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(54) Switch for electrical installations

(57) The invention relates to a switch for electrical installations, formed by a casing made from electrically insulating material made up of a hollow body (1) which is closed with a lid (2), internally housing terminals (4) for connecting external cables and an operating mechanism formed by a rocker (6) which is actuated from outside the lid (2) by means of a rocker element (9), the rocker (6) of the operating mechanism being arranged above the position of the terminals (4), such that the latter are close to each other; while the lid (2) is fixed with respect to the body (1) by means of ultrasonic welding joints (12) forming a non-disassemblable compact unit.

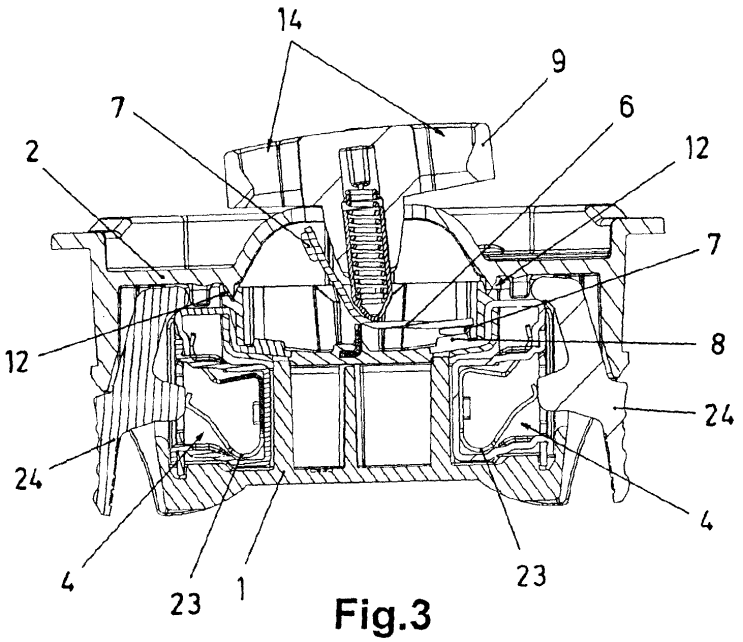

Fig.3

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Description

Sector of the Art

[0001] The present invention relates to switches for opening and closing electrical installation circuits, proposing a switch of this type with structural features making it functionally advantageous.

State of the Art

[0002] In electrical installations the active elements are connected in circuits which are controlled by means of electric conduction opening and closing switches, there being many types of said switches, depending on the application for which they are intended and on the operation which they must perform, being able to be simple, multiple, commutating, crossover, etc.

[0003] Regardless of their type and function, said switches are generally made up of a casing made from electrically insulating material in which at least one operating mechanism for the closing and opening between electrical contacts and connection terminals of the circuit cables to be controlled with the switch is housed.

[0004] In conventional switches, the casing housing the operating mechanism and the connection terminals of external cables is closed with a lid which is fixed with screw solutions and/or with clip solutions by means of corresponding shapes of said lid and of the body of the casing forming assemblies susceptible to opening and access to the internal elements, such that said elements can be handled altering the operating and safety characteristics of the switch.

[0005] The arrangement of the operating mechanism and connection terminals of external cables further specifies the structuring of the switch, determining specific conditions thereof relating to the possibilities of its application assembly.

[0006] On the other hand, the possibility of different functional configurations of the switch requires it to incorporate accessory elements for some functions, such that if the structural component assembly is not provided for allowing the incorporation of said accessory elements when they are necessary, it is necessary to make different structural elements for each type of switch.

Object of the Invention

[0007] According to the invention, a switch with structural features making it advantageous compared to conventional solutions is proposed.

[0008] This switch object of the invention consists of a casing made from electrically insulating material formed by a body determining cavities that are insulated from each other for housing the connection terminals of external cables therein, the operating mechanism of the switch being arranged above said terminals.

[0009] With it the terminals of both sides of the switch are positioned close to each other, which allows reducing the length of the switch, making the coupling thereof possible with respect to different types of securing frames for the application assembly.

[0010] On the other hand, that relative arrangement between the operating mechanism and the connection terminals of external cables forms an incidence position between the movable contacts and the fixed contacts in the opening and closing of the switch, preventing the arcs towards the inside.

[0011] The housing of the operating mechanism and of the connection terminals of external cables is closed with a lid which is arranged fixed to the body of the casing by means of ultrasonic welding, whereby obtaining a very safe compact switch unit since the assembly cannot be disassembled and therefore preventing the possible handling of the internal functional elements.

[0012] The operating mechanism of the switch is actuated by means of a rocker element to which an operating key is coupled, said rocker element having fitting cavities for coupling the key by means of pins which are inserted in said cavities, which have teeth collaborating in engaging with corresponding teeth of pins of the key whereby establishing the coupling, thus forming a retention securing the assembly.

[0013] The closure lid of the casing is provided with holes allowing the assembly of a light device in the switch, said light device being connected through those holes of the lid of the casing.

[0014] Concerning the connection terminals of external cables housing cavities, the body of the casing also forms channels for housing crossed flat bar connectors between several internal operating mechanisms of the switch, said crossed flat bar connectors being secured only by the fitting in the mentioned housing channels.

[0015] According to one embodiment, the connection terminals of external cables are overmoulded in a block made from electrically insulating material, thereby prevent said terminals from being affected by liquid or semi-liquid products used to help pass the cables through the installation tubes and entering the switch when establishing the connection of the cables.

[0016] Therefore, the switch object of the invention has features making it advantageous, acquiring its own identity and preferential character with respect to conventional switches of the same application.

Description of the Drawings

[0017]

Figure 1 shows an exploded perspective view of an embodiment of an electric switch with the features of the invention.

Figure 2 is a sectioned side view of the exploded assembly of the preceding figure.

Figure 3 is a sectioned side view of the assembled switch.

Figure 4 is a sectioned side view of the switch with only the functional elements of the operating mechanism relating to a borne in which an external cable is connected.

Figure 5 is a sectioned side view of the switch provided with an operating key.

Figure 6 is a perspective view of the switch in the position for being coupled to a securing frame.

