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(54) METHOD AND DEVICE FOR COOLING PRODUCTS

VERFAHREN UND VORRICHTUNG ZUM KÜHLEN VON PRODUKTEN

PROCÉDÉ ET DISPOSITIF POUR REFROIDIR DES PRODUITS

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Description

FIELD OF THE INVENTION

[0001] The invention relates to a method and apparatus for presenting products that are cooled below the ambient temperature, e.g. beverage cans, bottles or other products.

BACKGROUND

[0002] A Refrigerated Display Cabinet(RDC)is an apparatus for the display of refrigerated foodstuffs, with the purpose of selling these products to the public. RDCs are used in supermarkets, food stores, convenience stores and other places where refrigerated or deep frozen foodstuffs are sold.

[0003] In an RDC the products are cooled by means of cold air flowing along the product, where the cold air has a temperature below the desired product temperature. Alternatively the product may be cooled by means of contact cooling through the shelf or surface on which the product is placed, where this shelf or surface has a lower temperature than the desired product temperature. A combination of air cooling and contact cooling is also possible.

[0004] The air that cools the products is cooled inside the RDC and discharged into the area where the products are located through an air discharge opening. After the air has passed over the products, it may be collected again through a suction opening, and cooled again inside the RDC. The movement of the air may be produced by natural phenomena (silent cooling) or may be supported by means of fans.

[0005] The cooling of the air inside the RDC may be performed with a heat exchanger, along the outside of which the air is led and which on the inner side is fed with a refrigerant or a cooling medium, with a temperature lower than that of the air. The refrigerant or cooling medium can be circulated to the heat exchanger from an external cooling machine (in which case the cabinet is a so called remote cabinet) or can be circulated to the heat exchanger from a cooling machine that is integrated into the RDC (a so called integral cabinet).

[0006] The part of the RDCs where the refrigerated products are located may be visible to the public, either wholly exposed or by means of a glass door or sliding glass pane. In European RDCs, glass doors are common for RDCs that hold frozen foods and for RDCs that hold refrigerated drinks. These RDCs are usually called "glass door cabinets".

[0007] The control system of RDCs is dedicated to keep the air temperature inside the cabinet at a desired level. A secondary control is available to provide defrost cycles to the heat exchanger coil, as ice is formed on the coil during operation and the ice needs to be removed at regular intervals. The flow of air in the RDC is constant throughout the whole duration of the cooling period, and

is not controlled by the amount of products available in the RDC. During the period of defrosting of the evaporator coil, and shortly thereafter, the airflow in the RDC may be reduced by means of a control system on the basis of air or coil temperature or on the basis of time or on the basis of air or coil temperature and time.

[0008] At night - when no public is present - open refrigerated cabinets (without glass doors or glass sliding panels) can be covered with so called night covers, to prevent spilling of cold air out of the cabinet. Some cabinet control systems reduce the flow of air in the RDC during the period that the night covers are applied.

[0009] RDCs are used for a variety of cooled products, including dairy products, meat products, seafood products, vegetables, ready meals, flowers and drinks, as well as for frozen products such as vegetables, fish, meat, ready meals and ice cream.

[0010] Beverage cans or crates filled with bottles of beer or other beverages are products sold in food retail stores and other shops. Unlike dairy and meat products, these products do not need to be cooled for preservation purposes and extension of shelf life. Beverage cans or crates filled with bottles of beer or other beverages can be stored, displayed and sold at ambient temperature. Before actual consumption, beer and other beverages are cooled, to improve the drinking experience. Beer and other beverages are cooled in bottles or cans in a household refrigerator or in a cellar or in a cold water basin of some kind, large enough to hold one can or one bottle or larger. Other beverages alternatively are cooled by means of ice cubes, at the time of drinking. These ice cubes are produced in a household or commercial refrigerator with freezing compartment, refrigerator - freezer combination, or freezer. In retail cooled bottles or cans of beer or other beverages are displayed in glass door refrigerators, called bottle coolers. In these bottle coolers the bottles or cans are placed standing side - by - side or alternatively lying in rows, stacked on top of each other.

[0011] In bottle coolers beverage cans are not cooled individually, but the whole interior of the bottle cooler, in which the beverage cans are situated, is cooled.

[0012] Bottle coolers are not intended for the sale of a crate or crates of beer or other beverages, but for the sale of loose cooled bottles of beer or other beverages. Crates are not placed in glass door bottle coolers, as the horizontal access mode does not comply with the access to the bottles in the crates, where access is from above.

[0013] In prior art RDCs the interior of the cabinet is cooled as a whole, and the airflow in the cabinet is independent of the number of products stored in the cabinet. In Prior-art RDCs bottled or canned beer and beverages are not stored and displayed in cocoons or in a crate or in crates.

[0014] DE20216677 discloses a car ventilation system with a ventilation outlet that comprises a holder for a beverage container. The holder has a circular opening for receiving the beverage container. When a beverage container is placed in the holder, its top part sticks out from

the circular opening and air from the ventilation system flows along its bottom part to openings in front of the holder into the interior of the car. The holder has a lid that is forced by a spring to close off the circular opening when no beverage container is present, and is pushed aside by the beverage container when it is inserted.

[0015] FR2875177 discloses an air conditioning system for a motor vehicle, with a similar accessory for storage of water or food containers, located in a door. The accessory contains a fan located below the floor of the holder to create an air flow along the beverage container.

SUMMARY

[0016] One object is to display and cool products like e.g. beverage cans or bottles etc. in an energy efficient way, while they are placed so that the products can readily be taken out of the cooling environment.

[0017] A device according to claim 1 and a method according to claim 14 are provided. In an embodiment it is detected which holders are empty and/or which holders are not empty, and to direct, e.g. by air flow control means, the flow of cold air only to holders which contain at least one product to be cooled. In that way the need for cold air is variable, viz. adjusted to only the amount of not empty (or not absent) holders. The cold air may flow around or through the (not empty) holders.

[0018] The apparatus using the inventive cold air distribution is very well suited for retail situations, where the products are on display to the public and easily accessible without barriers between the products and the public. Every time a consumer picks a product out of the RDC, thus emptying the holder in which the product or set of products was placed, that action is detected and in an embodiment the cold air supply is automatically stopped. When the RDC, by the shop staff, is refilled again, that action is detected too and the cold air supply to the cocoon will be restored again.

[0019] The device is particularly suited for products containing beverages, as the liquid state of beverages facilitates cooling of the entire product when part of the product is inserted in a holder. Besides beverages etc., the device and method are also applicable for dairy products, meat products, ice cream etc.

[0020] Advantageous embodiments are set forth in the dependent claims.

Brief description of the drawing

[0021] Exemplary embodiments will be described using the following figures

Figures 1a-c show a first embodiment; figure 1a is a front view of the first preferred embodiment; figure 1b is a cross-section over the line AB in figure 1a; figure 1c is a magnified detail of figure 1a and figure 1b.

Figured 2a,b show a second embodiment; figure 2a

is a front view of the first preferred embodiment; figure 2b is a cross-section over the line AB in figure 2a.

Figures 3a-b shows a holder

Figure 4 shows holder

Figure 5 shows holder

Figures 6a-c show cabinets containing holders

EXEMPLARY EMBODIMENTS

[0022] The holder will also be called "cocoon" hereinafter.

