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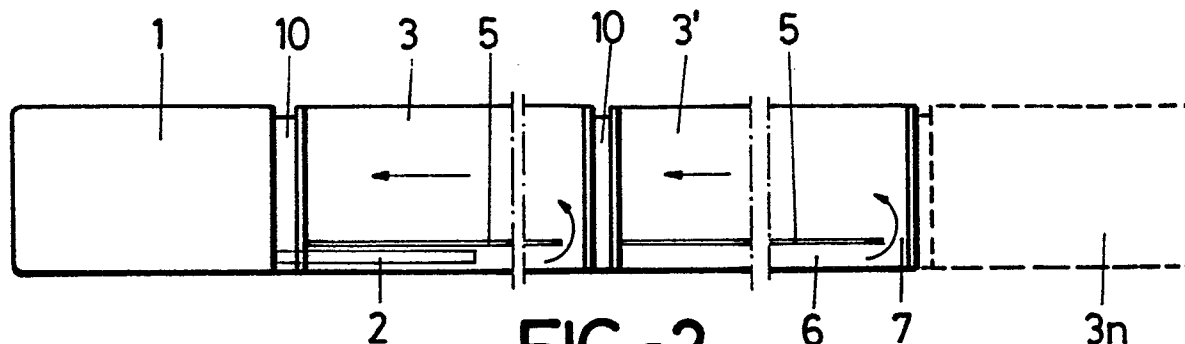
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Improvements introduced in cooled food showcases.

They consist in establishing a modular structure for the showcase, so that a module solely holds the cold equipment and a plurality of modules, the number of which can vary, act as actual showcases, and may be coupled to each other and to the base module, to suit the dimensions of the showcase as a whole to the practical requirements of each case, by using a suitable number of modules.

Furthermore, the cold equipment is assisted by a centrifugal re-circulation fan so that cold transmission takes place by forced air running along all the complementary modules, returning by closed circuit to the base module, to which end such modules are provided with means for coupling to each other.



IMPROVEMENTS INTRODUCED IN COOLED FOOD SHOWCASES

OBJECT OF THE INVENTION

The present invention relates to a series of improvements introduced in cooled food showcases, for instance those used in bars, coffee bars and the like, such improvements being on the one hand aimed at such showcases being easily suited to each user's specific needs, and on the other to attain an improved performance from the practical point of view.

BACKGROUND OF THE INVENTION

Conventional showcases with this specific use are comprised by an elongate body, one of its ends being provided with a cold unit, while the rest of the body and its bottom defines a container of small depth, filled with water, wherein are deposited a plurality of small casks to serve as receptable for the respective foodstuffs, while under the said small casks, within the said cavity and more specifically submerged in the water that fills the same, are positioned a series of pipes connected to the cold unit evaporator.

Obviously, in accordance with this structure, the pipes attached to the cooling circuit evaporator cool the tank water represented by the showcase bottom, and as the small casks or trays are partially submerged in the water, they are suited to the latter's temperature and cool the food products contained therein.

This solution, despite being the most advanced and the most widely used, nevertheless has some important and different problems.

One of such problems lies in the system's "stiffness", the showcase being formed with an element of previously determined dimensions, that will in some cases adjust to the user's needs, but that shall generally fail to coincide with such needs. In practice this results in the impossibility of having a showcase on a counter, perchance because the former is too long, or, in other words, because the section of the said counter available for such purpose is too short, because the said counter is curved, and so on. Other times it is the exact opposite, with a showcase being too short for a given section of the counter and therefore not making the most of the same.

Another problem inherent in conventional showcases lies in the fact that they are too high, because of their design with a water tank, housing the evaporator, and into which the trays holding the foodstuffs must be partially submerged, which ex-

cessive height could many other times also be problematic.

Furthermore, this cooling system, that could be said to be of the "water bath" type, implies that the food in the contact area or close to the contact area with the bath is kept cool, the temperature increasing gradually as the distance from the bath grows, because heat transmission takes place by conduction, distance with regard to the cold generating source being therefore essential.

Moreover, in conventional showcases where cold is conveyed by conduction, with or without the mediation of the "water bath", the trays holding the food, generally metallic, are cooled down most and this results in condensation forming on them that dampens the foodstuffs and may even spoil the same.

DESCRIPTION OF THE INVENTION

The improvements set forth by the invention have been designed to fully solve this problem, with regard to every single one of the aforesaid aspects, and to such end and pursuant to one of the characteristics of such invention, the showcase is shaped as a modular structure, so that as opposed to the single and conventional body, it is formed by a plurality of small-sized independent bodies or modules, that can be coupled to each other, one being the operative module, holding the cold equipment, while the other modules, the number of which can vary, together make up the actual showcase.

Obviously, from this modular nature and by selecting the suitable number of modules, the showcase may be suitably dimensioned to the possibilities of any counter, and not only as to size, but also formally, since the different modules may be coupled to each other by bent or arched connections, that in turn allow the showcase on the whole to take up a bent or arched shape, as the counters adopting such shape may require.

Furthermore, and as another characteristic of the invention, it has been foreseen that the cold be conveyed to the different modules by convection rather than conduction, as before, and more specifically by means of a forced stream of air generated in the cooling unit and duly directed throughout the different modules. Obviously, in this sense, the modules must be duly connected to each other, with the assistance of sockets or like means that establish a sufficiently tight coupling between the same, so that the stream of cold air runs along the lower area of the row of modules,

moves to the upper area of each of them, where the food is, this area also being provided with an intercommunication between the modules for the air to return toward the module holding the cold unit or cooling equipment, a closed circuit therefore being established.

A two way actuation electronic system controls stoppage (switching off) and operation (switching on) of the cooling unit.

In fact, a first sensor detects the temperature of the air returning to the cooling unit. When the return air temperature goes down to a previously set value, (that the user may adjust as he wishes), the cooling unit is switched off.

The second actuation procedure comprises a temporizer controlling the time of continued operation of the cooling unit. Once the pre-established time has elapsed, it is switched off.

Once the cold unit has been switched off for either of the above two circumstances, it shall always start operating (be switched on) through a second sensor controlling the evaporator temperature when the latter reaches the set value.

In accordance with a preferred embodiment of the invention, the showcase is made from a base module or cooling module, provided with a framework inside which are duly fitted the cooling unit compressor and condenser, while the evaporator complementing and completing the said cooling unit projects and overhangs from the side of the said framework, to be housed inside the first showcase-module, as shall be explained hereinafter.

The base module is also provided with a centrifugal fan, which generates the stream of air through the aforesaid showcase-modules, at the same time as a condensing fan throws out the air, through a grid operatively provided in the framework of such module, in order to remove the heat generated by the condenser.

The framework of the base module, in addition to having the said grid for outlet of the stream of air generated by the condensing fan, and the unavoidable means to attach the aforesaid operative elements, viz., the actual condensing fan, the condenser, the compressor and the centrifugal fan, is provided, on the surface that couples to the first showcase-module, with a lower neck, through which the evaporator projects, and with a large upper window through which air can return to the cooling module after picking up the heat of the various showcases.

Each such showcase is specially characterized in being provided with a heat insulating base, with a broad upper-front glass surface, by means of a double glass, defining a chamber, that moreover optimises internal insulation conditions, and a pair of sliding doors on its back wall or wall for access

into the same.

The lower part of the end walls of each module are provided with a neck similar to the aforesaid neck and further up, with an oval aperture, also extending into necks, for coupling of modules to each other, specifically with the assistance of middle sockets that clamp around complementary necks and that ensure a tight coupling between modules.

Furthermore, inside each showcase-module, shifted downwards considerably, is a base or shelf designed to support the receptacles holding the cooled foodstuffs to be displayed, there also being under this base or shelf a conduit through which cold air flows in the housing direction of the said cooling module, while the air returns to such module through the top compartments of the showcase-modules defined above the said base or shelf. Furthermore, a direct communication is established inside each showcase-module between its lower conduit and its top chamber, for which purpose the said base or shelf breaks off at a suitable surface area for a communication to be established between the conduit and the chamber and allow this individual shunt of the main stream of cold air.

Evidently, it is in the lower conduit of the first showcase-module, i.e., the one closest to the cooling module, where the evaporator projecting from the latter is fitted.

In accordance with another preferred embodiment of the invention, the operative module or cold unit is comprised by a framework housing inside it a compact cooling equipment, viz., a compressor, a condenser and an evaporator, but specially characterized in that the evaporator is housed in a sub-chamber where it is independent from the rest of the components and the wall of which is duly heat insulated, so that the heat generated by the condenser has no adverse effects on the evaporator's performance, such heat being let off to the environment through grids operatively provided on the said framework and with the assistance of a condensing fan annexed to the condenser.

The evaporator is itself assisted, established in the same sub-chamber, by a turbine that makes the air flow through the said evaporator, and that ejects it to the outside through a side wall of such cold module, specifically the wall for coupling to the first showcase-module, and more specifically through an aperture that extends into a neck for coupling to the lower area of the relevant side wall of the showcase-module, where there is also a complementary aperture.

Evidently, this same side wall of the cold module and at the evaporator level, has another aperture through which the air set into motion by the turbine returns, in a closed circuit and after running through the different showcase-modules related to

the repeatedly mentioned single cold module.

Each showcase-module, with its base duly structured to establish a suitable heat barrier and its top-front wall being a double glass provided with air chamber, with the same heat insulating aim, is provided with a tray inside, parallel to its lower base and at some distance from the latter, under which tray a conduit is established positioned at the same level as the lower neck for outlet of cold air from the cooling module and directly communicating the showcase-modules, since the latter have almost integral apertures at their end walls.

Furthermore, the shelf or tray of each showcase-module is attached to the said module's structure through one of its ends, basically overhanging and defining at its opposite end a direct communication between the lower conduit and the chamber above the said tray, where the foodstuffs shall be placed in containers deposited on the said tray. More specifically, the said tray is assembled on a module body slot, that is rather deep, so that the said tray may be removed to a greater or lesser extent from the said slot, and the marginal air passage established between the lower conduit and the top chamber of every single different module can therefore be adjusted at will.

Tight coupling between modules is attained with the assistance of sockets that relate the coupling surface of the cold module to the relevant surface of the first showcase-module, and the coupling surfaces between the different showcase-modules, the foregoing on the whole ending in a blind lid that blocks the end and free wall of the last showcase-module.

There is only left to say that the said tight coupling sockets between modules, designed to prevent air losses in the fan cooling closed circuit, can be arched and bent, in cases where the showcase is to be placed on counters that are in turn angled or arched.

It is also possible for the cold air to be channelled, at the outlet of the operative module or cold unit, through the upper part of the different modules, specifically through a conduit that adapts to the top of the said modules close to the sliding doors allowing access to the same, just behind the screen for the lighting means, projecting through holes duly provided on the base of the said conduit and returning to the cold unit through the lower conduit, which is located under the tray where the foodstuffs are placed.

It is moreover possible for this conduit below the tray where the food is located to be divided into compartments by means of a vertical partition wall, to define two longitudinal conduits, one for provision of cold air and another one for its collection and return.

DESCRIPTION OF THE DRAWINGS

In order to complement the description being made and to assist a better understanding of the characteristics of the invention, a set of drawings has been attached to the present specification, as an integral part thereof, showing the following in an illustrative and non-limiting manner:

Figure 1.- Is a partial, diagrammatic and perspective view of a cooled foodstuffs showcase made in accordance with the improvements subject hereof, only showing the module that holds the cold equipment and the first display module as such.

Figure 2.- Is a side elevation diagrammatic view of the showcase of the previous figure, with the two modules of the said figure duly assembled, on them a third module and with the dotted line a fourth module simulating the possibility of adjusting at will the actual showcase length.

Figure 3.- Is a plan detail of the showcase of the previous figures, in accordance with an embodiment where, due to installation requirements, such showcase must take up a bent shape.

Figure 4.- Is a perspective diagrammatic view of the module holding the cooling equipment, in the specific case where the evaporator is housed inside the same, rather than doing so in the first display module, as before.