Figure 7 is a sectioned side view of the switch coupled in the securing frame.

Figures 8 and 9 are respective exploded perspective views of the switch according to other embodiments.

Figure 10 is an exploded perspective view of the switch according to an embodiment with internal crossed flat bar connectors.

Figure 11 is a sectioned side view of the switch according the embodiment of the preceding figure.

Figure 12 is a sectioned side view of the switch provided with a light element connected from the outside by means of cable.

Figure 13 is a sectioned side view of the switch provided with a light element connected through the lid of the casing.

Figure 14 is an exploded perspective view of the switch with the external connection terminals overmoulded in a block made from electrically insulating material.

Detailed Description of the Invention

[0018] The object of the invention relates to a switch for electrical installations of the type comprising a casing made from electrically insulating material formed by a hollow body (1) which is closed with a lid (2), the body (1) forming cavities (3) for housing connection terminals (4) of external electric cables (5), an operating mechanism formed by a rocker (6) provided with movable contacts (7) which are susceptible to bearing against and separating from corresponding fixed contacts (8) linked with the terminals (4) being linked with said terminals (4), said rocker (6) being able to be actuated by means of a rocker element (9) to which an operating key (10)is coupled.

[0019] According to the invention, in the assembly arrangement the rocker of the operating mechanism rocker (6) is arranged above the position of the terminals (4), such that the terminals (4) of both sides of the switch are close to each other, the switch thereby having a reduced length, being able to be coupled to several types of securing frames (11) for the assembly in the application installations.

[0020] The switch is fixed on the frame (11) in which it will be incorporated by means of anchoring pins (2.1) provided with an end tooth (2.2) which the lid (2) has, which are inserted and establish a retaining catch in respective housings (11.1) of the assembly frame (11), as seen in Figures 6 and 7. In this assembly arrangement, the size of the end tooth (2.2) of the pins (2) determines how easy or difficult it is to disassemble the switch from the frame (11) once the assembly has been done.

[0021] In that arrangement the electric elements of the switch are closed in the casing made from electrically insulating material, the lid (2) being fixed on the body (1) of the casing by means of ultrasonic welding joints (12). This results in a compact assembly of the switch which cannot be disassembled, thus preventing the alteration of the functional features by means of handling of the internal elements.

[0022] The operating key (10) is coupled by means of fitting pins (13) of the key (10) itself in cavities (14) the rocker element (9) has, said cavities (14) forming teeth (15) collaborating with corresponding teeth (16) of the pins of the key (10), thus establishing a retaining catch securing the assembly of the key (10).

[0023] With that arrangement, different types of keys (10) which can be of any configuration can be incorporated in the switch, the rocker element (9) being able to be in a single part formed by two attached parts for actuating a single simple mechanism of the switch as in the embodiment of Figure 8, or for simultaneously actuating two integrated mechanism in the switch as in the embodiment of Figure 1; said rocker element (9) also being able to be in two independent parts for individually actuating two integrated mechanisms in the switch as in the embodiment of Figure 9, in this case two respective operating half keys (10) coupled to the mentioned independent parts of the rocker element (9) being arranged.

[0024] The switch can equally be formed with an arrangement of related mechanisms for establishing a switching arrangement between two switches in the application installations, and also with a crossover arrangement between mechanisms incorporated in the switch itself by means of cross connection flat bars (17), as in the embodiment of figures 10 and 11.

[0025] For the arrangement of the cross connection flat bars (17) the body (1) of the casing forms channels (18) in which said flat bars (17) are held by means of the insertion slot, without the need for overmoulding.

[0026] The switch can be complemented with a light signalling device, a light device (19) externally connected by means of a cable (20) being able to be incorporated as depicted in Figure 12, but a light device (21) connected through the lid (2) of the casing can also be placed as shown in Figure 13, the lid (2) being provided with holes (22) for that purpose through which said light device (21) is connected.

[0027] The terminals (4) for connecting external cables (5) can be pressure terminals with screws, but they are preferably of the pressure type through a strip (23) for automatic connecting by means of inserting the cable (5) to be connected as seen in Figure 4, each borne (4) having a lever (24) allowing to act against the strip (23) to perform the disconnection.

[0028] According to an embodiment, the terminals (4) can be overmoulded in an block (25) made from electrically insulating material which is inserted in the body (1)

of the casing, the terminals being (4) positioned in the same way as when the terminals (4) are independent, but with overmoulding on said block (25), the terminals (4) are protected to prevent them from possibly being affected and short-circuiting due to the liquid or semi-liquid products used for helping pass the cables (5) through the assembly tubes in the installation and can enter the switch when connecting said cables (5) in the terminals (4).

Claims

1. A switch for electrical installations, formed by a casing made from electrically insulating material made up of a hollow body (1) which is closed with a lid (2), internally housing terminals (4) for connecting external cables and an operating mechanism formed by a rocker (6) which is actuated from outside the lid (2) by means of a rocker element (9) on which an operating key (10) is incorporated, **characterised in that** the rocker of the operating mechanism is arranged above the position of the terminals (4), the latter being close to each other; and **in that** the lid (2) is fixed with respect to the body (1) of the casing by means of ultrasonic welding joints (12), forming a non-disassemblable compact unit.

2. The switch for electrical installations according to claim 1, **characterised in that** the assembly of the operating key (10) is established by means of inserting pins (13) which come out of the key (10) and are inserted in cavities (14) formed by the rocker element (9), said cavities (14) of the rocker element (9) having teeth (15) collaborating with corresponding teeth (16) of the pins (13) of the key (10), forming a retaining catch securing the assembly.

3. The switch for electrical installations according to claim 1, **characterised in that** the lid (2) is provided with holes (22) through which an accessory light device (21) incorporated on the outer part of said lid (2) is electrically connected.

4. The switch for electrical installations according to claim 1, **characterised in that** the body (1) of the casing forms channels (18) therein in which cross connection flat bars (17) are inserted between internal mechanisms of the switch.

