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Description

[0001] The present invention relates to a household appliance.

[0002] Herein the phrase "cells of household appliances" refers to those parts of household appliances which are provided with a compartment adapted to contain the materials treated by the appliance.

[0003] For example, the cell of an oven comprises the oven cavity in which food is placed for cooking, while the cell of a refrigerator or freezer comprises the refrigerated compartment adapted to store foodstuffs to be cooled/preserved.

[0004] The cell is associated with a structure of the household appliance, i.e. a functional unit, which comprises all those parts which are functionally required for the operation of the household appliance. For example, the functional unit or structure of a refrigerator comprises at least the cold air generating circuit, whereas in an oven it comprises at least the hot air generating heaters.

[0005] The present invention applies to household appliances wherein the cells can be removed from the structure, i.e. wherein the cells can be attached and detached to the structure.

[0006] Cells of household appliances are normally supplied with fluids required for the operation of the appliance and are illuminated.

[0007] For example, the refrigerated cell of a refrigerator is supplied with a cold fluid, typically cold air, and is fitted with a lighting system.

[0008] If the cell is a removable one, it is necessary to provide suitable mechanical connections between the cell and the structure in order to make it easy to support the cell to the structure, while at the same time it is necessary to supply the cell with fluid and with electrical current for lighting.

[0009] For this purpose the prior art solution is to provide different connections for each function to be performed: a mechanical connection for joining the cell to the structure, a fluid connection (normally a simple pipe starting from the structure and leading to the cell) and an electrical connection (that supplies a lamp provided in the cell for lighting the cell itself).

[0010] An example of this kind of solution is given in document WO94/13184, in which is shown a vertical cabinet provided by vertically spaced-apart support shelves which are supplied by means of a connector and supported to the cabinet by means of dedicated rails.

[0011] When attaching each cell the user must therefore assure that each connection (mechanical, fluid and electrical) is connected, for ensuring proper functioning of the cell; this is time consuming and not fault-proof, because the user can forget to ensure that one or more of those connections are properly connected; for instance forgetting the fluid connection would lead to have a cell not refrigerated, thereby wasting the contained goods to be preserved.

[0012] It is the object of the present invention to provide

a household appliance which can overcome the inherent drawbacks of prior-art methods and devices.

[0013] The household appliance adapted to attain said object incorporates the features set out in the appended claims, which are intended as an integral part of the present description.

[0014] The present invention is based on the general idea of supplying the cell only when the cell is joined mechanically to the structure and particularly only when it is properly positioned relative to the structure. The cell supply is a fluid supply.

[0015] A first embodiment of the household appliance according to the present invention provides a mechanical connection together with a fluid connection, in such a way that when the mechanical connection between the cell and the structure is established in a proper way, then it is assured in the same time the fluid supply to the cell.

[0016] This result is achieved by employing a fluid supply connector, or fluid connector, for delivering fluid to/from the cell, wherein said fluid connector is divided into two distinct parts, i.e. a first part associated with the structure and a second part associated with the cell, and the first part and second part are operationally associated with the fluid circuit of the structure and with the cell fluid ducts. The first and second parts of the fluid connector co-operate mechanically with each other: both the first and second parts, in fact, have an associated shutter which opens or closes the fluid flow section, said two shutters being opened or closed due to mutual interference between said first and second shutter. The shutters have a mutual engagement profile which is so designed that, when the shutters are in the interfacing condition, they co-operate mutually to their opening, thus opening the fluid flow section as well.

[0017] The above-mentioned connector may be advantageously used for both supplying and draining the fluid to/from the cell.

[0018] Since a structure and a cell are used which are fitted with either the first or the second part of the device according to the present invention, the fluid connector according to the present invention offers several advantages because the cell can be positioned and supplied very easily: in fact, in order to supply the cell with fluid it is sufficient to set the shutters of the first and second parts of the fluid connector to the interfaced condition.

[0019] An advantage of particular relevance is a combination of a connector according to the present invention and a modular apparatus, e.g. a modular refrigeration apparatus.

[0020] Generally, a modular refrigeration apparatus can be defined as an apparatus adapted to preserve foodstuffs. Such an apparatus comprises: one or more cells associated to corresponding modules, each of them being adapted to keep foodstuffs in a certain preservation state, those modules being attachable/detachable to a structure comprising the functional unit adapted to generate a refrigerating fluid (normally a cold air stream); the structure further comprises distribution devices adapted

to distribute the refrigerating fluid generated by the functional unit or structure, wherein the modules comprise connection means providing a connection to said distribution means, said connection means being adapted to allow refrigerated air to be supplied into said one or more cells, preferably into at least one inner compartment thereof, and to ensure that said one or more modules can be disconnected from said distribution means so as to allow a user to remove said one or more modules.

[0021] In other words, a modular refrigerator essentially comprises a number of removable modules, each comprising a cell, associated with a structure which is common to all modules and which is responsible for generating at least the refrigerating fluid.

[0022] By combining a modular refrigeration apparatus with a connector according to the present invention, it is possible to enhance the advantages offered by a modular refrigeration apparatus: removing or mounting the modules from/to the structure is in fact much easier because the user does not have to manually connect the refrigerating fluid ducts and then open a valve or the like in order to turn on the cell supply, or provide an electrical connection between the structure and the modules; on the contrary, the fluid flow sections are opened automatically, and/or the cell is illuminated as the user joins mechanically the module to the structure, by positioning it correctly relative to the structure.

[0023] The shutters of the first and second parts of the connector, once they have been interfaced to each other, will automatically open the fluid flow section, thus supplying fluid to the cell or allowing fluid to be drained from the cell: the fluid connector according to the present invention may in fact be used both for opening/closing the flow sections of the refrigerating fluid delivery ducts running from the structure to the cell and for opening/closing the flow sections of the refrigerating fluid return ducts running from the cell to the structure.

[0024] Although the annexed drawings and the descriptions thereof refer by way of example to a modular refrigeration apparatus, the present invention is also applicable to any other household appliance provided with at least one cell and one structure without departing from the teachings and protection scope of the present invention.

[0025] The device according to the present invention will become apparent, together with its further advantages, from the following detailed description and from the annexed drawings, which are supplied by way of non-limiting example, wherein:

Figs. 1 and 2 are two views of a modular refrigeration apparatus;

Fig. 3 is a perspective view of a cell and a structure of the apparatus of Figs. 1 and 2;

Fig. 4 is a perspective view of the cell of Fig. 3;

Figs. 5 and 6 are two perspective views of the first and second parts of the fluid connector according to a preferred embodiment;

Fig. 7 is a perspective view of a door of the fluid connector;

Figs. 8 and 9 are two perspective views of the first and second parts of the illumination connector according to a preferred embodiment;

Figs. 10 to 16 are sectional views of a mounting sequence relating to the fluid connector of Figs. 5 and 6; Fig. 17 to 23 are top views of the same mounting sequence of Figs. 10 to 16;

Fig. 24 shows some components of the illumination connector of Figs. 8 and 9.

[0026] The example shown in Figs. 1 and 2 refers to a modular refrigeration apparatus 1 of the above-described type, which comprises one or more modules 2, 20, 200 comprising cells connected to the structure 3, the latter comprising the known functional parts of the refrigerator, i.e. at least the cold air production circuit.

