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(54) **Household appliance with a front panel having means for fixing knob holders**

(57) The present invention relates to a household appliance comprising a number of control knobs on a control panel (20) having knob openings (26) and corresponding knob holders (10) with a hollow body for securely holding and fixing of said knobs. The control panel (20) further comprises an inwardly arranged integral ridge (24) in the circumferential vicinity of each knob opening (26) wherein each ridge (24) comprises at least one clamping slot (25) arranged in perpendicular direction to the control panel (20), and the knob holder (10) comprises a latching device (16) having a tip portion (11) arranged to be fixedly engaged with the slot (25) when the knob holder (10) abuts to the circumferential area of said ridge (24). With the arrangement as defined hereinabove knob holders (10) are directly attached to the control panel (20) without space occupying fixing means and additional components.

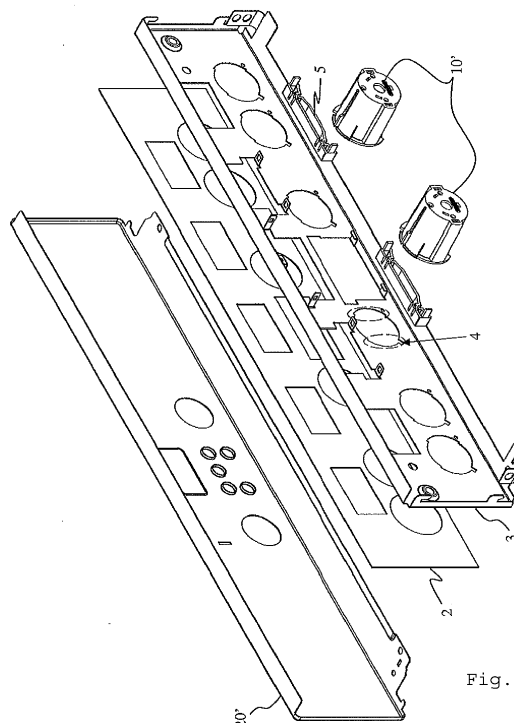


Fig. 1

Description

Field of the Invention

[0001] The present invention relates to a household appliance with an improved control panel, and more particularly the invention is pertaining to a household appliance having a front control panel adapted for holding and fixing of the knob holders.

Background of the Invention

[0002] Control knobs, especially the pop-out type control knobs employed in the conventional household appliances are generally placed and operated in individual hollow housings that are mounted right onto the rear side of a secondary panel. The hollow housing, also known as knob holder, has corresponding fixing means for secure attachment to the secondary panel.

[0003] With reference to Figure 1, there is shown a conventional arrangement of prior art as referred above wherein a number of knob holders are attached to a secondary panel by means of various fixing elements such as the grooves and additional supporting means adapted to prevent unintentional rotation and separation of said knob holder. The secondary panel attached with the knob holders is then affixed to the front panel by means of a double-sided self adhesive tape as shown in Figure 2. This conventional arrangement with three components is mainly adopted for providing a front panel having a uniform surface without any tracing or unenviable viewing of the fixing elements and knob holders.

[0004] Different attempts in the prior art have been exerted on providing alternative arrangements for modifying the aforementioned system and improving the knob holder connections. DE-C1-10044448 discloses a rotary switch arrangement for a household appliance wherein the hollow body of the knob holder is provided with elongated legs that engages to the upper and lower most vicinity of the front panel.

[0005] This and other arrangements of the prior art, however disadvantageously require space occupying additional fixing elements which are not comfortable to be used in such a limited backward area of the front panels, and are generally complicated with multiple components involving, for instance front and secondary panels along with adhesion means.

[0006] Therefore, there is still a long felt need for household appliances that involve simplified knob holder connections for providing the advantages expressed above. Thus, it is one of the objectives of the present invention to provide a household appliance that eliminates conventional multicomponent arrangements of the control panels employed in the prior art. A further object of the present invention is to provide a household appliance having a knob holder engagement directly to the front panel wherein fixing elements are occupying less space as compared to the known elements of the con-

ventional knob holders and control panels. These objects have been achieved through a household appliance as disclosed in claim 1.

Summary of the Invention

[0007] The present invention aims to solve the aforementioned technical problems by way of providing a novel household appliance comprising a number of control knobs on a control panel having knob openings and corresponding knob holders having a hollow body for securely holding and fixing of said knobs. According to the arrangement of the present invention, the knob holders and front control panel of the invention are adapted directly to engage each other without auxiliary fixing means.

