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(54) Door locking device, in particular for a domestic electrical appliance

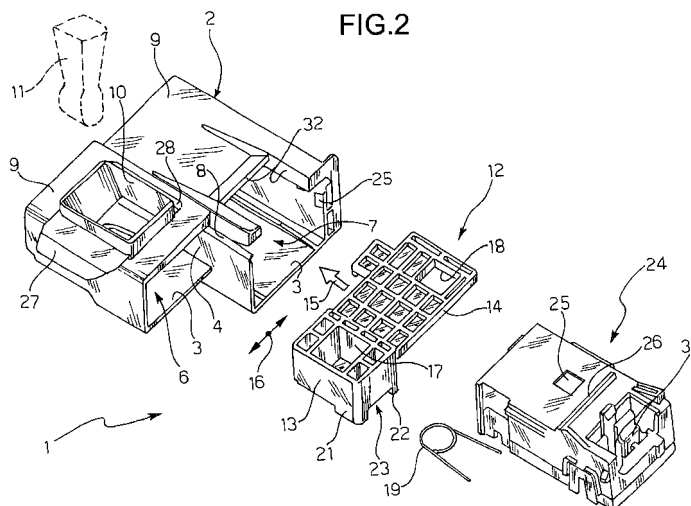
(57) The device (1) comprises a monolithic support housing (2), of electrically insulating material, having the shape substantially of a shaped tank, with a main assembly opening (3) and with an intermediate baffle (4) which extends between the main opening (3) and a base wall (5) and divides the area within the housing (2) into a first and a second cavity (6, 7) communicating with one another via a thin slot (8). A lateral wall (9) of the housing (2) comprises a secondary working opening (10) for the insertion into this first cavity (6) of a hook member (11) of a door of the domestic electrical appliance.

A slide (12) is mounted in the housing (2) via the main opening (3) and extends into the first and second cavity (6, 7) through the slot (8) and can, in operation, move in translation in the housing (2) adjacent to the

lateral wall (9) in a direction (16) parallel to the secondary opening (10). This slide (12) comprises a first and a second portion (13, 14) which extend into the first and second cavity (6, 7) respectively, the first portion (13) comprising a hooking opening (17) facing the secondary opening (10) of the housing (2) and adapted to cooperate with the hook member (11) of the door, the second portion (14) having a locking opening (18).

A resilient member (19) is mounted in the first cavity (6) and tends to maintain the slide (12) in a predetermined rest position.

An electronically operated control module (24) is mounted through the main opening (3) in the second cavity (7) adjacent to the second portion (14) of the slide (12) and comprises a moving locking member (25) which may be engaged in the locking opening (18) of the second portion (14) of the slide (12).



Description

[0001] The present invention relates to a door locking device, in particular for a domestic electrical appliance.

[0002] An object of the invention is to provide a door locking device of improved type which comprises a smaller number of parts and components and makes it possible to ensure a very high level of protection of its components from both the electrical and the hydraulic point of view, the latter aspect being of particular importance when the door locking device is used, for instance, in a washing machine.

[0003] These and other objects are achieved by the invention which relates to a door locking device whose salient characteristic features are set out in the accompanying claim 1.

[0004] Further characteristic features and advantages of the invention are set out in the following detailed description, given purely by way of non-limiting example, made with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of a door locking device of the present invention, shown in its assembled state;

Fig. 2 is a partially exploded perspective view of the door locking device of Fig. 1;

Fig. 3 is a perspective view of a support housing comprised in the door locking device, with the slide mounted, and shows the positioning methods of a spring associated with this slide;

Fig. 4 is a perspective view of the slide;

Figs. 5 and 6 are perspective views showing two stages of assembly of the spring associated with the slide;

Fig. 7 is a perspective view showing the methods of insertion and assembly of an electronic control module in the support housing of the door locking device; and

Figs. 8 and 9 are views showing the method of installation and snap-locking of a door locking device of the invention in a wall or panel of a domestic electrical appliance.

[0005] In the drawings, a door locking device of the present invention is shown overall by 1.

[0006] The door locking device comprises a monolithic support housing 2, of electrically insulating material, preferably stamped plastics material. The shape of the housing 2 is substantially that of a shaped tank, with a main assembly opening shown by 3.

[0007] An intermediate baffle 4 extends between the main opening 3 and a base wall 5 of the support housing 2 and divides the area within this housing 2 into a first and a second cavity 6 and 7 (see Fig. 3 in particular). These cavities 6 and 7 communicate with one another via a thin slot 8 formed between the baffle 4 and a lateral wall 9 of the housing 2.