Figure 5.- Is a cross-sectional diagrammatic view of a display module as such, that can be coupled to the module holding the cold equipment of the previous figure.

Figures 6 and 7.- Are views similar to figures 2 and 3 but corresponding to this latter case.

Figure 8.- Is another module corresponding to the cold equipment, but in an embodiment where the elements making up such equipment are grouped so that the module is elongate vertically rather than being so horizontally as in the previous case.

Figure 9.- Is a view similar to figure 6, but with the module holding the cold equipment made in accordance with the solution of figure 8.

Figure 10.- Is a side elevation view of a cooled foods showcase made in accordance with a different embodiment of the object of the invention and solely provided with two showcase-modules, which number can vary and only be limited by the operative power or capacity of the cold unit.

Figure 11.- Is a plan view of the assembly shown in the previous figure.

Figure 12.- Is a plan and diagrammatic view of the cooling module, with its framework cut off to show its internal structure.

Figure 13.- Is a longitudinal section of the module of the previous figure, along line A-B of the said figure.

Figure 14.- Is a cross section in echelon of the same module, in this case along the line C-D of figure 12.

Figure 15.- Is a longitudinal sectional detail of the showcase as a whole, where the cold module has only been partially shown and without being cut.

Figure 16.- Is a cross section of a showcase-module made along line E.F of figure 15.

Figure 17.- Is an enlarged detail of the previous figure, specifically marked by the arrow and enclosed in a circle.

Figure 18.- Is a perspective view of one of the necks for coupling between modules.

Figure 19.- Is a sectional detail of the groove and tongue coupling between modules, along line G-H of figure 16.

Figure 20.- Is a section similar to the previous figure, but along line I-J.

Figure 21.- Is a side elevation view of a cooled foodstuffs showcase made in accordance with a another embodiment of the object of the invention.

Figure 22.- Is another plan view of the assembly shown in the previous figure.

Figure 23.- Is a diagrammatic view of the cold module, with its framework cut to show its different internal components.

Figure 24.- Is a side elevation view of the cold module, partially cut, specifically at the level of the sub-chamber holding the evaporator and the turbine for re-circulation of the cooling air.

Figure 25.- Is a cross section of the same cold module, also at the level of the sub-chamber marked in the previous figure.

Figure 26.- Is a cross section of one of the showcase-modules.

Figures 27 and 28.- Are finally cross-sectional diagrammatic views of the same number of possibilities of directing the cooling air inside the display modules.

PREFERRED EMBODIMENT OF THE INVENTION

In the light of these figures, and more specifically figures 1 to 3, it may be observed that a cooled foodstuffs showcase made in accordance with the improvements subject hereof, comprises a series of modules, specifically a base module (1), holding the cold unit or cooling unit, of the compact type, comprising a compressor, a condenser and an evaporator, plus a pair of auxiliary elements, specifically a centrifugal re-circulation fan and a condensing fan.

The evaporator (2) shall be able to project outside the module (1) holding the cold unit, as shown in figure 1 and be housed inside the first

module (3) of those making up the showcase as such (3), (3'), ""

The lower part of the end walls of each such module (3) are provided with two apertures (4), either for penetration into the evaporator (2), as in the case of the first module (3), or for connecting the modules to each other, as in the others.

Just above the level of such apertures (4), the different modules (3) making up the showcases as such, are provided with a load platform (5) for depositing the foodstuffs to be displayed and cooled, under which is established the cold air conduit (6), both along each module and for passage from one module to the other through the apertures (4), such platforms (5) braking off at the end of each module (3) opposite module (1) holding the cold equipment, defining a passage (7) for cold air toward the area where the foods are located, as shown by the arched arrows of figure 2.

Furthermore, in the same end walls of the modules (3) but at a higher level, i.e., above platform (5), other holes or apertures (8) are established for the air to return toward the module (1) holding the cold unit, where there is also an aperture (9) to complete the cooling air closed circuit.

Evidently, the apertures (4) and (8) of adjacent modules will be connected to each other through relevant sockets (10) that ensure a duly tight coupling, which sockets can only affect each such apertures or wholly include the smaller surfaces, facing and corresponding to the said adjacent modules and that as shown in figure 3 can take up a bent shape, as the socket numbered (10') in such figure, in order to transmit this bent shape to the showcase as a whole.

The end module (3) and opposite module (1) holding the cold equipment, in the showcase web, may have a lid for each of its apertures (4) and (8), a common lid for all of them, and may even be a special module with no apertures at its free end, as shown by the dotted line and numbered (3n) in the figures, which module, as shown in figure 7, can take up a general shape similar to that of the module (1), to provide the showcase with some "symmetry" between end modules.

From this basic structure, it is possible for the operative module, i.e., the module holding the cold equipment, to also house the evaporator inside it, as in the case shown in figures 4 through 7, where the said module has been numbered (1') and it is similarly possible for the break (7) in platform (5) connecting the lower conduit (6) to the top area (11) of the module, where the foodstuffs are placed, not to be provided at the end of the module opposite or furthest away from the cold equipment (1), as in figure 2, but on one of the side edges of the said platform (6), as shown in figure 5, where the said passage or communication has been num-

bered (7').

Finally, and as shown in figure 8, in the event of the operative module integrally housing all the elements taking part in the cold equipment, viz., it also has the evaporator inside it, such operative elements may be grouped for the said module (1'') to be vertically elongate, so that this solution can be chosen in cases where space available transversally is scarce while there is no such problem considering the space available vertically.

The operative module (1) holding the cold equipment shall evidently be capable of supporting a given maximum number of modules (3) constituting showcases as such, and within this limitation, obviously depending on its cooling capacity, each user may acquire one or several operative modules (1) to couple to the same or to each of them the suitable number of modules (3), connected to each other through the most suitable necks (10-10'), to make the most of the counter space available to such end.

In accordance with the embodiment shown in figures 10 through 20, the showcase subject hereof comprises the functional combination of a cold module (21) and a plurality of showcase-modules (22-22') the number of which can vary, thereby allowing the length of the showcase as a whole, specific in each case, to be adjusted.

As to the cooling module (21), the latter comprises a framework, actually numbered (21), inside which are housed a compressor (23), a condenser (24), a condensing fan (25) and centrifugal fan (26), the framework (21) being provided, on its side surface operatively facing both the condensing fan (25) and the condenser (24), with respective grids (27) and (28) that favour heat disposal, i.e., removal of the condenser-generated heat.

The centrifugal fan is attached to the part (34) that guides the air through the evaporator and they are together in turn attached to the evaporator (33) that complements the cooling equipment and remains outside the framework (21) corresponding to the actual cooling module, specifically housed in a horizontal, lower, overhanging and suitable extension (34) of the sub-framework (29).

Each showcase-module (22-22') and as specifically shown in figure 16, is provided on its base (35) with a thick layer (36) of heat insulating material, its top-front wall being structured as a double glass (37) provided with an air chamber (38), that in turn acts as heat insulator and is designed to prevent vapour formation, while the other side surface of the module, allowing access to its inside, is provided with the classic sliding doors (39).

The ends walls of each showcase-module (22) are moreover provided with a rectangular and lower neck (40), similar to neck (32) of the cold module (31) for coupling of modules to each other, and a

top oval aperture that also extends into a neck (41), similar to the one in the framework (21), likewise previously mentioned and numbered (31).

Finally, each showcase-module has a base or shelf (42) that rests on marginal and longitudinal supports (43) of the module body and that breaks off before reaching its end opposite the cold unit, as specifically shown in figure 15, to define a passage (44) connecting the lower cold air conduit (45) to the top chamber (46) where the foodstuffs are to be displayed.

The necks (40-41) for coupling between modules are sealed or coupled tightly with the assistance of sockets (47) that albeit normally straight and scarcely long, as shown in figures 10, 11 and 18, may also take up arched or bent shapes, in order to adjust the different modules that form a cooling showcase made in accordance with the object of the invention, to the specific design of any counter, following the latter's curves or angles.

Such sockets (47) assist in tight coupling between modules but cannot hold them together longitudinally. In this sense and in accordance with figures 16, 19 and 20, each end surface of each module has been provided with a pair of cylindrical necks (48) and (49), the former being a brace, having a small internal perimetral groove (50), and the latter being a tongue (with an external diameter equal to the former's internal diameter) and having an external perimetral rib (51) complementary to groove (50) and designed to be coupled tightly in the same, as shown by the dotted line in figures 19 and 20. Evidently, during normal assembly or coupling between modules, the brace neck (48) of each of them shall couple axially to the other's tongue neck (48), and vice versa.

As in the previous case, a two way actuation electronic system controls stoppage (switching off) and operation (switching on) of the cooling unit.

In fact, a first sensor detects the temperature of the air returning to the cooling unit. When the return air temperature goes down to a previously set value, (that the user may adjust as he wishes), the cooling unit is switched off.

A second actuation procedure comprises a temporizer controlling the time of continued operation of the cooling unit. Once the pre-established time has elapsed, it is switched off.

Once the cold unit has been switched off for either of the above two circumstances, it shall always start operating (be switched on) through the sensor controlling the evaporator temperature when the latter reaches the set value.

In accordance with another embodiment of the invention, as shown in figures 21 through 26, the cooled food showcase comprises an operative module or cold unit (61) complemented with a series of showcase-modules (62-62'), the number

of which can vary, such number depending on the actual size of the said showcase-modules and specifically on the cooling capacity established in the cold module (61).

The cold module (61) is structured on the basis of a framework actually numbered (61), inside which is a partition wall (63) defining a sub-chamber (64) housing the evaporator (65) and a turbine (66) for air re-circulation, while the rest of the cooling circuit components, i.e., the compressor (67) and the condenser (68), are housed inside the framework (61) outside the said sub-chamber (64), assisted by a condensing fan (69) that facilitates ejection of the heat generated by the latter to the outside through grids operatively established to such end on the said framework (61).

The upper part of the side wall (70) for coupling of the cold module (61) to the first showcase-module (62) is provided with a broad aperture (71), operatively facing the evaporator (65) and the turbine intake (66), while under the same is established another aperture (72), of smaller size, and through which the said turbine projects the cold air to the outside through a conduit (73) that extends into a neck (74) designed to be inserted in the first showcase-module (62).

Each showcase-module (62, 62', ...) is comprised by a base body (75), with a foamed structure as shown in the figure (66) or with any other ensuring a suitable heat barrier, such base body being provided with front means for coupling of a double glass (76) constituting the top-front wall of the module and that is provided with an air chamber (77), also acting as a heat insulator, this double glass (76) ending in a top-rear section (78) that with the assistance of the base (75) defines the guides for the sliding doors (79).

Furthermore, the base is raised at the back to define a step or landing (80) for support and attachment of a shelf or tray (81), specifically with the assistance of a flange (82) above the step (80) and defining a longitudinal slot into which the relevant edge of the shelf (81) fits, as also shown in figure (26), this slot (80-82) being rather deep, to allow positional adjustment of the tray (81), as shown by the dotted line of the figure (26) and consequently width variation of the passage (83) that communicates the lower conduit (84) through which the cold air generated by the turbine (66) flows away from the cold unit, and the top chamber (85) where the foodstuffs are placed on the actual shelf or tray (82), in suitable containers and through which the cooling air returns toward the said cold unit, to penetrate therein through the top aperture (71).

Given that the shelf or tray (81) remains basically overhanging and may have to support considerable weights, one or several supports (86)

have been provided near its free end for its assistance.

In order to establish longitudinal communication between the different modules, their end walls are mostly open, and tight coupling between modules is achieved with the assistance of sockets (87), that may be stiff or deformable, and that as aforesaid, may be straight or scarcely long, in accordance with the figures, and also arched or bent, the terminal showcase-module being complemented with a blind lid (88), that blocks its free end.

A two way actuation electronic system controls stoppage (switching off) and operation (switching on) of the cooling unit.

