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(54) Containment and segregation compartment for switches and switch untis

(57) A containment and segregation compartment (4) for electric switches (20). The compartment (4) comprises a frame (32) shaped to fit against an insertion terminal board (24) for the switch (20) so as to prevent access to the electrically live parts adjacent to the insertion terminal board (24). The frame encloses a site of containment (36) able to accommodate the terminal board (24) and the switch (20); in addition, the frame (32) comprises a closure cover (64) able to close off access to the containment site (36), said cover (64) being mechanically separate from the closure hatch (16) of the electrical panel (8).

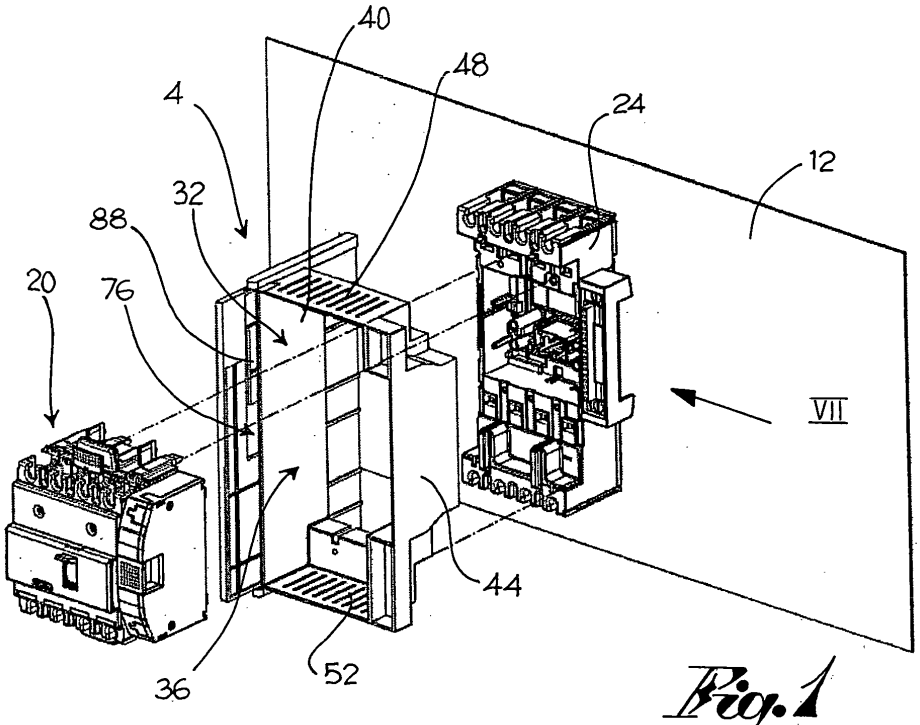

Fig. 1

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Description

[0001] The present invention regards a containment compartment for a switch, especially a boxed switch, and a switch unit.

[0002] To mechanically attach a boxed switch inside the inner compartment of an electrical panel and to ensure the electrical connection of such switch to an electric system the use of a support and electrical connection base is known of.

[0003] The base is attached mechanically to the electrical panel and is connected electrically inside the electrical panel to an electric system which the switch is to be connected to.

[0004] The base includes electrical connection terminals to enable the connection of the switch to an electric circuit, such as a line circuit or load circuit.

[0005] The electrical panel is a structure built-in to the wall closed off by a panel which when opened permits access to the switch.

[0006] Frequently the need arises to remove the switch from the electrical panel, for example so as to replace it, or to remove the switch temporarily from the panel and distance it from the same for maintenance operations on the electric system or tests on functioning with the system sectioned from auxiliary functions of the switch.

[0007] Known state-of-the-art electrical panels present numerous drawbacks.

[0008] In fact, in order to access the switches and remove and/or extract them from the electrical panel the door needs to be opened and the switch handled manually so as to extract or remove it.

[0009] There is also a risk that the operator might accidentally come into contact with live parts, such as for example the parts of the terminal board itself or the bars of current remaining visible after removal of the switch.

[0010] To obviate these drawbacks the creation of complex systems of segregation inside the electrical panel which prevent access to the live parts inside the electrical panel once the door of the electrical panel has been opened are known of.

[0011] Such devices make the electrical panels complex and expensive.

[0012] Electrical panels with switches which can be extracted with the door shut are also known of but such solutions are equally complex and complicated to produce.

[0013] The aim of this invention is to overcome the drawbacks mentioned with reference to the technical note.

[0014] Such drawbacks and limitations are resolved by a containment and segregation compartment for the switch in accordance with claim 1.

[0015] Other forms of embodiment of the invention are described in the subsequent claims.

[0016] Further characteristics and advantages of the present invention will be evident from the description given below of its preferred embodiments made by way of an indicative and non-limiting example according to the following figures, wherein:

figure 1 shows a perspective view of the separate parts of a switch unit in accordance with a form of embodiment of the present invention;
figure 2 shows a perspective view of the separate parts of the switch unit of figure 1, in a partially assembled configuration;
figure 3 shows a perspective view of the switch unit of figure 1, in an assembly configuration with compartment hatch open;
figure 4 shows a perspective view of the switch unit of figure 1, in an assembly configuration with compartment hatch closed;
figure 5 shows a perspective view of the switch unit of figure 1, in an assembly configuration in an electricaql panel, with the door of the panel closed and the hatch of the compartment open;
figure 6 shows a perspective view of the switch unit of figure 1, in an assembly configuration in an electrical panel, with the door of the panel closed and the hatch of the compartment closed;
Figure 7 shows a lateral view of the switch unit of figure 1, from the side of the arrow VII in figure 1;
figure 8 shows a lateral view of the switch unit of figure 2, from the side of the arrow VIII in figure2;
figure 9 shows a lateral view of the switch unit of figure 4, from the side of the arrow IX in figure 4;
figures 10-12 show perspective views of the compartment of the switch unit of figure 1, in a closed configuration and in two open configurations respectively.