[0008] The lateral wall 9 of the support housing 2 comprises a secondary working opening 10 for the insertion of a hook member 11 (Fig. 2) of a door (not shown) of a domestic electrical appliance.

[0009] The door locking device further comprises a slide shown overall by 12.

[0010] In the embodiment shown, the slide 12, which is also preferably made from stamped plastics material, comprises a first portion 13 of roughly parallelepipedic shape from which a second portion or lateral flange 14, shaped substantially as a plate, extends.

[0011] As shown by the arrow 15 in Fig. 2, the slide 12 is mounted in the support housing 2 via the main assembly opening 3 of the latter, with its portion 13 inserted in the cavity 6 and the flange 14 traversing the slot 8 and extending into the cavity 7.

[0012] The arrangement is such that when the slide 12 is inserted in the support housing 2, it may move in translation, relative to the housing, in the direction shown by the double arrow 16 in Fig. 2.

[0013] The portion 13 of the slide, which is housed in the cavity 6 of the housing 2 has a hooking opening 17 (Fig. 2) facing the opening 10 of the support housing and adapted to cooperate with the hook member 11 of the door of the domestic electrical appliance. The portion or flange 14 of the slide 12 has a locking opening, shown by 18 in Figs. 2 and 4.

[0014] In Figs. 2 to 6, reference numeral 19 designates a pin spring mounted with respect to the first cavity 6 of the support housing 2 and cooperating with the slide 12. As shown in Fig. 3 in particular, the spring 19 is positioned in a lowered seat 20 provided in the cavity 6 of the housing 2, and its terminal arms project externally to this seat in order to cooperate with the slide 12.

[0015] As shown in Fig. 4, the inner surface of the portion 13 of the slide 12 is provided with a pair of facing projections 21 and 22, which are substantially L-shaped, and between which the terminal arms of the pin spring 19 are adapted to be operationally engaged. A passage shown by 23 is formed between these projections 21 and 22 (Figs. 1, 2, 4-7).

[0016] The arrangement is such that during assembly, as shown in Fig. 5, the slide 12 is firstly mounted in the support housing 2 and the pin spring 19 is then inserted through the passage 23, between the projections 21 and 22 of the slide, with its coil forward until this spring is disposed in the seat 20 of the cavity 6 as shown in Figs. 3 and 6. In this state, the spring 19 tends to maintain the slide 12 in a predetermined rest position with respect to the support housing 2.

[0017] The door locking device 1 of the invention further comprises an electronically operated control module, shown overall by 24. This module 24 is mounted in the second cavity 7 of the housing 2, via the main opening 3 of the latter, and is locked in the housing adjacent to the second portion or flange 14 of the slide 12.

[0018] The module 24 comprises, in a manner known per se, a moving locking member 25 (Fig. 2) which can

move between a retracted position in which it does not oppose the sliding of the slide 12 in the housing 2 in the direction 16, and a forward position in which it may be engaged in the opening 18 of the slide 12 in order to retain the latter in the position in which it is able to retain the hook member 11 of the door, preventing the latter from opening.

[0019] With reference to Fig. 1, the module 24 is held in the cavity 7 of the support housing 2 by retaining projections 25 (Figs. 1 to 3) beyond which it is able to snap lock when its insertion into the cavity 7 is complete.

[0020] As shown in Figs. 1, 2 and 7, on its side facing the slide 12, the body of the module 24 has a linear boundary and guide formation 26 along which the slide 12 can slide in operation.

[0021] The housing 2 of the door locking device comprises, in the vicinity of the secondary opening 10, a pair of snap locking formations 27 and 28 facing in opposite directions, adapted to enable the door locking device to be secured in an opening 29 of a wall or panel of a domestic electrical device according to the methods shown in the sequence shown in Figs. 8 and 9.

[0022] As can be seen from Figs. 1 and 2, for instance, the module 24 is provided with a plurality of electrical connection members 31, accessible at the location of an end portion of the module which faces a notch 32 provided in the edge of the main opening 3 of the support housing 2 at the location of the cavity 7. By means of an electrical connector (not shown), the connection members 31 enable the module 24 to be connected to a control unit of the domestic electrical appliance with which the door locking device 1 is associated.

