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(54) Tamper-proof device applicable to boxes for supporting electrical plug-ins

(57) A tamper-proof device which can be applied to boxes for supporting electrical plug-ins, comprising a first portion (1) and a second portion (2) having respectively a detectable element (18) and a sensor (20). Both portions (1,2) can be associated one another to keep a signalling circuit deactivated, the signalling circuit being activatable upon separation of these portions. One (1) of the portions (1,2) is associated with the supporting frame (4) of the plug-ins in a supporting box (6) and the other one (2) can engage the box (6) for the mutual separation of the portions (1,2) upon removal of the frame (4) from the box (6).

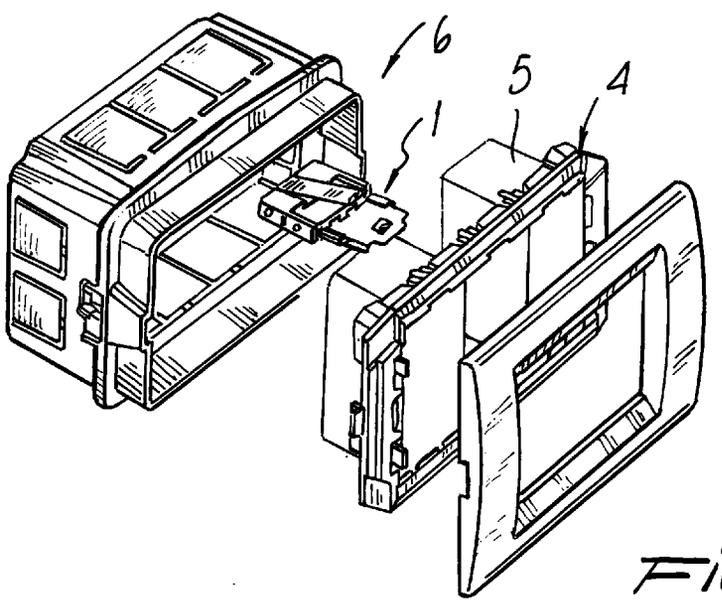

Fig. 1

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Description

The present invention relates to a tamper-proof device which can be applied to supporting boxes for electrical plug-ins (i.e. the electrical components arranged in supporting boxes).

It is known that in some electrical applications there is the need to apply signalling devices which allow to visualize that tampering with a given electrical plug-in has occurred. In particular with key-operated switches, it is recommendable to have a signalling system that allows to visualize any attempts to tamper with the switch or with its wiring.

Tamper-proof devices are currently produced by providing a detectable element, generally a permanent magnet, directly on the body of the electrical plug-in to be controlled; a sensor is instead applied to the box that accommodates the plug-in with the purpose of keeping the contacts of the signalling circuit deactivated while the detectable element provided in the plug-in is arranged at the sensor.

This solution causes the need to provide special plug-ins, with consequent considerable production difficulties and with the need to have special plug-ins available if they must be checked to prevent tampering therewith.

A principal aim of the invention is to eliminate the above-mentioned drawbacks, by providing a tamper-proof device that allows to protect the various plug-ins without having to perform interventions directly thereon.

Within the scope of this aim, a particular object of the invention is to provide a tamper-proof device that allows to protect removal of the plug-in from the box support, thus preventing access to the wiring of the various plug-ins contained in the support.

Another object of the present invention is to provide a tamper-proof device that can be installed very quickly and easily in all boxes for plug-ins in which the plug-ins are applied to the supporting frame that is applied to the box so as to allow extraction from the rear.

This aim, these objects, and others which will become apparent hereinafter are achieved by a tamper-proof device applicable to boxes for supporting electrical plug-ins, comprising a first portion and a second portion that respectively have a detectable element and a sensor, said portions being associable one another to keep a signalling unit deactivated, said signalling unit being activatable upon separation of said portions, characterized in that one of said portions is associated with the supporting frame of the plug-ins in a supporting box and the other one of said portions can engage said box for the mutual separation of said portions upon removal of said frame from said box.