[0023] The use of an air flow which is controlled by the amount of non-empty/non-absent holders increases the performance of the apparatus by reducing the amount of cold air that is spilt to the environment. This reduction of spilt cold air reduces the amount of refrigeration energy needed by the apparatus. This reduction of spilt cold air also reduces the amount of cold introduced by the apparatus into the comfort zone around the apparatus. In this comfort zone public may be present, that experiences discomfort arising from the introduction of cold air into the comfort zone.

[0024] Sensing/detecting the amount of empty/absent holders may be based on the weight or the physical boundaries of the products.

[0025] Control of the air flow may be extended to sensing the amount of e.g. crates partly filled with beverages bottles and adapting the cold air output to those partly filled product holders.

[0026] The extraction of heat from the cold air flow through the apparatus and through the holders or crates may be done by means of an evaporator coil of a refrigerating machine, where the refrigerating machine is integrated in the apparatus or where the refrigerating machine is located outside the apparatus. It is also possible that cold air is supplied to the apparatus from an external source, where the cold air supplied from the external cold air source makes up for the cold air spilt into the comfort zone and other losses of cold from the apparatus and the holders or crates.

[0027] Detection means, arranged to detect which holders are empty/absent and/or which holders are not empty/absent, and the air flow control means may be arranged electronically, electro-mechanically or pure mechanically. The detection means and the air flow control means may preferably be integrated, and may e.g. comprise a mechanical part which protrudes in the area in which the holder or product resides (not empty/not absent holder state) or not resides (empty/absent holder state). Control means, e.g. having the shape of an air flap or slide, may be communicatively connected with the detection means, thus providing direct and simple control of the cold air flow to or through the product holder.

[0028] In the device of figure 1 for cooling products below the ambient temperature a flow of cold air is generated by a cold air generator 1, mounted in the bottom chamber 2 of a housing 3. Moreover, the housing 3 comprises a vertically extending distribution chamber 4,

which may be communicatively connected with a number of restricted holders, also called cocoons 5. Each cocoon 5 may be loaded with one - in figure 1 - or a number - in figure 2 - of the products to be cooled. In this example the product may be cans 6 containing soft drink or beverage.

[0029] The device, moreover, comprises detection means which are arranged for detecting - in the embodiment of this figure 1 - the load (viz. empty or occupied by a can 6) of each cocoon, as well as air flow control means which are arranged to restrict the flow of cold air only to cocoons which are loaded with at least one product to be cooled.

[0030] The device of figure 1 is arranged so that the cold air flows through the cocoons 5 and mainly around the cans 6. Cold air does not flow through those cocoons 5 of which it is detected that they are empty, thus not loaded with a can 6s, due to the fact that those empty cocoons are cut off from the cold air source, distributed by the distribution chamber 4.

[0031] The detection means comprise a mechanical detection part in the form of a detection shaft 7, including having a flat end and spring-loaded protruding in the cocoon 5 in which the can 6 may or may not reside. The detection shaft 7 is mechanically communicatively connected with mechanical air flow control means, in the form of a disk-shaped valve 8, cooperating with a valve seat 9 which surrounds an aperture 10 in the wall between the distribution chamber 4 and the series of cocoons 5.

[0032] When no can 6 is inside a cocoon 5, the spring-loaded detection shaft 7 extends inside the cocoon 5, allowing the valve 8 to rest upon the valve seat 9 and thus closing the aperture 10 and preventing the cold air to enter in the empty cocoon 5. When, however, a can 6 is inserted into the cocoon 5, the spring-loaded detection shaft 7 will be pushed backwards, forcing the valve 8 to leave the valve seat 9 and thus opening the aperture 10 and allowing the cold air to enter in the empty cocoon 5. In this way the mechanical air flow control means are arranged to control the air flow per cocoon, viz. to exclusively flow through the loaded cocoons 5 with cold air while excluding the empty cocoons 5.

[0033] Each cocoon 5 may be provided with apertures 5a in their sides, enabling the cold air to return, e.g. via a common return chamber 5b, surrounding all individual cocoons 5, to the cold air generator 1.

[0034] Not shown in the figures is an alternative configuration wherein the detection means comprise electrical or electronic detection parts extending to the cocoon 5 or the area in which the cocoon 5 or product 6 may reside, and which are electrically or electronically connected with electric or electromechanical air flow control means arranged to control the air flow per cocoon or per area in which the cocoon or product may reside. Implementation of embodiments of such an alternative configuration is within the capabilities of any person skilled in the art.

[0035] Figure 2 shows another example of a device for cooling products below the ambient temperature by means of a flow of cold air. In Figure 2 the rooms of restricted dimensions, called cocoons, are formed by crates or boxes 11 loaded with a number, e.g. ten or fifteen of the products to be cooled, e.g. cans 6 or bottles of beer, which can be piled up on a floor 12.

[0036] As in the example of figure 1 a flow of cold air is generated by a cold air generator 1, mounted in the bottom chamber 2 of a housing 3. Moreover, the housing 3 comprises a vertically extending distribution chamber 4, which may be communicatively connected with a number of cocoons, having the form here of the boxes 11. As usually each box 11 will be sold as a whole, viz. entirely filled with bottles or cans 6, each cocoon, shaped as a box 11 is loaded with a fixed number of the products to be cooled. However, it may be possible to sell the content of the box 11 piece-by-piece, which does not influence the operation of the embodiment, although the content of the (upper) box 11 should be inspected regularly by e.g. the supermarket's staff.

[0037] As in the example of figure 1, the device comprises detection means which are arranged for detecting - in the embodiment of this figure 2 - the presence of each cocoon, as well as air flow control means which are arranged to restrict the flow of cold air only to areas which are occupied by a cocoon, in this case a box (which may be entirely or partly - see note - be filled with bottles or cans 6).

[0038] The device of figure 2 is arranged such that the cold air flows through the boxes and mainly around the cans 6. Each box 11 is connected to the cold air distribution chamber 4 via controllable cold air outlets which may have the same configuration as the previous example, shown in detail in figure 1c.

[0039] The detection means comprise a mechanical detection part in the form of a detection shaft 7, including having a flat end and spring-loaded protruding in an (open) area 13 which may or may not be occupied by a box 11. The detection shaft 7 is mechanically communicatively connected with mechanical air flow control means, in the form of a disk-shaped valve 8, cooperating with a valve seat 9 which surrounds an aperture 10 in the wall between the distribution chamber 4 and the area 13.

When no box 11 is within area 13 at the level of a certain detection shaft 7, that spring-loaded detection shaft 7 extends inside the area 13, allowing the valve 8 to rest upon the valve seat 9 and thus closing the aperture 10 and preventing the cold air to enter in the area 13. When, however, the spring-loaded detection shaft 7 has been pushed backwards by one of the piled up boxes 11, that box will thus force the valve 8 to open the aperture 10 and to allow the cold air to enter in the box 11. In this way the mechanical air flow control means are arranged to restrict the cold air flow to boxes 11 and to close the cold air outlets which mouth into the area 13 which is not occupied by any box 11.

