



(51) International Patent Classification:  
*F25D 23/12* (2006.01)

(21) International Application Number:  
PCT/BR2010/000218

(22) International Filing Date:  
7 July 2010 (07.07.2010)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
PI0902376-3 9 July 2009 (09.07.2009) BR

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG,

[Continued on next page]

(54) Title: AN IMPROVEMENT PROVIDED IN A LIQUID DISPENSER

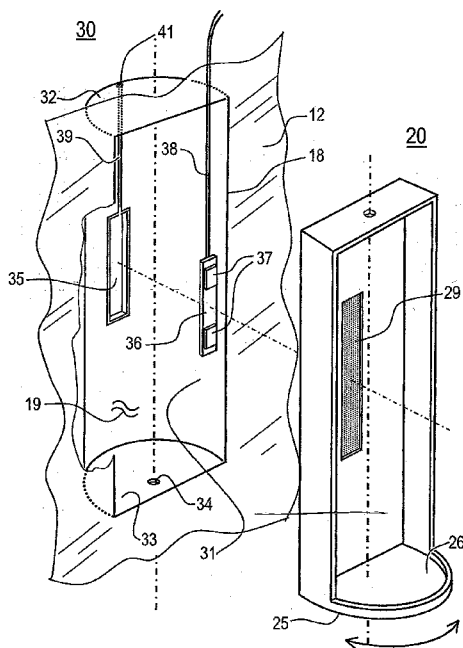


Fig. 4

(57) Abstract: An improvement provided in a liquids dispensing means comprising a niche for accommodating a container to be filled with liquid, the said niche being associated with the outer panel (12) of a cabinet, being lighted from the rear wall thereof (21,56), apart of the light flux impinging on a window provided with a sheet of translucent material (29) located in the closing means (21,51) of the said niche, the said window being in substantial alignment/register with the lighting means (36,37,54) provided on the said rear wall.



ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*

## “AN IMPROVEMENT PROVIDED IN A LIQUID DISPENSER”

### Field of the invention

The present invention relates to an improvement provided in liquid  
5 dispensers, and more particularly to the water dispensers located in niches  
accessible from the outside of refrigerator cabinets.

### Description of the prior art

Currently, a large number of refrigerators are equipped with iced  
10 water or ice dispensers that may be used by the users without requiring the  
opening of the main door of the refrigerator. In addition to the advantage of a  
more comfortable use, such dispensers provide a reduction in electric power  
consumption, since the opening of the door would cause the loss of a substantial  
amount of cold air from the refrigerated cabinet, thereby requiring the activation  
15 of the compressor to return the temperature within the said cabinet to its normal  
values. The said dispensers are normally located on the front door of the  
cabinets and are configured in the form of niches or recesses in which are  
inserted or supported the containers or drinking glasses to be filled with the  
liquid.

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Thus, for example, patent document No. WO2007/027072 proposes  
a dispenser system, located on the outer face of the refrigerator door that  
dispenses either iced water or ice depending on a selection made by the user.  
The dispenser is configured as a niche, wherein the user inserts a container such  
25 as a cup or a glass, and the liquid or the ice are poured into the cited container  
by way of an appropriate nozzle. One of the disadvantages associated with this  
dispenser resides in the fact of the same being directly exposed to the

environment, thereby facilitating the ingress of dirt and/or microorganisms, and therefore requiring periodical cleaning thereof.

For the purpose of overcoming such disadvantages, patent No. US 7,137,272 proposes a small rectangular swinging door coupled to the niche by means of a shaft near the lower edge of the corresponding opening and having a pair of supporting struts whose first ends are hinged with the sides of the small door and whose second ends slide within side channels in the walls of the cavity or niche. On opening thereof, the cited small door projects outwardly while remaining in the horizontal position, thereby forming a support for the cups or glasses. As such, it is subjected to vertical strains arising from the provision of support to objects or to human support, being thereby subjected to a possible breakage of the suspension system and excessive wear of the elements that make up the same.

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In patent document No. PI0703959-0 there is proposed a dispenser comprising a niche inserted in the front face of the front door of the cabinet, which frontal opening is closed by a panel that pivots vertically between first and a second positions. According to the illustration of Fig. 1 of the instant application, in the first position the panel 11 is positioned substantially on the same plane of the front face 12. In the second position, which is illustrated in Fig. 2, the said panel 11 is recessed with relation to the said face, in order to configure a niche in the shape of a parallelepiped box of shallow depth, open at the front face thereof and closed at its rear face by the said panel, wherein is provided at its upper part the end 14 of the iced water dispensing tube, the control thereof being provided by means of a user-operated button 13. The upper and lower horizontal panels of the said box are provided with rotary coupling

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means to the said front door, forming a virtual vertical axis 15 about which the box-shaped assembly rotates between the first and second positions, the latter being the dispenser's utilization position. In order to facilitate this utilization, a part of the lower horizontal panel 16 protrudes outwardly in order to form a  
5 semi-circular support 17 for a container during the filling of the latter.