[0017] The elements or parts of elements common to the forms of embodiment described below will be indicated with the same reference numerals.

[0018] With reference to the aforesaid figures, the reference numeral 4 globally denotes a containment and segregation compartment for switches.

[0019] The compartment 4 is suitable for inserting in a recess 6 of an electrical panel 8 fitted with a base 12 and an opening/closing hatch 16. The opening/closing hatch 16 can be removable from the panel 8 or attached to the panel 8 for example by a hinge, so that it can be opened. The recess 6 of the panel 8 is included between the base 12 and the hatch 16, and is able to accommodate at least one electric switch 20 through an aperture 7 on the front of the hatch 16.

[0020] The switch 20 is attached to the electrical panel 8 by means of an insertion terminal board 24. The insertion terminal board 24 can be attached to the base 12 of the electrical panel 8 by interposing an attachment panel, for example, parallel to the base 12, or by interposing a small support frame comprising uprights and/ or crossbeams and relative threaded means of connection.

[0021] The compartment 4 is advantageously situated between the switch 20 and a relative insertion terminal

board 24.

[0022] The insertion terminal board 24 comprises electric connection terminals 28 to a line circuit and/or load circuit able to receive complementary electric terminals of the associable switch 20.

[0023] According to one form of embodiment, the compartment 4 comprises a frame 32 which defines a site of containment 36 able to accommodate at least partially the insertion terminal board 24 and the switch 20.

[0024] For example, the frame 32 is overall a box-like structure comprising a first and a second upright 40,44 as well upper crossbeam 48 and a lower crossbeam 52.

[0025] The uprights 40,44 and the crossbeams 48,52 form a closed loop which define the site of containment.

[0026] The frame 32 is open at a rear portion 56, able to interface with the insertion terminal board 24, and a front portion 60 able to receive the associable switch 20.

[0027] Advantageously, the frame 32 is shaped so as to fit exactly against the insertion terminal board 24 so as to prevent access to the live parts adjacent to the terminal board 24.

[0028] In other words, the frame 32 is shaped so as to fit exactly against the insertion terminal board 24 so that after having fitted the compartment 4 on to the terminal board 24, the latter is covered around its perimeter by the compartment 4.

[0029] According to one form of embodiment, the frame 32 comprises a closure cover 64 able to close off the front portion 60, so as to close off access to the site of containment 36. According to one form of embodiment, the closure cover 64 can be moved independently of the hatch 16 of the electrical panel 8, so as to allow access to the site of containment 36 without having to open or remove the hatch 16 of the electrical panel 8. According to one possible form of embodiment, the closure cover 64 is mechanically separate from the hatch 16 of the electrical panel 8.

[0030] Preferably, the cover 64, in a closed configuration, sits flush with the front portion 60 of the compartment 4.

[0031] According to one form of embodiment, the frame 32 of the compartment 4 comprises a housing recess 68 able to house at least partially the cover 64 of the compartment 4, in an open configuration of the cover 64.

[0032] Specifically, the housing recess is preferably situated in a position adjacent to an upright 40,44 of the frame 32, and preferably at the height of the upright at which the cover 64 is hinged.

[0033] The closure cover 64 is therefore hinged to an upright 40,44 of the frame 32 so as to move in a rotatory movement in relation to said upright 40. Said closure cover 64 can for example rotate by 90 degrees and sit, in an open configuration, essentially perpendicular to the front portion 60 of the frame 32 or it can for example rotate 180 degrees to sit parallel to the front portion 60 (figure 11).

[0034] According to one form of embodiment, the closure cover 64 is attached to an upright 40,44 of the frame 32 by means of a rotor-translatory coupling, so as to be able to rotate in relation to an axis of the hinge X-X essentially parallel to the relative upright 40,44 and be able to translate in a perpendicular direction to the same axis of the hinge X-X, inserting itself at least partially inside the housing recess 68 (figure 12).

[0035] Preferably, the housing recess 68 comprises insertion guides 72 of the cover 64 able to guide the cover inside the housing recess 68.

[0036] According to one form of embodiment, the cover 64 of the compartment 4 presents an aperture 76 able to receive a protruding front portion 80 of the switch 20 fitted with a control lever 84, so as to be able to activate the control lever 84 of the switch 20 even when the cover 64 of the compartment 4 is closed.

[0037] According to one form of embodiment, the cover 64 of the compartment 4 is fitted with a flap 88 able to close said aperture 76 of the cover 64 of the compartment 4, so as to prevent access inside the panel 8 following removal of the switch 20.

[0038] For example, the flap 88 is sliding and is situated adjacent to the aperture 76 of the closure cover 64 of the compartment 4.

[0039] According to one form of embodiment, the flap 88 slides along an upper edge 92 which defines the aperture 76, according to a shutter movement.

[0040] Preferably, the flap 88 comprises a handle 96 to facilitate moving of the flap 88.

[0041] Preferably, the flap 88 comprises means of blocking, able to block the flap 88 in the open and/or closed position; according to a possible form of embodiment the flap 88 is fitted with a spring which keeps it automatically in the closed position when the switch 20 is not on.

[0042] As may be seen from the description the containment and segregation department according to the invention allows the drawbacks described in the technical note to be overcome.

[0043] In fact, the compartment makes it possible to prevent accidental contact between an operator and the live parts of the terminal board, given that the compartment is shaped to fit exactly against the terminal board and is made in electrically insulated material.