Each box may be provided with apertures 14 in their side walls which match with the locations of the cold air outlet apertures 10 in the distribution chamber 4. Moreover, the boxes may be provided with matching apertures 15 in their upper and lower sides, enabling the cold air to flow through the entire pile of boxes, towards the floor 12, which comprise sucking apertures 16, enabling the (main part of the) air flow to return to the cold air generator 1.

[0040] Figures 3a-b show a cocoon 5(holder) in cross-section, with and without an inserted beverage can 31 respectively. Holder 5 comprises a support structure 30, a sealing ring 34, a slide 38 and a spring 39. Support structure 30 may be a closed wall, for example, with an inlet and outlet 36a,b for flow of cooled air provided in this wall of holder 5. Alternatively, support structure 30 may be more open, in the form of a wall with openings, a wire cage or a set of bars. In each case, support structure 30 defines a cylindrical inner space, such as the space that is walled by the wall, wherein the product can be introduced.

Slide 38 is located inside support structure 30 and spring 39 is provided between slide 38 and a bottom of holder 5. Protrusions may be provided on the inside of support structure to restrict the range of movement of slide 38. Sealing ring is located along a perimeter of an opening of holder 5 to let in beverage can 31. Wall 30 of holder 5 may be of cylindrical shape, with a circular cross-section perpendicular to the axis of the cylinder, with a diameter that is sufficient to receive beverage can 31. The support structure is attached to a front panel 32 of the cooling device.

Beverage can 31 is inserted only partly in holder 5 by pushing back slider 38 against the force of spring 39. Protrusions may be provided on the inside of support structure 30 of holder 5 to prevent a standard size beverage can from being pushed in completely. As standard size beverage can size may for example have a height of 116 millimeter and a diameter of 66 millimeter. Protrusions may be located so that a can supporting surface of slide 38 can be pushed in up to a distance from the surface of front panel 32 that is no more than 80 millimeter. Before

[0041] beverage can 31 is inserted and after it has been removed, spring 39 forces slide 38 against sealing ring 34, thus closing off holder 5. Alternatively a further sealing ring (not shown) may be provided in parallel with sealing ring 34 to cooperate with slide 38 to close of holder 5, sealing ring 34 being used only to operate in combination with beverage can 31 or any other product.

[0042] When beverage can 31 has been inserted, sealing ring 34 closes off flow of cooled air out of holder 5 through the opening along the side of beverage can 31. Thus there is no need to close off the inlet for the flow of cooled air when beverage can 31 is removed. Alternatively, or in addition, a valve 8 and shaft 7 construction as shown in may be used to close off an inlet conduit for flow of cooled air into the holder.

[0043] In a further embodiment the protrusions on sup-

port structure 30 of holder 5 are movably mounted loaded by a further spring, so that they flip back when more than a threshold force is exerted when inserting a product. This enables the protrusions to be pushed aside by exerting extra force when a bottle, which sticks out further than a beverages can, is inserted in holder 5. In an alternative embodiment the support structure comprises an adjustable blocking element that may be fixed in the holder at selectable depths from the front of the holder, to limit the depth to which slider 38 can be pushed. The adjustable blocking element may be implemented as a ring or disc for example that can be placed on selectable sets of supports that are provided at a plurality of depths on the support structure. In this case the inside diameter of the ring or disc is so small that it blocks movement of slider 38, whereas the sets of supports by themselves do not block movement. In a further embodiment the ring or disc may be locked to the set of supports. A dedicated tool may be provided to take the disc or ring from a set of supports and move it to another set of supports. Such a blocking element may also be used to block movements of products like beverage cans directly, when no slider is used.

[0044] Figure 4 shows an alternative embodiment of holder 5, wherein a rotating lid 40 is used instead of slide 38 and spring 39. Rotating lid 40 is rotatable around a rotation axle, between a position wherein it abuts against sealing ring 34 and a position wherein it is pushed against the support structure of holder 5, leaving the opening of holder 5 free. A torsion spring (not shown) is provided attached around the rotation axle of rotating lid 40 to force rotating lid 40 against sealing ring 34 when no external force is inserted. The depth of holder 5 may be selected so that a standard size beverage can will partly extend from holder 5 when it has been inserted.

[0045] When beverage can is inserted, rotating lid 40 is pushed aside and sealing ring 34 closes off flow of cooled air out of holder 5 through the opening along the side of beverage can 31. Thus there is no need to close off the inlet for the flow of cooled air when beverage can 31 is removed. Alternatively, or in addition, a valve 8 and shaft 7 construction as shown in may be used to close off an inlet conduit for flow of cooled air into the holder.

[0046] Figure 5 schematically shows an embodiment wherein the shape of the inside support structure of holder 5 has a plurality of support structure parts 50, 52. Wall parts 50, 52, which are shown in cross-section, each correspond to a respective cylinder for inserting a beverage holder of a respective size.

[0047] By way of example the positions 54, 56 of such beverage holders are indicated by dashed lines. As will be appreciated only one beverage holder may be inserted at a time. For example, one cylinder may have a diameter of at least 66 millimeter, and a depth of at most 80 millimeter, corresponding to a standard size beverage can, which can only be partly inserted in the cylinder. Another cylinder may have a diameter of at least 65 millimeter, and a depth of at most 200 millimeter, corre-

sponding to a bottle, which can only be partly inserted in the cylinder.

[0048] The cylinders are provided extending from sealing ring 34 at the opening of holder 5, an angle to each other. The cylinders differ in depth and/or diameter to a differently sized beverage holder. The support structure parts 50, 52 of holder 5 have surfaces with the shape of the cylinders, but left open where the cylinders extend through each other. In this way, holder 5 is made suitable for alternative placement of differently sized beverage holders, in each case with part of the holder extending from the holder.

[0049] Although holders have been shown with horizontal orientation, with a vertical opening for inserting and removing beverage cans with a horizontal movement, it should be realized that different orientations are possible. Using orientations with at least a vertical component has the advantage that products rest in the holders with the aid of gravity, but this is not strictly necessary. In an embodiment the holders may be directed vertically, with a horizontal opening, so that beverage cans have to be removed with an upward movement and inserted with downward movement. In this case the axis of the cylindrical shape of the holder may be at an angle of less than forty five degrees with the vertical. In another embodiment different holders in the same device may have mutually different orientations, for removing beverage cans with movements in different directions, while inside the apparatus the space in holders with different orientations is cooled by a common air flow. This makes it easier to take out products from the device, by offering a choice of directions. Thus for example a plurality of different orientations (axes of the cylindrical shape of the inner space of the holder) radiating from a single point may be used, for example at regular angular intervals of sixty degrees or less from each other. Also more or less random different orientations may be used.

[0050] Figures 6a-c show various cabinets 60, 64, 66 containing holders with automatically closing openings 62 for beverage containers as described. As will be appreciated the use of such holders makes it possible to provide for openings at various orientations relative to each other within easy reach of different users. Figure 6a shows an embodiment where a tower cabinet 60 is used, with two faces with openings 62, the faces being directed at an angle relative to each other. As will be appreciated a holder structure is provided inside cabinet 60, so support beverage containers that are inserted partly extending through openings. Although a vertical cabinet is shown, it should be appreciated that the cabinet may be tilted or even put in a horizontal position, so that all openings 62 lie at the same height. This provides for access from two directions. In its vertical or slightly tilted position the cabinet can easily be placed with its back against standard shop shelves, to allow users to access both articles on the shelves and from the cabinet. In free standing towers more than two faces with openings 62 may be provided.

