17, which is usually associated with the refrigeration means 2 in order to ensures its optimum operation.

[0039] With particular reference to Figures 2 to 4, the actuation lever systems 13 can be rotatably supported by the first supporting device 15 at respective pivoting portions 13a, while at an intermediate position said lever systems 13 are provided with a pin 30, which can engage a respective substantially vertical guide 31 supported by a respective L-shaped element 32, so that upon rotation (in one direction or the other) of the lever system 13 (about the pivoting portion 13a) the L-shaped element 32 slides (along a direction that is horizontal during use) with a back-and-forth motion.

[0040] Moreover, the L-shaped element 32 is provided with an inclined guide 34, which is arranged at a portion thereof that is designed to face a shoulder 35 (rigidly coupled to the first supporting element 15), which supports a second vertical guide 36.

[0041] The inclined guides 34 and the corresponding second vertical guides 36 are slidingly engaged by an end pivot 37, which is supported by a transverse bar 38 on which the refrigeration means 2 rest so as to ensure, as a consequence of the back-and-forth horizontal motion of the L-shaped element 32, the lifting (or lowering) of the transverse bar 38 and therefore of the refrigeration means 2.

[0042] Conveniently, it is possible to provide two transverse bars 38, each of which has, at its free ends, an end pivot 37, which can slide within a respective inclined guide 34 (supported by the L-shaped element) and within a second vertical guide 36 (formed at a shoulder 35).

[0043] Moreover, the inclined guides 34 may have, at their upper end, a flat portion that is designed to keep the transverse bars 38 in stable contact or bearing condition when they are in the raised position.

[0044] According to another aspect of the invention, the refrigeration device 1 may comprise a second supporting device 20 for a control unit 21, said second supporting device 20 being slidingly supported by the containment frame 12, in order to move between a position for insertion within a respective further housing 22 and an inspection position, in which it is extracted at least partially from the respective housing 22.

[0045] Advantageously, as clearly shown in Figure 1, the housing 22 is formed below the refrigeration means 2.

[0046] According to another aspect, the present invention provides a refrigeration device 1 that has, at the same time, both the movement means associated with the sealing gasket and the second supporting device for the control unit, which is slidingly supported by the containment frame.

[0047] Operation of the refrigeration device according to the invention is evident from what has been described above.

[0048] In particular, if the refrigeration means 2 are to be extracted from the housing, after naturally opening the front panel, one acts on the actuation lever system or systems 13, so as to allow the lifting means to lower the refrigeration means (and therefore the sealing gasket 7 associated with them) with respect to to the lower surface 6, so as to provide a clearance between the sealing gasket 7 and the lower surface 6.

[0049] This operation is greatly facilitated, since the sealing gasket 7 is not forced to slide against the lower surface 6.

[0050] At this point, by acting on the pulling handle 16 or on similar elements supported by the refrigeration means 2, a traction force is applied in order to move the refrigeration means into the extraction position. During this operation, the slider (which constitutes the first supporting device 15) that supports the refrigeration means 2 slides easily on the guides supported by the side walls 5a of the containment frame 12 or by the lower end face 6.

[0051] If the control unit 21 also is supported by the second supporting device 20, it is evident that it is possible to simply and effectively extract independently both the refrigeration means 2 (optionally associated with the relative movement means) and said control unit 21, since its housing 22 does not occupy a region subjected to the translational motion of the refrigeration means 2 by being formed below said refrigeration means 2.

[0052] All the characteristics of the invention described above as advantageous, convenient or the like may also be omitted or be replaced with equivalents.

[0053] It will be noted that terms as "upward", "lower", "lateral", "front", "inclined", "vertical" etc. refer to the position in which the device is shown for exemplification in the figures and will not be intended as having a limiting signification.

[0054] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0055] In practice it has been found that the invention has achieved its intended aim and objects in all the embodiments.

[0056] It is in fact evident that it is possible to ensure efficient tightness against the leakage of refrigerated air from the refrigeration device.

[0057] Moreover, thanks to the lifting means, it has been found that even after a large number of extractions of the refrigeration means from their housing, the sealing gasket is still intact.

[0058] In practice, the materials used, so long as they are compatible with the contingent use, as well as the dimensions and shapes, may be any according to requirements.