[0044] Advantageously it is possible to perform operations of removal and/or extraction of the switch without having to open the hatch of the electric panel. In fact, it is possible to access the switch through the aperture of the closure cover of the compartment of the switch itself without affecting the compartments of the other switches on the electric panel.

[0045] Advantageously, following removal of the switch, for example so as to conduct maintenance and /or replacement operations, it is possible to block access to the electrical panel through the flap, ensuring operator safety. In addition, the infiltration of liquid or dust inside the electrical panel following removal of the switch is thus prevented.

[0046] Advantageously, the operator can easily work on the switch inside the electrical panel, without interfering with the closure hatch of the panel which can be conveniently put away in the relative housing recess.

[0047] In fact the closure hatch of the electrical panel can remain closed and the closure cover of the compartment, after being opened, can be conveniently inserted out of sight into the compartment housing recess. This way the operator has more space for manoeuvring.

[0048] A technician skilled in this area, may make numerous modifications and adjustments to the compartments described above so as to satisfy contingent and specific requirements, all moreover contained within the sphere of the invention as defined by the following claims.

Claims

1. Compartment of containment and segregation for switches (4), suitable for inserting in an electrical panel (8) and positioned between an electric switch (20) and a relative insertion terminal board (24) inside the electrical panel (8), the switch (20) and the insertion terminal board (24) comprise electrical connection terminals (28) to a line and/or load circuit, the compartment (4) comprising

   - a frame (32) which defines a site of containment (36) able to house at least partially the insertion terminal board (24) and the switch (20);
   - wherein the frame (32) is shaped to fit exactly against the insertion terminal board (24) so as to prevent access to the live electrical parts adjacent to the insertion terminal board (24),
   - and wherein the frame (32) comprises a closure cover (64) able to close off access to the site of containment (36), said cover (64) being moveable independently of the opening/closing hatch (16) of the electrical panel (8), so as to allow access to the site of containment (36) without having to open or remove the hatch (16) of the electrical panel (8).

2. Compartment (4) according to claim 1, wherein the closure cover, in a closed configuration, sits flush with a front portion (60) of the compartment (4), so as to prevent access to the site of containment (36) of the switch (20).

3. Compartment (4) according to claim 1 or 2, wherein the closure cover (64) is shaped so as to fit against a frontal hole (7) of the hatch(16) of the electrical panel able to allow the insertion and extraction of the switch (20).

4. Compartment (4) according to any one of the previous claims, wherein the frame (32) of the compartment (4) comprises a housing recess (68) able to accommodate at least partially the closure cover (64) of the compartment (4), in an open configuration of the cover (64).

5. Compartment (4) according to claim 4, wherein said housing recess (68) is situated adjacent to an upright (40,44) of the frame (32).

6. Compartment (4) according to claim 5, wherein the closure cover (64) is hinged to said upright (40,44) of the frame (32) so as to be able, in an open configuration, to slide inside said housing recess (68).

7. Compartment (4) according to any one of the previous claims, wherein the closure cover (64) is connected to an upright (40,44) of the frame (4) by means of a rotor-translatory coupling, so as to be able to insert itself inside the housing recess (68) in an open configuration.

8. Compartment (4) according to any one of the previous claims from 4 to 7, wherein the housing recess (68) comprises insertion guides (72) of the cover (64).

9. Compartment (4) according to any one of the previous claims, wherein the cover of the compartment (64) presents an aperture (76) able to receive a protruding frontal portion (80) of the switch (20) fitted with a control lever (84), so as to be able to activate the control lever (84) of the switch (20) even when the cover (64) of the compartment (4) is closed.

10. Compartment (4) according to claim 9, wherein the cover (64) of the compartment (4) is fitted with a flap (88) able to close said aperture (76) of the cover (64) of the compartment (4) so as to prevent access to the electrical panel (8) following removal of the switch (20).

11. Compartment (4) according to claim 10, wherein said flap (88) is sliding and is located adjacent to the aperture (76) of the closure cover (64) of the compartment (4).

12. Compartment (4) according to claim 10 or 11, wherein said flap (88) slides along an upper edge (92) which defines the aperture (76), so as to close the aperture (76) according to a shutter movement.

13. Compartment (4) according to claims 10, 11 or 12, wherein said flap (88) comprises a handle (96) to facilitate moving of the flap (88).

14. Compartment (4) according to any one of the previous claims from 10 to 13, wherein said flap (88) comprises means of blocking, able to block the flap (88) in the open and/or closed position.

15. Switch unit comprising a compartment (4) according to any one of the previous claims from 1 to 14, an insertion terminal board (24) and a switch (20) electrically connected to the insertion terminal board (24), the compartment (4) being situated between the insertion terminal board (24) and the switch (20).