At certain times or under conditions in which there is poor ambient light or none at all, the use of the previously described dispensers entails some disadvantages. Thus, when the control is performed by the user by pressing a  
10 button or equivalent means, the poor visibility of the surface of the liquid in these conditions might lead the user to interrupt the dispensing of liquid before the proper time, or otherwise that same poor visibility might lead such user to keep the activating button pressed until the capacity of the container is exceeded, with the consequent occurrence of spilling. The switching on of the  
15 lighting in the room where the refrigerator is located will avoid the problem cited above, in addition to allowing a proper placement of the container inside the niche of the dispenser. However, such switching on of the lights entails an increase in electric power consumption, in addition to requiring an increased attention from the part of the user, who must not forget to turn off the light when  
20 leaving the room.

### **Objects of the invention**

In light of what has been set forth above, the present invention is aimed at avoiding an inadequate filling of the container with the liquid, due to  
25 the absence of adequate lighting.

One other objective consists in facilitating the location of the

dispenser in environments with poor lighting or no lighting at all.

### **Brief description of the invention**

The objectives cited herein, as well as others, are achieved by the invention by means of the inclusion in the dispenser of a lighting means, which in addition to illuminating the inside of the dispenser niche, provided an external signaling indicating the location of the dispenser, facilitating the location thereof by the user without requiring such user to switch on the main lighting of the room.

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According to another characteristic of the invention, the said means is activated automatically when the dispenser is used.

According to another characteristic of the invention, the said means comprises at least one electroluminescent element that illuminates the inside of the dispenser niche, installed on the wall of the said niche.

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According to another characteristic of the invention, the dispenser comprises a niche of substantially parallelepiped shape, with a shallow depth, which main face constitutes the panel that closes the front opening of the niche, the said panel being provided with a translucent window through which passes by the light flux originated from the said lighting means in order to illuminate the inside of the said niche.

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According to another characteristic of the invention, the said box may be rotated about a vertical axis between a first and a second positions, the first constituting the usage position in which the niche is oriented toward the

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front of the cabinet with its opening accessible to the user, and the second being the closed position, in which the said panel is located closely adjacent to the plane of the front face of the said cabinet.

5                   According to another characteristic of the invention, in the said usage position the said translucent window is juxtaposed to the said lighting means, remaining substantially aligned or in register with this means when in the closed position.

10                   According to another characteristic of the invention, a control circuit drives the said lighting means.

                    According to another characteristic of the invention, the said control circuit detects the presence of the user.

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### **Description of the figures**

Other objects, aspects, advantages and characteristics of the invention will become more evident from the detailed description of a preferred embodiment of the invention and of the figures that refer thereto, in which:

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Figures 1 and 2 show a dispenser configured in accordance with the prior art.

Figure 3 shows the box of substantially parallelepiped shape that  
25 forms the niche of the dispenser, formed by the closing panel and its perimeter flaps, according to the principles of the invention.

Figure 4 is an exploded view showing the relationship between the main parts of the dispenser.

Figure 5 shows the dispenser with the rotary assembly oriented in the usage position of the dispenser.

Figure 6 shows the dispenser with the rotary assembly oriented in the closed position of the dispenser.

Figure 7 shows a cross-sectional view of the dispenser, in the closed position, according to the principles of the invention.

Figure 8 shows a second embodiment of the invention, applied to a dispenser with a horizontally swinging plate, according to the principles of the invention.

### **Detailed description of the invention**

Now referring to Figure 3, the dispenser comprises a rotary assembly 20 in the shape of a parallelepiped box of shallow depth, comprising a larger vertical panel 21, two vertical panels 23 e 23' and two horizontal panels, an upper horizontal panel 22 and a lower horizontal panel 24, the latter being provided with an extension in the shape of a semi-circular flap 26. The assembly formed by panels 21, 22, 23, 23' and 24 with its flap 26 constitutes the niche wherein is accommodated the container intended to be filled with the liquid. The said upper horizontal panel 22 is provided at the center thereof with a through hole 27 through which is projected the liquid supply tube when this assembly is mounted on the refrigerator door. The lower horizontal panel is provided at the

center thereof with a supporting pin 28, which together with the hole 27 defines the vertical axis of rotation of the rotary assembly 20. Further according to the invention, the larger panel 21 is provided, along the vertical central axis thereof, with a window formed by a narrow aperture of rectangular shape, which is closed by a plate of translucent material 29 such as polycarbonate, acrylic, or an equivalent material.