[0059] All the details may further be replaced with other technically equivalent elements.

[0060] The disclosures in Italian Patent Application No. VR2004A000067 from which this application claims priority are incorporated herein by reference.

[0061] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of in-

creasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A refrigeration device, particularly for vending machines, comprising refrigeration means (2) that comprise a refrigeration element (2a) and ventilation means (3) that are designed to force the air through said refrigeration element (2a), said refrigeration means (2) being adapted to move between an active position, in which they are accommodated within a housing (5) formed in an upward region by a lower surface (6) supported by a containment frame (12), and an extraction position, in which they are at least partially arranged outside said housing (5), **characterized in that** it comprises at least one sealing gasket (7), which when said refrigeration means (2) are in the active position is arranged between said lower surface (6) and the upper edge (8) of said refrigeration means (2), and means (9) for the relative movement of said upper edge (8) with respect to said lower surface (6) along a direction that is substantially perpendicular to the plane of arrangement of said at least one sealing gasket (7).

2. The refrigeration device according to claim 1, **characterized in that** said relative movement means comprise means for lifting (9) said refrigeration means (2) in said active position, which are adapted to move said upper edge (8) closer to said lower surface (6), so as to compress said sealing gasket (7) at least partially.

3. The refrigeration device according to one or more of the preceding claims, **characterized in that** it comprises at least one lever system (13) for actuating said lifting means (9).

4. The refrigeration device according to one or more of the preceding claims, **characterized in that** said sealing gasket (7) lies at a peripheral portion of said upper edge (8) of said refrigeration means (2).

5. The refrigeration device according to one or more of the preceding claims, **characterized in that** it comprises at least one slider, which can slide on at least one guide that is supported by said containment frame (12) for the movement of said refrigeration means (2) between said active position and said extraction position.

6. The refrigeration device according to one or more of the preceding claims, **characterized in that** said actuation lever system (13) is rotatably supported by a first supporting device (15) and has, at an intermediate position, a pin (30) that can be engaged within a respective substantially vertical guide (31) supported by a respective L-shaped element (32), as a consequence of the rotation of said lever system (13) in one direction or the other, said L-shaped element (32) sliding with a back-and-forth motion and being provided with an inclined guide (34) that is arranged at a portion that faces a shoulder (35) supported by said first supporting device and supports a second vertical guide (36), said inclined guide (34)and the corresponding second vertical guide (36) being slidingly engaged by an end pivot (37), which is supported by a transverse bar (38) that supports said refrigeration means (2).

7. The refrigeration device according to one or more of the preceding claims, **characterized in that** it comprises at least one pair of transverse bars (38), each of which has, at its free ends, an end pivot (37) that can slide within a respective inclined guide (34) and within a second vertical guide (36) formed at a shoulder (35).

8. The refrigeration device according to one or more of the preceding claims, **characterized in that** said inclined guides (34) have, at their upper end, a flat portion that is adapted to keep the corresponding transverse bar (38) in stable contact or bearing when it is in the raised position.

9. The refrigeration device, comprising a first supporting device (15) for refrigeration means (2) which comprise a refrigeration element (2a) and ventilation means (3) designed to force the air through said refrigeration element (2a), said first supporting device (15) being slidingly supported by a containment frame (12) in order to move between an active position, in which it is accommodated within a housing (5) formed by said containment frame (12), and an extraction position, in which it is at least partially arranged outside said housing (5), **characterized in that** it comprises a second supporting device (20) for a control unit (21), which is slidingly supported by said containment frame (12) in order to move between a position for insertion withing a respective housing (22) and an inspection position.

10. The refrigeration device according to claim 9, **characterized in that** said housing (22) is formed below said refrigeration means (2).

11. The refrigeration device according to any one of claims 1 to 8, comprising a first supporting device (15) for said refrigeration means (2), said first supporting device (15) being slidingly supported by said containment frame (12) in order to move between said active position, in which it is accommodated

within said housing (5) formed by said containment frame (12), and an extraction position, in which it is arranged at least partially outside said housing (5), **characterized in that** it comprises a second supporting device (20) for a control unit, which is slidingly supported by said containment frame (12) in order to move between a position for insertion within a respective further housing (22) and an inspection position.

12. The refrigeration device according to claim 11, **characterized in that** said housing (22) is formed below said refrigeration means (2).