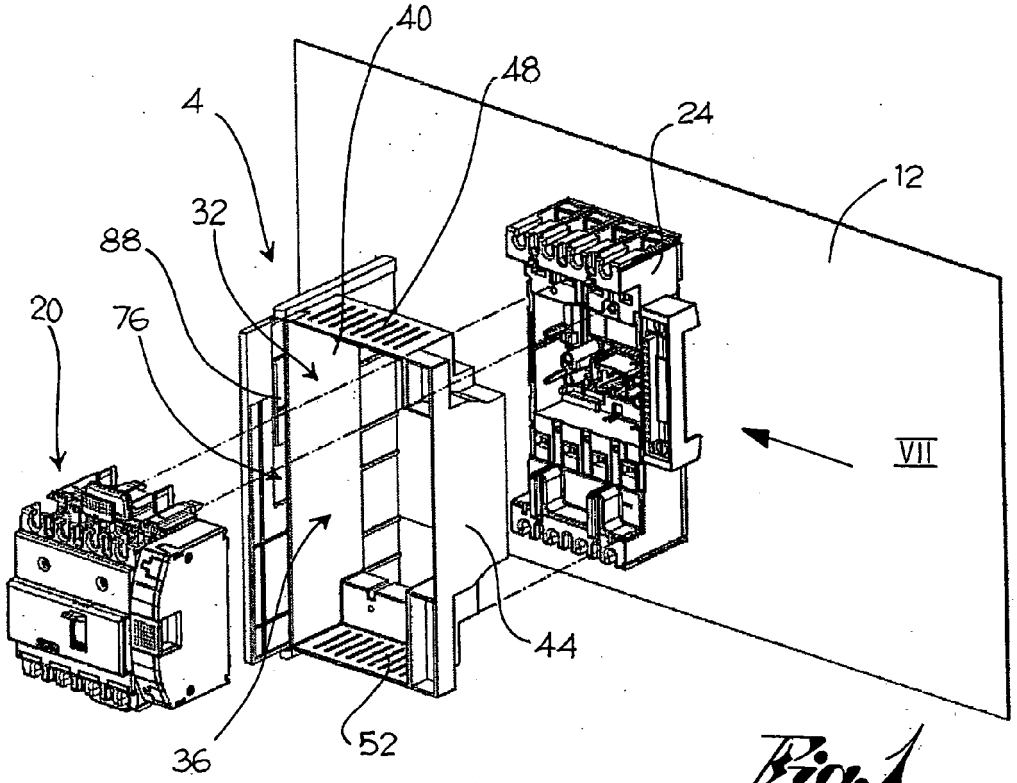
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Fig.1

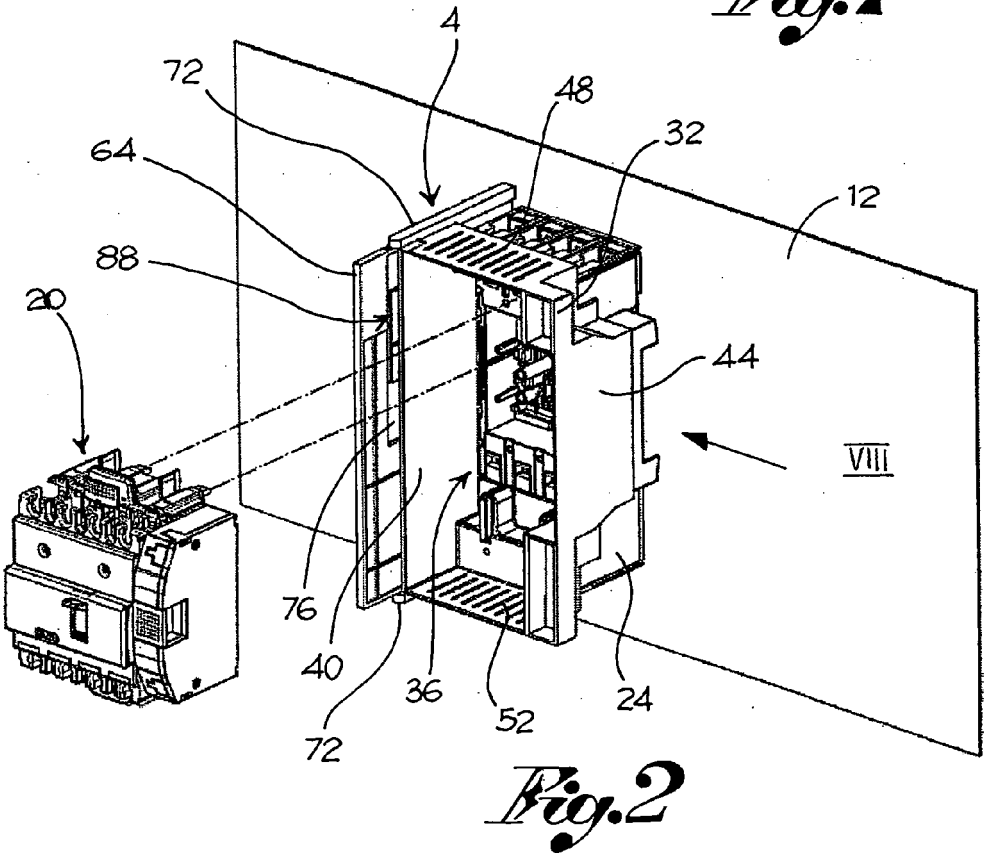
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Fig.2