[0027] As shown in Figs. 3 and 4, at least one module 2 can be removed from the structure 3, (all or just some of the modules or cells 2, 20, 200 being removable).

[0028] In addition, the module 30 may also be removable, said module being positioned, according to the embodiment shown by way of non-limiting example in Figs. 1 and 2, on top of the modules 2, 20 and 200 and being characterized by being approximately half shorter than the other modules 2, 20 and 200 and by being accessible by the user through the removal of a cover 77 (which is advantageously transparent) that covers a corresponding aperture obtained in at least a portion of the top surface of the module 30.

[0029] As can be seen in the attached drawings, the connector according to the present invention (both in the case that it is suitable for supplying fluid or light) comprises two cooperating parts: a first male part 4, 14, 40, 140 and a second female part 5, 15, 50, 150 that can be coupled together to attach the cell (or module) to the structure.

[0030] This first and second parts ensure the proper mechanical coupling between the cell 2, 20, 200 and the structure 3, and keep the module 2, 20, 200 attached to the structure 3, thus playing the role of a mechanical connection between those two, supporting the cell on the structure.

[0031] As can be seen later, the first male part 4, 14, 40, 140 and the second female part 5, 15, 50, 150 are provided with locking means in order to ensure a stable coupling by countering the relative movements between the male part 4, 14, 40, 140 and the female part 5, 15, 50, 150.

[0032] The locking means may consist of a system comprising a pair of pistons, which in the same time, thanks to matching guides (later on described), will guide the user in the relative movement between the module and the structure. Such a pistons are kept apart by a contrast spring on one part of said connector and slides in the slide guides on the other part of said connector.

[0033] According to the present invention, the connec-

tor (beside the mechanical coupling function) is provided with means for supplying fluid, to the module, described later on, so as to perform the function of a fluid connector.

[0034] Each module could be provided with one or more fluid connectors.

[0035] Generally speaking, with reference to attached drawings 5, 6, 8, 9, the connector comprises two cooperating parts: a first male part 4, 14, 40, 140 and a second female part 5, 15, 50, 150, that are meant to be coupled together to support the module 2, 20, 200 to the structure 3; advantageously, the male part 4, 14, 40, 140 of the connector has a parallelepiped convex shape, and the female part 5, 15, 50, 150 has a corresponding concave shape.

[0036] It is preferable to apply the female parts 5, 50, 15, 150 of the connectors to the cell 2, since they have no projecting portions, being concave, and are therefore less bulky and subject to damage.

[0037] Both the male and the female parts are provided with a curved wall having a wide radius 9 of curvature, so as to help the user to insert the male part in the female part by promoting their relative sliding.

[0038] In order to guide the user in the coupling operation the male part 4, 14 is provided with pistons 11, and the female part 5, 15 is provided with corresponding guides 13: during the coupling the pistons 11 slide in the guides 13, until the end of the guide itself, which is provided with holes fitting the pistons 11, thereby stopping the relative motion between the two parts, and assuring the correct coupling, as described later on.

[0039] Figs. 3 and 4 show a preferred embodiment of the connector according to the present invention; in particular, in this embodiment the connector is a fluid connector and consists of a first male part 4 and a second female part 5.

[0040] The female parts 5 and 50 are associated with the module 2 and connect to corresponding male parts 4 and 40 of the fluid connector, thus providing sections for fluid flow from the structure 3 to the cell 2 and vice versa.

[0041] Obviously the male parts 4, 40 and female parts 5, 50 can be reciprocated between the cell and the structure.

[0042] If the cell (e.g. cell 30) has a low height, a single female part 5 may be associated thereto for supplying refrigerating fluid into the cell 30, since the refrigerating fluid is then drained through leaks releasing a metered amount of it into the outside environment, rather than through a refrigerating fluid return path to the structure 3.

[0043] The connector part applied to the structure 3 is connected to suitably thermoinsulated channels arranged inside the structure 3 through outlet/inlet sections located at the same level as the removable modules.

[0044] When the modules are removed by the user, said sections can be kept closed through suitable means such as gate valves (on-off damper or stepping type) or through flexible membranes which can be opened by the pressure difference generated by the flow of refrigerated

air.

[0045] Referring now to Figs. 5, 6 and 7, there is shown the first part of a fluid connector and a preferred shape of the shutter 6, 60.

[0046] The shutter 6 is fitted to the male part 4 and cooperates with the shutter 60 fitted to the female part 5 when the male part 4 is inserted into the female part 5, as shown in Figs. 10 to 16 and 17 to 23 described later on.

[0047] The shutter 6, 60, shown in Fig. 7, is a tiltable shutter and has a general shape of a door, having at least one flat body portion 7, adapted to close the flow section, and an engagement profile 8, preferably located at one edge of said flat portion 7, i.e. in the area of the shutter 6, 60 which is hinged to the fluid connector. The shutter 6, 60 is rotatably associated with and closes the body of the fluid connector.

[0048] The opening and closing of both shutters 6, 60 takes place through mutual interference between the first and second shutters, in particular through mutual interference between the engagement profiles 8, which are so shaped that the shutters, when set to the interfaced condition, co-operate together to their mutual opening, thus opening the fluid flow section.

[0049] The illustrated engagement profile 8 comprises three different faces 8', 8'' and 8'''', which are inclined by an increasing angle with respect to the flat portion 7. In particular, the end face 8''' is perpendicular to the flat portion 7.

[0050] Figs. 13 to 16 show the different steps according to which the shutters 6 and 60, when set to the interfaced condition, mutually contribute to their reciprocal opening by means of the engagement profile 8.

[0051] In Fig. 14 the abutted faces are the surfaces 8', whereas in Fig. 15 the abutted faces are the surfaces 8'' and in Fig. 16 are the surfaces 8'''', the latter being perpendicular to the flat portion 7 and thus allowing the shutter to be fully opened and letting the fluid flow through.

[0052] The engagement profile 8 may be provided either as shown or in other equivalent manners featuring cam profiles, grooved profiles or the like.

[0053] Advantageously, the male part 4 of the fluid connector has a parallelepiped shape wherein one wall is associated with the shutter 6 and the remaining walls are closed, except for one wall, not shown, which is open on a fluid duct of the structure in order to allow the fluid, in particular refrigerated air, to be supplied to the cell.

[0054] The wide radius 9 of the male connector wall opposite to the wall that houses the shutter 6 promotes its relative sliding over the corresponding wall 10 of the female connector part 5 as the connection is made, and facilitates the air flow within the connector itself (male part 4), thus reducing load losses.

[0055] In order to ensure a hermetic seal when the shutter 6, 60 is closed, it is equipped with at least one of the following devices: a torsion spring (or a reed spring) mounted to the pin about which the shutter 6, 60 can rotate, and/or a ballast mounted to the shutter near the

side opposite to the hinge side, and/or a magnetic shutting system attracting the shutter to the aperture edge.

[0056] Said shutting devices may be advantageously combined with a gasket in order to further improve the sealing effect.

[0057] In particular, the remaining portion of the shutter may have a constant thickness and/or contain a seat for insulating material.