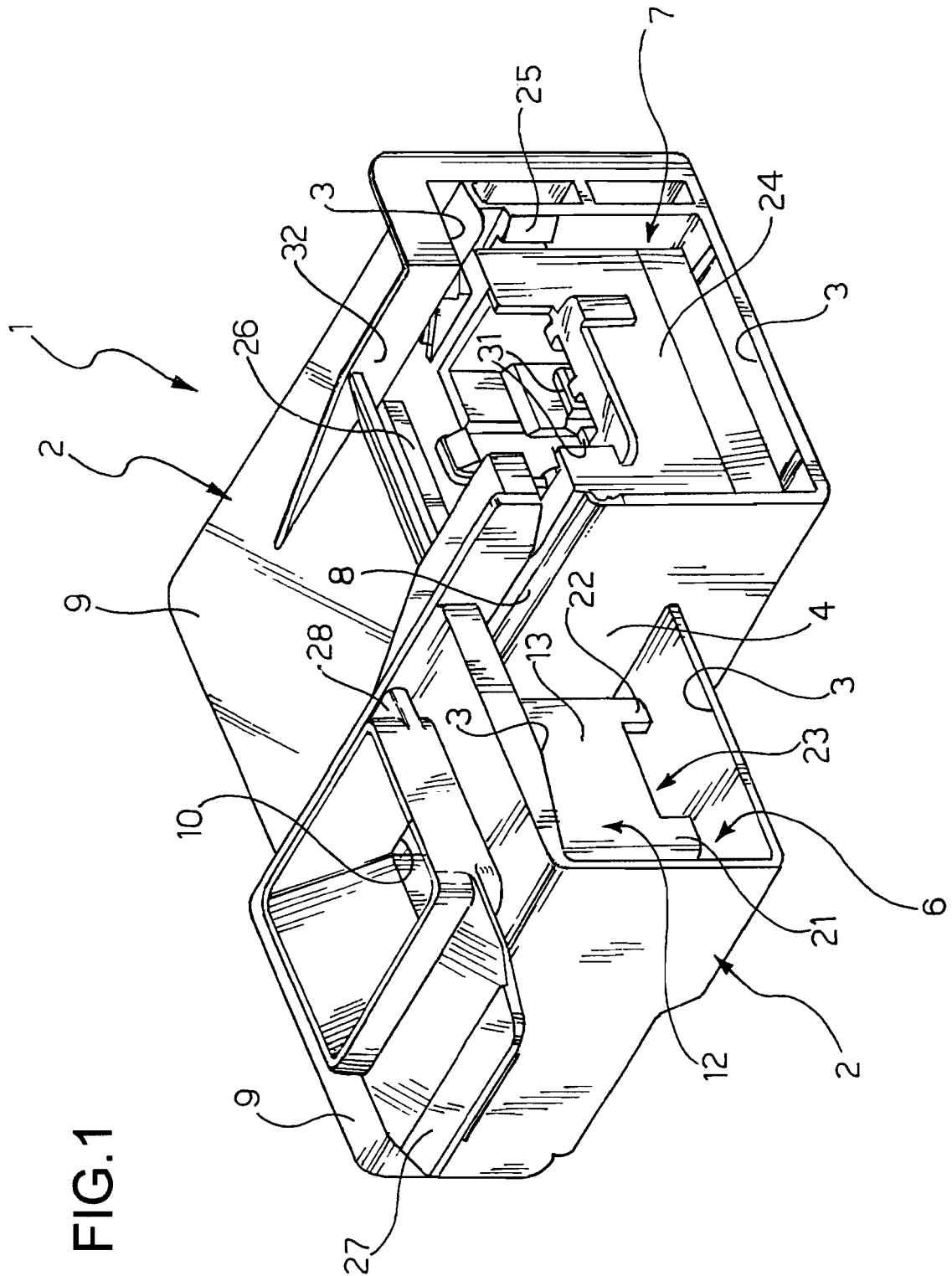
[0023] As will be appreciated from the above description, the door locking device of the invention has a very small number of parts. The support housing 2 makes it possible to provide efficient protection against water, and efficient electrical protection. The invention obviously extends to all embodiments of equivalent utility using the same innovative concepts.