[0051] Figure 6b schematically shows an embodiment with a cabinet 64 comprising a plurality of cubes with openings 60 in them on different faces of the cubes. Connections (not shown) between the cubes are provided to transport cooled air to and from the interior of the cubes. The cubes are oriented at different orientations. Again it should be clear from this embodiment that the arrangement with an internal support structure and automatically closing openings enables the ability to provide for access to beverage cans from various directions at the same time.

[0052] Figure 6c shows a cylindrical tower shape cabinet 66 with a row of openings 60. When the tower has sufficient diameter, multiple rows with openings in different directions may be used. With a smaller diameter a single opening may be used at each level of the tower. The openings may be directed in different directions at different levels. Such a structure may be used as a building block of a larger structure with commercially appealing appearance. A palm tree may be built for example, with its trunk made up of one or more of such towers.

Claims

1. A device for presenting products (6) that are cooled below the ambient temperature by means of cooled air, the device comprising

- a plurality of holders (5), each holder (5) having an opening for inserting a product (6) partly into the holder (5), each holder comprising a sealing ring, located along a circumference of the opening of the holder, configured to close off air flow along a side of the product when the product is placed partly in the holder;
- a source of cooled air coupled to the holders (5) for supplying the cooled air to the holders (5);
- means (8) for closing off a flow of the cooled air to and/or from respective ones of the holders (5) in response to removal of the products (6) from the respective ones of the holders (5),

characterized in that the holders (5) comprise

- a support structure (30) defining an inner space of cylindrical shape for receiving a part of the product (6),
- a slider (38) fitting within the support structure (30) and slidable on the support structure (30) in a direction of the axis of the cylindrical shape, the slider (38) being configured to support said part when said part is in the inner space;
- a spring (39) located to force the slider (38) against the sealing ring (34), or a further sealing ring in parallel with the sealing ring (34), when no product (6) is inserted in the holder (5).

2. A device according to claim 1, comprising a protrusion attached to the support structure (30), extending into the inner space, and located to block movement of the slider (38) when the slider (38) is at a position wherein a space between the slider (38) and the sealing ring (34) is less than a length of the product (6) in the direction of the axis. 5

3. A device according to claim 2, comprising a flipping mechanism configured to flip back the protrusion when more than a threshold force is exerted when inserting the product (6). 10

4. A device according to claim 1, wherein the holder (5) comprises a rotatable lid (40), rotatably mounted in the holder (5) and rotatable between a first position wherein the rotatable lid (40) lies against the sealing ring (34), and a second position wherein the rotatable lid (40) lies out of the way of a product (6) inserted in the holder (5), the holder (5) furthermore comprising a spring arranged to force the rotatable lid (40) to the first position when no product (6) is inserted in the holder (5). 15

5. A device according to any one of claims 1 to 4, comprising a blocking element that is attachable to the support structure (30) at selectable depths from the opening, at positions to block movement of the product (6) deeper into the holder (5). 20

6. A device according to any one of claims 1 to 5, comprising a support structure (30) with a first and second support structure part (50, 52), each support structure part (50, 52) defining a respective inner space having a respective cylindrical shape, each support structure parts being configured to support a part of the product (6) when in the respective inner space, the respective cylindrical shapes being oriented at an angle with respect to each other, each extending from the opening of the holder (5), the structure parts being left where the cylindrical shapes intersect, outlines of the respective cylindrical shapes fitting sizes of respective products (6), with a depth so that the respective products (6) will partly extend from the holder (5) through the sealing ring when located in the respective cylindrical shapes. 25

7. Device according to any one of claims 1 to 6, comprising, for each holder (5) 30
 - a valve (8) arranged for selectively permitting flow of the cooled air to the holder (5);
 - a movable mechanical detection part (7) which protrudes into the holder (5) in an area (13) in which said part of the product (6) resides when inserted into the holder (5), and which is mechanically communicatively connected with the35

8. Device according to any one of claims 1 to 6, comprising for each holder (5) 40
 - a valve (8) arranged for selectively permitting flow of the cooled air to the holder (5) ;
 - an electrical detector extending to the area in the holder (5) in which the product (6) will reside, when inserted partly in the holder (5), the detector being coupled to the valve (8) to control the flow of the cooled air to the holder (5).45

9. Device according to any one of claims 1 to 8, wherein the holders (5) are oriented at mutually different orientations, for removal of the products (6) from the holders (5) with movement along mutually different directions. 50

10. Device according to claim 9, wherein a common flow of cooled air is used to cool the holders (5) that are oriented at mutually different orientations.

11. A presentation arrangement comprising a device as claimed in any one of claims 1 to 8, the presentation arrangement furthermore containing inserted products (6), each placed in a respective one of the holders (5), partly extending from the respective one of the holders (5).

12. A presentation arrangement according to claim 11, wherein each of the products (6) extends for at least a quarter of its length from the respective one of the holders (5) in which the product (6) is placed.

13. A presentation arrangement according to claim 11, wherein the products (6) are beverage cans.

14. A method of presenting products (6) and cooling the products below the ambient temperature by means of cooled air, the method comprising
 - providing a source (1) of cooled air;
 - supplying the cooled air to a plurality of holders (5), wherein each holder (5) comprises a support structure (30) defining an inner space of cylindrical shape for receiving part of the product (6), a slider (38) fitting within the support structure (30) and slidable on the support structure (30) in a direction of the axis of the cylindrical shape and a spring (39) located to force the slider (38) against a sealing ring (34), or a further sealing ring in parallel with the sealing ring (34), when no product (6) is inserted in the holder (5), the slider (38) being configured to support said part

of the product (6) when said part is in the inner space;
 - placing the products (6) to be cooled in respective ones of the holders (5), with a part of the product (6) extending outside the holder (5);
 - activating a restriction of a flow of the cooled air to and/or from the respective ones of the holders (5) each in response to removal of the products (6) from the respective one of the holders (5).

Patentansprüche

1. Vorrichtung zum Präsentieren von Produkten (6), die mittels gekühlter Luft unter die Raumtemperatur gekühlt werden, das Verfahren umfassend

- eine Vielzahl von Haltern (5), von denen jeder Halter (5) eine Öffnung hat, um ein Produkt (6) teilweise in den Halter (5) einzulegen, jeder Halter einen Dichtungsring umfasst, angeordnet entlang eines Umfangs der Öffnung des Halters, konfiguriert zum Abschließen von Luftstrom entlang einer Seite des Produkts, wenn das Produkt teilweise in den Halter platziert ist;
 - eine Quelle von gekühlter Luft, gekoppelt an die Halter (5), zum Zuführen der gekühlten Luft zu den Haltern (5);
 - Mittel (8) zum Abschließen eines Stroms der gekühlten Luft zu und/oder von entsprechenden der Halter (5) als Reaktion auf das Entfernen der Produkte (6) aus den entsprechenden der Halter (5),

dadurch gekennzeichnet, dass die Halter (5) Folgendes umfassen:

- eine Trägerstruktur (30), die einen Innenraum von zylindrischer Form zum Aufnehmen eines Teils des Produkts (6) definieren,
 - einen Schieber (38), der in die Trägerstruktur (30) passt und auf der Trägerstruktur (30) in eine Richtung der Achse der zylindrischen Form verschiebbar ist, welcher Träger konfiguriert ist, das Teil zu stützen, wenn sich das Teil in dem Innenraum befindet;
 - eine Feder (39), angeordnet, um den Schieber (38) gegen den Dichtungsring (34) oder einen weiteren Dichtungsring, der parallel zu dem Dichtungsring (34) ist, zu zwingen, wenn kein Produkt (6) in den Halter (5) eingelegt ist.