The exploded view of Fig. 4 shows a simplified view of the main elements of the dispenser, which comprises, in addition to the rotary assembly 20, a substantially semi-cylindrical cavity 19 which extends into the door of the refrigerator from the rectangular cutout 18 opened on the front panel 12, the said cutout having sufficient size to accommodate the said dispensing assembly. The said cavity is delimited by a curved panel 31 that forms the side of the cylinder, an upper base 32 and a lower base 33 which is provided with pin engaging means 34 for the pin 28 (visible in Fig. 3). The perimeter of the said lower base 33 is slightly larger than the perimeter 25 of the flap 26, allowing the accommodation of the latter and its free rotational movement when the rotary assembly 20 is engaged in the said cavity 19. The wall 31 is provided with a recess 35, located about halfway up its height, wherein is engaged the lighting subassembly 36 comprising one or more electroluminescent elements 37. In the exemplary embodiment under discussion, there is/are used one or more light emitting diodes (LEDs), which can be of the conventional or the SMD types. Other functionally equivalent components may be used for the production of light.

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A control circuit (not shown) located externally with relation to the dispenser drives the said diodes by means of the conductors 38, which enter the

cavity 19 through the hole 32, and are lodged in a groove 39 along the course between the said hole and the recess 35. According to the principles of the invention, the said recess containing the lighting subassembly 36 remains substantially aligned or in register with the window 29 of the rotary assembly 20 when it is in its usage position, shown in Fig. 5, such that the light flux emitted by the LEDs 37 passes through the said window in order to illuminate the niche formed by the rotary in this position.

There are various forms of turning on the light emitters by means of the control circuit. The first form consists in activation by means of a switch whose contacts close when the rotary assembly is placed in the usage position, that is, with the flap 26 protruding outward from the plane of the front panel 11 of the cabinet door, as shown in Fig. 5. In this condition, the light passes through the translucent plate 29 and illuminates the niche where the container is placed, as well as the end 14 of the supply tube, allowing the metering of the amount of liquid sought by the user. Optionally, a light emitter element (not shown) may be associated to the supply valve control button 13, which will stay lighted together with the illumination of the niche. A second possibility consists in associating the control circuit to a presence or proximity sensing means in order to make the dispenser visible upon the user coming near the refrigerator, even with the dispenser closed. In the embodiment under discussion, the closing is achieved by rotation of the rotary assembly 20 about the cited vertical axis until reaching the position shown in Fig. 6 and detailed in Fig. 7, wherein it may be observed that the outer face of the panel 21 stays substantially closely adjacent to the plane of the outer face of the panel 12 of the refrigerator door. In this closed position, part of the light flux originated from the elements 37 (see Fig. 7) impinges on the translucent plate 29 of the panel 21 since this plate is

substantially aligned or in register with the lighting subassembly 36. Thus, a user in an unlighted environment may easily locate the dispenser. Simultaneously, the control button 13 may also stay lighted in order to facilitate the operation thereof by the user. It should be noted that the proximity sensor  
5 and the control circuit comprise circuits that are known in the art and do not constitute the object of the present invention.

Notwithstanding that the invention has been described with reference to a specific exemplary embodiment, it should be understood that  
10 other forms of realization are possible to be achieved by technicians skilled in the art, still remaining within the limits of the inventive concept expressed herein. Thus, for example, the window and the corresponding translucent element 29 may have a shape that is different from the elongate rectangular shape, such as, for example, a rectangle with the ends forming semi-circles, or  
15 any other shape, with the proviso that the lighting subassembly is configured in accordance with the said shape. The conductors that feed the lighting subassembly may also be led externally to the cylindrical wall 31, such as exemplified in Fig. 5, instead of being embedded in the groove 39 as illustrated in the exploded view of Fig. 4.