[0008] Accordingly the control panel comprises an inwardly arranged integral ridge in the circumferential vicinity of each knob opening wherein each ridge comprises at least one clamping slot arranged in perpendicular direction to the control panel. The knob holders provided according to the present invention are characterized by a latching device having a tip portion arranged to be fixedly engaged with the slot when the knob holder abuts to the circumferential area of said ridge.

Brief Description of the Drawings

[0009] The attached drawings are solely for illustrating a preferred embodiment of the invention and in no way limiting the scope of the appended claims, wherein;

Figure 1 shows an exploded demonstration of a prior art control panel with a number of knob holders.

Figure 2 is a perspective view of the conventional control panel arrangement of Fig. 1 in mounted form.

Figure 3 is a rear perspective view of the control panel of a household appliance according to the present invention.

Figure 4 is sectional front view of the control panel used in the household appliance according to the present invention.

Figure 5 shows a cross-sectional view of the knob holder in engaged position according to the present invention.

Figure 6 is another cross-sectional view of the knob holder in engaged position according to the present invention.

Figure 7 shows a further cross-sectional view of the knob holder in engaged position according to the present invention.

Figure 8 is a magnified view of a detail (C) obtained from the connection area of knob holder and control panel according to the present invention.

Figure 9 shows the knob holder and fixing means of the control panel in demounted position.

Detailed Description of the Invention

[0010] The household appliance (not shown) according to the present invention comprises a control panel (20) which is generally in the form of a front panel as conventionally known in the prior art arrangements, and comprising a number of knob holders (10) for securely holding corresponding knobs, particularly pop-out type knobs (not shown). Figure 3 shows a rear perspective view of the control panel arrangement according to the present invention wherein the knob holders (10), that are substantially in the form of a cylindrical hollow body, and the control panel (20) are adapted directly to engage to each other without auxiliary fixing elements and adhesive materials.

[0011] For achieving this object, control panel (20) of the present invention is provided with inwardly arranged ridges (24) in the circumferential vicinity of the knob openings (26) wherein the each ridge (24) arranged in a manner as above is formed integrally with the control panel body (20) by way of, for instance inwardly bending the material of said control panel (20) with a bending process involving conventional bending machinery. Each ridge (24) according to the present invention comprises at least one clamping slot (25) preferably in the form of a slit. Said slot (25) is arranged in perpendicular direction to the control panel (20) for engaging to the knob holder (10). This arrangement according to the present invention preferably comprises at least two slots (25), and more preferably three slots (25) as shown in Figure 3.

[0012] In a preferred embodiment, the slot (25) as referred above according to the invention is provided on a protrusion (22) that protrudes from the ridge (24). Said protrusion (22) is arranged in perpendicular direction relative to the control panel (20) (parallel to the knob holder (10)) so that the knob holder (10) may easily engage with it. The arrangement of the invention preferably comprises same number of protrusions (22) as the slots (25).

[0013] In accordance with the above arrangement, the knob holders (10) of the present invention comprise corresponding latching devices (16) having an inwardly bending tip portion (11) adapted to engage and lock with the slot (25) as shown in Figures 5 to 7. A detail (C) of the locking section shown in Figure 7 is magnified and shown again in Figure 8 for better illustration of the locking relation in-between the tip portion (11) of the latching device (16) and said slot (25). Accordingly, the tip portion (11) is adapted to lock with the slot (25) with its protruded structure.

[0014] According to a preferred embodiment, the ridges (24) formed in the vicinity of the knob openings (26)

are bended as an arc with a radius (R1) as shown in the detail (C) of Figure 8. The inventors report that best results for obtaining a durable ridge (24) is obtained when said radius is substantially equal to the thickness of the metal sheet constituting the control panel (20). The knob holder (10) is adapted tightly to surround the ridge (24) portion by suitably adjusting its inside diameter (R2). Thus, in this preferred embodiment, the knob holder's (10) contact surfaces with the control panel (20) are provided with an inclination (15) having a toleration angle for tolerating the arc shaped bending corner of the ridges (24), and eventually perfect abutting onto the control panel surface is obtained. Hence, by virtue of the perfect abutting of the knob holder (10) with the integral ridges (24), and also of the tight engagement between the slots (25) and latching devices (16) according to the invention, no visual defects occur in the frontal view of the control panel as shown in Figure 4.