In accordance with the embodiment of figure 27, each showcase-module (91) may have, just behind the screen (92) of its light source (93) and preferably constituting a single element with such screen (92), a tubular section (94) defining a conduit for the cold air coming from the relevant cold unit, which air goes into the module's top receptable (95), where the foodstuffs shall be placed, through holes or apertures (96) operatively provided on the base of the section (94), while the air returns to the cold unit through the lower conduit (97), established under the tray (98), reaching such conduit through longitudinal apertures (99) that define the said tray (98) with respect to the sides of the showcase-module (91) body.

It is also possible, in accordance with the embodiment of figure 28, for each showcase-module (101) and under the tray (102) for placing the foodstuffs, to be provided with a partition wall (103) defining two longitudinal conduits, one (104) to guide the cold air from the cold unit toward the different showcase-modules, the air reaching the said top chamber (105) holding the foodstuffs through a longitudinal aperture (106), while the other lower conduit (107) is for the air to return toward the cold unit, that also penetrates the said conduit (107) longitudinally through the aperture (108) in accordance with the arrows shown in the said figure 28.

Claims

1.- Improvements introduced in cooled food showcases, essentially characterized in comprising the establishment of a modular structure for such showcase, the latter being made up by a base module or operative module, holding the cold equipment, specifically a compact type equipment, comprising a compressor, a condenser and an evaporator, and a series of complementary modules, the number of which can vary, defining the showcase as such, that can couple to each other

and couple to the base module.

2.- Improvements introduced in cooled food showcases, in accordance with claim 1, characterized in that the base module is moreover fitted with a centrifugal fan through which a forced stream of cold air is established, along the different complementary modules, in closed circuit, i.e., with return to the base module, for which purpose both the base module and the complementary modules are provided with holes or apertures for communication with each other.

3.- Improvements introduced in cooled food showcases, in accordance with previous claims, characterized in that the complementary modules constituting the showcase as such are provided, at a lower level, with a platform that defines the support surface for the receptacles holding the food, under which platform is established a conduit for the forced stream of cold air, there being apertures for communication between modules under the said platforms and apertures for connection to each other above the same, for the stream of air to return, at the same time as each platform is provided with a communication passage between the lower conduit and the upper area where the foods are placed.

4.- Improvements introduced in cooled food showcases, in accordance with previous claims, characterized in that the modules couple to each other with the assistance of necks that can affect the intercommunication apertures individually or jointly, which necks may in turn take up straight, arched or bent shapes to suit the alignment of modules constituting a given showcase to the shape of the counter where it shall be placed.

5.- Improvements introduced in cooled food showcases, in accordance with previous claims, characterized in that the centrifugal re-circulation fan is joined through a conduit to the evaporator that projects and overhangs from the said module's framework, through a broad neck existing in one of the side walls thereof, the said evaporator having been provided to be housed inside a showcase-module as such, to be coupled both to the cooling module and to showcase-modules in line with the same.

6.- Improvements introduced in cooled food showcases, in accordance with claim 5, characterized in that each showcase-module is provided with a base or shelf defining a lower conduit, that in the case of the first module houses the cooling group evaporator, the lower communications between modules being established at the same level as this conduit, while the upper communications are located at the level of the chamber that in each module is defined above the said base or shelf where the food is placed, specially characterized in that this lower conduit that runs through all mod-

ules, is provided inside each of them with a shunt toward the relevant upper chamber, specifically through a break in the base or shelf before reaching the free module end opposite the cooling module.

7.- Improvements introduced in cooled food showcases, in accordance with claims 5 and 6, characterized in that the lower base of each showcase-module is covered with a layer of heat insulating material, its top-front wall is a double glass provided with an air chamber and it is fitted with sliding doors on the wall allowing access to its inside.

8.- Improvements introduced in cooled food showcases, in accordance with claims 5, 6 and 7, characterized in that both the lower and the upper apertures for communication between modules extend into short coupling necks, assisted by tight coupling sockets, such sockets having been provided to be straight and with a scarce axial size, or to take up arched or bent positions determining variations in the trajectory of the modules arrangement, that can be suited to the different counter designs.

9.- Improvements introduced in cooled food showcases, in accordance with claims 5, 6, 7 and 8, characterized in that the end surfaces of each module are provided with a pair of small cylindrical necks for tongue and groove coupling between modules, the internal diameter of one of them coinciding with the external diameter of the other, and their adaptation surfaces being provided with perimetral and complementary groove and rib through which they are pressure tongued and grooved.

10.- Improvements introduced in cooled food showcases, in accordance with claims 1 through 4, characterized in that the framework holding the cold module is provided with a sub-chamber that houses the evaporator, while the compressor and the condenser remain outside the said chamber, such two elements being assisted by a condensing fan that generates a stream of air that throws out the condenser-generated heat through grids operatively provided to such end on the framework walls, the wall of the sub-chamber holding the evaporator being duly heat insulated and the said chamber being moreover provided with the turbine for re-circulation of air through the showcase-modules, specially characterized in that the surface of the cold module for adaptation to the first showcase-module is provided with a broad upper aperture for direct access to the evaporator and a lower aperture, of smaller size, through which projects a neck that belongs to a conduit coming from the air re-circulation turbine and through which the cooling air reaches the showcase-modules.

11.- Improvements introduced in cooled food

showcases, in accordance with claim 10, characterized in that each showcase-module is provided with a horizontal shelf or tray, at some distance from its base, defining a lower conduit operatively facing the neck for outlet of air from the cold unit, specially characterized in that such shelf is attached to the module body, in an overhanging position, through one of its longitudinal edges, defining at its other longitudinal end a communication passage between the lower cold air conduit and the upper module chamber where the foods are located and through which the air again returns to the cold unit.

12.- Improvements introduced in cooled food showcases, in accordance with claims 10 and 11, characterized in that the said shelf or tray is coupled to the module body in a side and longitudinal and rather deep slot of the latter, that allows varying penetration of the shelf into it and therefore the passage for the air defined at the opposite edge of such shelf to be adjusted.

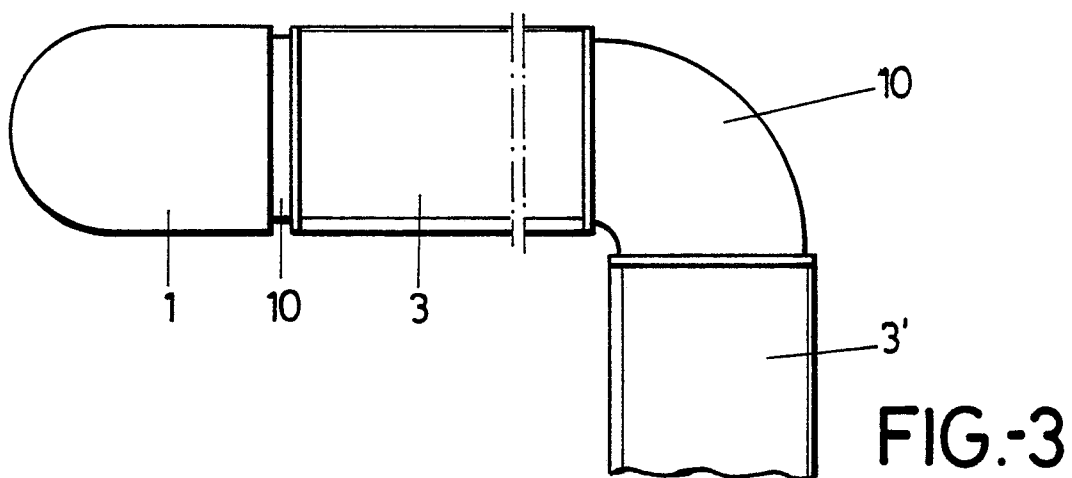
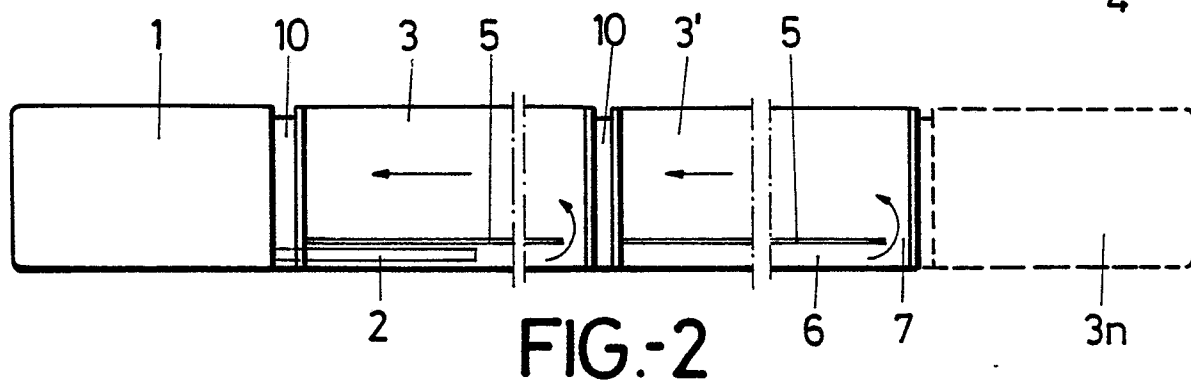
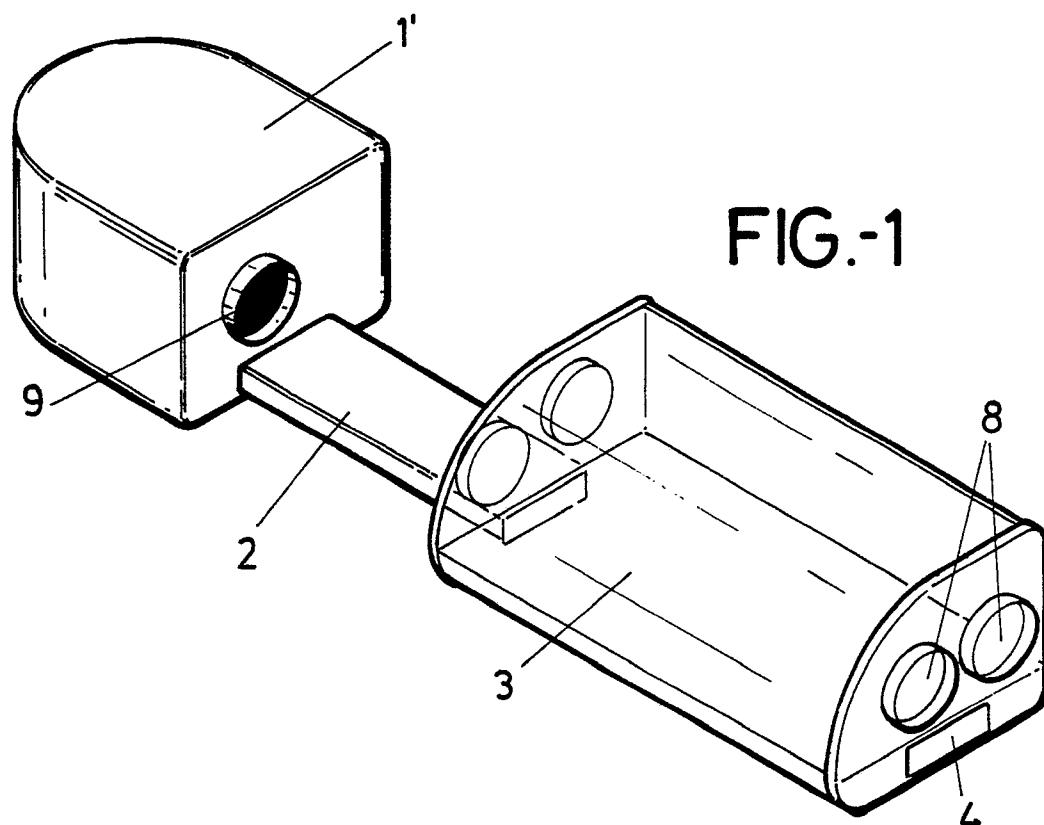
13.- Improvements introduced in cooled food showcases, in accordance with claims 10, 11 and 12, characterized in that the showcase-modules are mostly open on their end and inter-coupling side surfaces, and are assisted by sockets establishing a tight coupling for the same.