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Moreover, the inventive concept disclosed herein may be applied to dispensers that are structured differently from that which served as a basis to the preceding description. In Fig. 8 there is shown the application of the invention to a dispenser whose closing means are provided by the lid/cover 51, which is able  
25 to swing about an horizontal axis. In this case, the cavity 52, which is delimited on the bottom thereof by the flat wall 55 and laterally by the curved walls 53, constitutes the niche itself wherein is inserted the container (not shown) to be

filled with the liquid. As shown in the figure, the lighting of this niche originates from the translucent plate 54 that closes an opening with the same dimensions in the said wall, the light emitter elements (not shown) being positioned or juxtaposed externally, that is, behind the said plate. Similarly, the closing means  
5 comprising the lid/cover 51 are provided with a window, which in turn is provided with a plate 55 of translucent material, in order to render the dispenser visible when the said lid/cover is closed and the lighting is activated by proximity sensing.

10               It is not necessary that the cavity exemplified by the embodiment shown in Fig. 8 be a circular semi-cylinder, as it may have other shapes, such as a prismatic shape, or even a cubic or parallelepiped shape, with or without rounded edges and corners.

15               Therefore, the invention is defined and delimited by the set of claims that follows.

## CLAIMS

1. An improvement in a liquids dispensing means comprising a niche for accommodating a container to be filled with liquid, the said niche  
5 being associated with the outer panel (12) of a cabinet and comprising closing means (21, 51) for closing the aperture thereof, **characterized** in that the said niche is lighted from its rear wall (21, 56) and in that a part of the light flux that produces the said lighting impinges on an opening provided with a sheet of translucent material (29, 54) located in the said closing means.

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2. An improvement as claimed in claim 1, **characterized** in that the niche comprises a rotary assembly (20) which rotates about a vertical axis, substantially configured in the form of a parallelepiped box of shallow depth, the rear wall of the said niche being constituted by one of the larger faces (21) of  
15 the said box, which is open at the larger face located opposite the said rear wall, the said rotary assembly being inserted in a substantially semi-cylindrical cavity (19) which opening is oriented towards the front of the said cabinet.

3. An improvement, as claimed in claim 2, **characterized** in that  
20 the said rear wall (21) is provided with a window which in turn is closed by a sheet of translucent material (29), which is juxtaposed to a lighting subassembly (36) mounted on the wall (31) of the said cavity (19), when the said rotary assembly (20) is oriented in the position of usage of the dispensing means.

25 4. An improvement, as claimed in one of claims 2 or 3, **characterized** in that the said closing is provided by the said rear wall (21) when the rotary assembly (20) is oriented to the position opposite the position of

usage of the dispensing means.

5           5. An improvement, as claimed in claim 4, **characterized** in that the said window closed by a sheet of translucent material (29) is substantially aligned or in register with the said lighting subassembly (36) when the said rotary assembly (20) is oriented in the closing position.

10           6. An improvement, according to claim 1, **characterized** in that the said niche is provided by a cavity (52) with its opening oriented towards the front of the said cabinet, lighted from a lighting subassembly (54) installed at the rear wall thereof (56), the closing means (51) of the said cavity being provided with an aperture closed by a plate of translucent material (55) which stays substantially aligned/in register with the said lighting subassembly when the said means are in the closed position.

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          7. An improvement, as claimed in claim 6, **characterized** in that the said lighting subassembly comprises a window closed by a sheet of translucent material (52), with the light emitter elements mounted in juxtaposition relatively to the outer face of the said window.

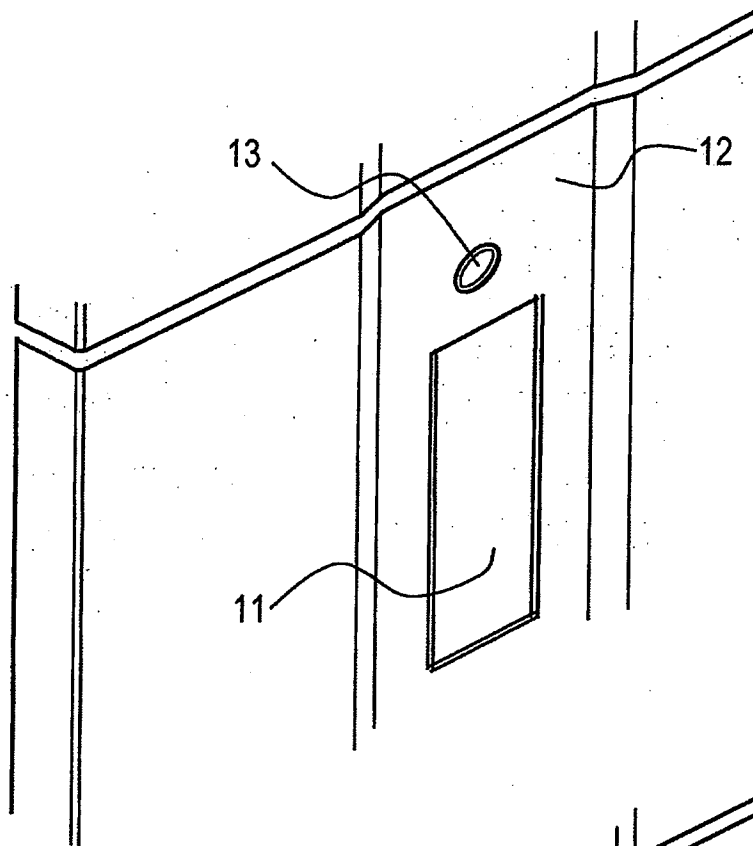
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          8. An improvement, as claimed in any of the preceding claims, **characterized** in that the said light source is driven/activated by a control circuit.