[0058] In order to avoid detachments of the male and the female parts alternatively, a magnetic system associated with the shutters 6, 60 may be used in order to prevent the male part 4 from detaching from the female part 5 after they have been coupled together. For example, magnets having opposite polarities may be applied to the face 8''' so that, when the two shutters 6, 60 interfere with each other, the attraction force between the magnets will force the two shutters to stay in contact with each other, until the user applies a force which overcomes said magnetic attraction. In this case, the pistons 11 may be replaced in the same position with a pair of rigid, fixed protrusions which, once positioned inside the guides 13, will prevent any side movements between the first part and the second part.

[0059] The female part 5 is so shaped that the surfaces of the female parts 5 adhere to the matching surfaces of the male part 4 as the interfacing is carried out.

[0060] Therefore, the female part 5 is substantially a parallelepipedon in shape, with surfaces of the same size as the male part 4 (by way of example, said parallelepipedon may be approx. 47mm high, 41mm wide and 70mm deep).

[0061] Figs. 10 to 16 show a cinema-like sequence of sectional views of the interfacing action between the male part 4 and the female part 5.

[0062] A corresponding sequence of top views is shown in Figs. 17 to 23.

[0063] In Figs. 10 to 13, and in the corresponding Figs. 17 to 20, the two shutters 6 and 60 have not yet come in contact with each other, while the relative movement between the male part 4 and the female part 5 is guided by the sliding action of the pistons 11 in the guides 13, as clearly shown in Figs. 11 to 13 and in the corresponding Figs. 18 to 20, thus advantageously ensuring an optimal interfacing action.

[0064] In Figs. 14 to 16 and in the corresponding Figs. 21 to 23, the fluid flow section is opened gradually as the shutters 6, 60 are opened as described above, until the fully open condition shown in Figs. 16 and 23 is attained.

[0065] The male-female shape of the fluid connector shown herein should not be understood as limiting, since even a simple flat shape of the first and second parts of the fluid connector may perform the required functions, in this case a proper support for the cell is needed for supporting the cell itself, such for example a supporting plane placed under each cell; the connector in this case assures only the proper coupling between the cells and the structure, but it does not provide mechanical support to the cell itself.

[0066] The male-female shape of the fluid connector advantageously serve as a guide for the correct positioning the cell 2 onto the structure 3, thus assisting the user and guiding the insertion/coupling of the cell 2, 20, 200 onto the structure 3.

[0067] When combining one or more fluid connectors with a modular refrigeration apparatus as described above, said apparatus becomes very easy to use because the modules can be positioned correctly, mechanically supported and held in position, as well as supplied with fluid in a particularly advantageous simplified manner through the fluid according to the present invention.

[0068] Further to this the cell or module may be completely passive, as opposed to the structure which is, on the contrary, active: the structure comprises all the elements which are functionally required for the operations for which the household appliance has been designed, while the cell or module is supplied in its entirety by the structure for performing his operation.

[0069] Nevertheless, the above-described fluid may also be used to much advantage in terms of ease of use in the general field of household appliances, and in particular in any household appliance comprising a cell or a module that can be removed from a structure, and wherein the cell or module needs to be supplied with a flow produced by the structure. Advantageously, in fact, the cell or module may be completely passive, as opposed to an active structure: the structure comprises all the elements which are functionally required for the operations for which the household appliance has been designed, while the cell or module is supplied by the structure.

[0070] As far as the possible variants of the present invention are concerned, it should be underlined that the manner in which the fluid are applied to the structure 3 and to the cell 2 as shown in Figs. 3 and 4 is intended as a particular embodiment provided by way of non-limiting example. In Figs. 3 and 4, the connectors are applied to the structure 3 and to the module 2 by mounting a set of horizontal inserts, each comprising a male part of the fluid connector and a male part of the illumination connector, or a female part of the fluid connector and a female part of the illumination connector, and preferably provided with support ribs (e.g. longitudinal or transversal) and elements (e.g. baffles) adapted to properly convey the flow of refrigerated air, thus reducing load losses. Said horizontal inserts may be mounted to the structure 3 by means of matching profiles which interact with one another in order to provide a stable coupling; as an alternative, they may be mounted to the module 2, buried in the insulation material of the module 2 itself. The method of application of the fluid connector to the structure 3 and to the module 2 shown in Figs. 3 and 4 requires that seats extending horizontally be obtained in the structure 3, in particular in the surface of the structure 3 facing the module 2, for inserting the inserts.

[0071] According to a first advantageous variant of the above-described method of application of the fluid connector, two vertical inserts, instead of horizontal ones,

are applied to the structure 3, each of said vertical inserts comprising parts of the fluid connector in order to provide a connection between the structure 3 and the removable modules 2, 20, 200 and 30. This first advantageous variant has a lower number of inserts, thus making it easier to mount the inserts themselves to the structure 3. The manner in which the fluid connector are applied to the structure 3 and to the cell 2 according to the first advantageous variant requires that seats extending vertically be obtained in the structure 3, in particular in the surface of the structure 3 facing the cell 2, for inserting the inserts, the number of said vertically extending seats being preferably two.

[0072] According to a second advantageous variant of the method of application of the fluid connector, a plurality of inserts are applied to the structure 3 and/or to the module 2, each of which comprises only a single part (i.e. either the male part or the female part) of the fluid connector. This second advantageous variant provides ease of maintenance, in that the parts of the fluid connectors connector may be replaced separately should they fail. The method of application of the fluid connector to the structure 3 and to the module 2 according to the first advantageous variant requires that a plurality of small seats be obtained in the structure 3, in particular in the surface of the structure 3 facing the cell 2, for inserting the inserts, said inserts being preferably secured to said seats by means of screws, joints or different removable mechanical connections.

[0073] According to a third advantageous variant of the method of application of the fluid connector, the parts of the fluid connector are applied to the structure 3 and/or to the module 2 directly when moulding the structure 3 and the module 2, said parts being thus obtained in one piece with the structure 3 or module 2. This third advantageous variant is particularly beneficial in terms of cost, simplicity and accuracy of application of the fluid connector to the structure 3 and to the module 2, while however reducing the ease of maintenance of the connector parts.

[0074] Finally, as regards the material used for manufacturing the parts of the fluid connector, it may be any material, provided that it has good workability and mechanical strength properties (especially when the parts are applied to the structure according to said third advantageous variant): therefore, said material may be conveniently chosen among steel, aluminium, polymeric materials or the like.

Claims

1. Household appliance comprising a cell or module (2,20,200) and a structure (3) and a connector for supporting said cell or module (2,20,200) to said structure (3) of said household appliance, said cell or module (2,20,200) being provided with a compartment adapted to contain the materials treated by the appliance, and said structure (3) being provided with

functional units for performing the operation of such an appliance, said connector comprising means for supply the cell or module (2,20,200), and two cooperating part, a first part (4,14,40,140) provided on said cell or module (2,20,200) and a second part (5,15,50,150) provided on said structure (3), so as to perform a mechanical coupling between the cell or module and the structure (3),

said connector being a fluid connector adapted to supply/drain a fluid to/from the cell (2,20,200), wherein the first part and the second part are operationally associated with a fluid circuit of the structure and with fluid ducts of the cell, respectively, said first part and said second part of the fluid connector being mutually co-operating with each other mechanically, said first part and said second part of said fluid connector comprising a corresponding shutter (6,60) which opens or closes a fluid flow section, the opening and closing of said two shutters (6,60) taking place through mutual interference between the first shutter (6) and second shutter (60) by means of a reciprocal engagement profile (8) so that, when said two shutters (6,60) are set to the interfaced condition, they mutually co-operate to their reciprocal opening,

characterised by

said shutters (6,60) being rotatably hinged to said first part and said second part,

said shutters (6,60) being fitted with at least one flat body portion (7) adapted to close the flow section and with an engagement profile (8) preferably located at one edge of said flat portion (7), said engagement profile (8) comprising one or more faces (8', 8'', 8'''), which are inclined by an increasing angle with respect to said flat portion (7).