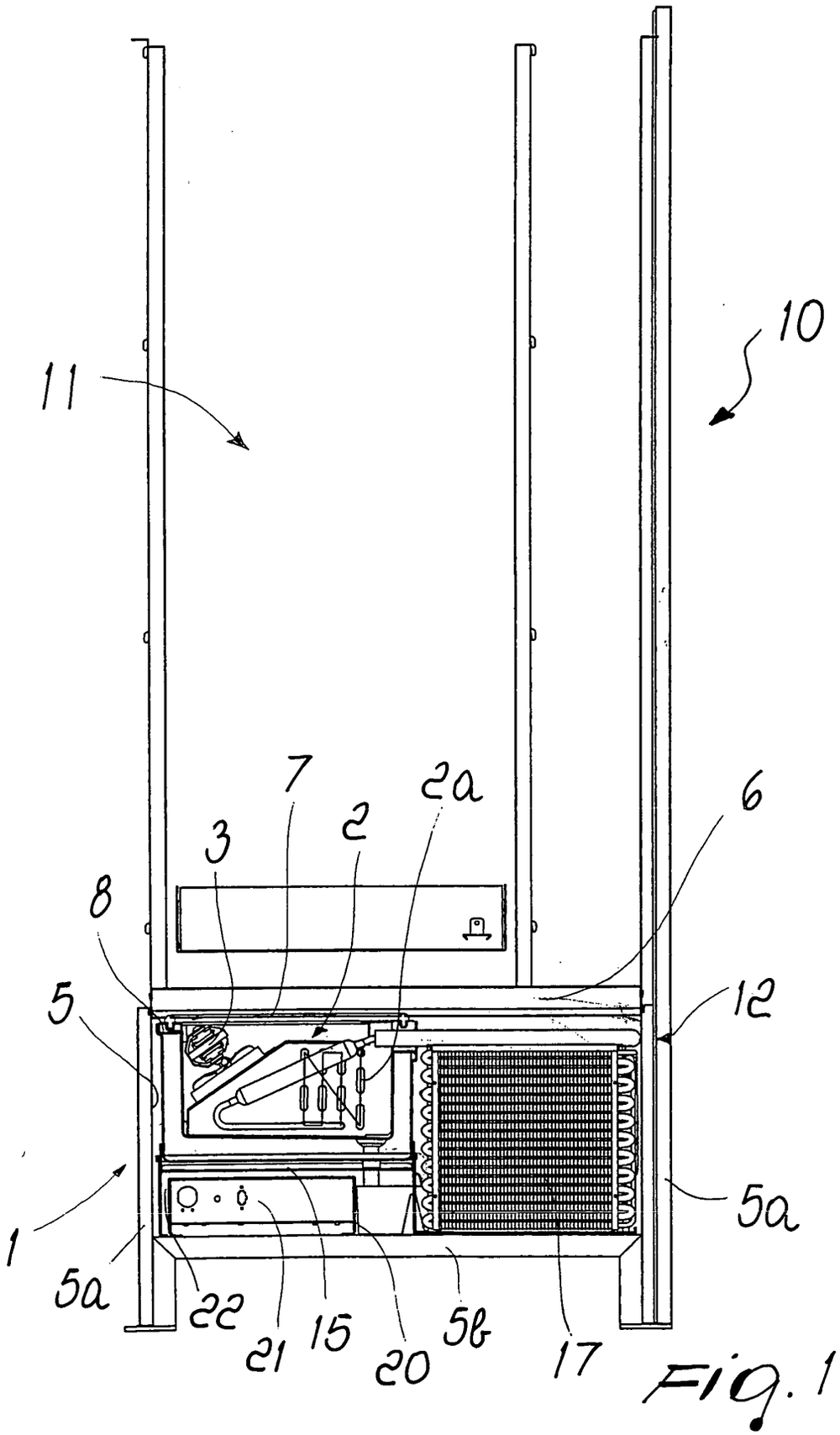

Fig. 1

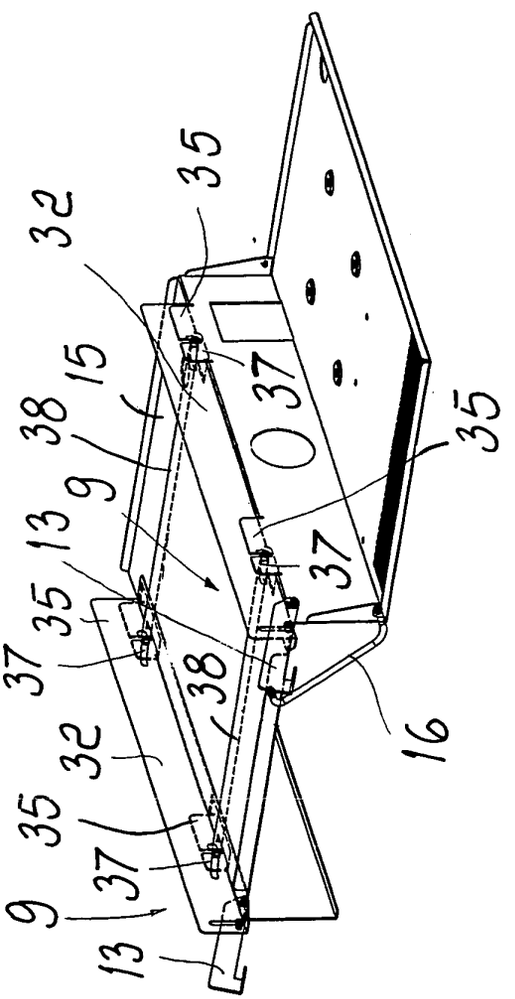

Fig. 2