14.- Improvements introduced in cooled food showcases, in accordance with claims 10, 11, 12 and 13, characterized in that each module comprises a base body, with a foamed structure or any other that can provide it with a height extent of insulation, such base body being provided with the means for attachment of the shelf or tray, and the double glass with air chamber constituting the showcase top-front surface, attached through its top-rear edge to a section that, with the actual module base body, define the guides for the sliding doors allowing access to the upper chamber thereof.

15.- Improvements introduced in cooled food showcases, in accordance with claims 1 through 4, characterized in that the top part of each showcase-module, preferably just behind the screen for the showcase lighting means and preferably being integral with the said screen, is provided with a tubular section defining a cold air conduit, coming from the cold unit, the lower part being provided with holes or apertures for outlet of air toward the upper chamber of each showcase-module, specially characterized in that the tray of such showcase-modules on which the foodstuffs are deposited, have their longitudinal edges separated from the showcase body defining areas for access to the sub-chamber located under the said tray and constituting a conduit for air collection and return toward the cold unit.

16.- Improvements introduced in cooled food showcases, in accordance with claims 1 through 4,

characterized in that the lower chamber of each showcase-module, defined under the platform or tray receiving the foodstuffs, is divided by means of a vertical partition wall into two longitudinal and parallel conduits, communicated through their external longitudinal edge to the upper chamber where the food is located, one conduit being for provision of cold air from the cold unit and another one for air collection and return toward such cold unit.