2. Household appliance according to claim 1, **characterized in that** it is provided with locking means in order to ensure a stable coupling by countering the relative movements between the first part (4,14,40,140) and the second part (5,15,50,150).
3. Household appliance according to claim 1 or 2, **characterized in that** the first part is a male part (4,14,40,140) having a convex shape, and the second part is a female part (5,15,50,150) having a corresponding concave shape, particularly such a shape is a parallelepiped shape.
4. Household appliance according to one or more of the preceding claims, **characterized in that** at least one of said faces (8''') being the end face of said engagement profile (8) is perpendicular to said flat portion (7).
5. Household appliance according to claim 4, **characterized in that** said shutter (6,60) is fitted with a shutting device, such as a torsion spring or a reed spring, mounted to the pin about which the shutter (6, 60)

rotate, and/or a ballast mounted to the shutter near the side opposite to the hinge side, and/or a magnetic shutting system attracting the shutter to the aperture edge.

6. Household appliance according to claim 3, **characterized in that** at least one side wall of said male part and said female part is a curved wall having a wide radius (39,40) adapted to facilitate the connection between said male part (14,140) and said female part (15,150). 5
7. Household appliance according to one or more of the preceding claims, **characterized in that** said cell (2,20,200) is operationally associated in a removable fashion with said structure (3). 10
8. Household appliance according to one or more of the preceding claims, **characterized by** being a modular refrigeration apparatus comprising at least one structure (3) and at least one removable module, said module being supplied with refrigerating fluid through the connector. 15
9. Household appliance according to claim 3, **characterized in that** each cell (2,20,200) comprises at least one female part (5), in particular two female parts (5,50), of the connector, and that the structure comprises one or more matching male parts (4,40) of the connector, each male-female pair (4,5 and 40,50) being used for fluid supply and/or drainage of cold air between said cell and said structure. 20 25 30

Patentansprüche

1. Haushaltsgert mit einer Zelle oder einem Modul (2, 20, 200) und einer Rahmenkonstruktion (engl.: structure) (3) und einem Verbindungselement zum Tragen der Zelle oder des Moduls (2, 20, 200) an der Rahmenkonstruktion (3) des Haushaltsgertes, wobei die Zelle oder das Modul (2, 20, 200) ein Fach aufweist, das dazu vorgesehen ist, die Materialien zu enthalten, die durch das Gerat behandelt werden, und wobei die Rahmenkonstruktion (3) mit funktionalen Einheiten zum Durchfuhren des Betriebs solch eines Gerates ausgestattet ist, wobei das Verbindungselement Mittel zum Versorgen der Zelle oder des Moduls (2, 20, 200) und zwei zusammenwirkende Teile aufweist, wobei ein erstes Teil (4, 14, 40, 140) an der Zelle oder dem Modul (2, 20, 200) vorgesehen ist und ein zweites Teil (5, 15, 50, 150) an der Rahmenkonstruktion (3) vorgesehen ist, um so eine mechanische Verbindung zwischen der Zelle oder dem Modul und der Rahmenkonstruktion (3) herzustellen, wobei das Verbindungselement ein Flussigkeitsverbindungselement ist, das zum Zufuhren einer Flussigkeit zu oder Ablassen einer Flussigkeit von der Zelle (2, 20, 200) vorgesehen ist, wobei das erste Teil und das zweite Teil funktional mit einem Flussigkeitskreislauf der Rahmenkonstruktion bzw. mit Flussigkeitsleitungen der Zelle verbunden sind, wobei das erste Teil und das zweite Teil des Flussigkeitsverbindungselements gegenseitig miteinander mechanisch zusammenwirken, wobei das erste Teil und das zweite Teil des Flussigkeitsverbindungselements einen entsprechenden Verschluss (6, 60) aufweisen, der einen Strmungsabschnitt offnet oder schlieft, wobei das Offnen und Schliefen der zwei Verschlusse (6, 60) durch gegenseitigen Eingriff des ersten und zweiten Verschlusses (6, 60), durch ein reziprokes Eingriffsprofil (8) so stattfindet, dass, wenn die beiden Verschlusse (6, 60) in den einkoppelnden Zustand gebracht werden, diese gegenseitig zu ihren reziproken Offnungen passen, **dadurch gekennzeichnet, dass** die Verschlusse (6, 60) an den ersten Teil und den zweiten Teil drehbar angelenkt sind, dass die Verschlusse (6, 60) mit wenigstens einem flachen Hauptabschnitt (7) ausgestattet sind, der vorgesehen ist, den Strmungsabschnitt zu schliefen, und mit einem Eingriffsprofil (8), das vorzugsweise an einer Kante des flachen Abschnitts (7) vorgesehen ist, wobei das Eingriffsprofil (8) eine oder mehrere Anlageflachen (8', 8'', 8''') aufweist, welche in Bezug auf den flachen Abschnitt (7) um einen ansteigenden Winkel geneigt sind. 35 40 45 50 55

sigkeit zu oder Ablassen einer Flussigkeit von der Zelle (2, 20, 200) vorgesehen ist, wobei das erste Teil und das zweite Teil funktional mit einem Flussigkeitskreislauf der Rahmenkonstruktion bzw. mit Flussigkeitsleitungen der Zelle verbunden sind, wobei das erste Teil und das zweite Teil des Flussigkeitsverbindungselements gegenseitig miteinander mechanisch zusammenwirken, wobei das erste Teil und das zweite Teil des Flussigkeitsverbindungselements einen entsprechenden Verschluss (6, 60) aufweisen, der einen Strmungsabschnitt offnet oder schlieft, wobei das Offnen und Schliefen der zwei Verschlusse (6, 60) durch gegenseitigen Eingriff des ersten und zweiten Verschlusses (6, 60), durch ein reziprokes Eingriffsprofil (8) so stattfindet, dass, wenn die beiden Verschlusse (6, 60) in den einkoppelnden Zustand gebracht werden, diese gegenseitig zu ihren reziproken Offnungen passen, **dadurch gekennzeichnet, dass** die Verschlusse (6, 60) an den ersten Teil und den zweiten Teil drehbar angelenkt sind, dass die Verschlusse (6, 60) mit wenigstens einem flachen Hauptabschnitt (7) ausgestattet sind, der vorgesehen ist, den Strmungsabschnitt zu schliefen, und mit einem Eingriffsprofil (8), das vorzugsweise an einer Kante des flachen Abschnitts (7) vorgesehen ist, wobei das Eingriffsprofil (8) eine oder mehrere Anlageflachen (8', 8'', 8''') aufweist, welche in Bezug auf den flachen Abschnitt (7) um einen ansteigenden Winkel geneigt sind.