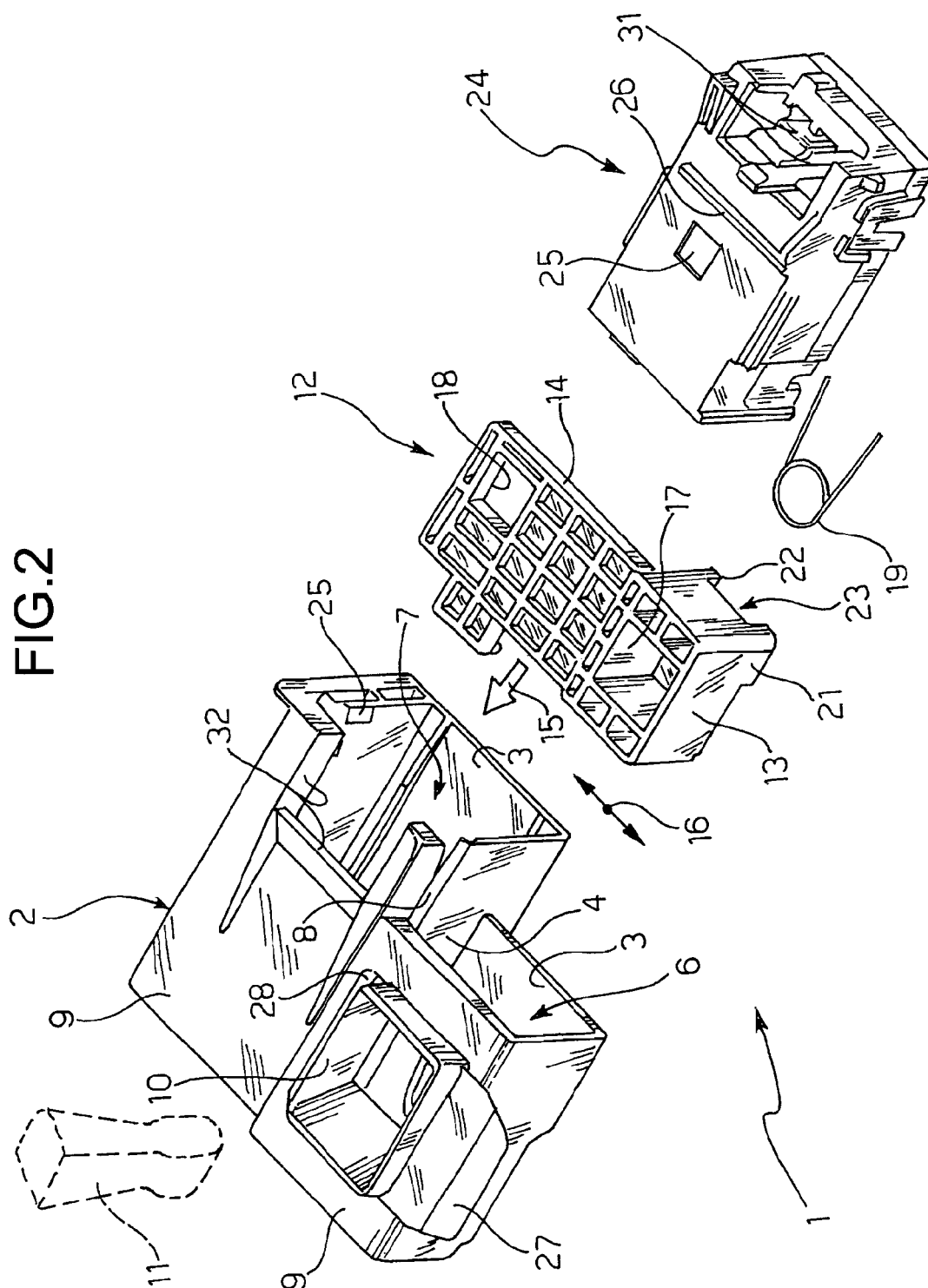
Claims

1. A door locking device (1), for a domestic electrical appliance in particular, comprising a monolithic support housing (2), of electrically insulating material, having the shape substantially of a shaped tank, with a main assembly opening (3) and with an intermediate baffle (4) which extends between the main opening (3) and a base wall (5) of the support housing (2) and divides the area within this housing (2) into a first and a second cavity (6, 7) communicating with one another via a thin slot (8), a lateral wall (9) of the housing (2) comprising a secondary working opening (10) for the insertion into this first cavity (6) of a hook member (11) of a door of a domestic electrical appliance, a slide (12), preferably also of electrically insulating

material, mounted in the housing (2) via the main opening (3) and extending into the first and second cavity (6, 7) through the slot (8), which, in operation, can move in translation in the housing (2) adjacent to the lateral wall (9) in a direction (16) parallel to the secondary opening (10), the slide (12) comprising a first and a second portion (13, 14) which extend into the first and second cavity (6, 7) respectively of the housing (2), the first portion (13) comprising a hooking opening (17) facing the secondary opening (10) of the housing (2) and adapted to cooperate with the hook member (11) of the door, the second portion (14) having a locking opening (18), a resilient member (19) mounted in the first cavity (6) of the housing (2) and tending to maintain the slide (12) in a predetermined rest position with respect to the housing (2); and an electronically operated control module (24) mounted via the main opening (3) in the second cavity (7) of the housing (2) adjacent to the second portion (14) of the slide (12) and comprising a moving locking member (25) which may be engaged in the locking opening (18) of the second portion (14) of the slide (12).