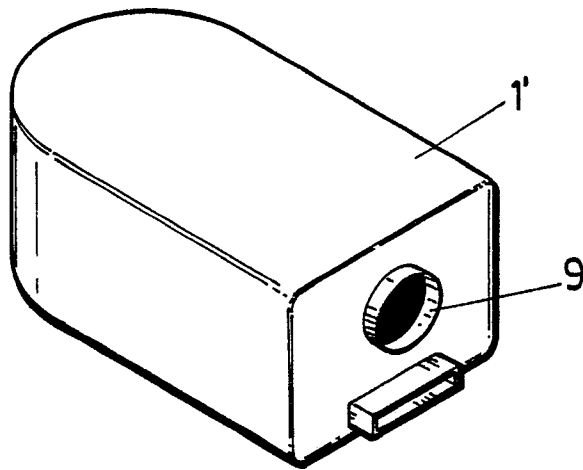


FIG.-4

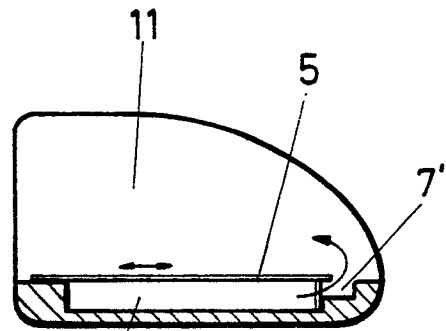


FIG.-5

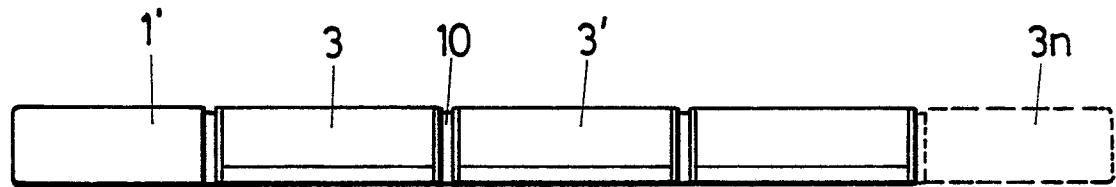


FIG.-6

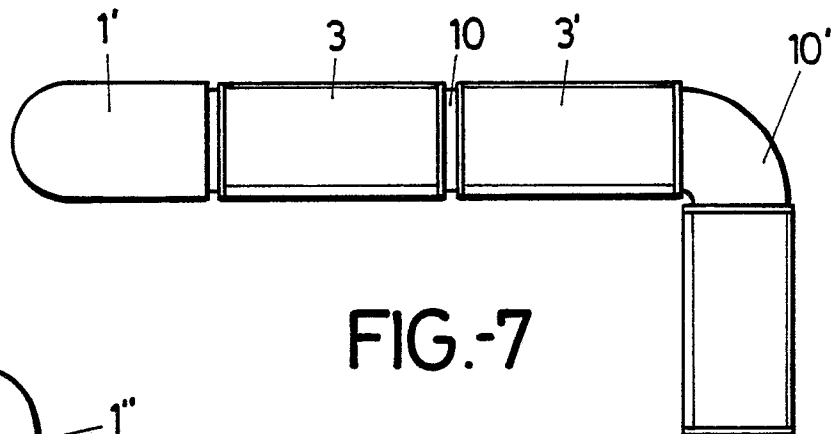


FIG.-7

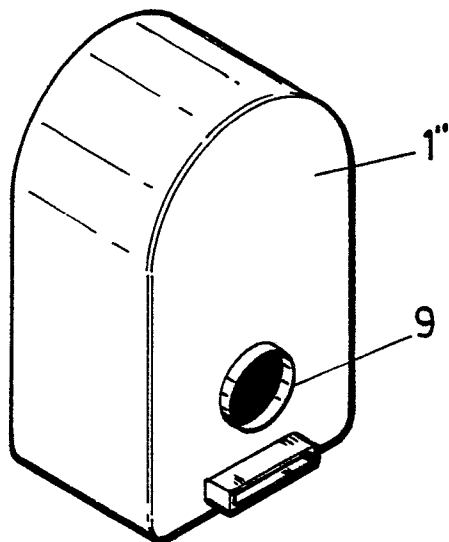


FIG.-8

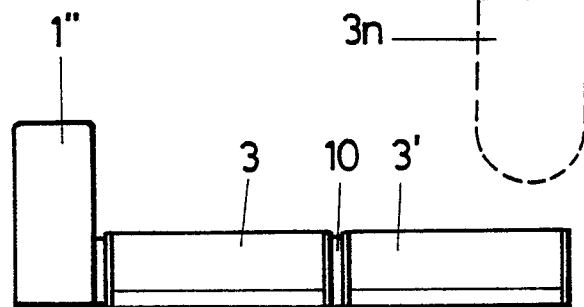


FIG.-9

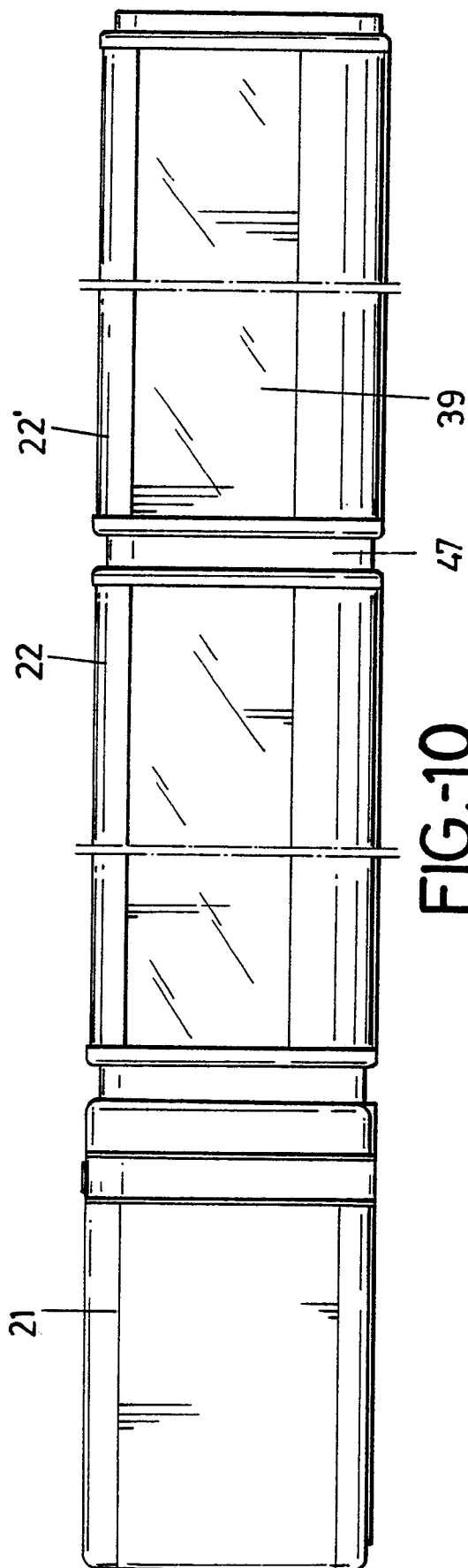


FIG.-10

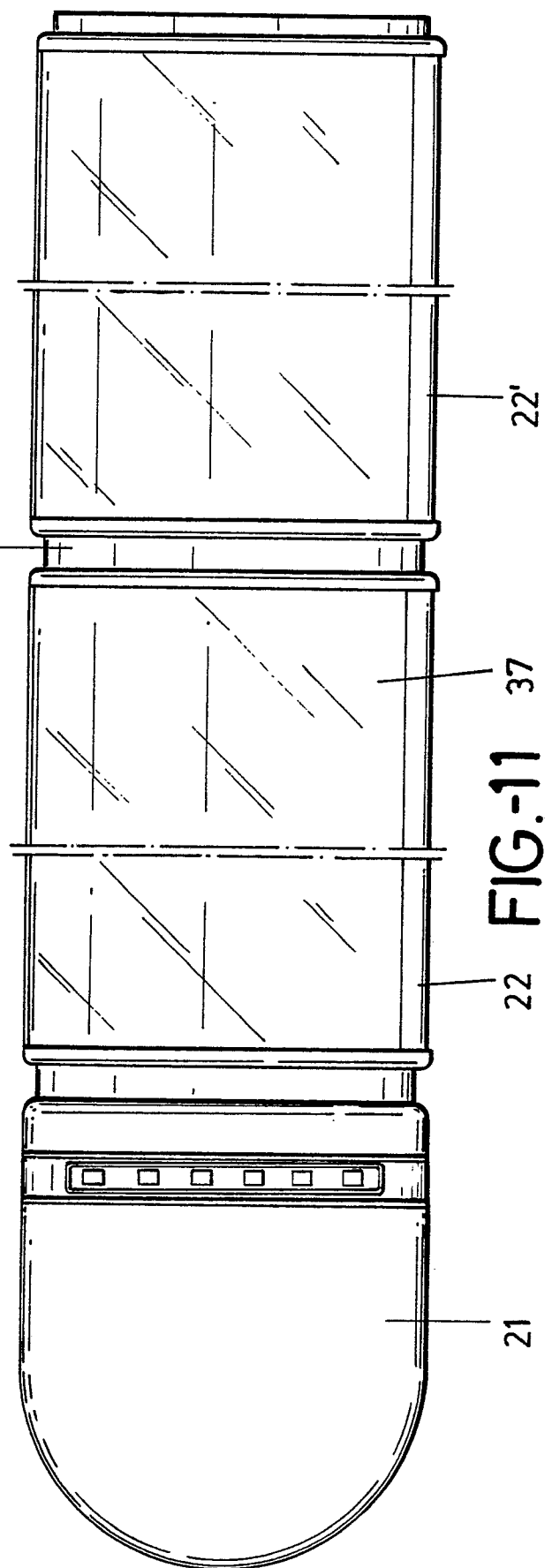
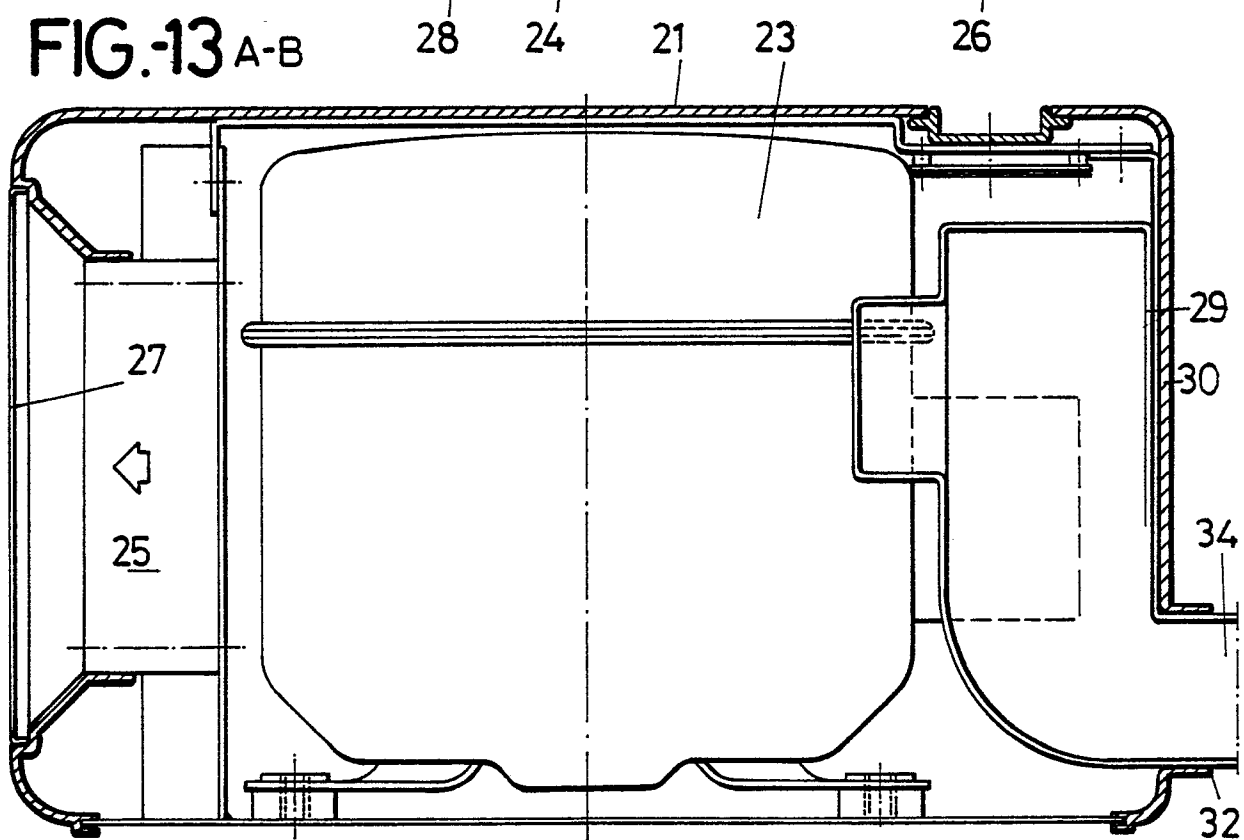
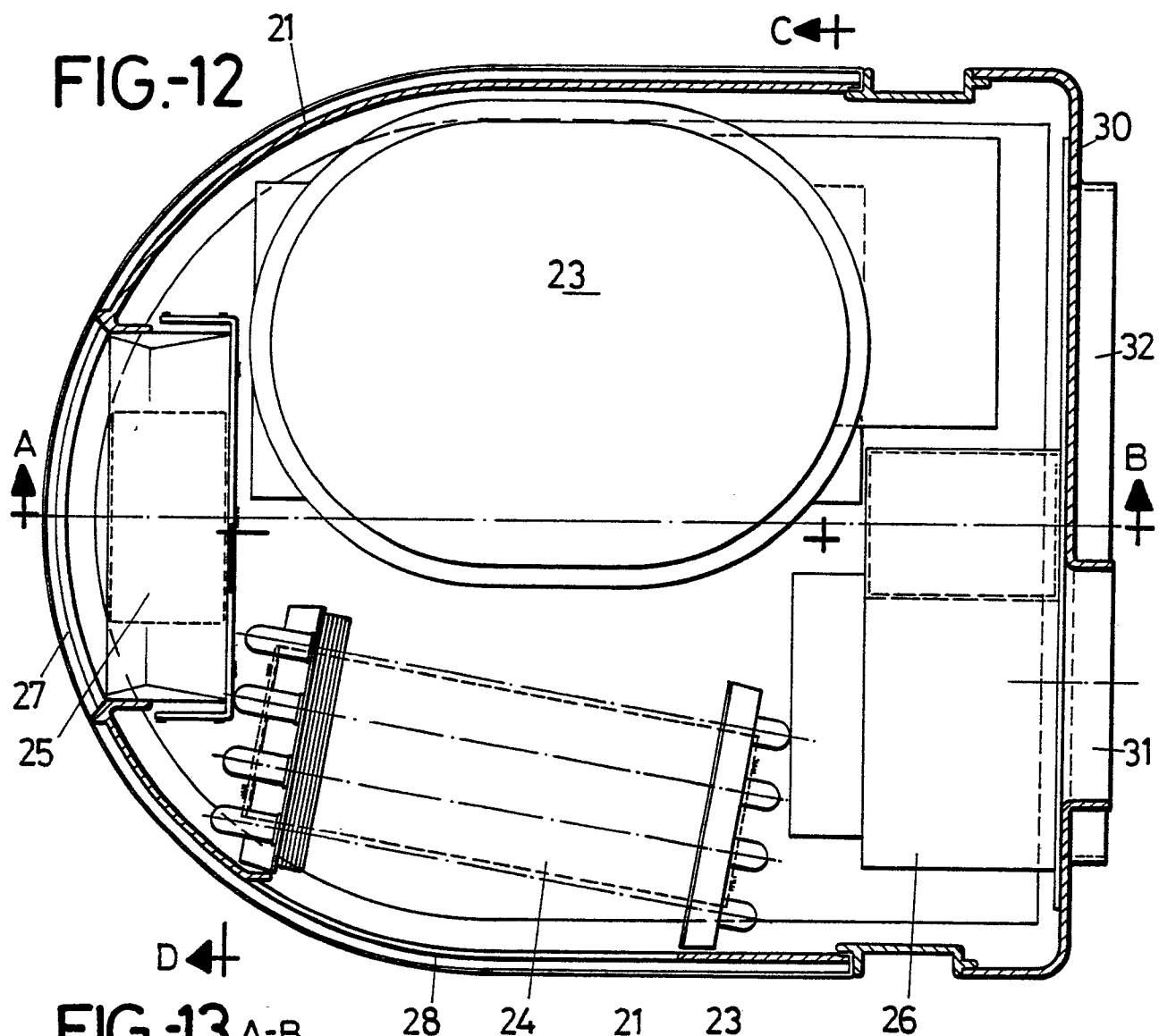
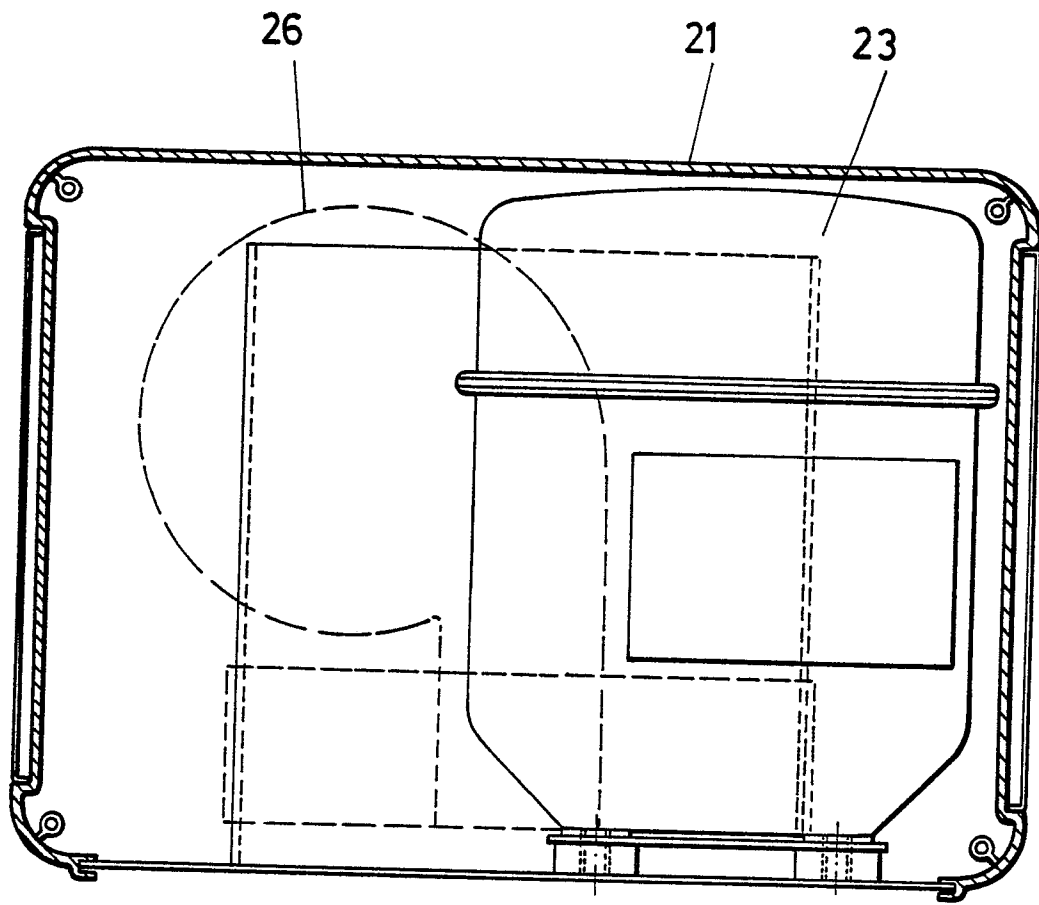