2. Vorrichtung nach Anspruch 1, umfassend einen Vorsprung, befestigt an der Trägerstruktur (30), verlaufend in den Innenraum und angeordnet, um die Bewegung des Schiebers (38) zu blockieren, wenn der Schieber (38) in einer Position ist, in der ein Raum

zwischen dem Schieber (38) und dem Dichtungsring (34) weniger als eine Länge des Produkts (6) in Richtung der Achse ist.

3. Vorrichtung nach Anspruch 2, umfassend einen Schnippmechanismus, konfiguriert, um den Vorsprung zurückzuschneiden, wenn mehr als eine Schwellenwertkraft beim Einlegen des Produkts (6) ausgeübt wird.

4. Vorrichtung nach Anspruch 1, wobei der Halter (5) einen drehbaren Deckel (40) umfasst, der drehbar in dem Halter (5) montiert ist und drehbar ist zwischen einer ersten Position, in der der drehbare Deckel (40) gegen den Dichtungsring (34) anliegt, und einer zweiten Position, in der der drehbare Deckel (40) außerhalb des Wegs eines in den Halter (5) eingelegten Produkts (6) liegt, welcher Halter (5) ferner eine Feder umfasst, angeordnet, um den drehbaren Deckel (40) in die erste Position zu zwingen, wenn kein Produkt (6) in den Halter (5) eingelegt ist.

5. Vorrichtung nach einem der Ansprüche 1 bis 4, umfassend ein Blockierelement, das an der Trägerstruktur (30) an wählbaren Tiefen von der Öffnung an Positionen zum Blockieren der Bewegung des Produkts (6) tiefer in den Halter (5) befestigt werden kann.

6. Vorrichtung nach einem der Ansprüche 1 bis 5, umfassend eine Trägerstruktur (30) mit einem ersten und zweiten Trägerstrukturteil (50, 52), von denen jedes Trägerstrukturteil (50, 52) einen entsprechenden Innenraum mit einer entsprechenden zylindrischen Form definiert, jedes Trägerstrukturteil konfiguriert ist, um einen Teil des Produkts (6), wenn in dem Innenraum, zu stützen, welche entsprechenden zylindrischen Formen in einem Winkel zueinander ausgerichtet sind, jeder verlaufend von der Öffnung des Halters (5), die Strukturteile verbleibend wo die zylindrischen Formen sich schneiden, wobei Konturen der entsprechenden zylindrischen Formen zu Größen entsprechender Produkte (6) passen, mit einer Tiefe, sodass die entsprechenden Produkte (6) teilweise durch den Dichtungsring aus dem Halter (5) ragen, wenn sie sich in den entsprechenden zylindrischen Formen befinden.

7. Vorrichtung nach einem der Ansprüche 1 bis 6, umfassend für jeden Halter (5)

- ein Ventil (8), angeordnet, um selektiv den Strom gekühlter Luft zu dem Halter (5) zu erlauben;
 - ein bewegliches mechanisches Detektionsteil (7), das in den Halter (5) ragt, in einen Bereich (13), in dem sich der Teil des Produkts (6) befindet, wenn eingelegt in den Halter (5), und das

- mechanisch kommunikativ mit dem Ventil (8) verbunden ist, um das Ventil (8) zu veranlassen, den Strom gekühlter Luft zu dem Halter (5) zu erlauben, wenn das mechanische Detektionsteil (7) durch Einlegen des Teils des Produkts (6) in den Halter (5) bewegt wird. 5
8. Vorrichtung nach einem der Ansprüche 1 bis 6, umfassend für jeden Halter (5) 10
- ein Ventil (8), angeordnet, um selektiv den Strom gekühlter Luft zu dem Halter (5) zu erlauben;
 - einen elektrischen Detektor, verlaufend zu dem Bereich in dem Halter (5), in dem sich das Produkt (6) befindet, wenn es teilweise in den Halter (5) eingelegt ist, welcher Detektor an das Ventil (8) gekoppelt ist, um den Strom gekühlter Luft zu dem Halter (5) zu steuern. 15
9. Vorrichtung nach einem der Ansprüche 1 bis 8, wobei die Halter (5) in voneinander verschiedenen Ausrichtungen ausgerichtet sind, um die Produkte (6) aus den Haltern (5) zu entfernen, mit Bewegung entlang voneinander verschiedenen Richtungen. 20
10. Vorrichtung nach Anspruch 9, wobei ein gemeinsamer Strom gekühlter Luft verwendet wird, um die Halter (5), die in voneinander verschiedenen Ausrichtungen ausgerichtet sind, zu kühlen. 25
11. Präsentationsanordnung, umfassend eine Vorrichtung nach einem der Ansprüche 1 bis 8, welche Präsentationsanordnung ferner eingelegte Produkte (6) enthält, jedes platziert in einem entsprechenden der Halter (5), teilweise sich erstreckend aus dem entsprechenden der Halter (5). 30
12. Präsentationsanordnung nach Anspruch 11, wobei jedes der Produkte (6) sich um mindestens ein Viertel seiner Länge aus dem entsprechenden der Halter (5), in den das Produkt (6) platziert ist, erstreckt. 35
13. Präsentationsanordnung nach Anspruch 11, wobei die Produkte (6) Getränkedosen sind. 40
14. Verfahren zum Präsentieren von Produkten (6) und Kühlen der Produkte unter die Raumtemperatur mittels gekühlter Luft, das Verfahren umfassend 45
- das Bereitstellen einer Quelle (1) gekühlter Luft;
 - das Zuführen der gekühlten Luft zu einer Vielzahl von Haltern (5), wobei jeder Halter (5) eine Trägerstruktur (30), die einen Innenraum von 50

(30) in eine Richtung der Achse von zylindrischer Form verschiebbar ist, und eine Feder (39), angeordnet, um den Schieber (38) gegen einen Dichtungsring (34) oder einen weiteren Dichtungsring, parallel zu dem Dichtungsring (34), wenn kein Produkt (6) in den Halter (5) eingelegt ist, zu zwingen, umfasst, welcher Schieber (38) konfiguriert ist, um den Teil des Produkts (6) zu stützen, wenn der Teil sich in dem Innenraum befindet;

- das Platzieren der zu kühlenden Produkte (6) in entsprechende der Halter (5), wobei ein Teil des Produkts (6) sich aus dem Halter (5) erstreckt;
- das Aktivieren einer Beschränkung eines Stroms der gekühlten Luft zu und/oder von den entsprechenden der Halter (5), jeweils als Reaktion auf das Entfernen der Produkte (6) aus dem entsprechenden der Halter (5).