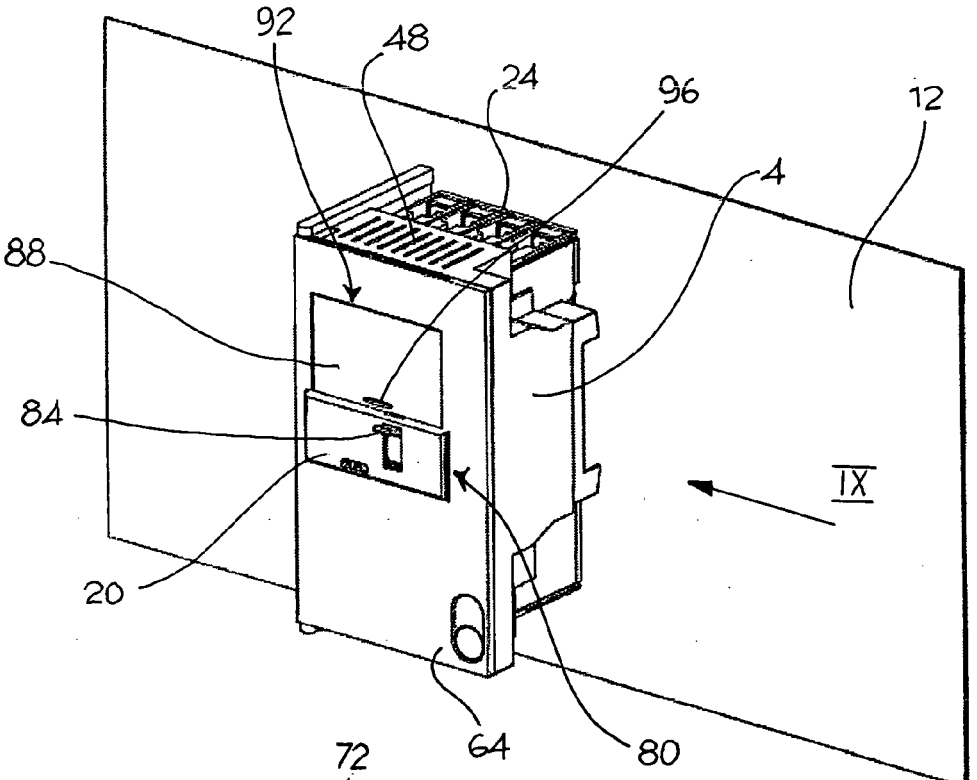


Fig.4

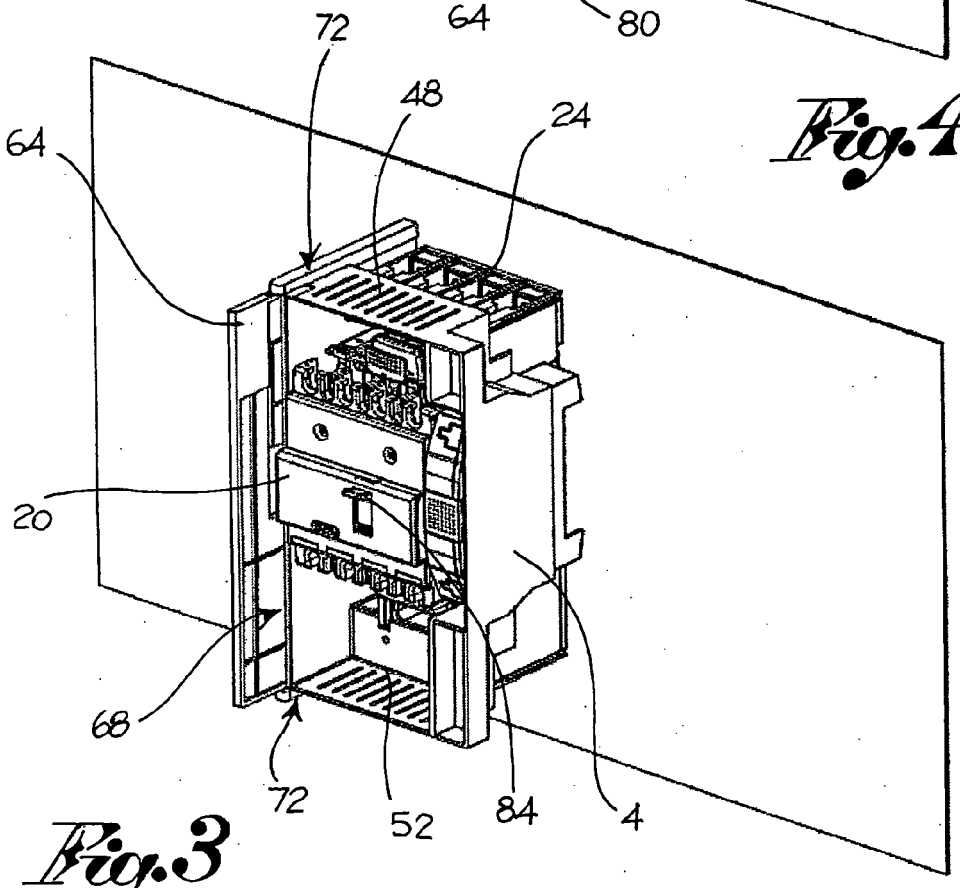


Fig.3

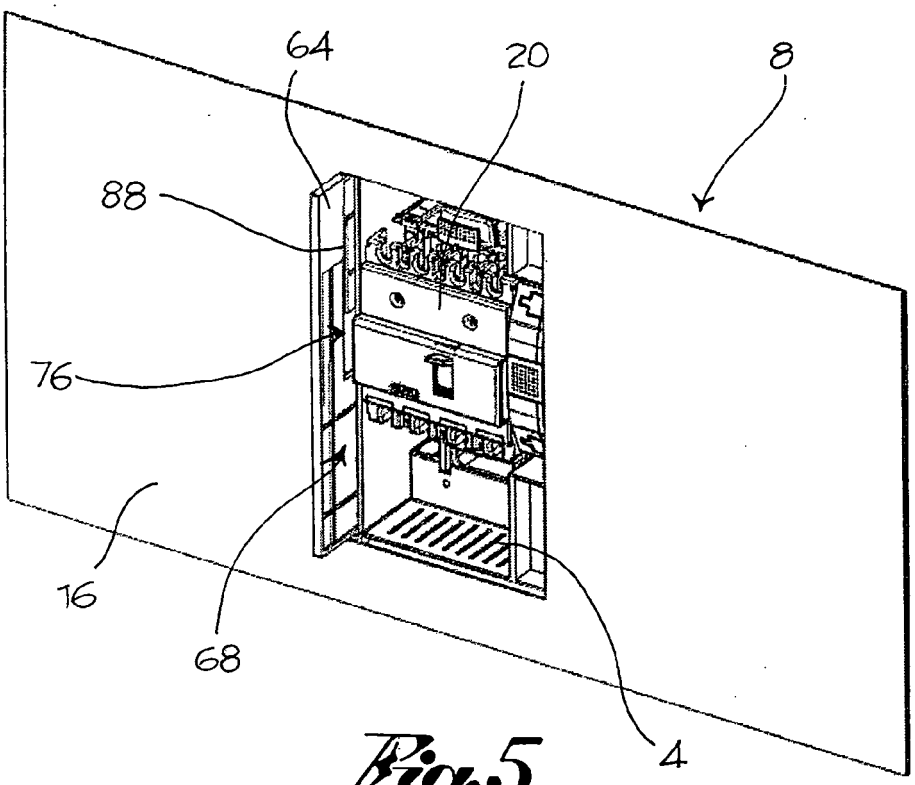


Fig.5

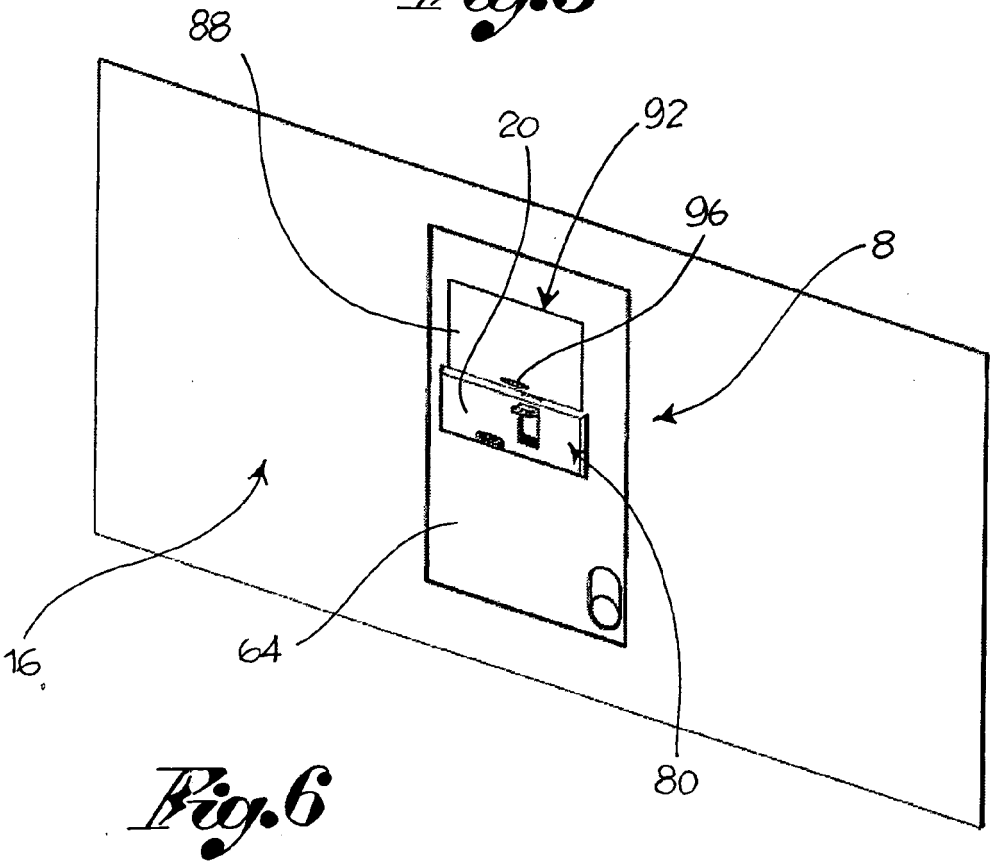


Fig.6

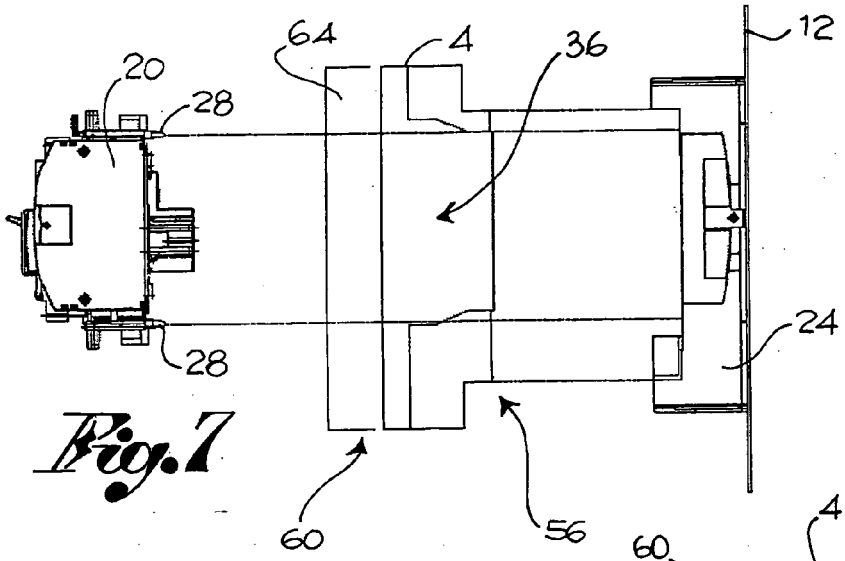


Fig.7

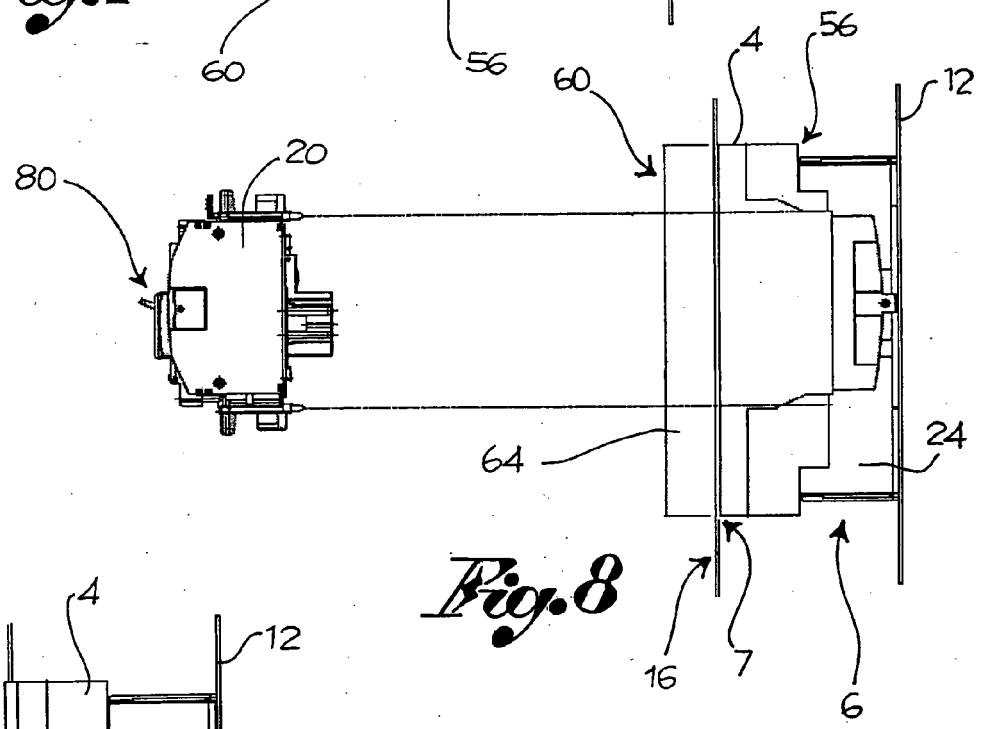


Fig.8