2. Haushaltsgert nach Anspruch 1, **dadurch gekennzeichnet, dass** es Verriegelungsmittel aufweist, um eine feste Kopplung sicherzustellen, indem den relativen Bewegungen zwischen dem ersten Teil (4, 14, 40, 140) und dem zweiten Teil (5, 15, 50, 150) entgegengewirkt wird. 35
3. Haushaltsgert nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** das erste Teil ein mannliches Teil (4, 14, 40, 140) mit einer konvexen Form ist, und das zweite Teil ein weibliches Teil (5, 15, 50, 150) mit einer entsprechenden konkaven Form ist, insbesondere dass eine solche Form eine Parallelepipedon-Form ist. 40
4. Haushaltsgert nach einem oder mehreren der vorstehenden Anspruche, **dadurch gekennzeichnet, dass** wenigstens eine der Anlageflachen (8'''), die die begrenzende Anlageflache des Eingriffsprofils (8) ist, senkrecht zu dem flachen Abschnitt (7) ist. 45
5. Haushaltsgert nach Anspruch 4, **dadurch gekennzeichnet, dass** der Verschluss (6, 60) mit einer Verschlussvorrichtung ausgestattet ist, wie beispielsweise eine Torsionsfeder oder eine Blattfeder, die an dem Bolzen angebracht ist, um 50 55

welchen sich der Verschluss (6, 60) dreht, und/oder mit einem Ballast, der in der Nähe der der angelenkten Seite gegenüberliegenden Seite an dem Verschluss befestigt ist, und/oder einem magnetischen Schließsystem zum Anziehen des Verschlusses an die Öffnungskante.

6. Haushaltsgerät nach Anspruch 3,
dadurch gekennzeichnet, dass wenigstens eine Seitenwand des männlichen Teils und des weiblichen Teils eine gebogene Wand ist mit einem großen Radius (39, 40), der dazu vorgesehen ist eine Verbindung zwischen dem männlichen Teil (14, 140) und dem weiblichen Teil (15, 150) zu ermöglichen bzw. zu erleichtern.
7. Haushaltsgerät nach einem oder mehreren der vorstehenden Ansprüche,
dadurch gekennzeichnet, dass die Zelle (2, 20, 200) funktionsfähig in einem abnehmbaren Zustand mit der Rahmenkonstruktion (3) verbunden ist.
8. Haushaltsgerät nach einem oder mehreren der vorstehenden Ansprüche,
dadurch gekennzeichnet, dass das Haushaltsgerät eine modulare Kühlungsvorrichtung ist, die wenigstens eine Rahmenkonstruktion (3) und wenigstens ein abnehmbares Modul aufweist, wobei das Modul durch das Verbindungselement mit Kühlungsflüssigkeit versorgt wird.
9. Haushaltsgerät nach Anspruch 3,
dadurch gekennzeichnet, dass jede Zelle (2, 20, 200) wenigstens ein weibliches Teil (5), insbesondere zwei weibliche Teile (5, 50), des Verbindungselements aufweist, und dass die Rahmenkonstruktion ein oder mehrere passende männliche Teile (4, 40) des Verbindungselements aufweist, wobei jedes männlichweibliche Paar (4, 5 und 40, 50) zur Flüssigkeitszufuhr und/oder zum Abführen kalter Luft zwischen der Zelle und der Rahmenkonstruktion verwendet wird.

Revendications

1. Appareil domestique comprenant une cellule ou un module (2, 20, 200) et une structure (3) et un connecteur pour supporter ladite cellule ou ledit module (2, 20, 200) sur ladite structure (3) dudit appareil domestique, ladite cellule ou ledit module (2, 20, 200) étant doté(e) d'un compartiment adapté pour contenir des matières traitées par l'appareil, et ladite structure (3) étant dotée d'unités fonctionnelles pour exécuter le fonctionnement d'un tel appareil, ledit connecteur comprenant des moyens permettant l'alimentation de la cellule ou du module (2, 20, 200), et deux parties en coopération, une première partie (4,

14, 40, 140) prévue sur ladite cellule ou sur ledit module (2, 20, 200) et une seconde partie (5, 15, 50, 150) prévue sur ladite structure (3) de façon à réaliser un couplage mécanique entre la cellule ou le module et la structure (3),

ledit connecteur étant un connecteur de fluide adapté pour fournir/drainer un fluide vers/hors de la cellule (2, 20, 200), dans lequel la première partie et la seconde partie sont, respectivement, associées fonctionnellement à un circuit de fluide de la structure et à des conduites de fluide de la cellule, ladite première partie et ladite seconde partie du connecteur de fluide coopérant mutuellement l'une avec l'autre de façon mécanique,

ladite première partie et ladite seconde partie dudit connecteur de fluide comprenant un volet obturateur correspondant (6, 60) qui ouvre ou ferme une section d'écoulement de fluide, l'ouverture et la fermeture des deux dits volets obturateurs (6, 60) se produisant par l'intermédiaire d'une interférence mutuelle entre le premier volet obturateur (6) et le second volet obturateur (60) au moyen d'un profilé d'engagement réciproque (8) de sorte que, lorsque les deux dits volets obturateurs (6, 60) sont placés en situation d'interface, ils coopèrent mutuellement à leur ouverture réciproque, **caractérisé par le fait que** lesdits volets obturateurs (6, 60) sont articulés à rotation sur ladite première partie et sur ladite seconde partie,

lesdits volets obturateurs (6, 60) sont ajustés avec au moins une partie de corps plate (7) adaptée pour fermer la section d'écoulement et avec un profilé d'engagement (8) placé, de préférence, au niveau d'un bord de ladite partie plate (7), ledit profilé d'engagement (8) comportant une ou plusieurs face(s) (8', 8'', 8'''), qui sont inclinées suivant un angle croissant par rapport à ladite partie plate (7).

2. Appareil domestique selon la revendication 1, **caractérisé en ce qu'il** est équipé de moyens de verrouillage afin d'assurer un couplage stable en contrecarrant les déplacements relatifs entre la première partie (4, 14, 40, 140) et la seconde partie (5, 15, 50, 150).

3. Appareil domestique selon la revendication 1 ou 2, **caractérisé en ce que** la première partie est une partie mâle (4, 14, 40, 140) présentant une configuration convexe, et la seconde partie est une partie femelle (5, 15, 50, 150) présentant une configuration concave correspondante, cette configuration présentant particulièrement une configuration parallépipédique.