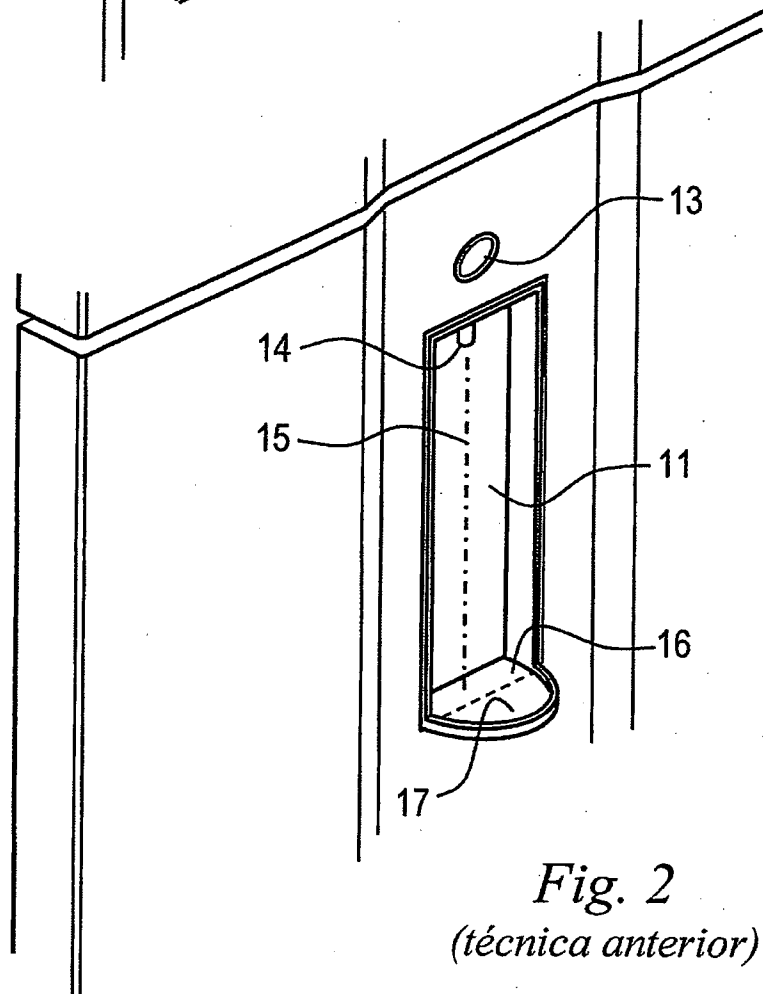
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          9. An improvement, as claimed in claim 8, **characterized** in that the said control circuit comprises a proximity sensor.