5. The switch for electrical installations according to claim 1, **characterised in that** the terminals (4) for connecting external cables are arranged by overmoulding in an block (25) made from electrically insulating material which is positioned inside the body (1) of the casing.

6. The switch for electrical installations according to claim 1, **characterised in that** the lid (2) has anchoring pins (2.1), provided with an end tooth (2.2), whereby establishing the catch coupling with respect to a securing frame of the switch in the application assembly, said anchoring pins (2.1) being inserted in respective housings (11.1) of the frame (11).

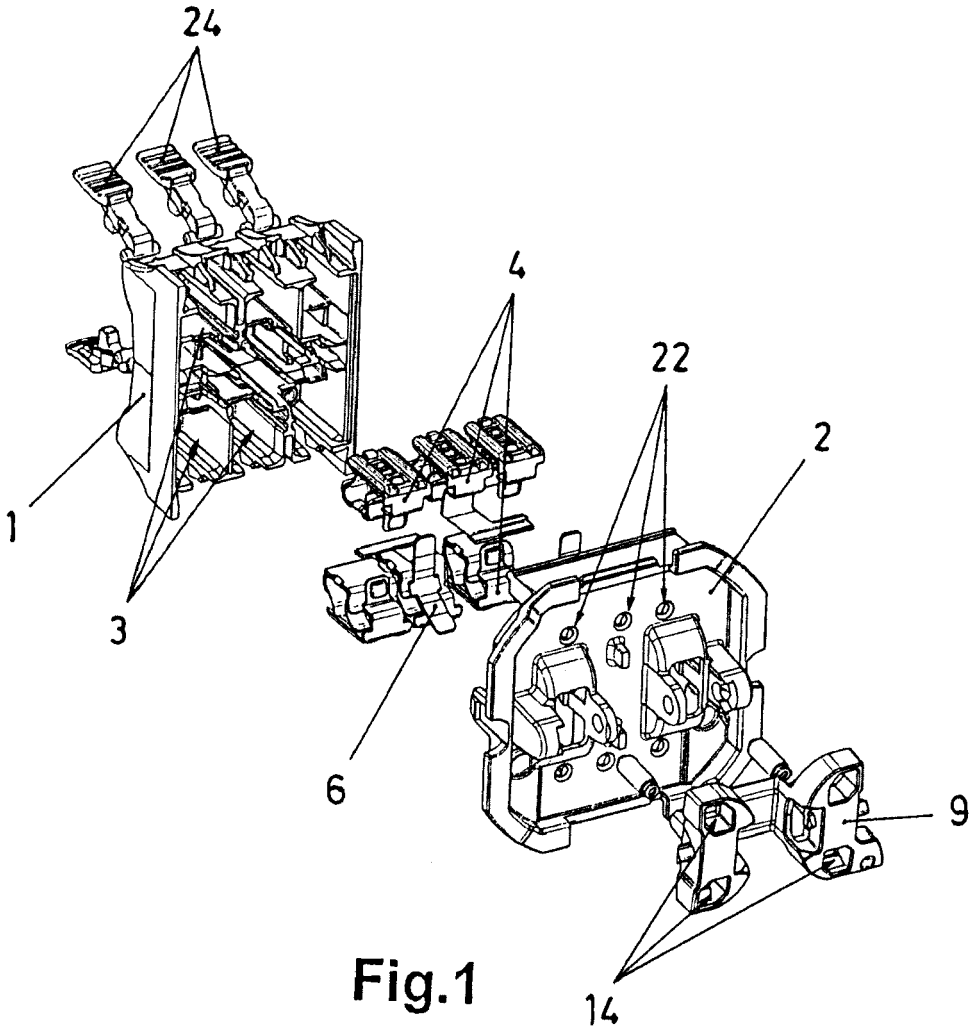

Fig.1

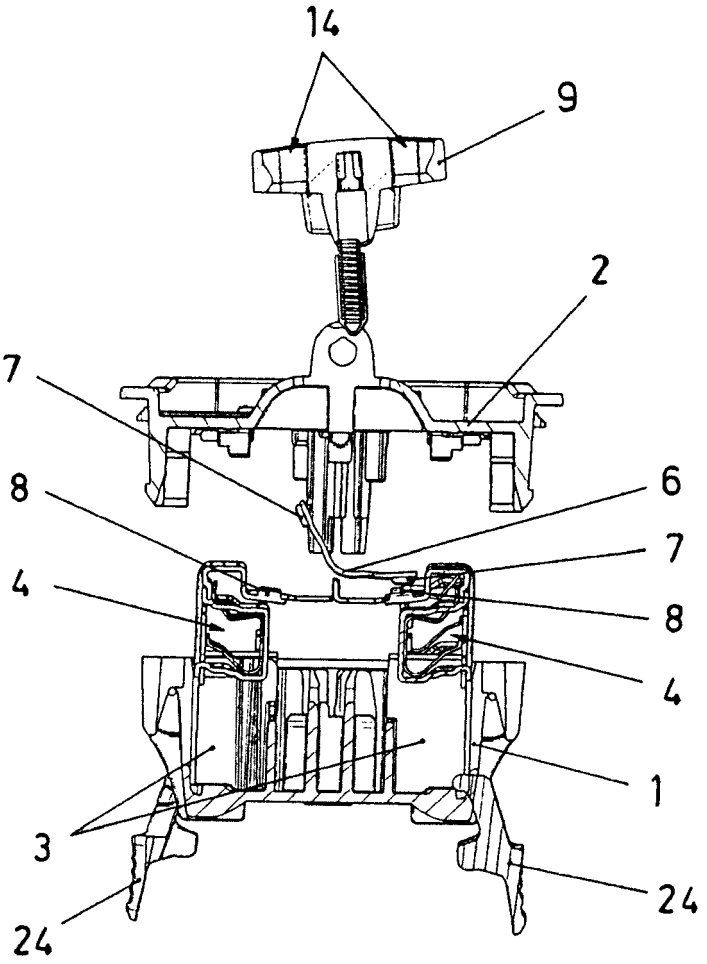

Fig.2

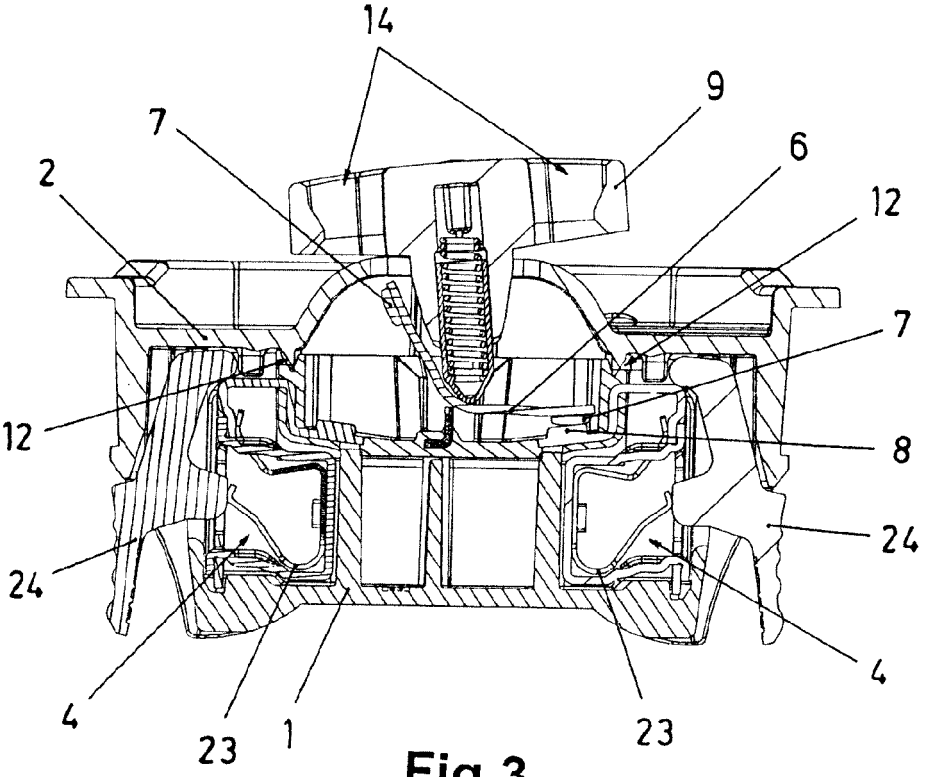

Fig.3

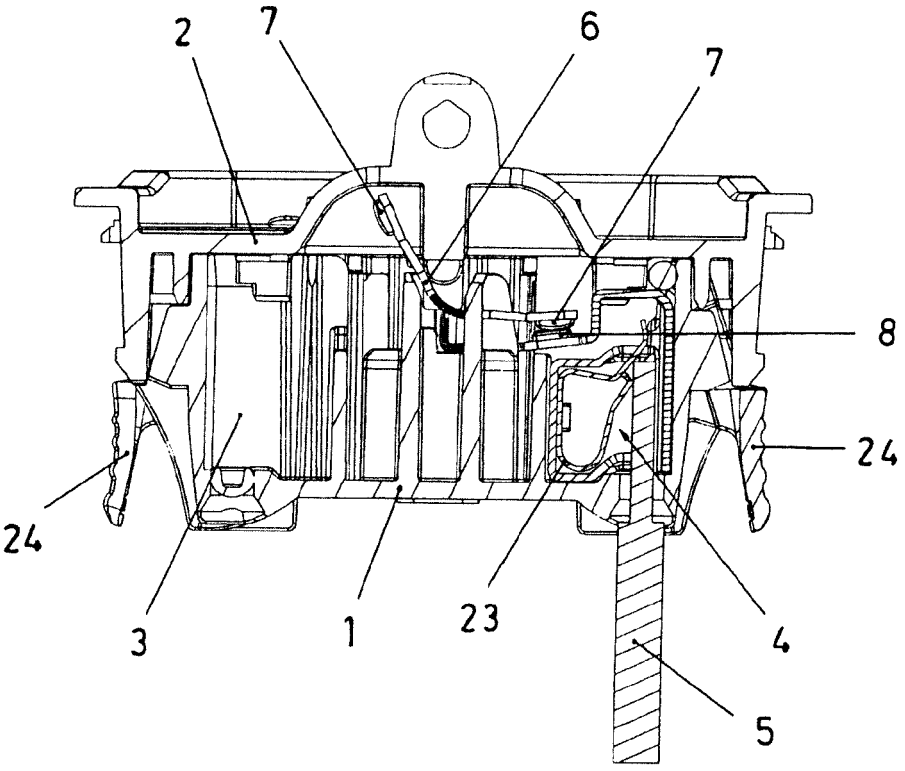

Fig.4

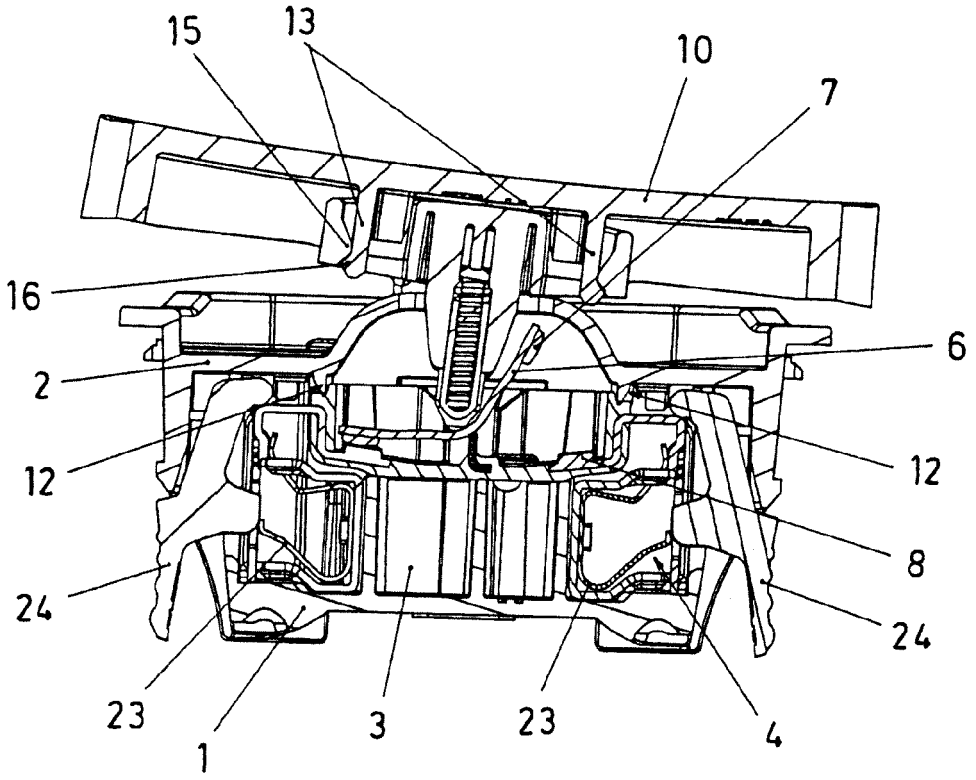