FIG.-11





C-D
FIG.-14

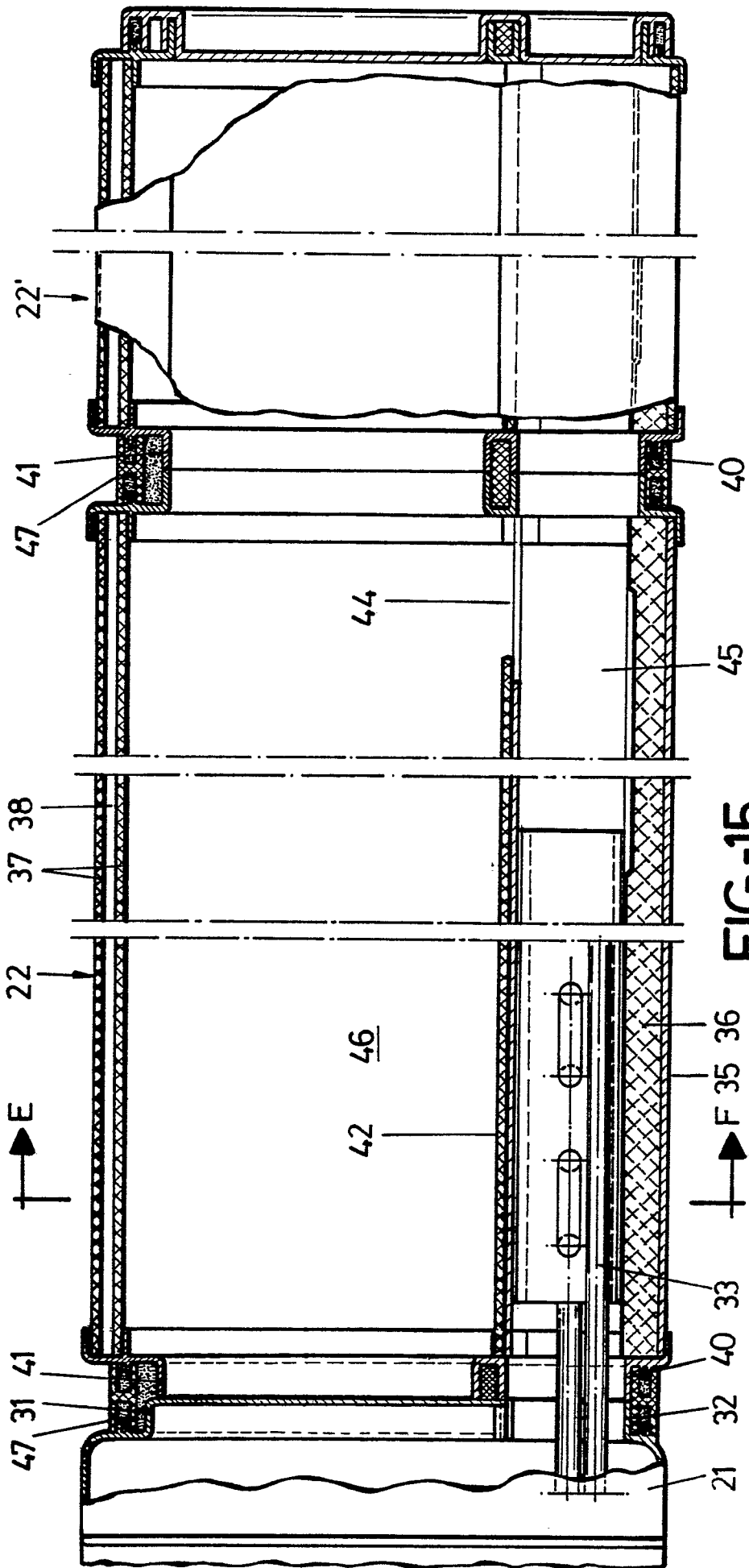


FIG.-16

E-F

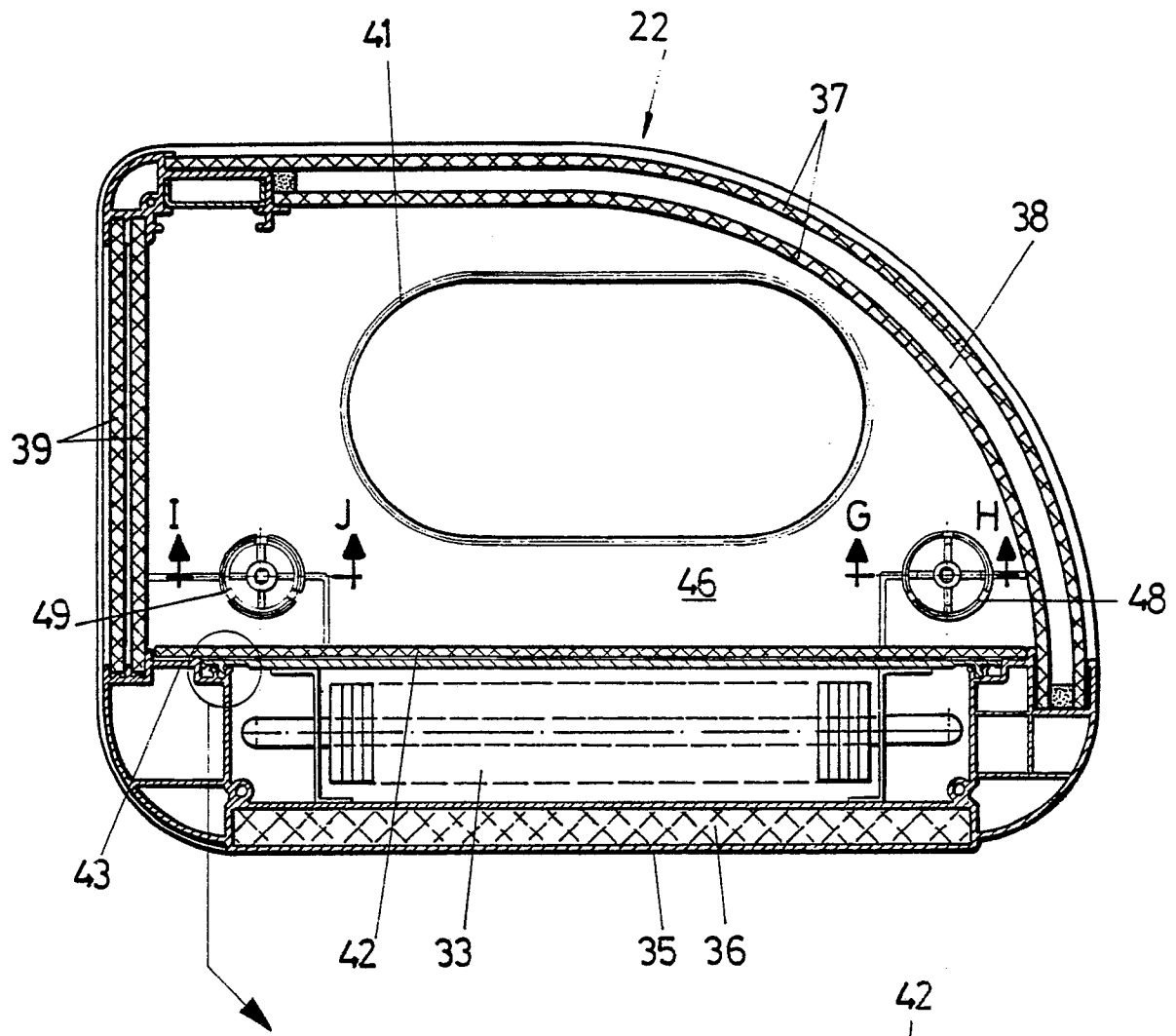
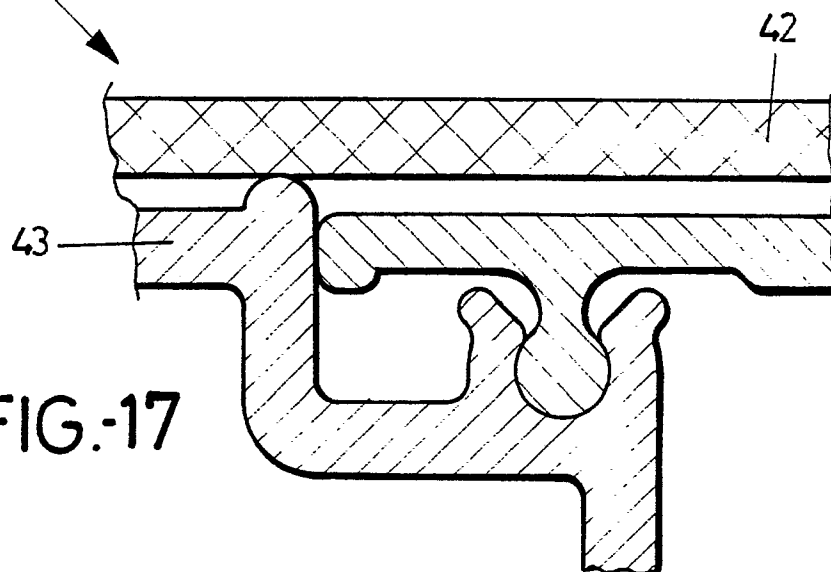
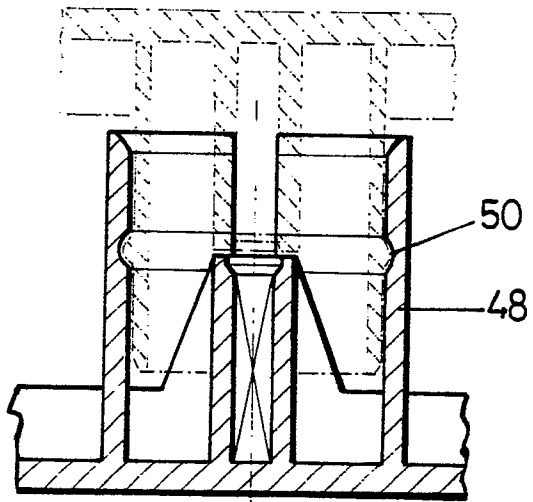
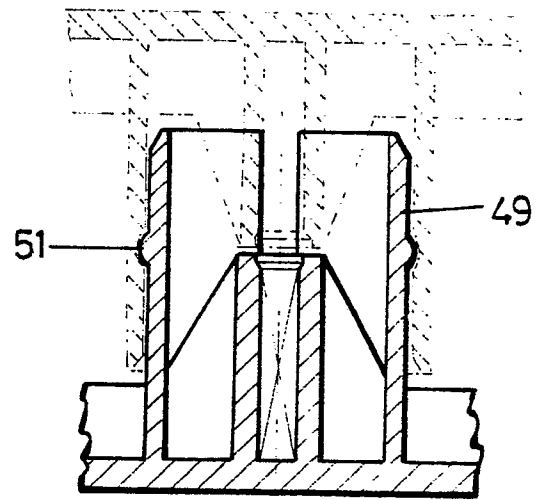