[0015] Referring now to a further preferred embodiment as shown in Figure 9, wherein a connection section of the control panel (20) and knob holder (10) are shown in demounted form, each protrusion (22) as provided on the ridge (24) has arc shaped front corners (27) and also arc shaped smooth connection corners (28) for eliminating sharpness and improving durability.

[0016] In this preferred embodiment, the latching devices (16) formed on the knob holder (10) of the invention are formed by U shaped incision which provides a flexible structure permitting easier engagement and disengagement of the tip portion (11) to/from slot (25) of the ridge (24). The positions of the latching devices (16) on the knob holder (10) are arranged such that when said knob holder (10) is put in place and permitted to abut the circumferential area of the ridges (24), the tip portion (11) of the latching device (16) immediately engages to the slit opening of the slot (25).

[0017] In a preferred embodiment where at least two, more preferably three protrusions (22) are provided on the ridges (24), the knob holder (10) is eliminated of the unintentional rotation caused by rotation of the knob. However, more protrusions (22) may be provided for strengthening the engagement of the knob holder (10) as may be appreciated by those skilled in the technical field.

List of References

[0018]

- (10) Knob holder
- (11) Tip portion
- (15) Inclination
- (16) Latching device
- (20) Control Panel

(22) Clamping protrusion

(24) Ridge

(25) Clamping slot

(26) Knob opening

(27) Front corner of the protrusion

(28) Connection corner of the protrusion

(R1) Radius of the arc

(R2) Inner diameter of the knob holder

said radius (R1) is equal to the thickness of the metallic sheet material.

8. A household appliance according to one of the preceding claims 1 to 7, wherein abutting surface of the knob holder (10) that is placed in contact with the control panel (20) is provided with an inclination (15) having a toleration angle for tolerating the arc shaped bending corner of the ridge (24).

9. A household appliance according to one of the preceding claims 3 to 8, wherein the protrusions (22) comprises arc shaped front corners (27) and connection corners (28).

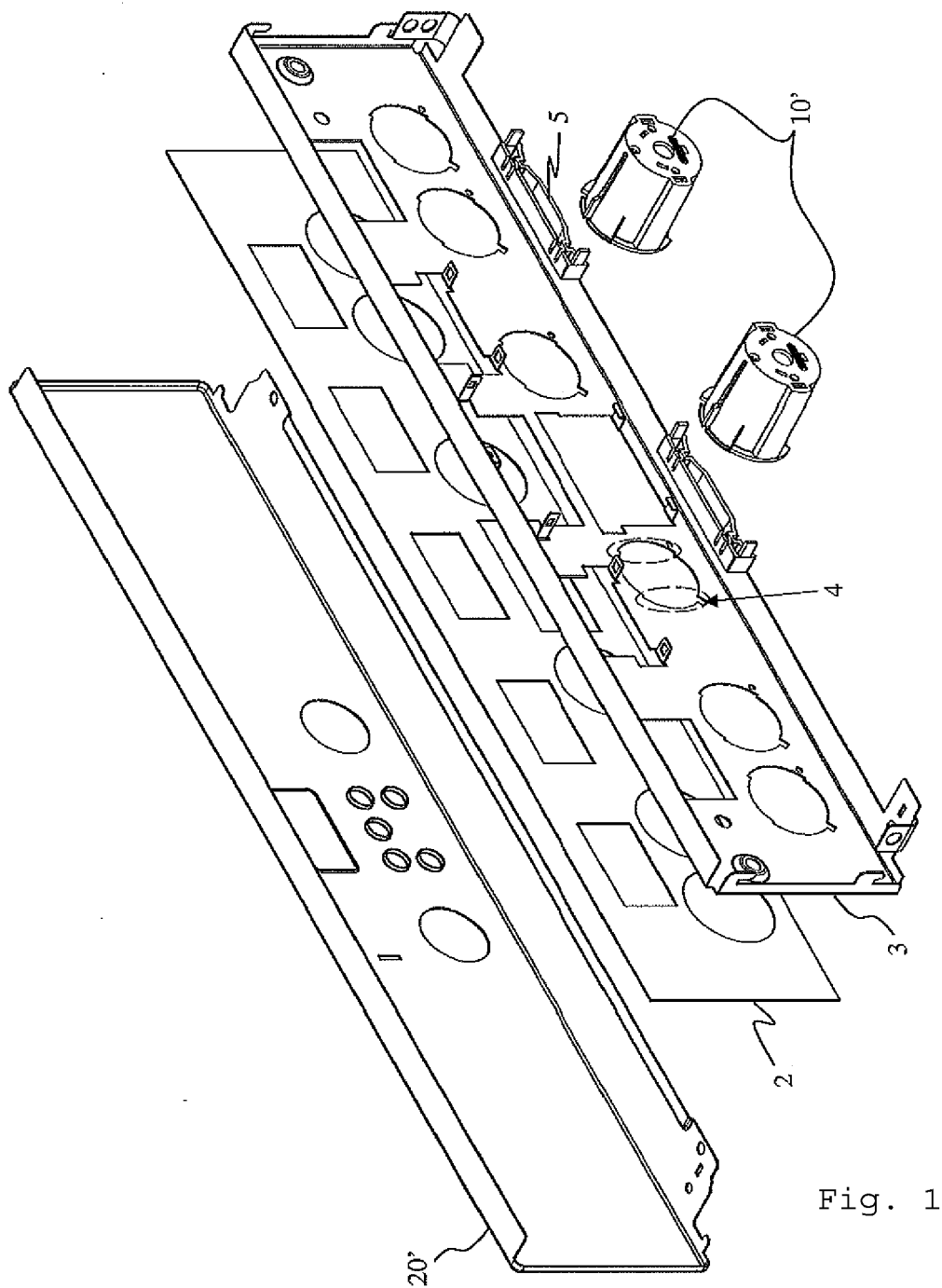
10. A method for producing a household appliance comprising the steps of:

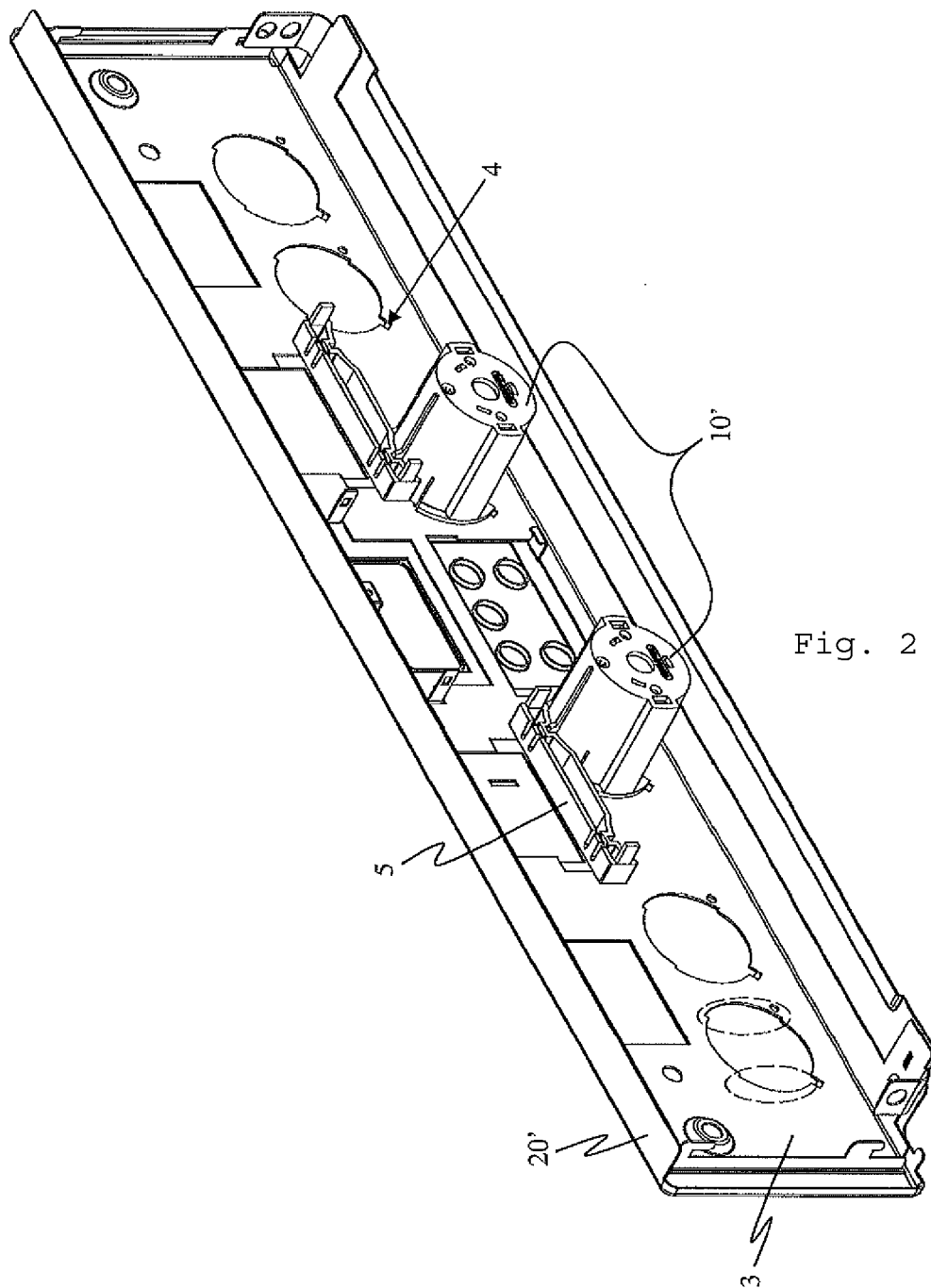
- providing a control panel (20),
- forming a number of knob openings (26) on said control panel (20), and bending the circumferential area of each knob opening (26) in order to form an inwardly arranged integral ridge (24) in the circumferential vicinity of said knob opening (26),
- forming at least one clamping slot (25) on said ridge (24), the slot (25) being arranged in perpendicular direction to the control panel (20),
- providing a number of knob holders (10), each comprising a latching device (16) having a tip portion (11) arranged to be fixedly engaged with the slot (25) of said ridge (24),
- placing said knob holder (10) onto the control panel (20), and mounting so formed control panel (20) onto a household appliance.