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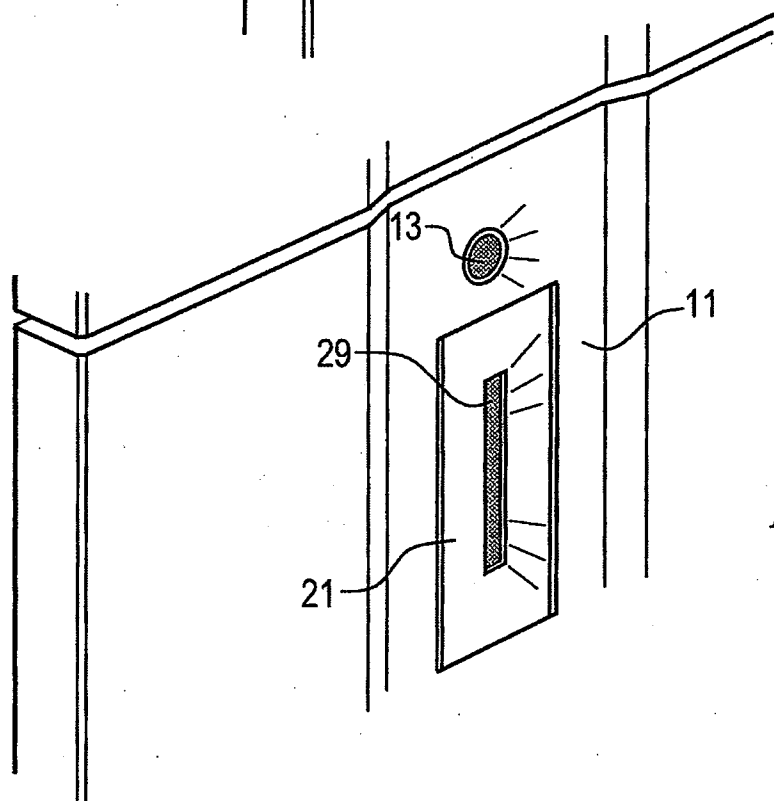
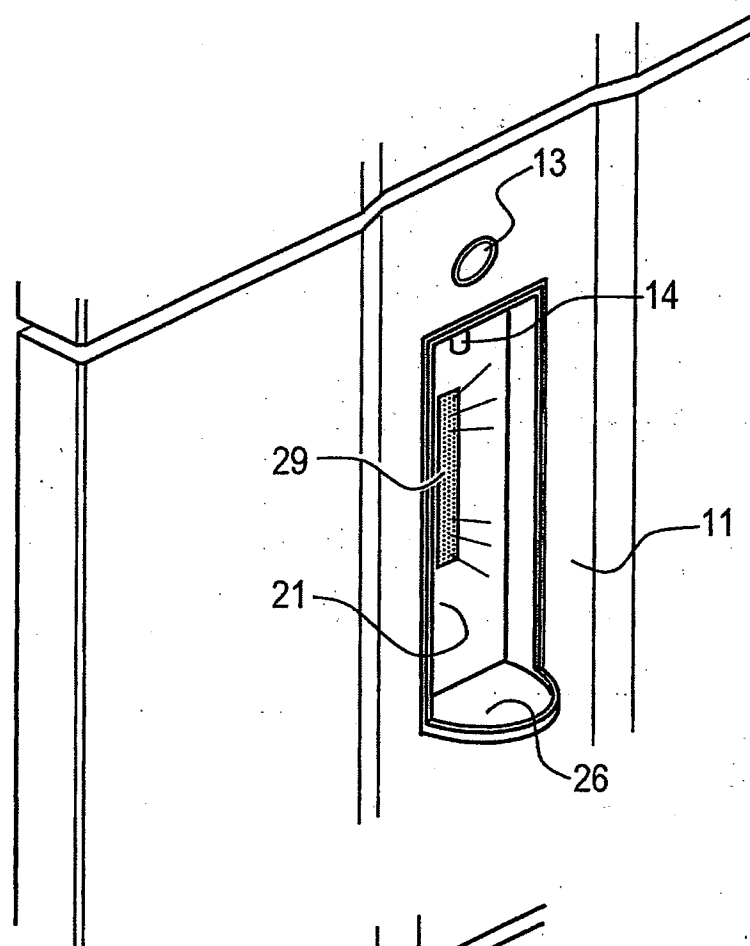