Further characteristics and advantages will become apparent from the following detailed description of a preferred but not exclusive embodiment of a tamper-proof device that can be applied to supporting boxes for plug-ins, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a schematic perspective view of the tamper-proof device, applied to a flush-mount box;

figure 2 is an exploded perspective view of the tamper-proof device according to the invention;

figure 3 is a sectional view of the two portions of the tamper-proof device, shown coupled to each other;

figure 4 is a lateral elevation view of the tamper-proof device;

figure 5 is a schematic sectional view of the two portions, shown separated from one another;

figure 6 is a sectional view, taken along the plane VI-VI of figure 3;

figure 7 is a schematic view of the tamper-proof device applied to a box;

figure 8 is a view of the device upon removal of the frame.

With reference to the above figures, the tamper-proof device applicable to boxes for supporting electrical plug-ins and the like comprises a first portion, generally designated by the reference numeral 1, and a second portion, generally designated by the reference numeral 2, that respectively have a detectable element and a sensor, as will become apparent hereinafter.

The first portion 1 has a plate 3 for connection to the frame 4 for supporting electrical plug-ins 5; said plate can be applied to a box that is generally designated by the reference numeral 6.

In transverse cross-section, the plate 3 is shaped like an open C so as to form two lateral arms 10 that allow it to fit snugly within the guides that are normally provided on the supporting frame 4 of the plug-ins 5.

A body 11 of plastic material is associable with the plate 3 and can be locked by means of a first tab 12 that is formed by blanking on the plate 3; furthermore, the plate 3 has teeth 13 which are folded in the opposite direction and allow coupling to the raised portion 15 that is formed on the frame 3.

Inside the plastic body 11 there is provided a detectable element, which is advantageously obtained by means of a cylinder 18 constituted by a permanent magnet that can be detected by the sensor 20 provided in the second portion 2, said portion being constituted by a box-like container 21 made of plastics that forms mutually opposite arms 22 for slidingly accommodating the body 11 and retaining it by means of lateral arms 16 provided on the body 11 and having a protrusion 17 which enters holes 23 formed on the arms 22.

Electrical contact bushes 30, for connection to a signalling circuit, are furthermore connected to the sensor 20.

In a median portion of the box-like container 21 there is provided a seat 35 in which the lower wing 36 of a locking lamina 37 fits. Connection is provided by means of a hook-shaped tooth 38 that is formed in the seat 35 and engages an opening 39 provided on the wing 36 of the lamina.

The lamina 37 ends with a folded portion 40 that has the purpose of abutting below a protrusion 41

formed by the box-like container 6, which in practice provides for the abutment of the second portion 2.

Substantially, when the plug-ins contained in the box 6 have to be protected against tampering, it is sufficient to apply the tamper-proof device to the frame 4, inserting it in the guides normally provided for the plug-ins.

Once it has been inserted, as shown in figure 7, the locking lamina 37 abuts below the protrusion 41, so that removal of the frame 4 from the box 6 causes the separation of the first portion from the second portion, so that the sensor 20, constituted by a reed switch, causes the closure of the signalling circuit.

In practice, the above-described tamper-proof device has the important particularity that it is applied to the supporting frame, which must be removed if one wishes to act on the electrical wiring of the various switches, and therefore it constitutes an effective protection for all the electrical plug-ins placed on the frame.

Another important aspect is constituted by the fact that the tamper-proof device according to the invention works on all kinds of flush-mount boxes with metal or plastic inserts and on boxes having thin walls with adjustable inserts, always allowing to use conventional plug-ins.

The tamper-proof contact is hermetic and is actuated magnetically, being therefore protected against any oxidation; moreover, the protection cannot be accessed from outside, since it is protected inside the box-like element, shielded from occasional impacts or twisting of the conductors, which may occur during installation.

The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept.

All the details may furthermore be replaced with other technically equivalent elements.