Revendications

1. Dispositif pour présenter des produits (6) qui sont refroidis au-dessous de la température ambiante au moyen d'air refroidi, le dispositif comprenant

- une pluralité de supports (5), chaque support (5) ayant une ouverture pour l'insertion d'un produit (6) partiellement dans le support (5), chaque support comprenant une bague d'étanchéité, située le long d'une circonférence de l'ouverture du support, configurée pour bloquer un écoulement d'air le long d'un côté du produit lorsque le produit est placé partiellement dans le support ;
- une source d'air refroidi couplée aux supports (5) pour l'approvisionnement de l'air refroidi dans les supports (5) ;
- des moyens (8) de fermeture d'un écoulement de l'air refroidi vers et/ou depuis les supports (5) respectifs en réponse au retrait des produits (6) depuis les supports (5) respectifs,

caractérisé en ce que les supports (5) comprennent

- une structure de soutien (30) définissant un espace intérieur de forme cylindrique pour la réception d'une partie du produit (6),
- un coulisseau (38) s'insérant dans la structure de soutien (30) et pouvant coulisser sur la structure de soutien (30) dans une direction de l'axe de la forme cylindrique, le coulisseau (38) étant configuré pour supporter ladite partie lorsque ladite partie se trouve dans l'espace intérieur ;
- un ressort (39) positionné pour pousser le coulisseau (38) contre la bague d'étanchéité (34), ou une bague d'étanchéité supplémentaire pa-

- rallèle à la bague d'étanchéité (34), lorsqu'aucun produit (6) n'est inséré dans le support (5).
2. Dispositif selon la revendication 1, comprenant une saillie attachée à la structure de soutien (30), s'étendant dans l'espace intérieur, et positionnée pour bloquer le déplacement du coulisseau (38) lorsque le coulisseau (38) est dans une position dans laquelle un espace entre le coulisseau (38) et la bague d'étanchéité (34) est inférieur à une longueur du produit (6) dans la direction de l'axe. 5 10
 3. Dispositif selon la revendication 2, comprenant un mécanisme de basculement configuré pour rabattre la saillie lorsque plus d'une force de seuil est exercée lors de l'insertion du produit (6). 15
 4. Dispositif selon la revendication 1, dans lequel le support (5) comprend un couvercle rotatif (40), monté de manière rotative dans le support (5) et pouvant tourner entre une première position où le couvercle rotatif (40) se trouve contre la bague d'étanchéité (34), et une seconde position où le couvercle rotatif (40) se trouve hors du trajet d'un produit (6) inséré dans le support (5), le support (5) comprenant en outre un ressort agencé pour pousser le couvercle rotatif (40) jusqu'à la première position lorsqu'aucun produit (6) n'est inséré dans le support (5). 20 25 30
 5. Dispositif selon l'une quelconque des revendications 1 à 4, comprenant un élément de blocage qui peut être attaché à la structure de soutien (30) à des profondeurs sélectionnables par rapport à l'ouverture, dans des positions pour bloquer un déplacement du produit (6) plus profondément dans le support (5). 35
 6. Dispositif selon l'une quelconque des revendications 1 à 5, comprenant une structure de soutien (30) ayant une première et une seconde partie de structure de soutien (50, 52), chaque partie de structure de soutien (50, 52) définissant un espace intérieur respectif ayant une forme cylindrique respective, chaque partie de structure de soutien étant configurée pour supporter une partie du produit (6) lorsqu'elle est dans l'espace intérieur respectif, les formes cylindriques respectives étant orientées selon un angle l'une par rapport à l'autre, chacune s'étendant depuis l'ouverture du support (5), les parties de structure étant déposées là où les formes cylindriques se croisent, des contours des formes cylindriques respectives s'ajustant à des dimensions des produits respectifs (6), avec une profondeur de sorte que les produits respectifs (6) vont partiellement s'étendre à partir du support (5) à travers la bague d'étanchéité lorsqu'elle est située dans les formes cylindriques respectives. 40 45 50 55
 7. Dispositif selon l'une quelconque des revendications 1 à 6, comprenant, pour chaque support (5)
 - une soupape (8) agencée pour permettre de manière sélective l'écoulement de l'air refroidi dans le support (5) ;
 - une partie de détection mécanique mobile (7) qui fait saillie dans le support (5) dans une zone (13) dans laquelle se trouve ladite partie du produit (6) lorsqu'il est inséré dans le support (5), et qui est connectée en communication de manière mécanique avec la soupape (8) pour amener la soupape (8) à permettre un écoulement d'air refroidi dans le support (5) lorsque la partie de détection mécanique (7) est déplacée par insertion de ladite partie du produit (6) dans le support (5).
 8. Dispositif selon l'une quelconque des revendications 1 à 6, comprenant pour chaque support (5)
 - une soupape (8) agencée pour permettre de manière sélective un écoulement de l'air refroidi dans le support (5) ;
 - un détecteur électrique s'étendant dans la zone du support (5) dans laquelle va se trouver le produit (6), lorsqu'il est inséré partiellement dans le support (5), le détecteur étant couplé à la soupape (8) pour commander l'écoulement de l'air refroidi dans le support (5).
 9. Dispositif selon l'une quelconque des revendications 1 à 8, dans lequel les supports (5) sont orientés selon des orientations mutuellement différentes, pour retirer les produits (6) des supports (5) avec un déplacement le long des directions mutuellement différentes.
 10. Dispositif selon la revendication 9, dans lequel un écoulement commun d'air refroidi est utilisé pour refroidir les supports (5) qui sont orientés selon des orientations mutuellement différentes.
 11. Équipement de présentation comprenant un dispositif selon l'une quelconque des revendications 1 à 8, l'équipement de présentation contenant en outre des produits insérés (6), chacun placé dans l'un des supports (5) respectifs, s'étendant partiellement à partir du support (5) respectif.
 12. Équipement de présentation selon la revendication 11, dans lequel chacun des produits (6) s'étend sur au moins un quart de sa longueur à partir du support respectif (5) dans lequel est placé le produit (6).
 13. Équipement de présentation selon la revendication 11, dans lequel les produits (6) sont des canettes de boisson.

14. Méthode de présentation de produits (6) et de refroidissement des produits au-dessous de la température ambiante au moyen d'air refroidi, le procédé comprenant les étapes consistant à

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- fournir une source (1) d'air refroidi ;
- délivrer l'air refroidi dans une pluralité de supports (5), dans lequel chaque support (5) comprend une structure de soutien (30) définissant un espace intérieur de forme cylindrique pour la réception d'une partie du produit (6), un coulisseau (38) s'ajustant dans la structure de soutien (30) et pouvant coulisser sur la structure de soutien (30) dans une direction de l'axe de la forme cylindrique et un ressort (39) positionné pour pousser le coulisseau (38) contre une bague d'étanchéité (34), ou une bague d'étanchéité supplémentaire parallèle à la bague d'étanchéité (34), lorsqu'aucun produit (6) n'est inséré dans le support (5), le coulisseau (38) étant configuré pour supporter ladite partie du produit (6) lorsque ladite partie se trouve dans l'espace intérieur ;
- placer les produits (6) à refroidir dans les supports (5), une partie du produit (6) s'étendant à l'extérieur du support (5) ;
- activer une restriction d'un écoulement de l'air refroidi vers et/ou depuis les supports (5) respectifs, chacun en réponse au retrait des produits (6) du support (5) respectif.