FIG.-17





G-H
FIG.-19



I-J
FIG.-20

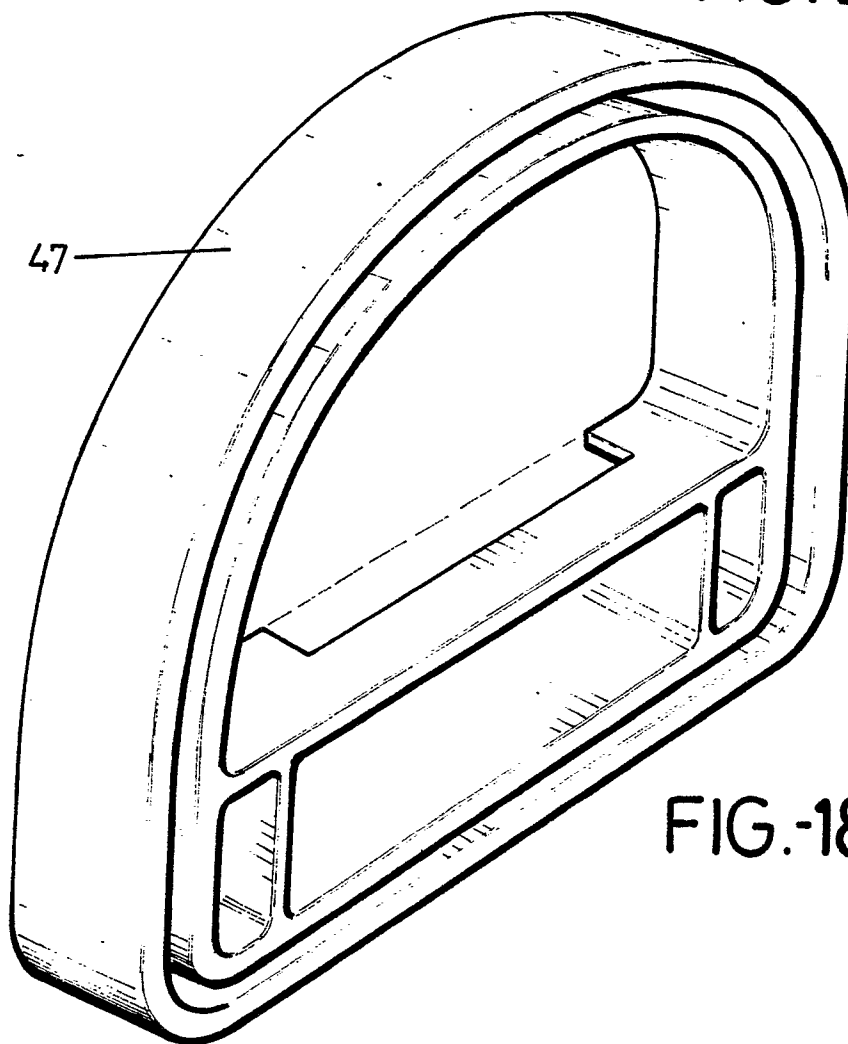


FIG.-18

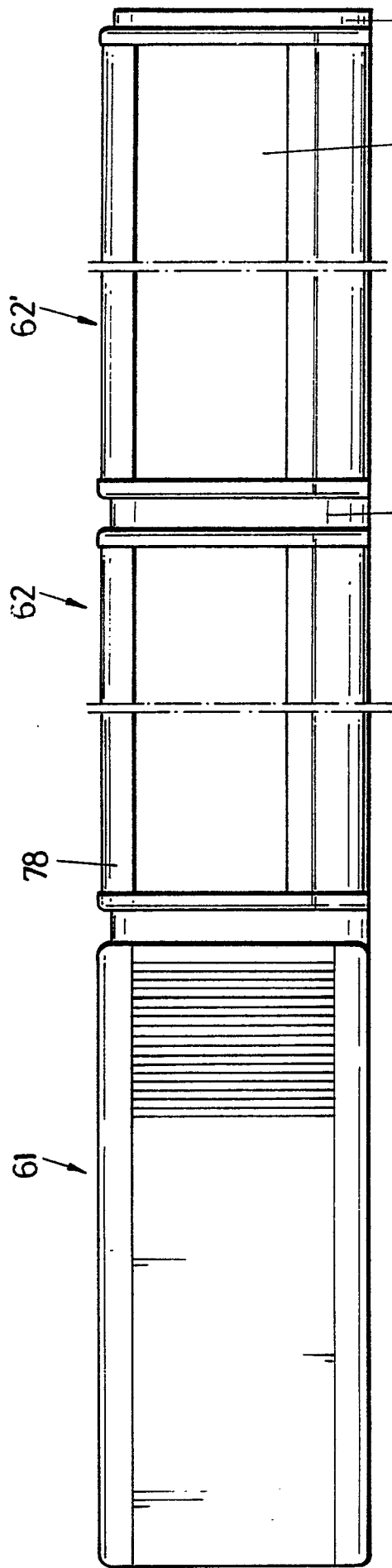


FIG.-21

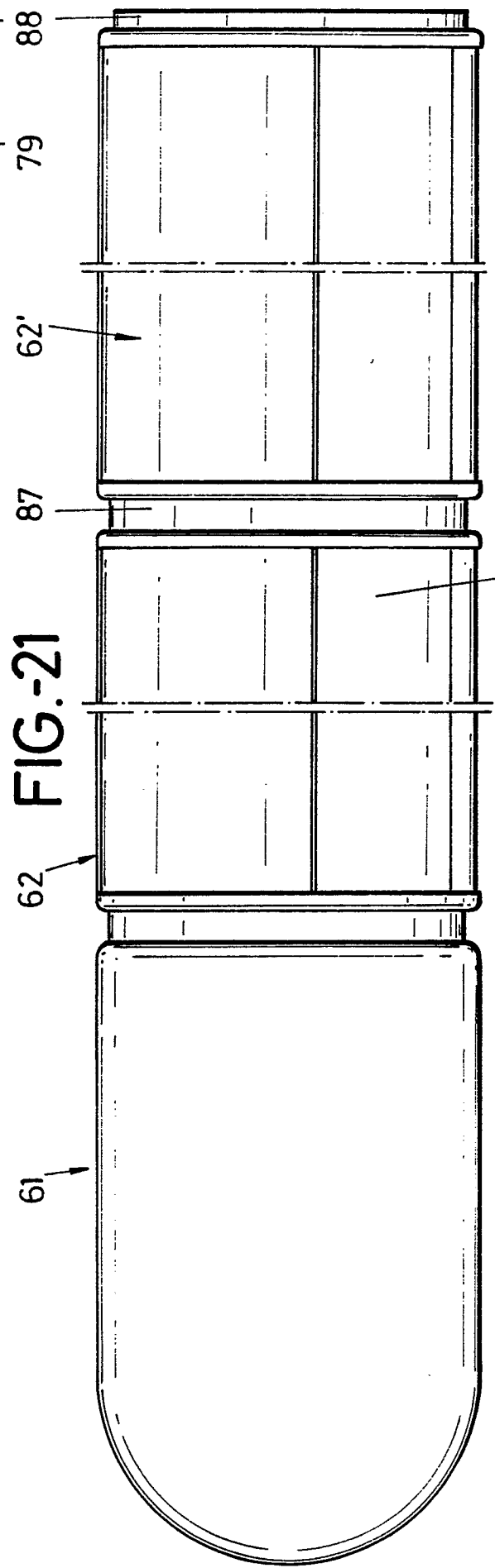


FIG.-22

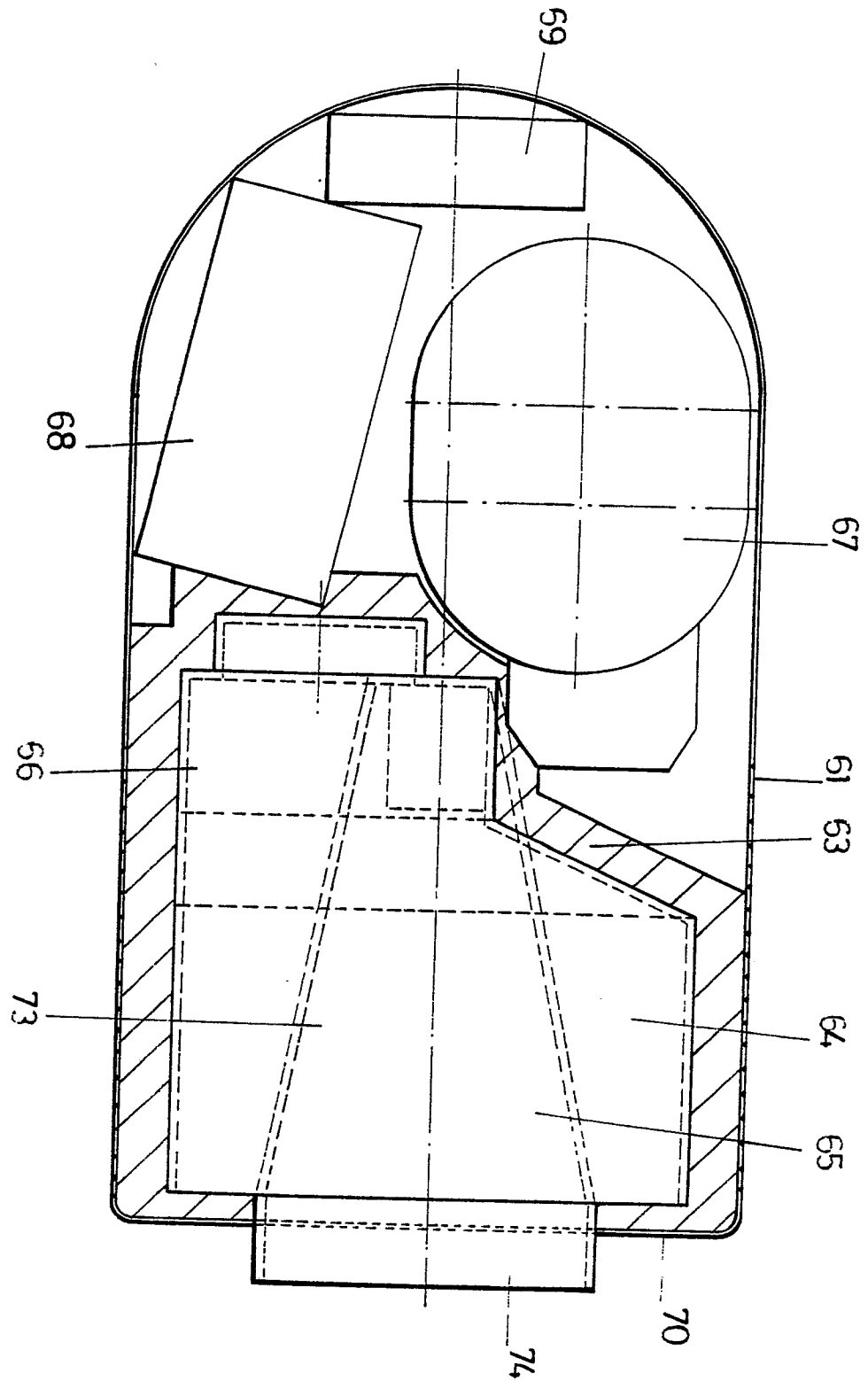
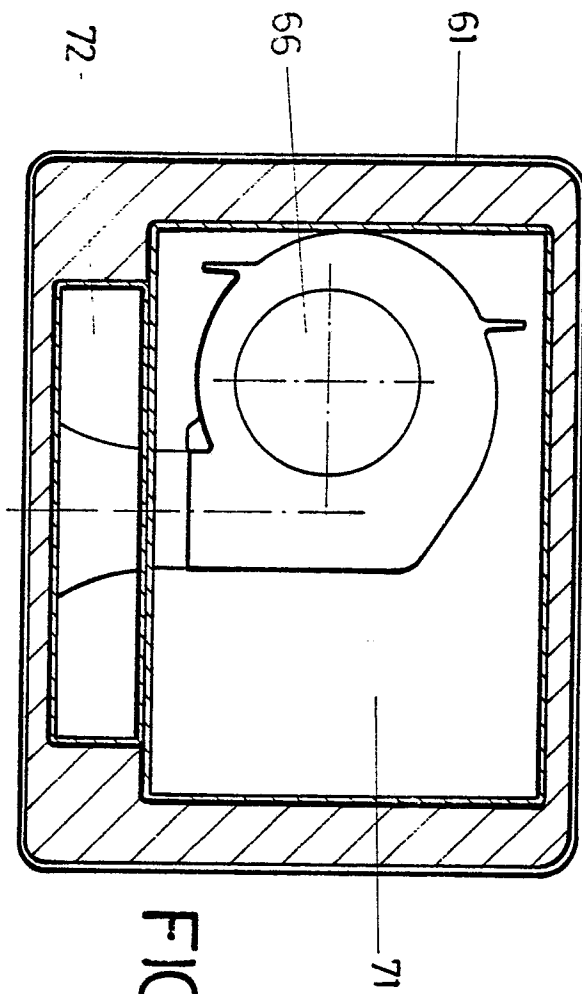
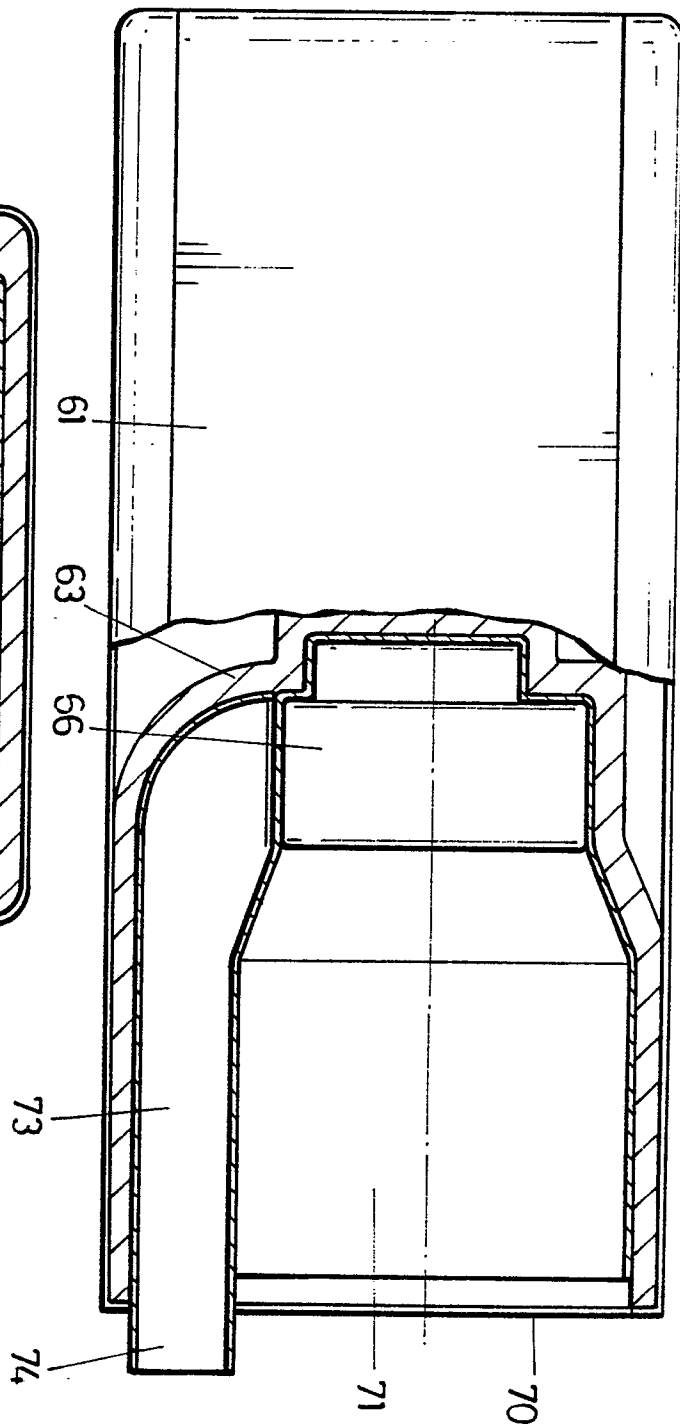