In practice, the materials employed, so long as they are compatible with the specific use, as well as the contingent shapes and dimensions, may be any according to the requirements.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A tamper-proof device applicable to boxes for supporting electrical plug-ins, comprising a first portion and a second portion that respectively have a detectable element and a sensor, said portions being associable one another to keep a signalling unit deactivated, said signalling unit being activatable upon separation of said portions, characterized in that one of said portions is associated with the supporting frame of the plug-ins in a supporting box and the other one of said portions can engage said box for the mutual separation of said portions upon removal of said frame from said box.

2. A tamper-proof device according to claim 1, characterized in that said first portion has a plate that is provided with a first tab for coupling to a body for containing said detectable element and with coupling teeth that can engage a protrusion formed on said frame.

3. A tamper-proof device according to claim 2, characterized in that said plate is substantially shaped like an open C and can be inserted in the seat for accommodating the plug-ins on said frame.

4. A tamper-proof device according to claim 1, characterized in that said detectable element is constituted by a permanent magnet.

5. A tamper-proof device according to claim 2, characterized in that said second portion has a box-like body that forms mutually opposite arms that provide the seat for accommodating said body provided with elastic arms with a protrusion that can be detachably inserted in holes formed on said arms.

6. A tamper-proof device according to claim 5, characterized in that said sensor is constituted by a reed relay accommodated inside said box-like body.

7. A tamper-proof device according to claim 5, characterized in that it comprises a locking lamina that is associated with said box-like body and engages, at one end, a protrusion that is formed in said box to prevent the translatory motion of said box-like body upon removal of said frame from said box.

8. A tamper-proof device according to claim 7, characterized in that said locking lamina has an engagement end provided with an opening that can engage a hook-like tooth formed on a seat provided on the face of said box-like body.

9. A tamper-proof device applicable to boxes for supporting electrical plug-ins, characterized in that it comprises one or more of the described and/or illustrated features.