Fig.5

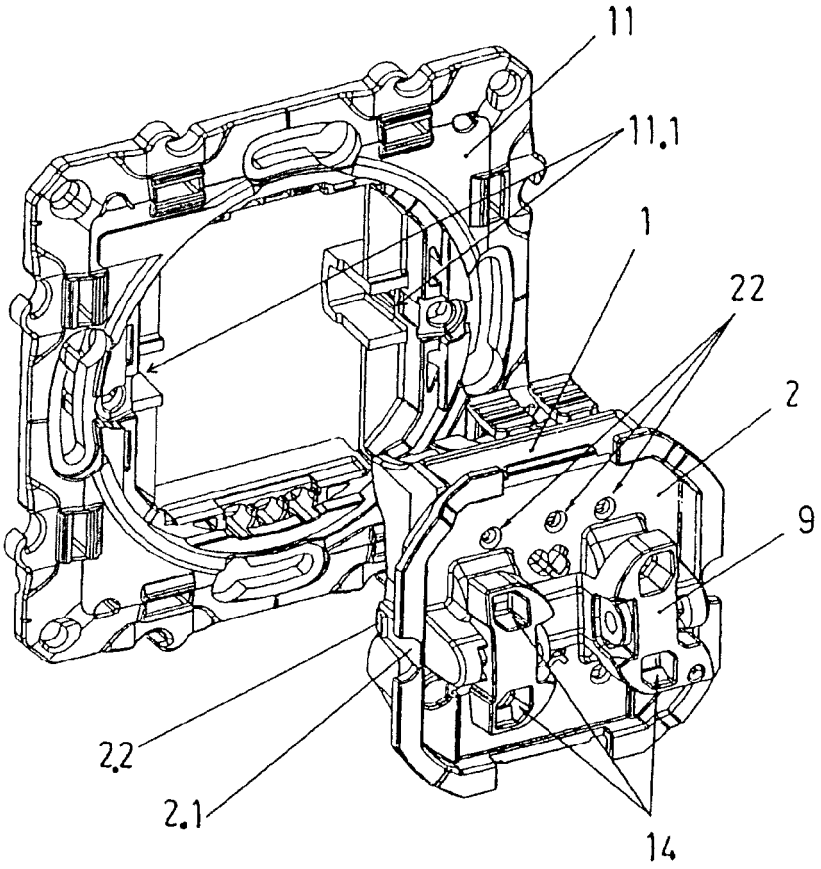

Fig.6

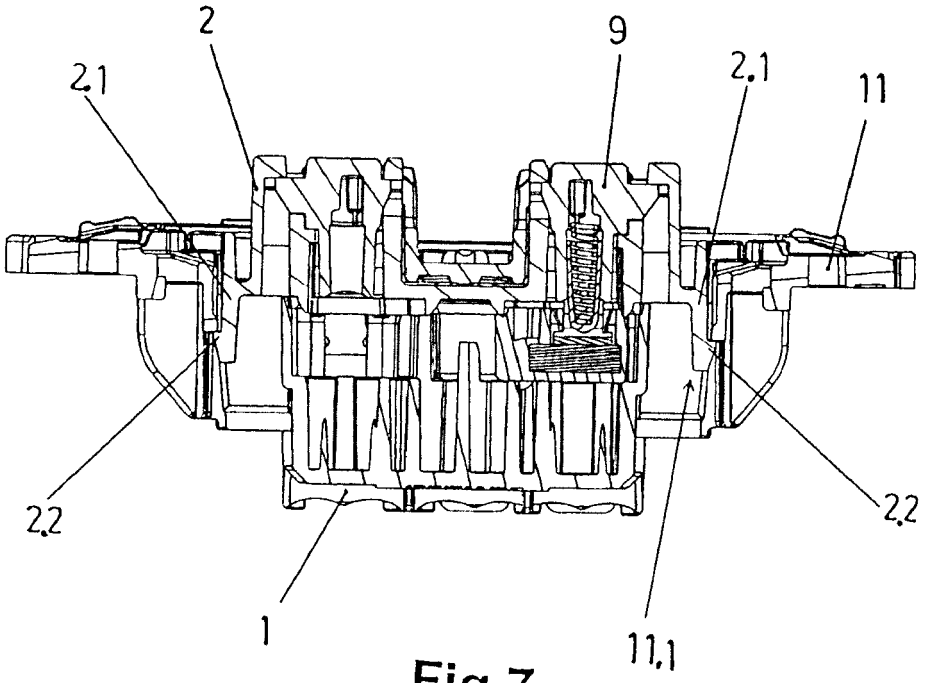

Fig.7

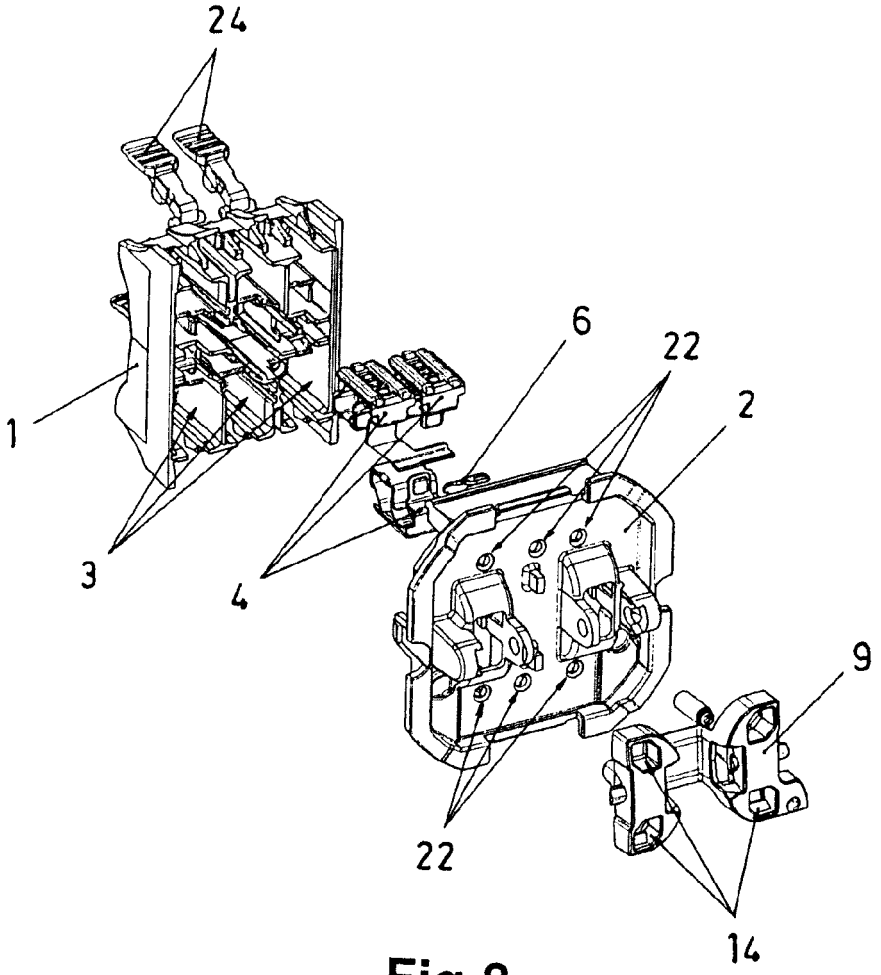

Fig.8

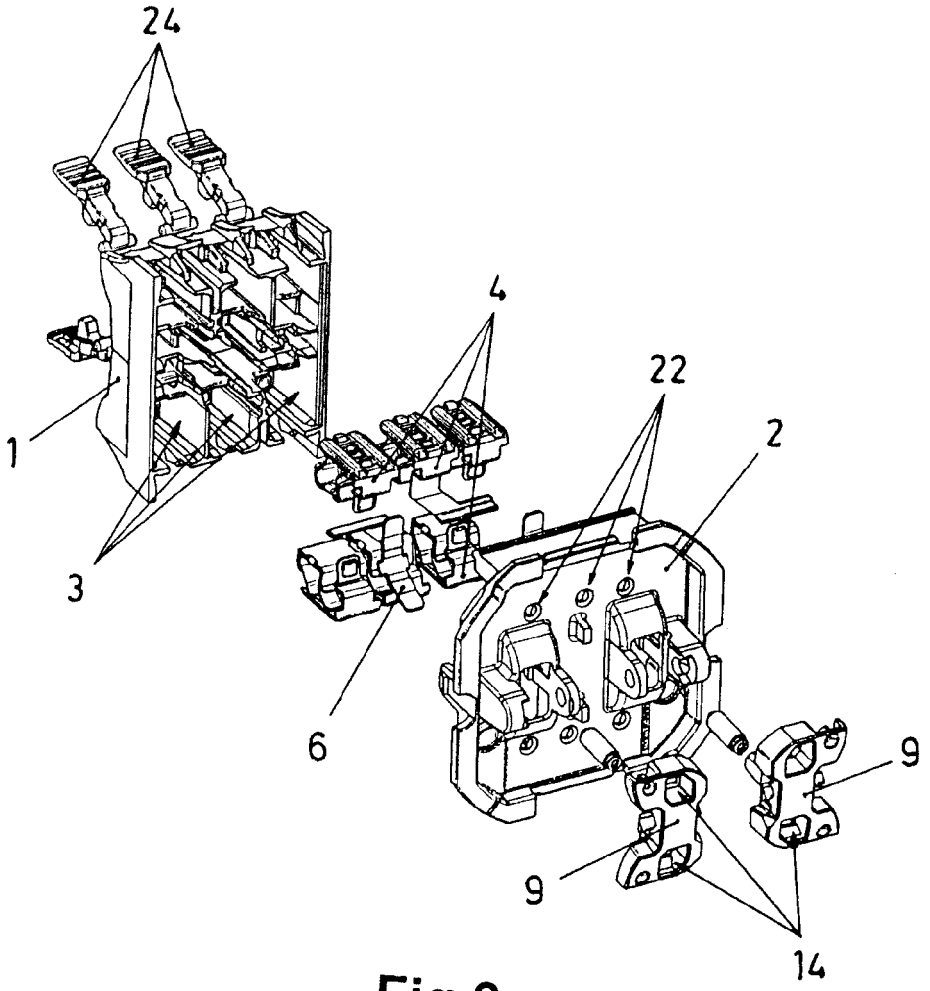

Fig.9

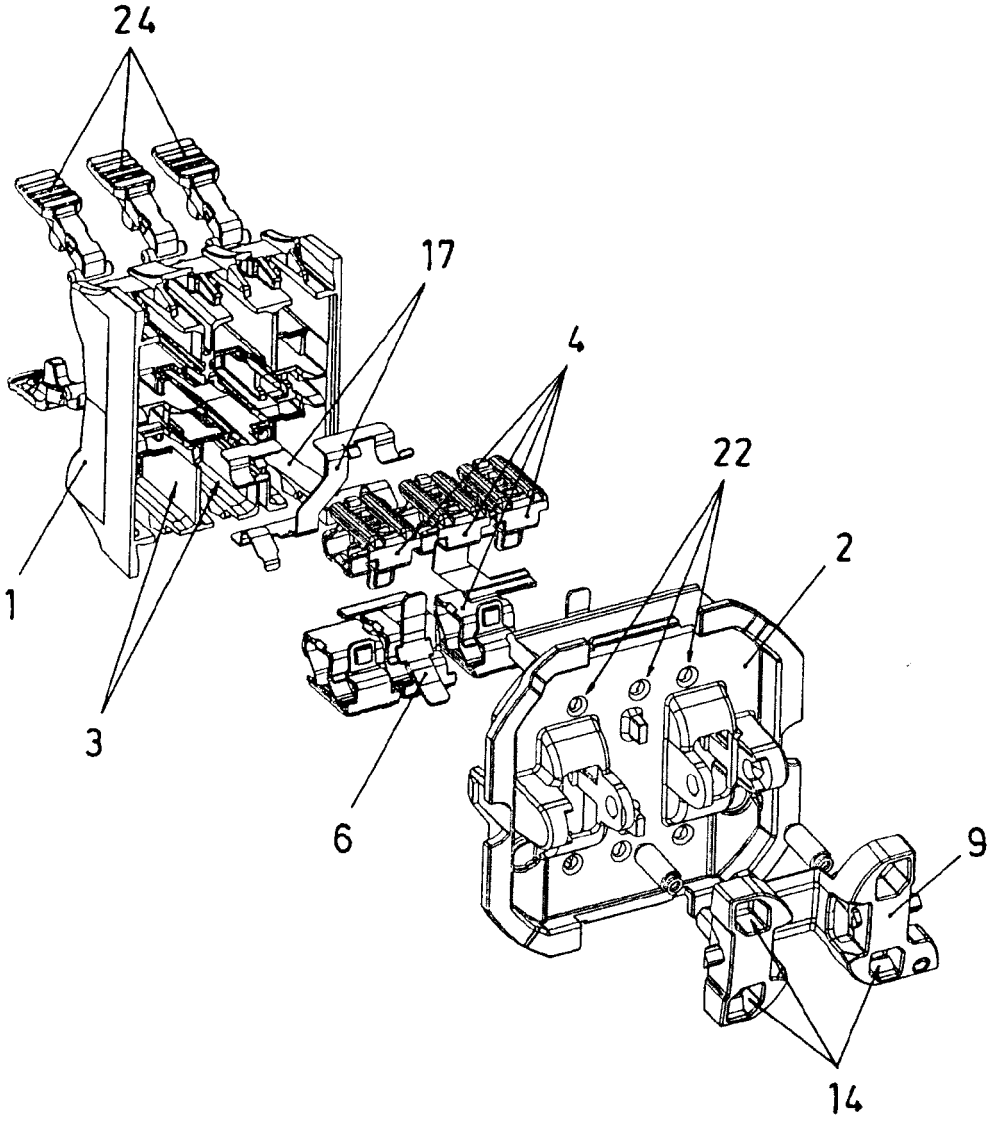