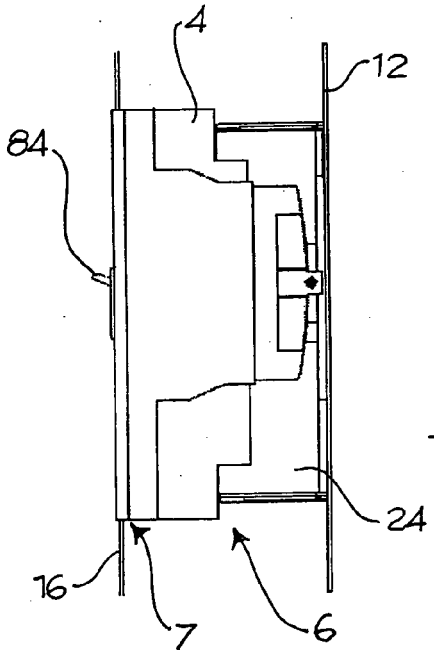


Fig.9

Fig.10

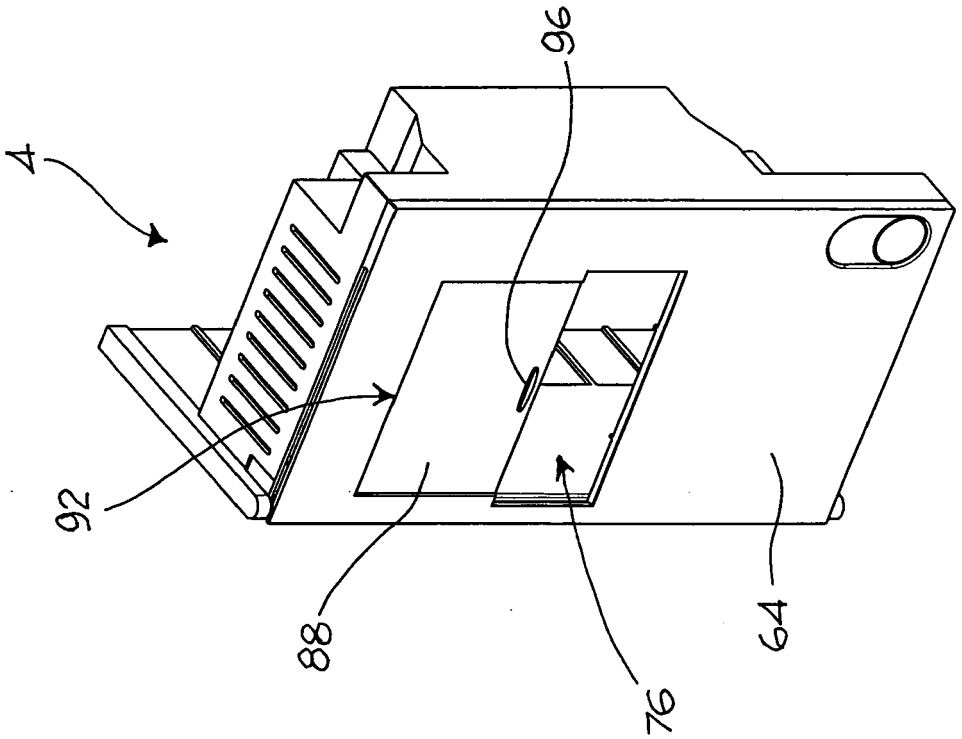


Fig.11

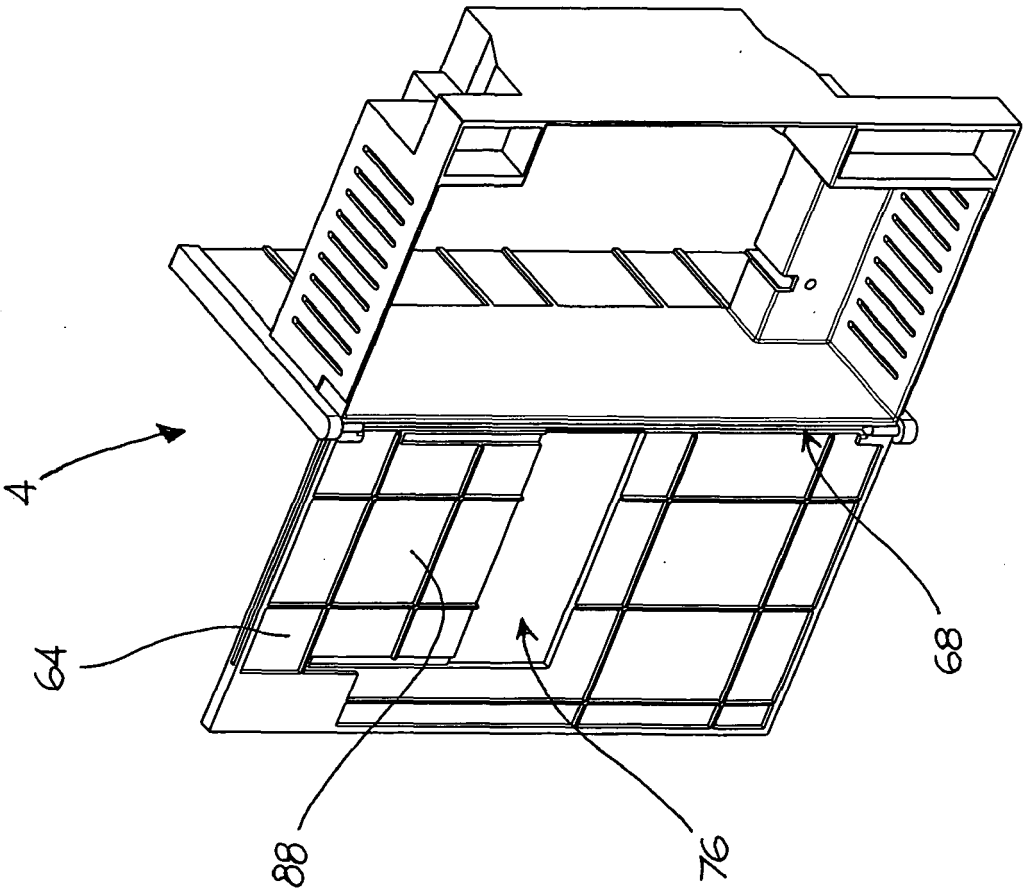
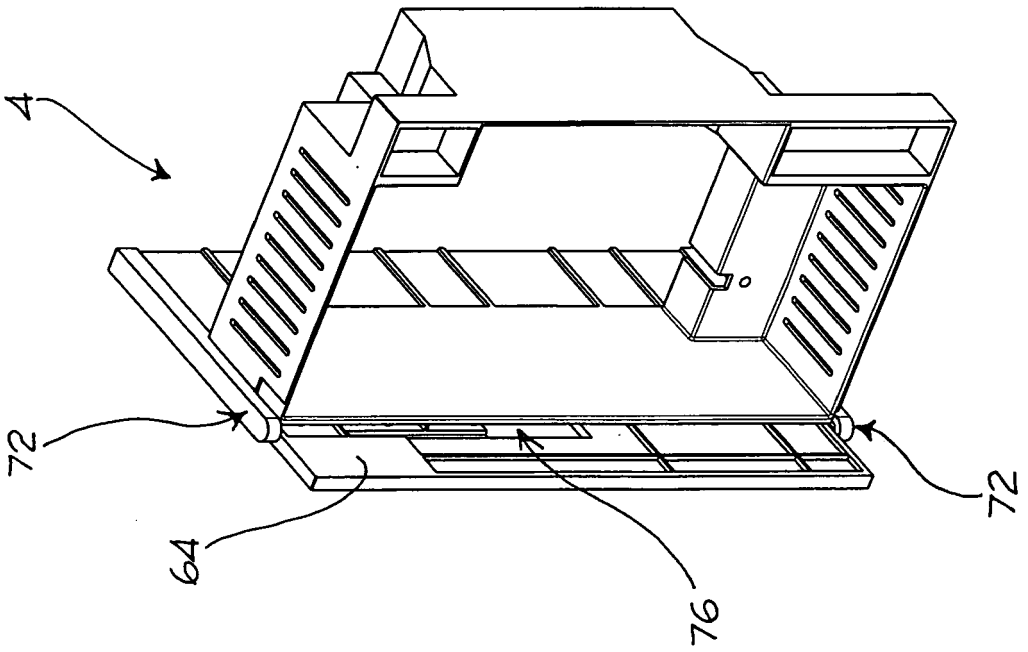


Fig.12



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EUROPEAN SEARCH REPORT

Application Number
EP 08 42 5071

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 5 172 300 A (MORBY JOHN A [US] ET AL) 15 December 1992 (1992-12-15) * figure 4 *	1-3,9,15	INV. H01H71/02 H02B1/056 H02B1/06
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A	JP 11 185587 A (MATSUSHITA ELECTRIC WORKS LTD) 9 July 1999 (1999-07-09) * the whole document *	1,15	

TECHNICAL FIELDS SEARCHED (IPC)

H01H
H02B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	28 July 2008	Ramírez Fueyo, M

CATEGORY OF CITED DOCUMENTS

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28-07-2008

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