4. Appareil domestique selon l'une ou plusieurs des revendications précédentes, **caractérisé en ce que** au moins l'une desdites faces (8''') qui représente la face d'extrémité dudit profilé d'engagement (8) est

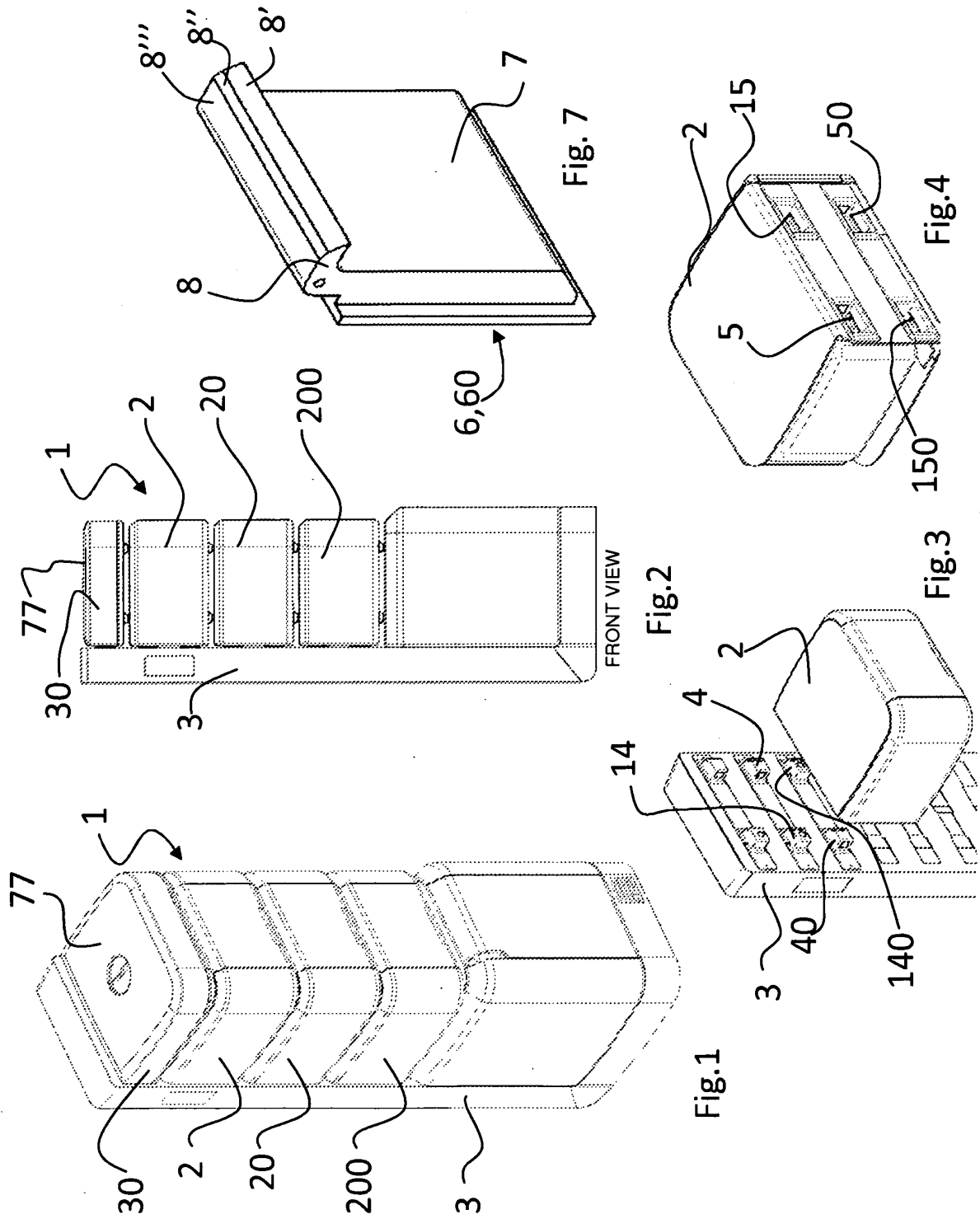
perpendiculaire à ladite partie plate (7).

5. Appareil domestique selon la revendication 4, **caractérisé en ce que** ledit volet obturateur (6, 60) est ajusté avec un dispositif d'obturation, tel qu'un ressort à torsion ou un ressort à lame souple, monté sur la broche autour de laquelle le volet obturateur (6, 60) tourne, et/ou un lest monté sur le volet obturateur à proximité du côté opposé au côté de l'articulation et/ou un système d'obturation magnétique attirant le volet obturateur vers le bord d'ouverture. 5
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6. Appareil domestique selon la revendication 3, **caractérisé en ce qu'**au moins une paroi latérale de ladite partie mâle et de ladite partie femelle est une paroi courbe ayant un grand rayon (39, 40), adaptée pour faciliter la connexion entre ladite partie mâle (14, 140) et ladite partie femelle (15, 150). 15
7. Appareil domestique selon l'une ou plusieurs des revendications précédentes, **caractérisé en ce que** ladite cellule (2, 20, 200) est associée fonctionnellement d'une façon amovible à ladite structure (3). 20
8. Appareil domestique selon l'une ou plusieurs des revendications précédentes, **caractérisé par** le fait d'être un appareil de réfrigération modulaire comportant au moins une structure (3) et au moins un module amovible, ledit module étant alimenté avec un fluide réfrigérant à travers le connecteur. 25
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9. Appareil domestique selon la revendication 3, **caractérisé en ce que** chaque cellule (2, 20, 200) comprend au moins une partie femelle (5), en particulier deux parties femelles (5, 50), du connecteur et **en ce que** la structure comporte une ou plusieurs partie(s) mâle(s) d'adaptation (4, 40) du connecteur, chaque paire mâle-femelle (4, 5 et 40, 50) étant utilisée pour une alimentation en fluide et/ou un drainage d'air froid entre ladite cellule et ladite structure. 35
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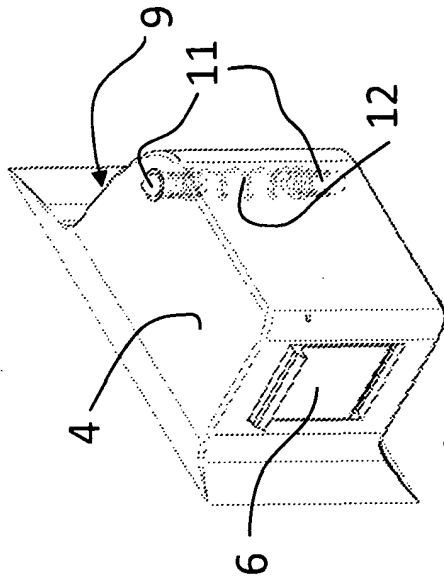