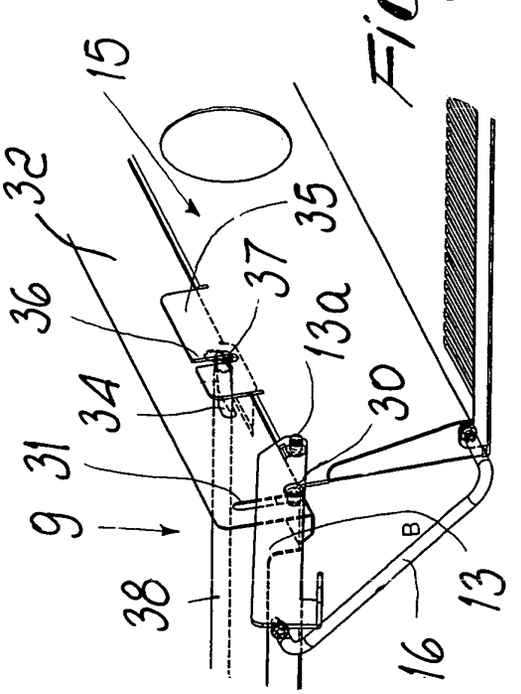

Fig. 3

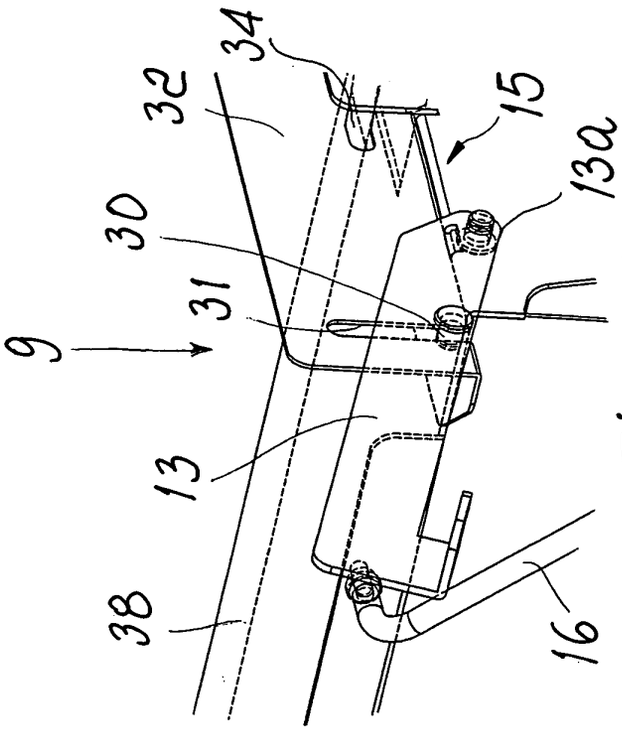

Fig. 4