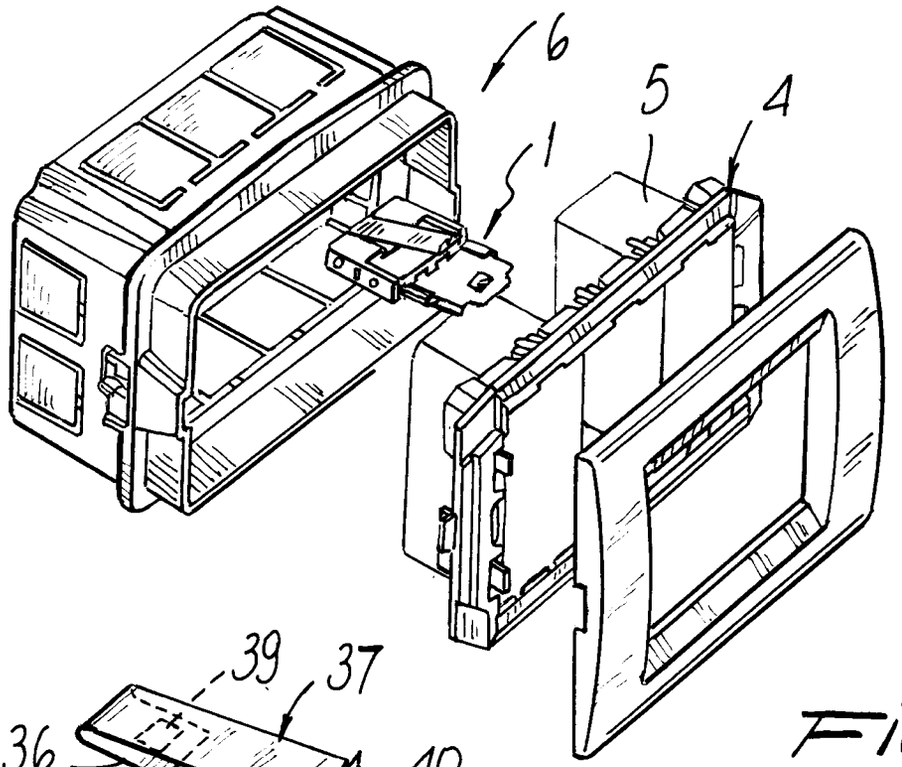


Fig. 1

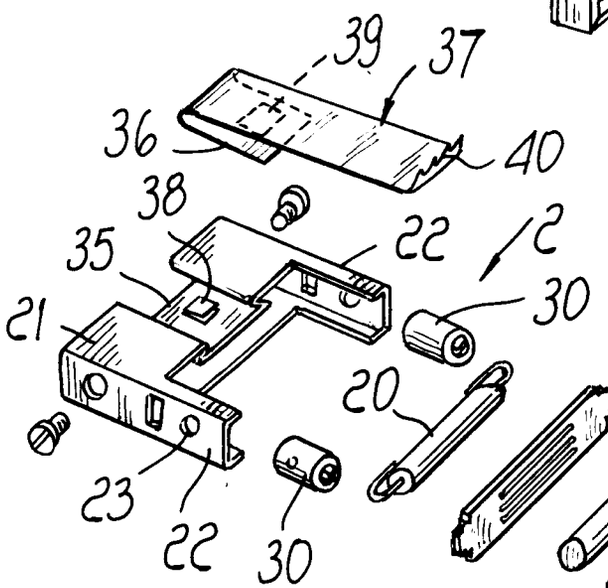


Fig. 2

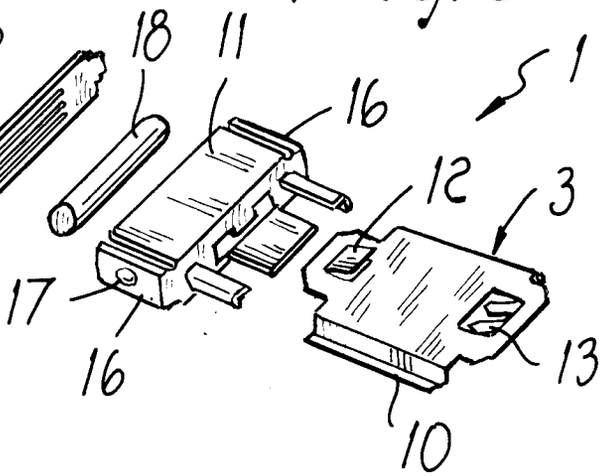
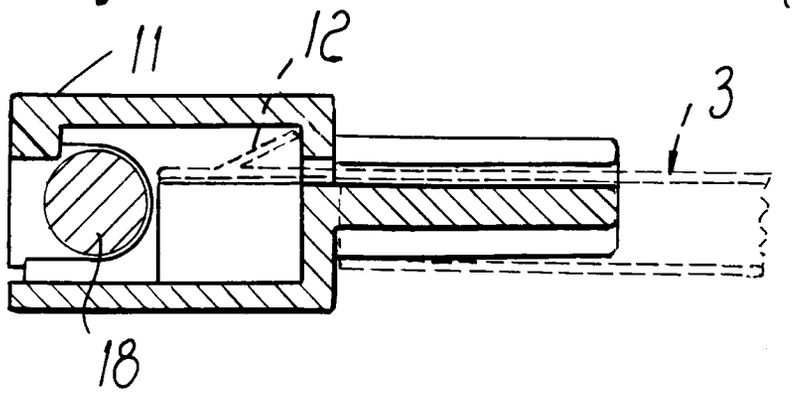