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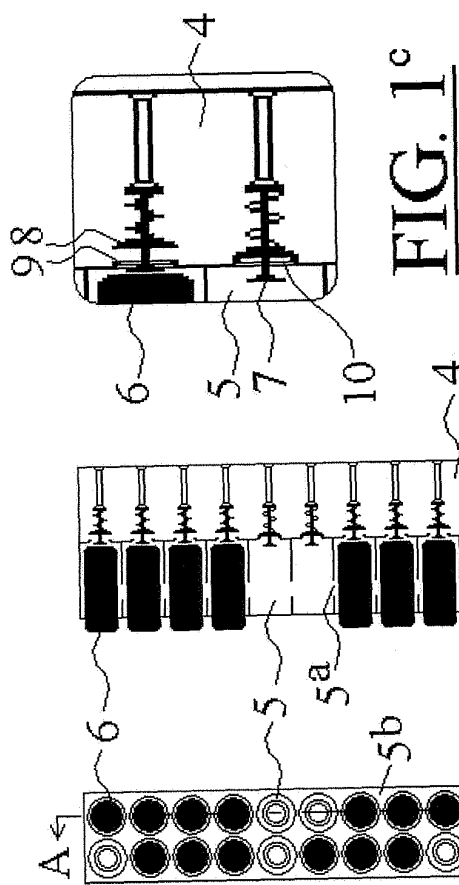


FIG. 1^a FIG. 1^b

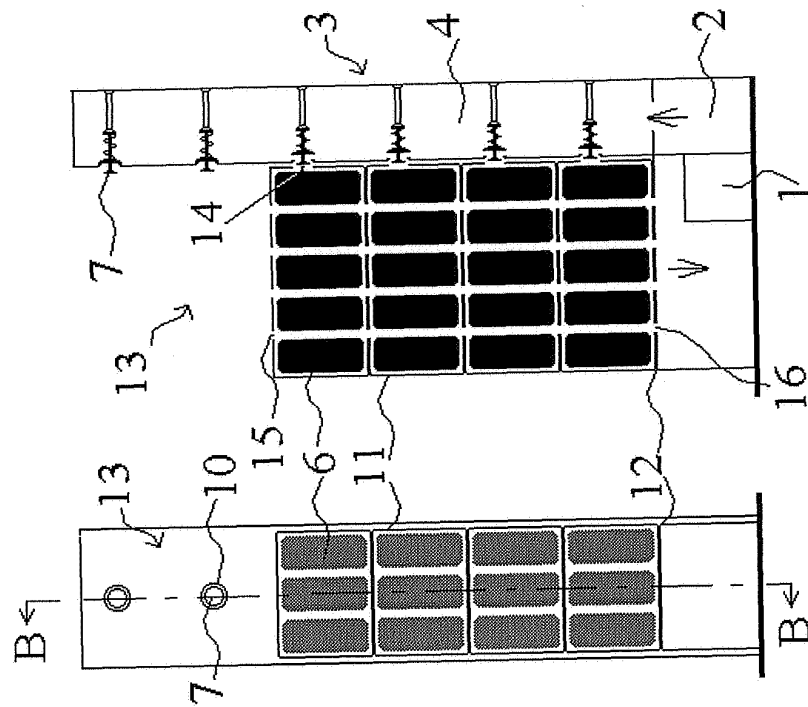
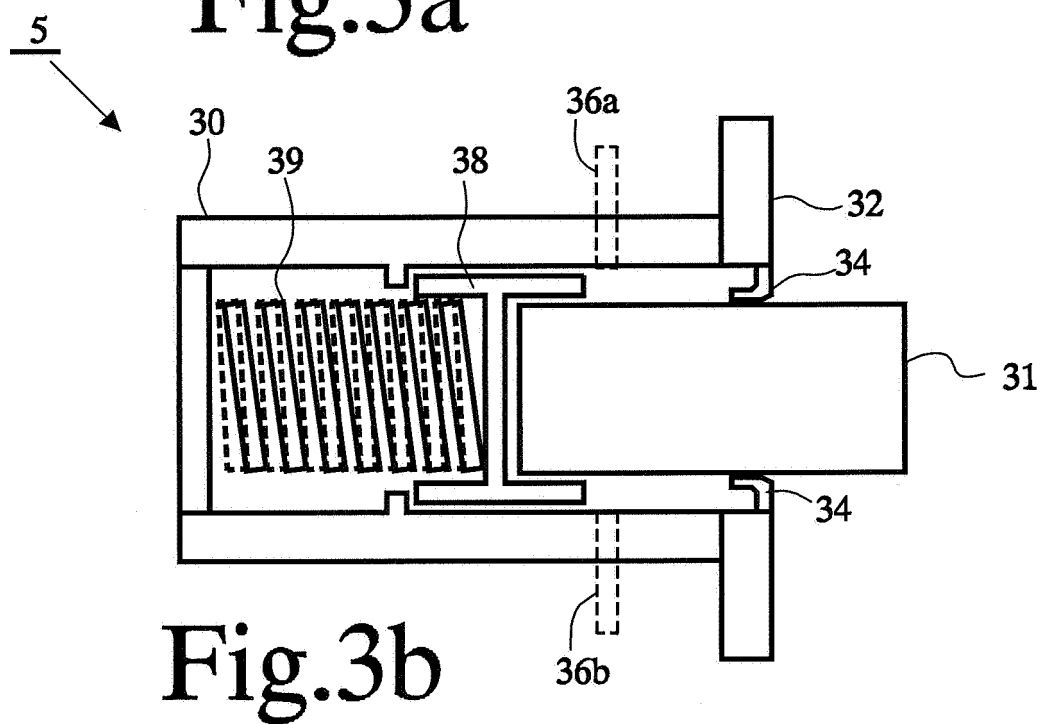
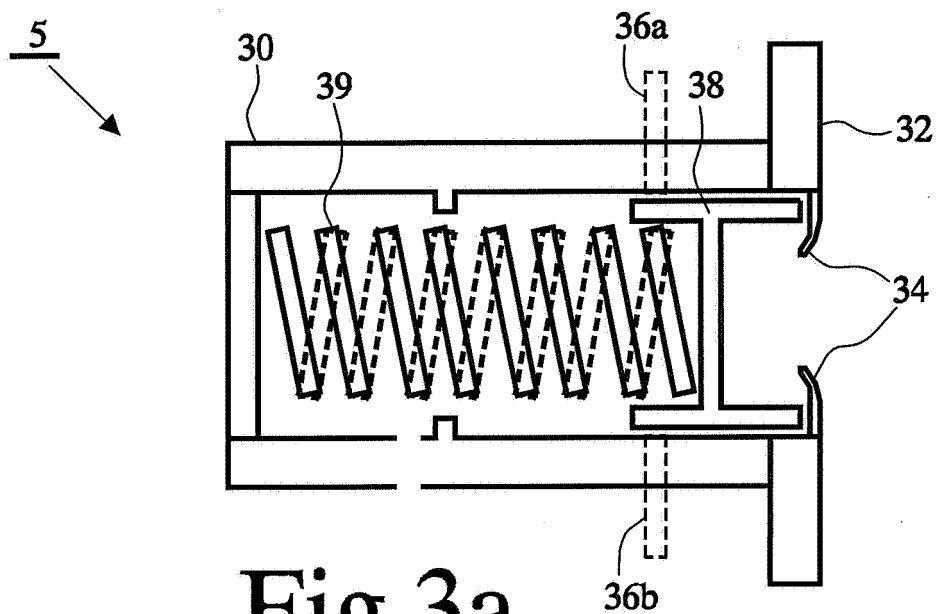
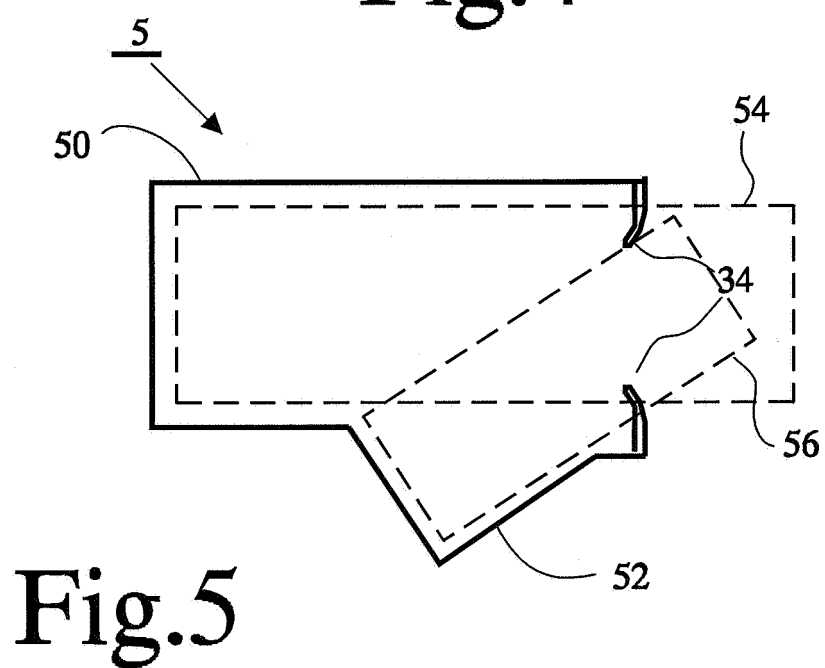
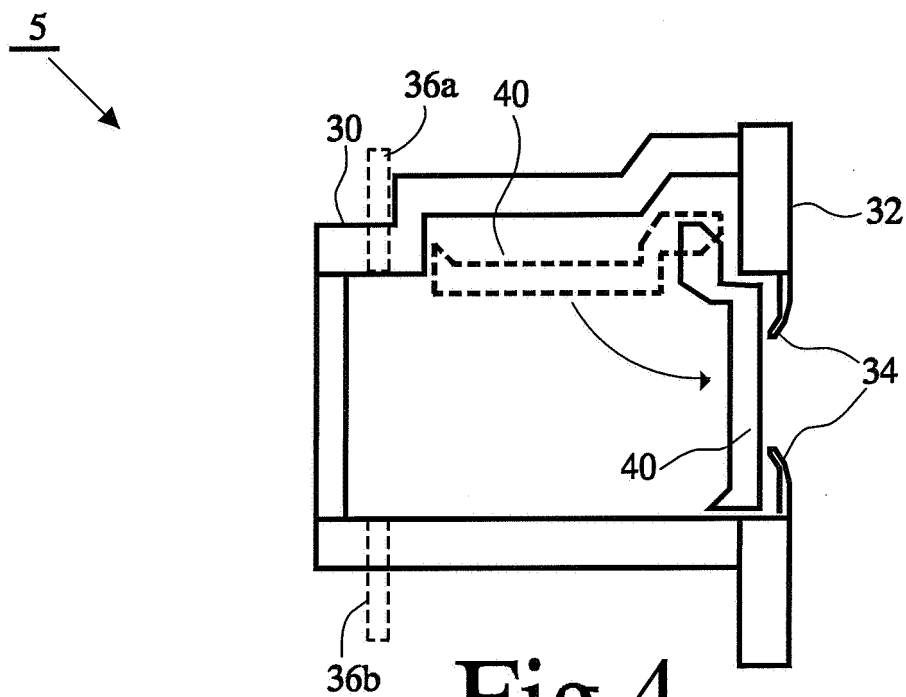