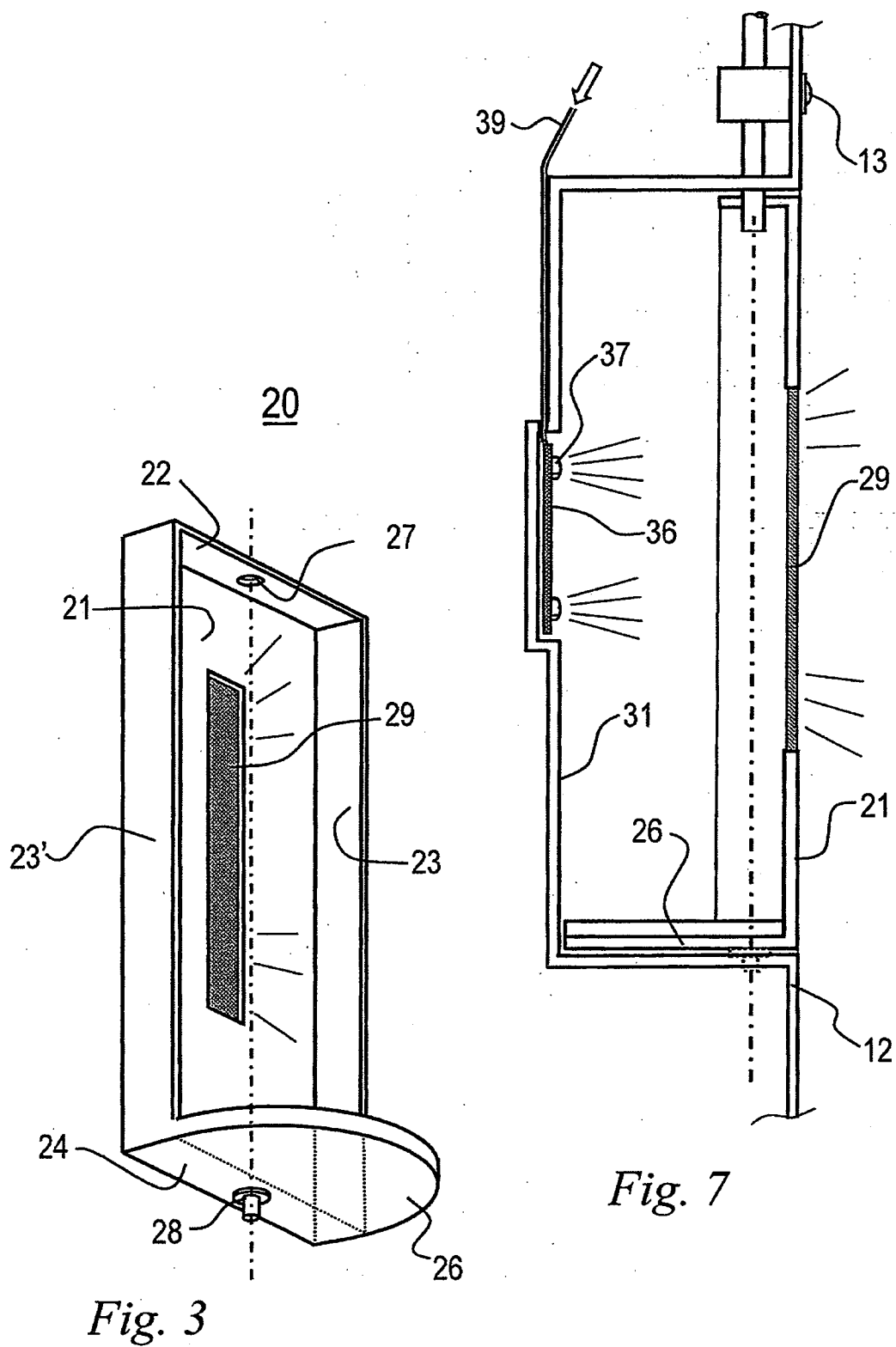
*Fig. 1*  
(técnica anterior)