2. A door locking device as claimed in claim 1, in which the resilient member (19) is a pin spring (19) positioned in a seat (20) provided in the first cavity (6) of the housing (2) and comprising at least one arm which projects externally to the seat (20) and is adapted to cooperate with the first portion (13) of the slide (12).
3. A door locking device as claimed in any one of the preceding claims, in which the control module (24) is held in the second cavity (7) by snap locking means (25) provided in the vicinity of the main opening (3) of the support housing (2) and the slide may slide along a formation (26) of the control module (24) which retains it within the housing (2).
4. A door locking device as claimed in any one of the preceding claims, in which, in the vicinity of the secondary opening (10), the support housing (2) has snap locking formations (27, 28) adapted to enable it to be secured in an opening (29) of a wall or panel (30) of the domestic electrical appliance.





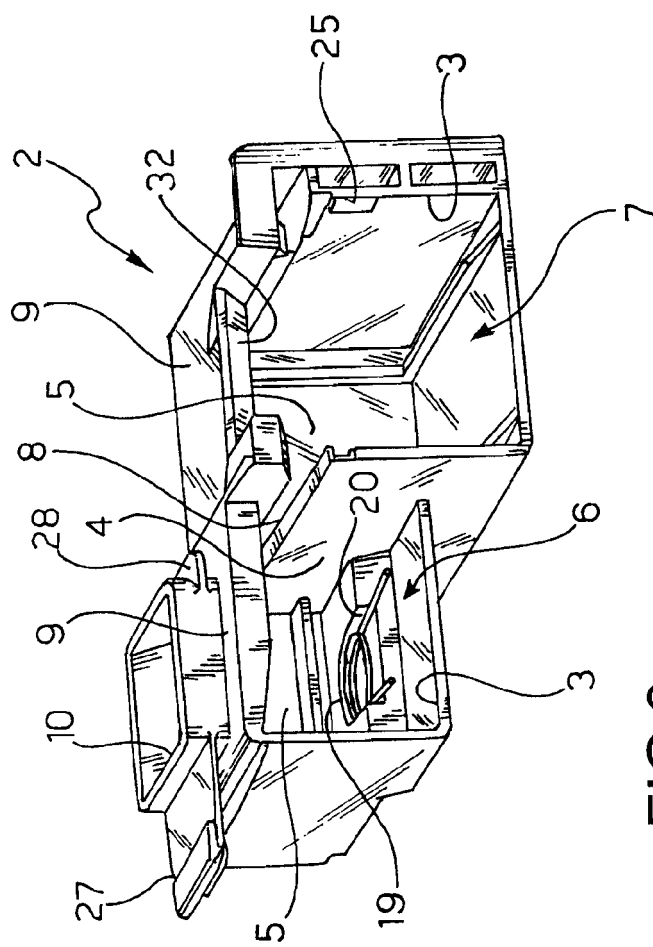


FIG. 3

FIG. 4

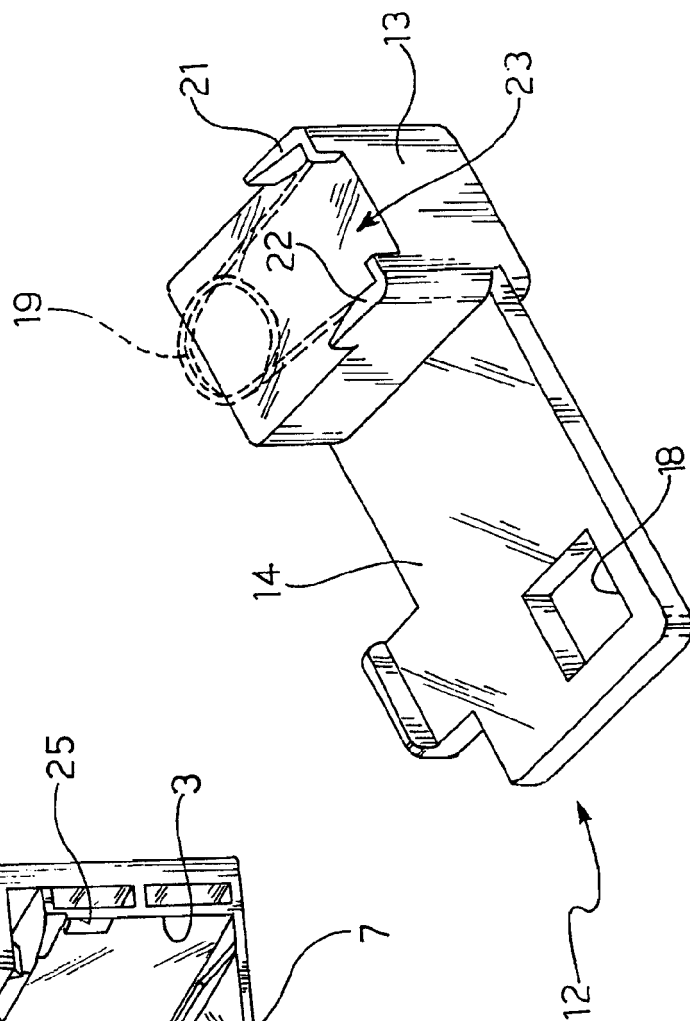


FIG.5

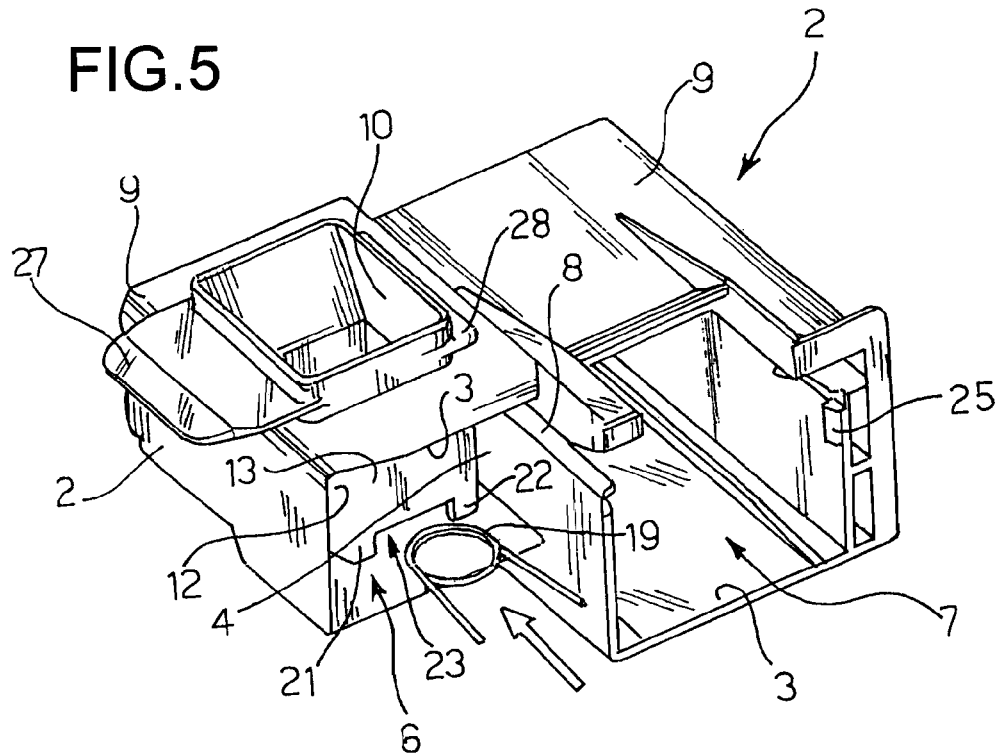
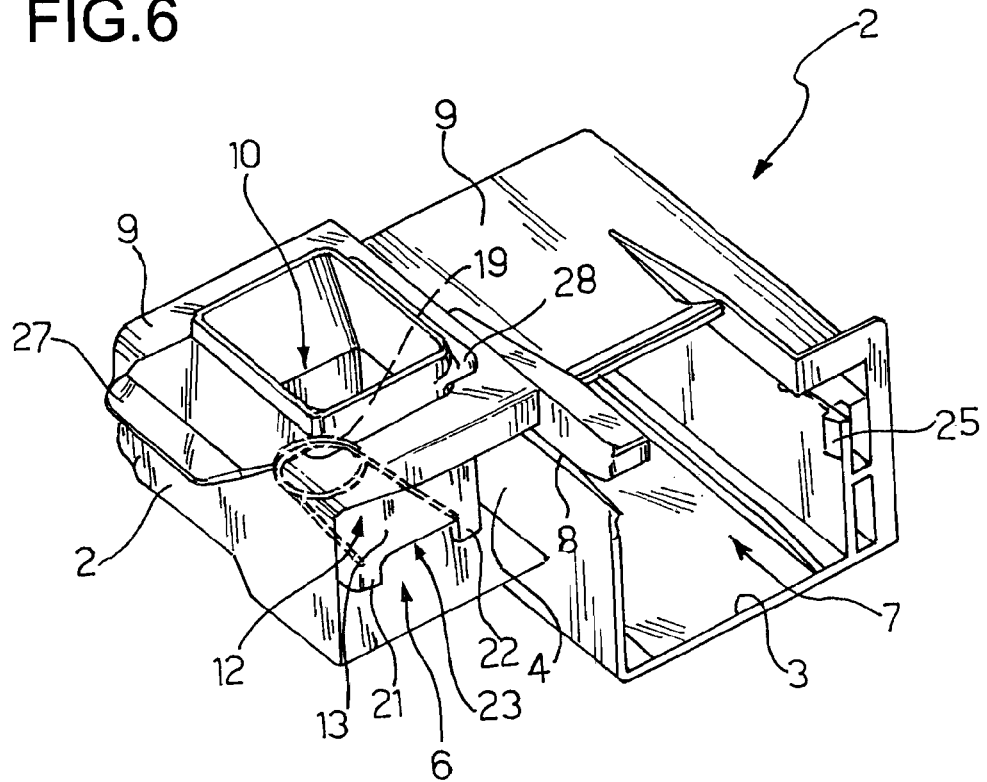