Fig. 6

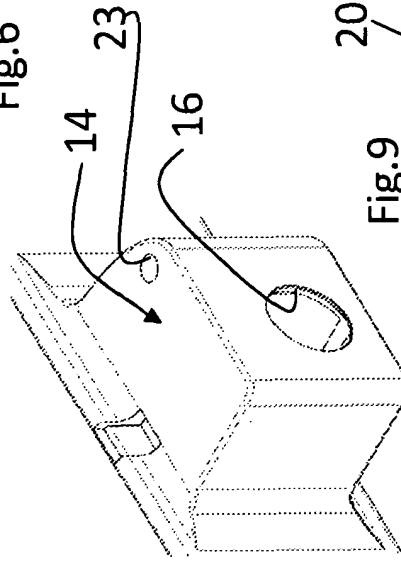


Fig. 9

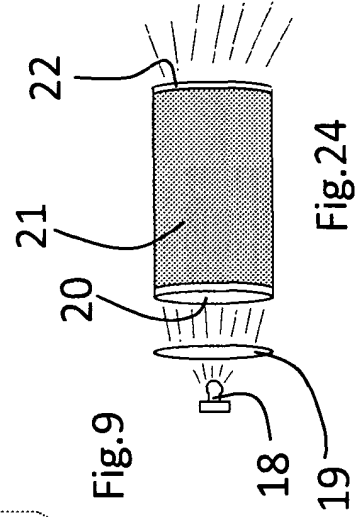


Fig. 24

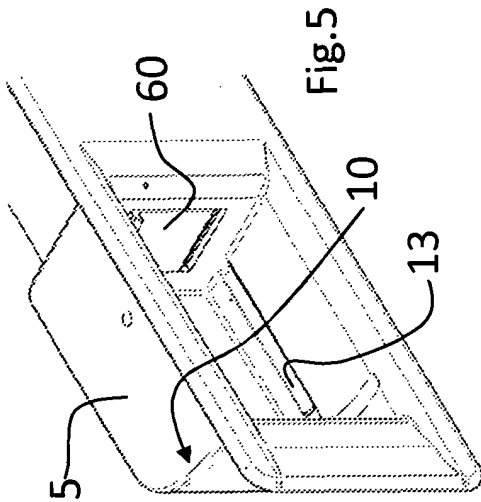


Fig. 5

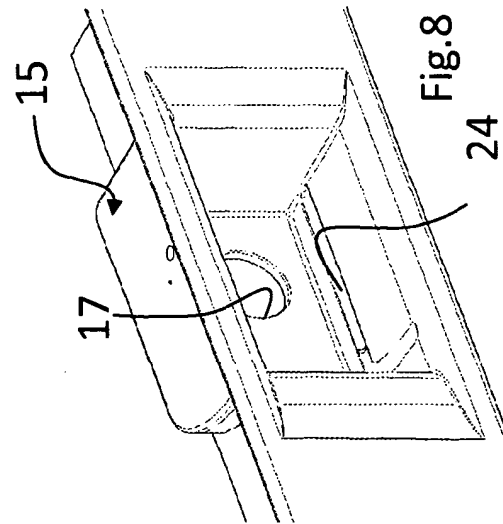
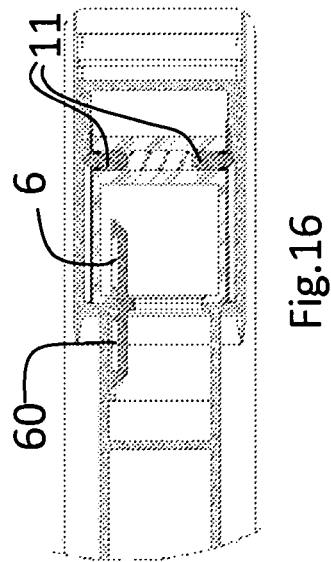
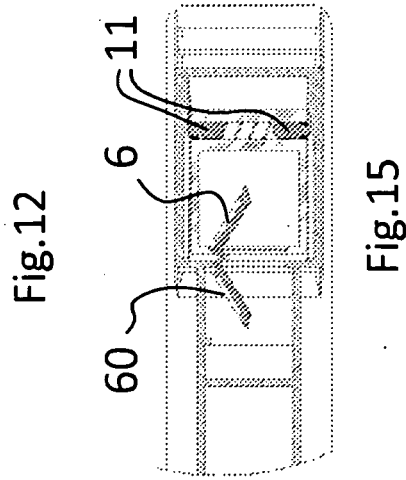
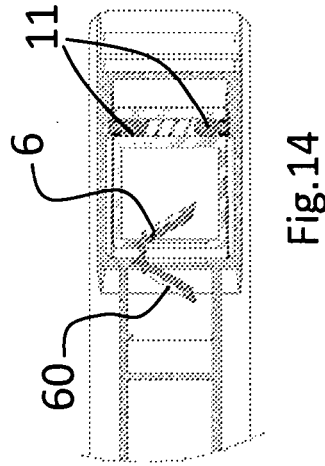
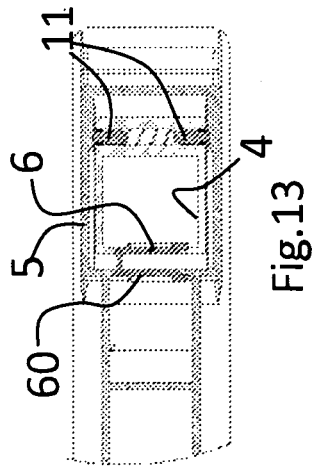
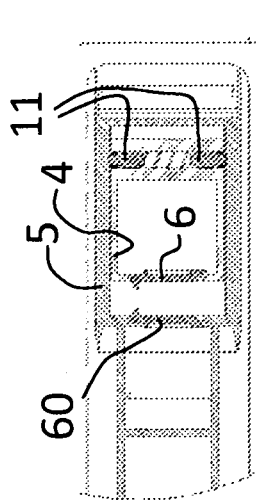
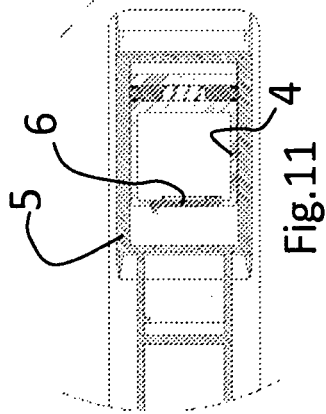
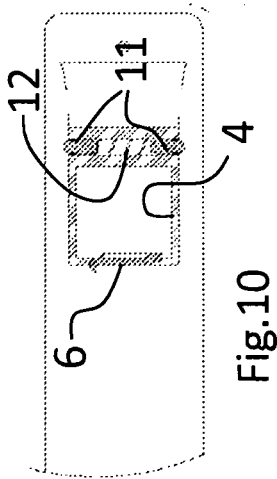