FIG.-23



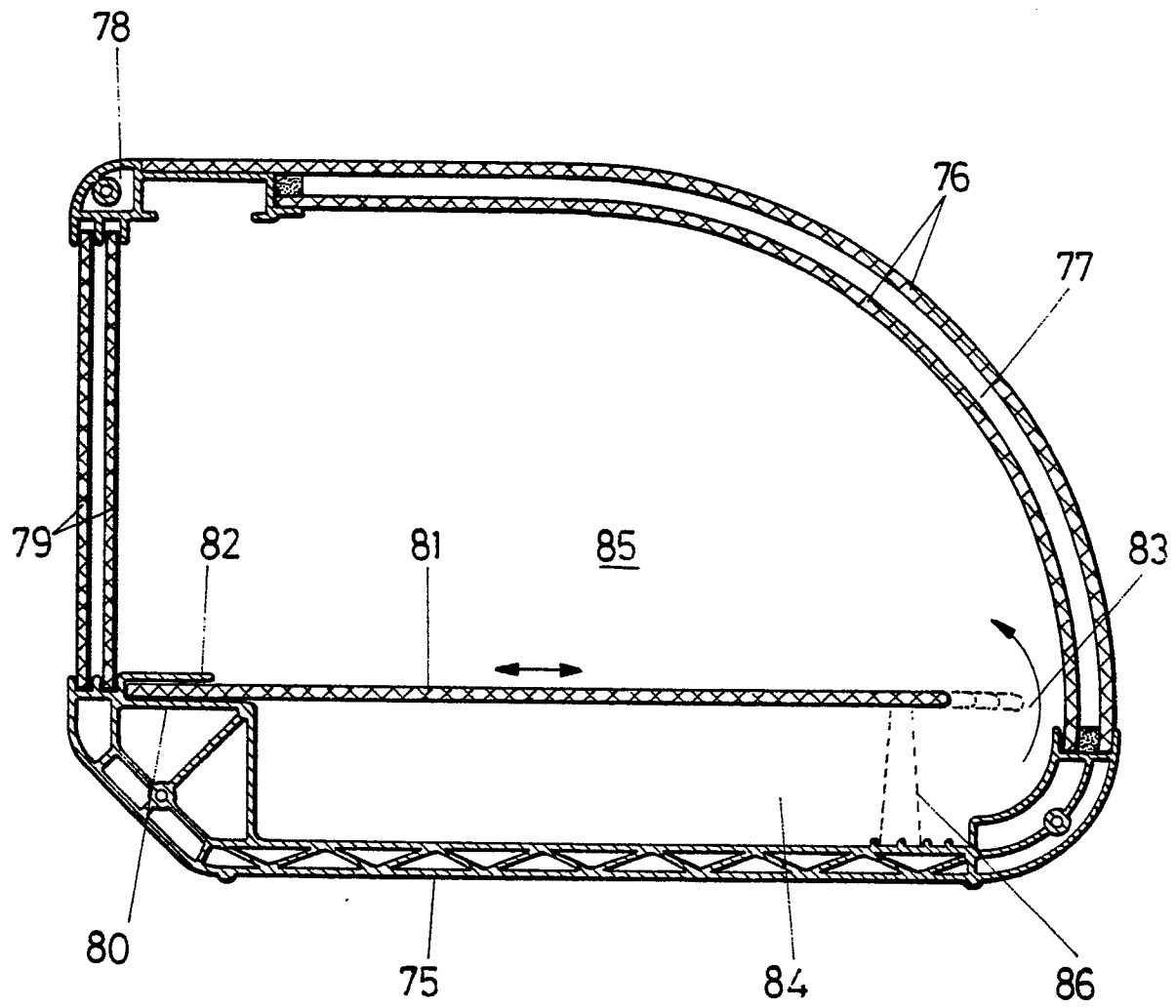
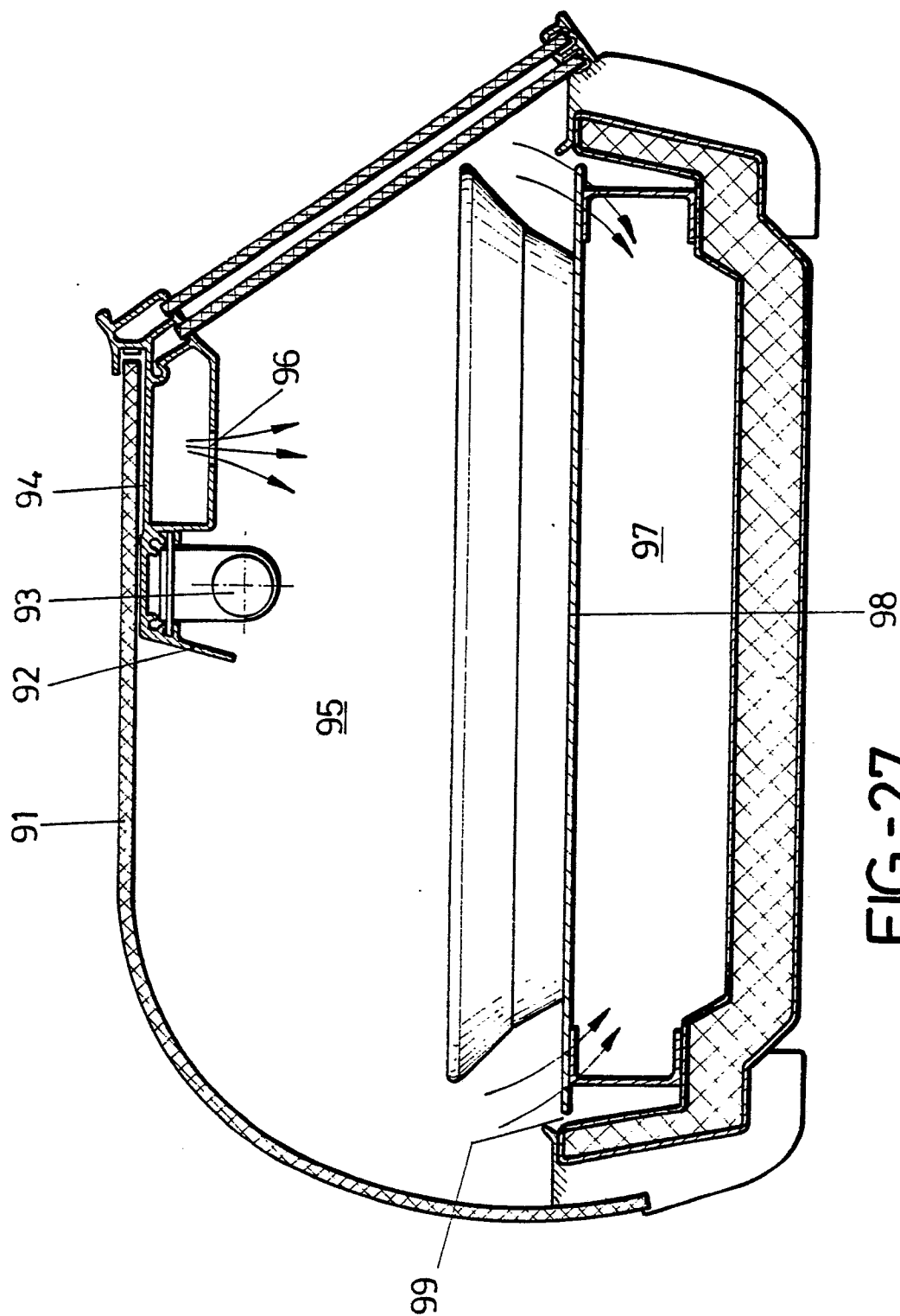


FIG.-26



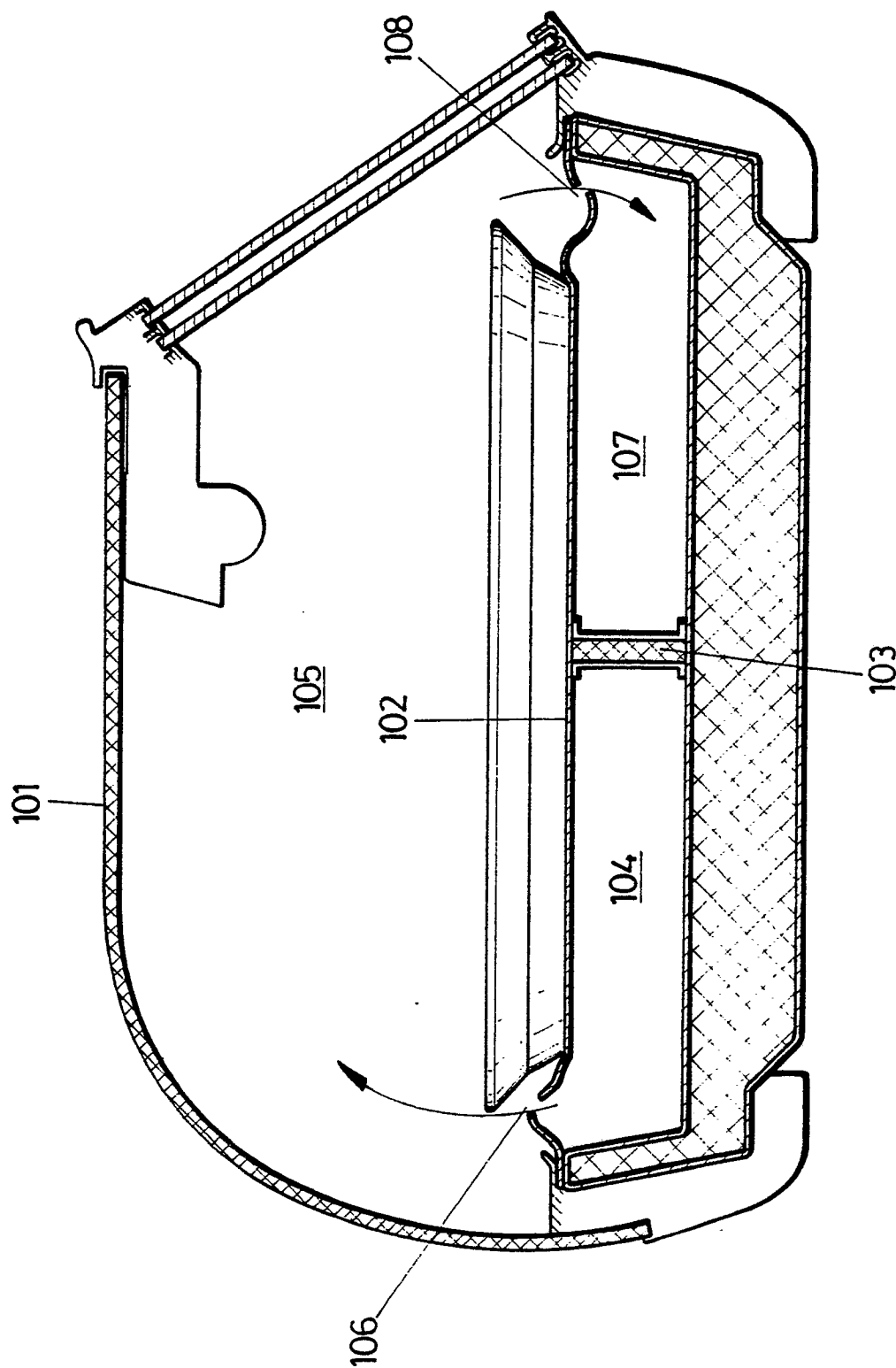


FIG.-28