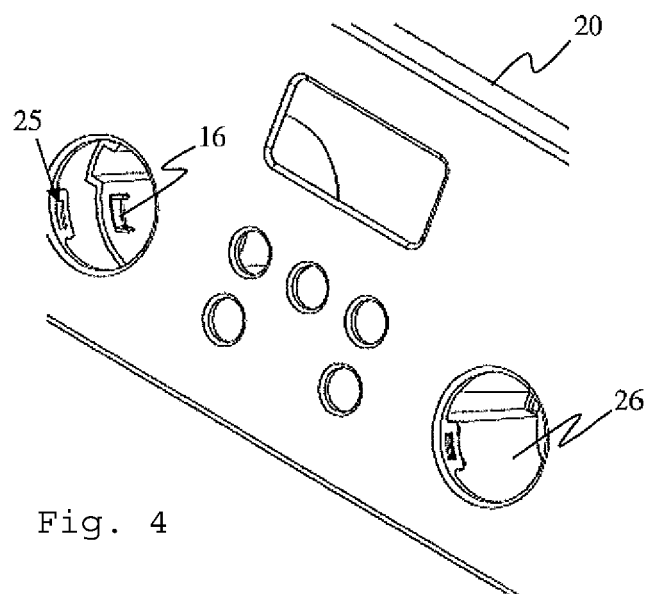
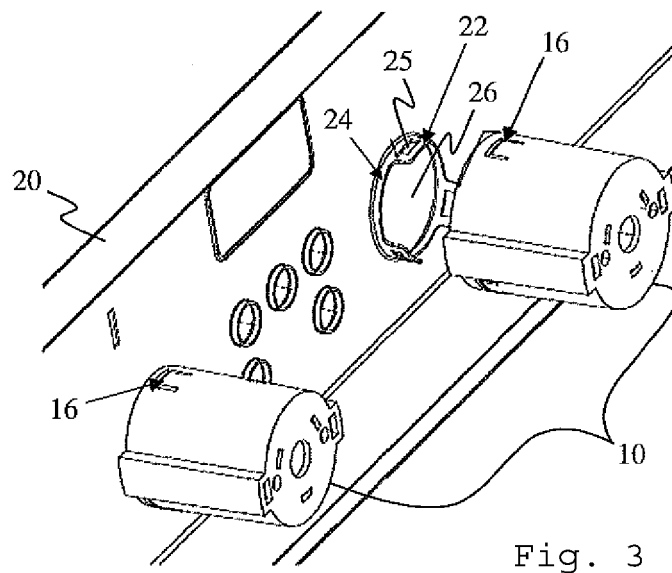
11. A method according to claim 10 wherein the method further comprises forming of at least one protrusion (22) and forming said clamping slot (25) on said protrusion (22).