*Fig. 2*  
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*Fig. 5**Fig. 6*



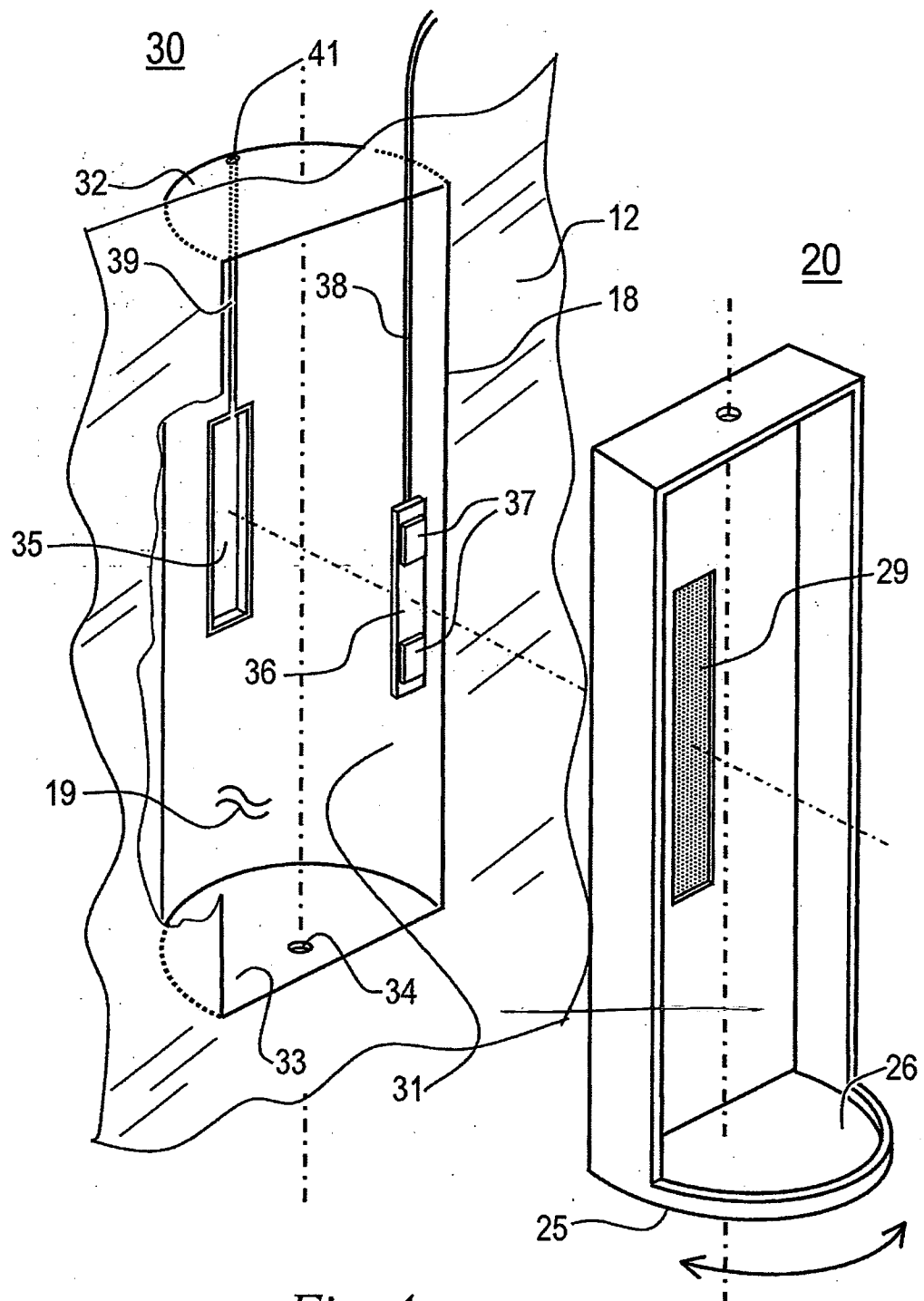
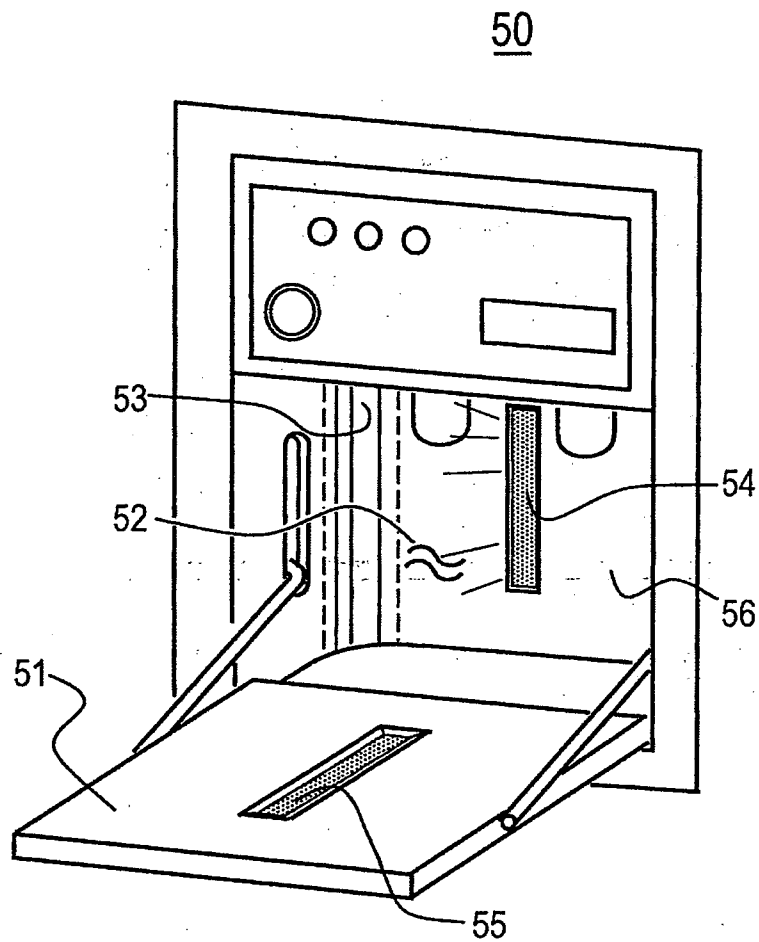


Fig. 4

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*Fig. 8*