FIG. 2^a FIG. 2^b





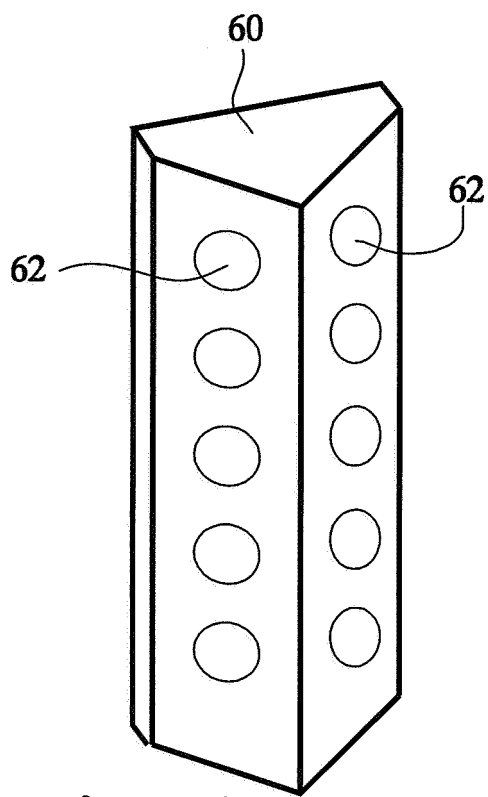


Fig. 6a

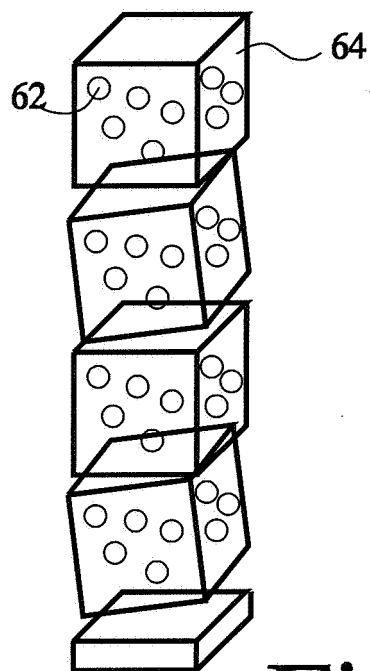


Fig. 6b

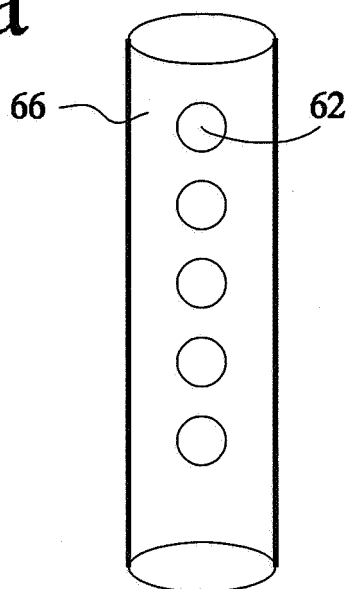


Fig. 6c

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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