Claims

1. A household appliance comprising a number of control knobs on a control panel (20), said control panel (20) having knob openings (26) and corresponding knob holders (10) having a hollow body for securely holding and fixing of said knobs, **characterized in that**, the control panel (20) further comprises an inwardly arranged integral ridge (24) in the circumferential vicinity of each knob opening (26) wherein each ridge (24) comprises at least one clamping slot (25) arranged in perpendicular direction to the control panel (20), and **in that**, the knob holder (10) comprises a latching device (16) having a tip portion (11) arranged to be fixedly engaged with the slot (25) when the knob holder (10) abuts to the circumferential area of said ridge (24).
2. A household appliance according to claim 1 wherein each ridge (24) comprises three clamping slots (25) whereas each knob holder (10) comprises latching devices (16) corresponding thereto.
3. A household appliance according to claim 1 or 2 wherein said ridge (24) comprises protrusions (22) bearing the clamping slots (25).
4. A household appliance according to one of the preceding claims 1 to 3, wherein the control knobs are pop-out type control knobs.
5. A household appliance according to one of the preceding claims 1 to 4, wherein the control panel (20) is made of a metallic sheet material.
6. A household appliance according to one of the preceding claims 1 to 5, wherein inwardly arranged ridge (24) is having an arc shaped bending corner with a radius (R1).
7. A household appliance according to claim 6 wherein