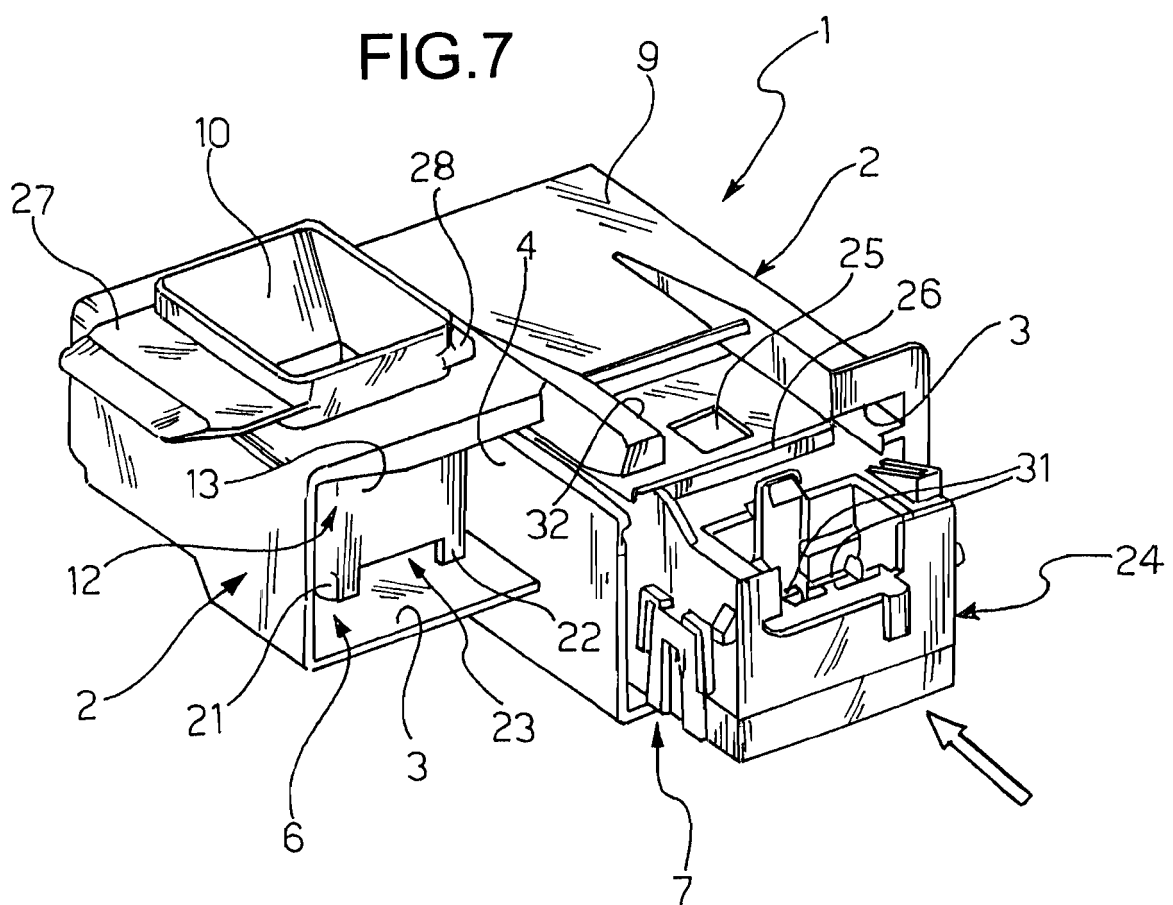
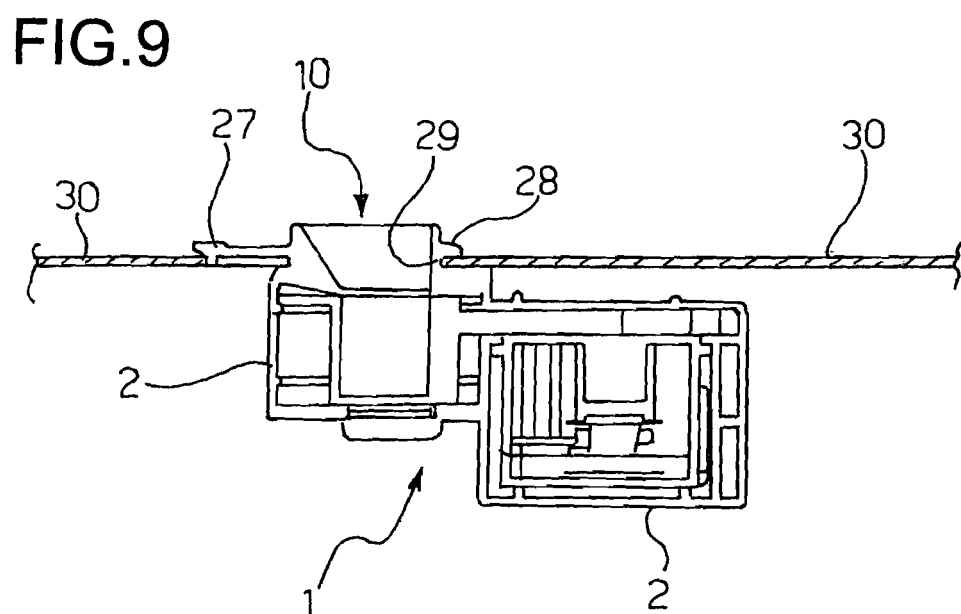
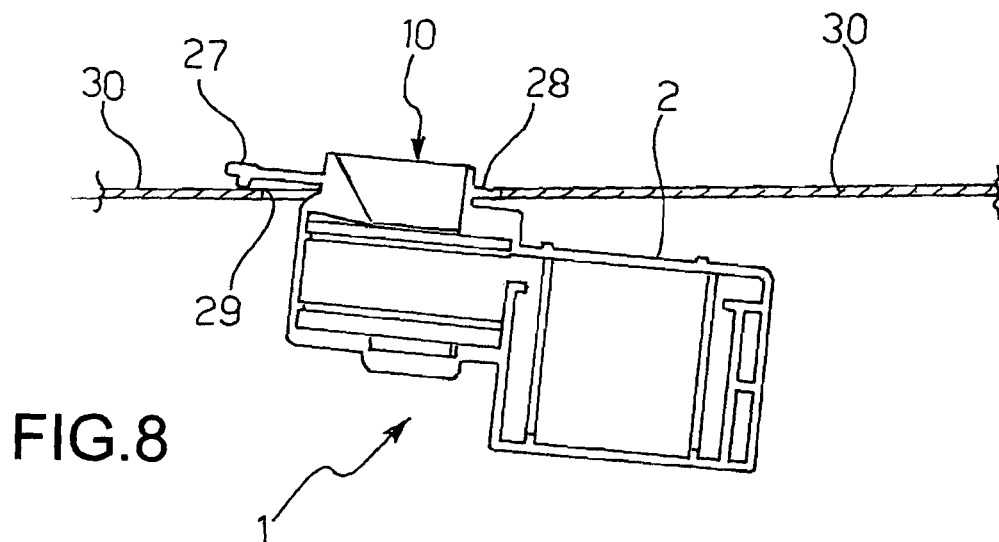


FIG.6









European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 05 11 2619

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 1 March 2006	Examiner Lodato, A
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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