Fig. 8



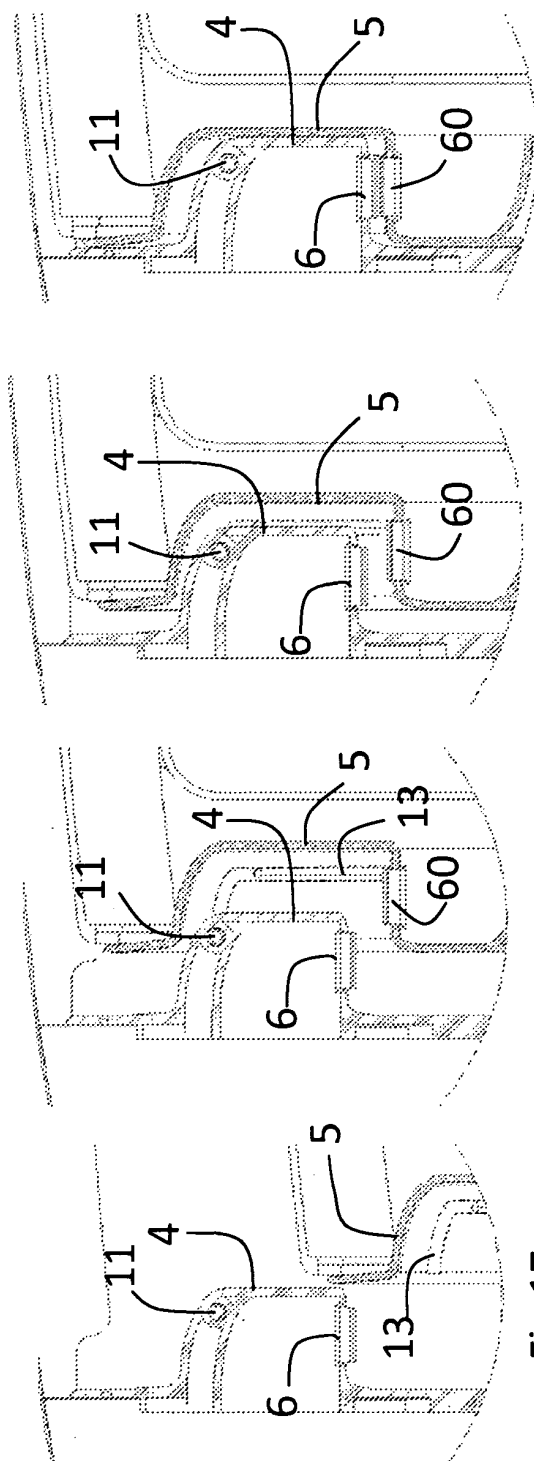


Fig.17

Fig.18

Fig.19

Fig.20

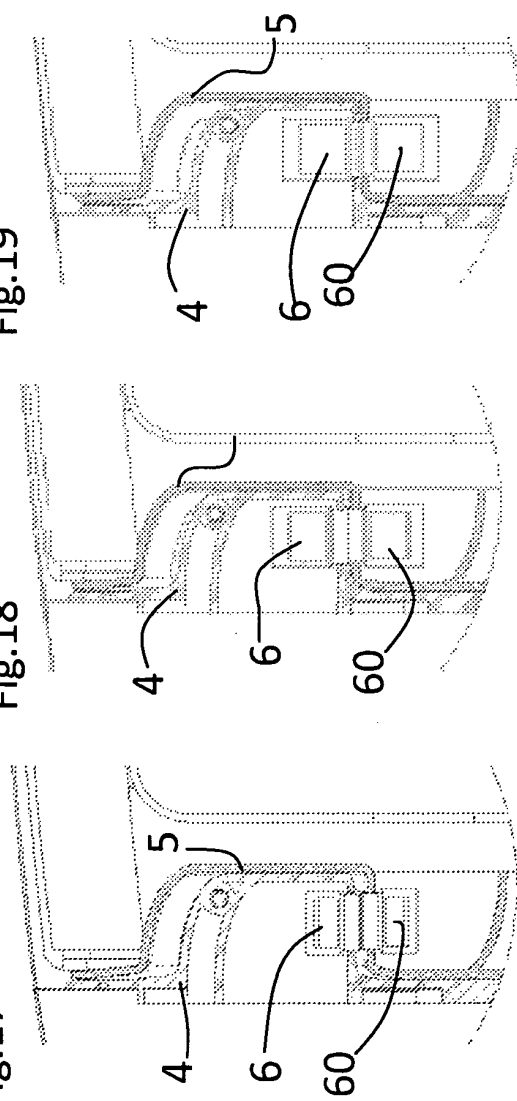


Fig.21

Fig.22

Fig.23

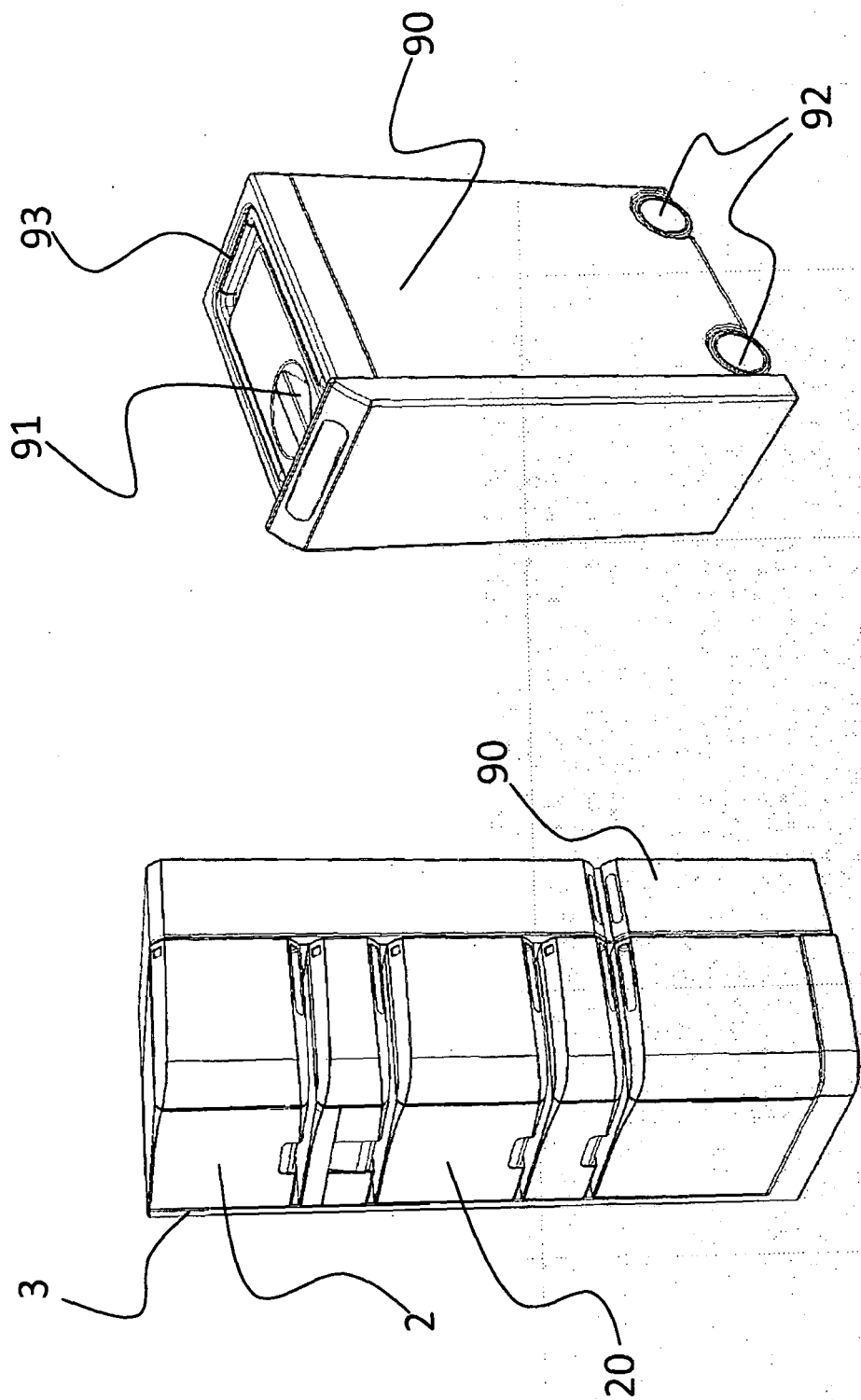


Fig.26

Fig.25

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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