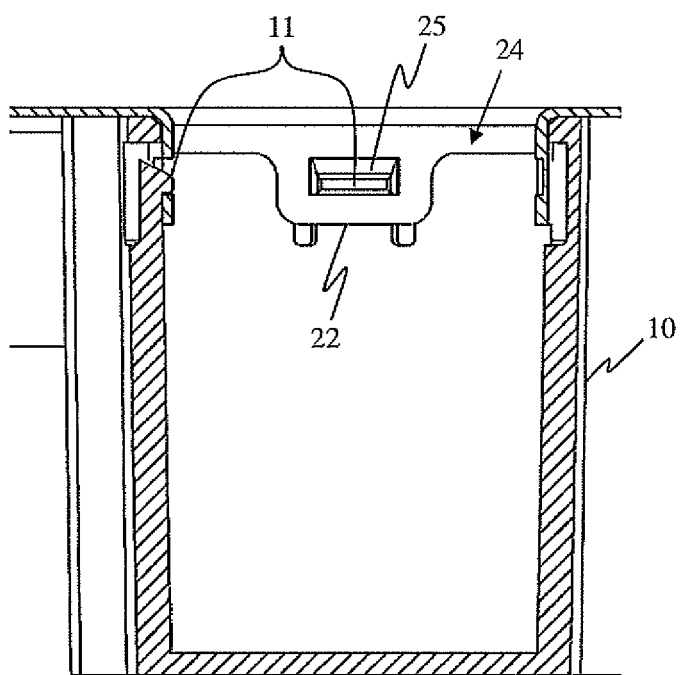
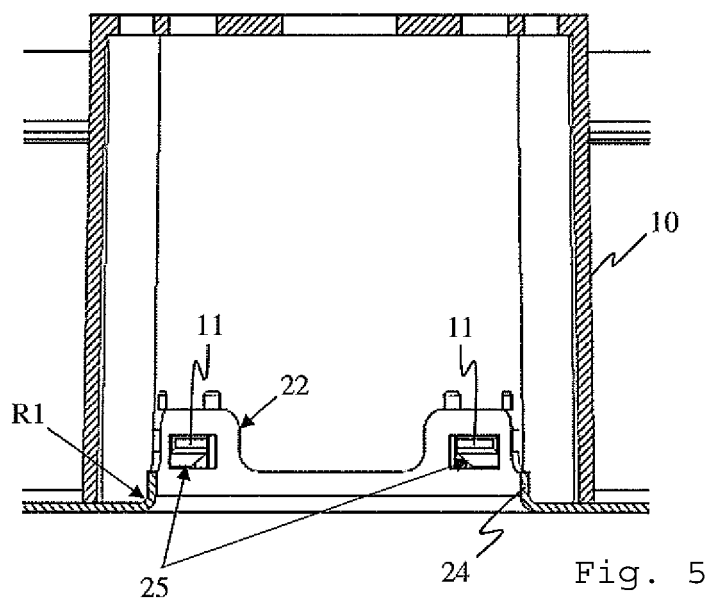
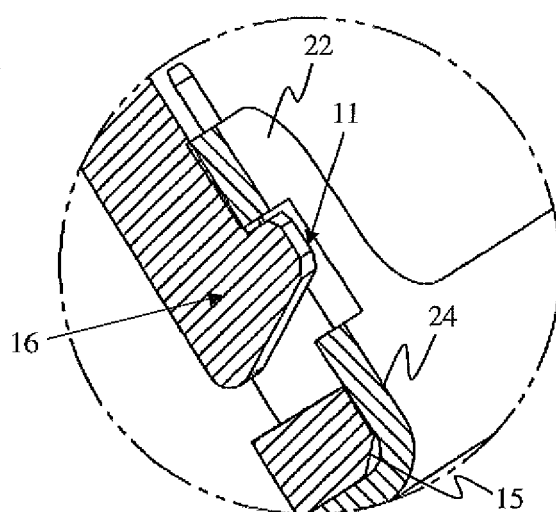
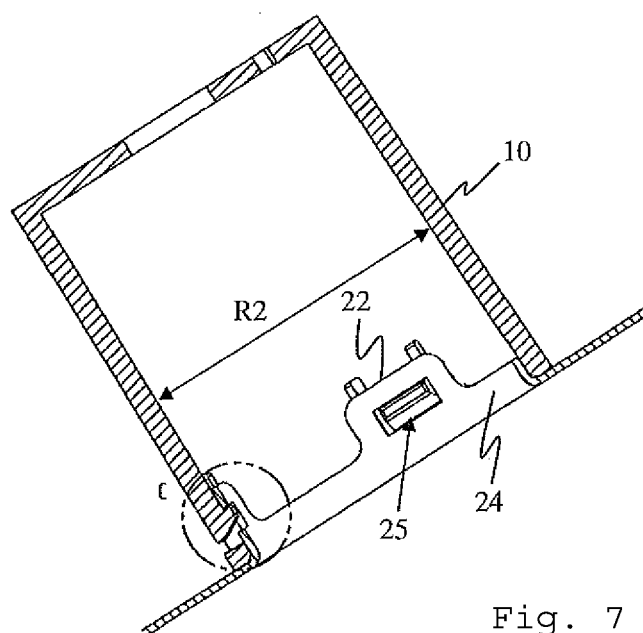


Fig. 6



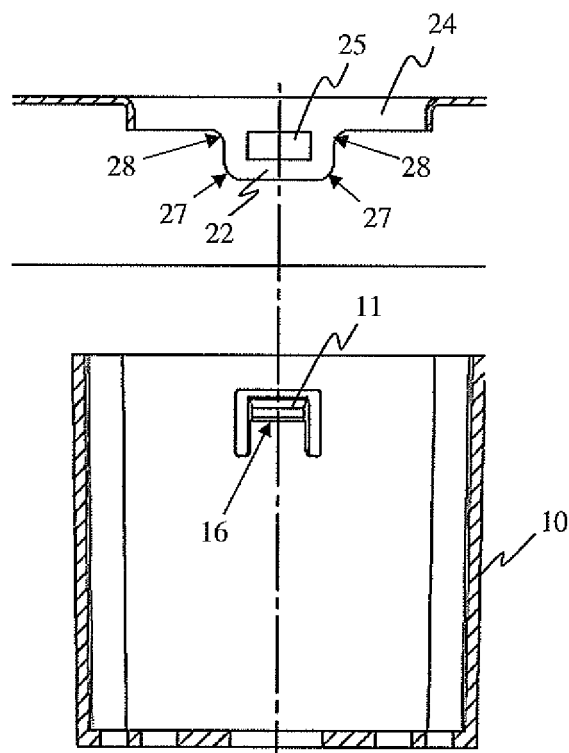


Fig. 9

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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