Fig.10

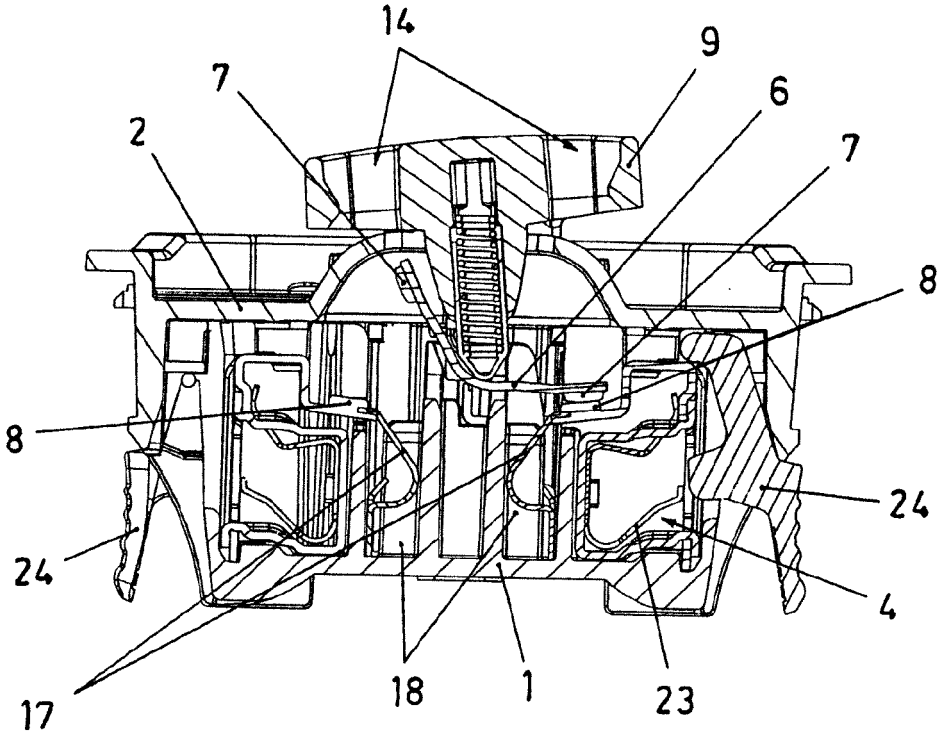

Fig.11

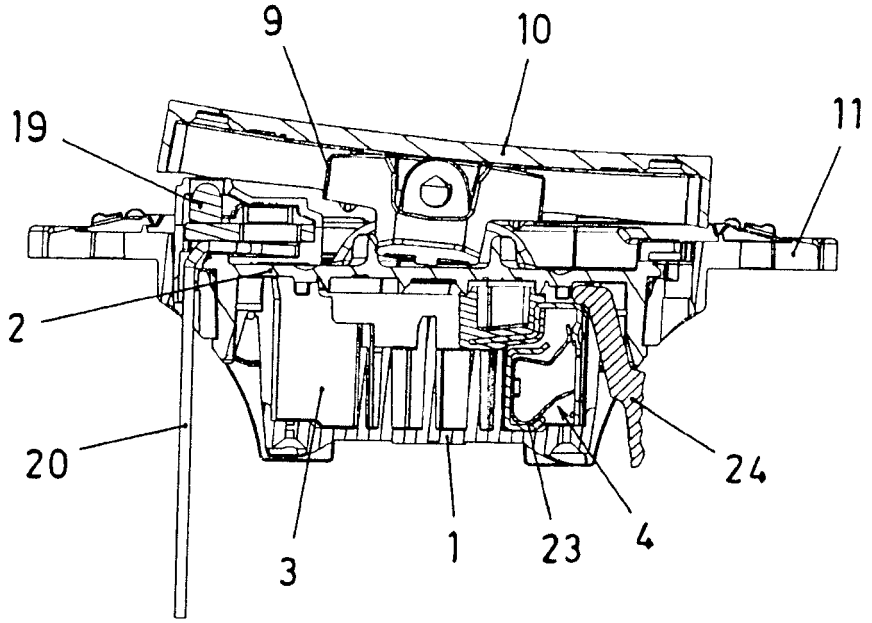

Fig.12

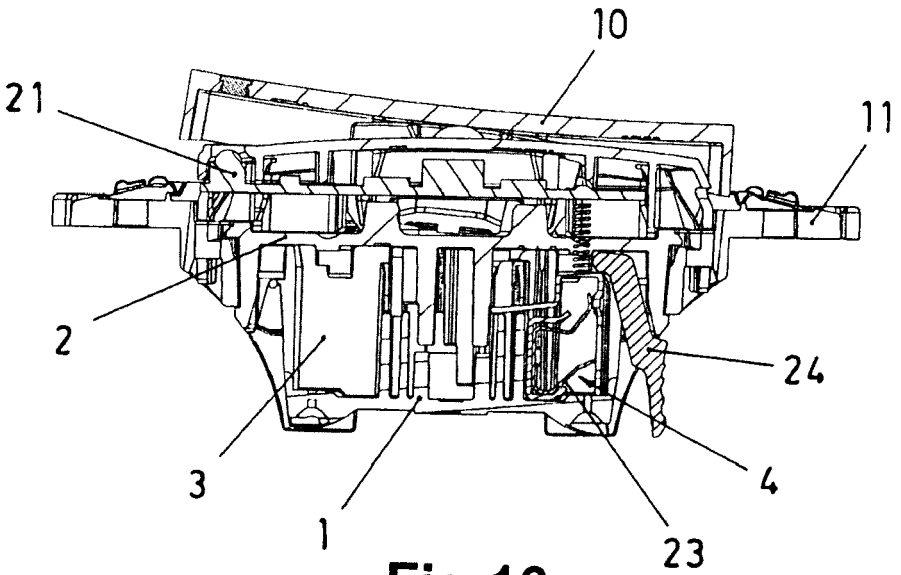

Fig.13

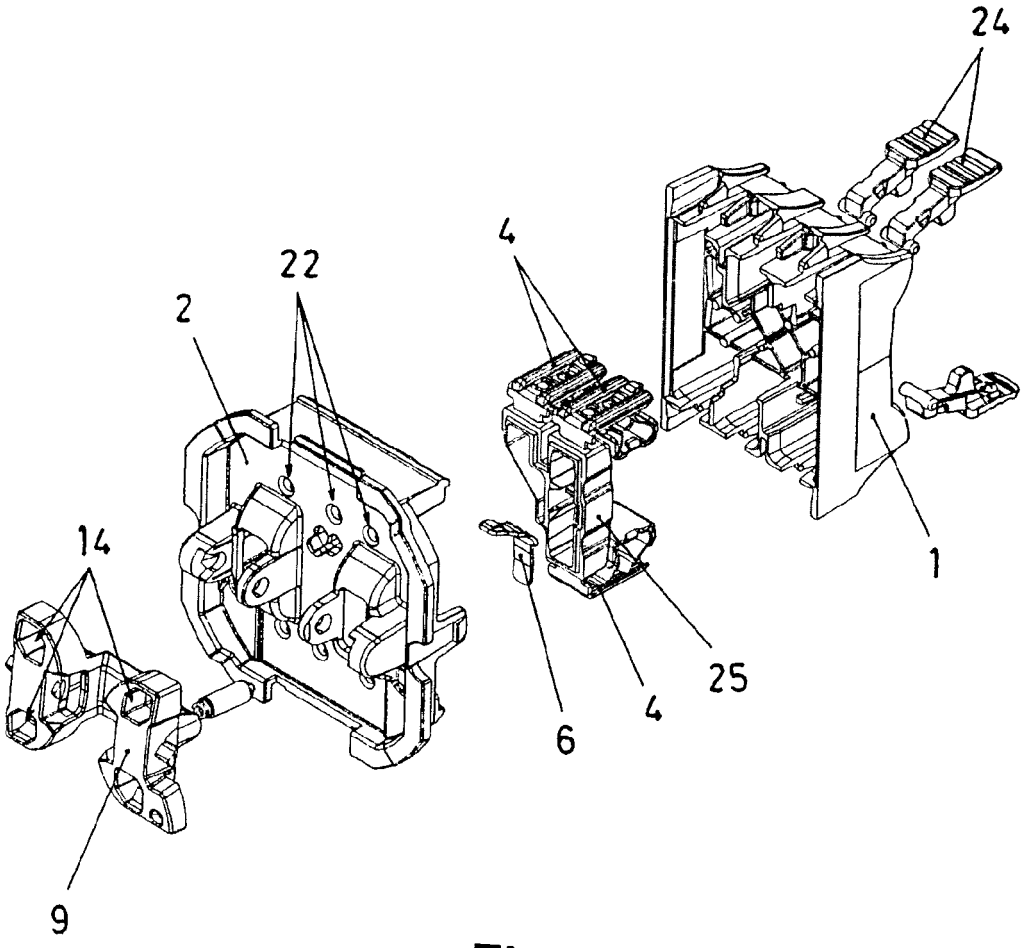

Fig.14