Fig. 6



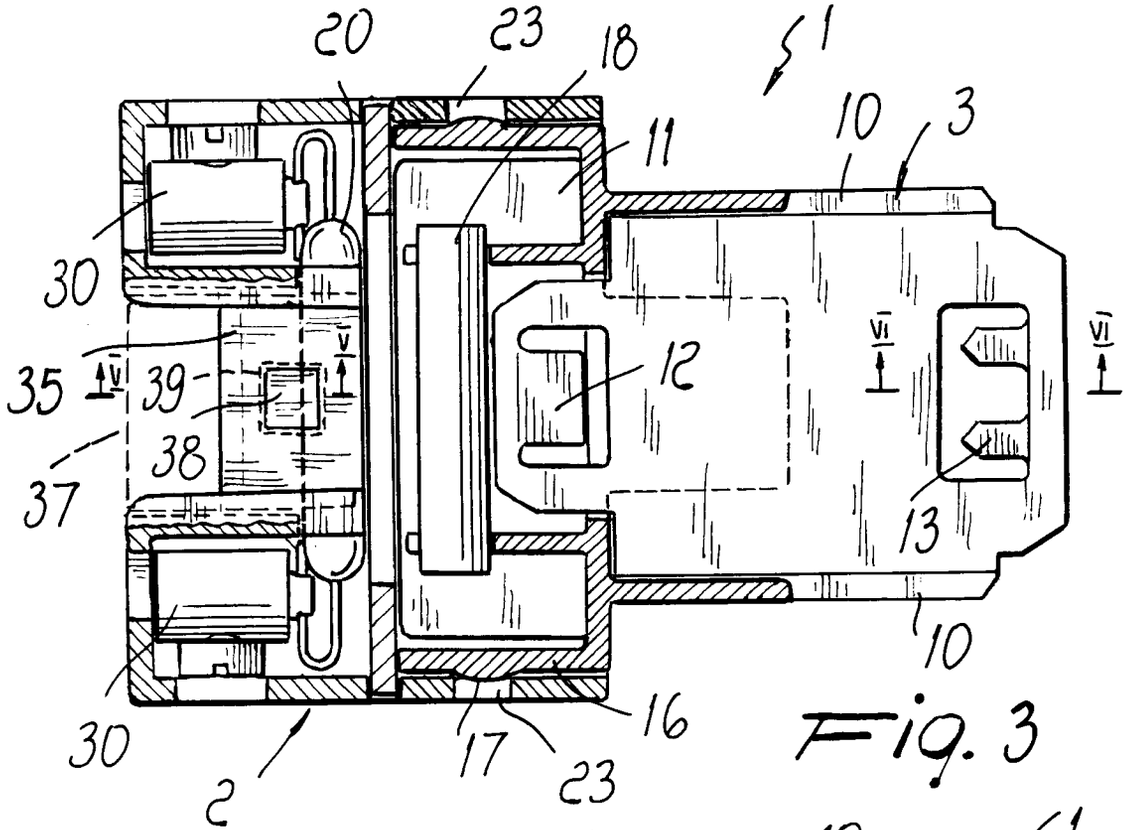


Fig. 3

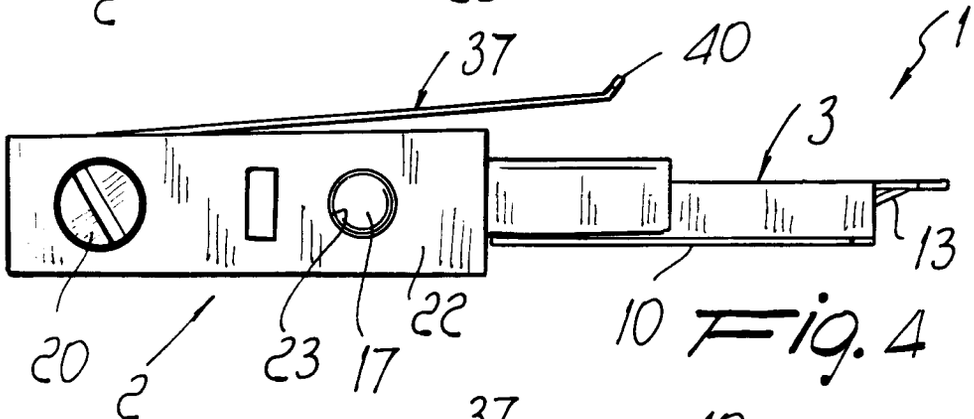


Fig. 4

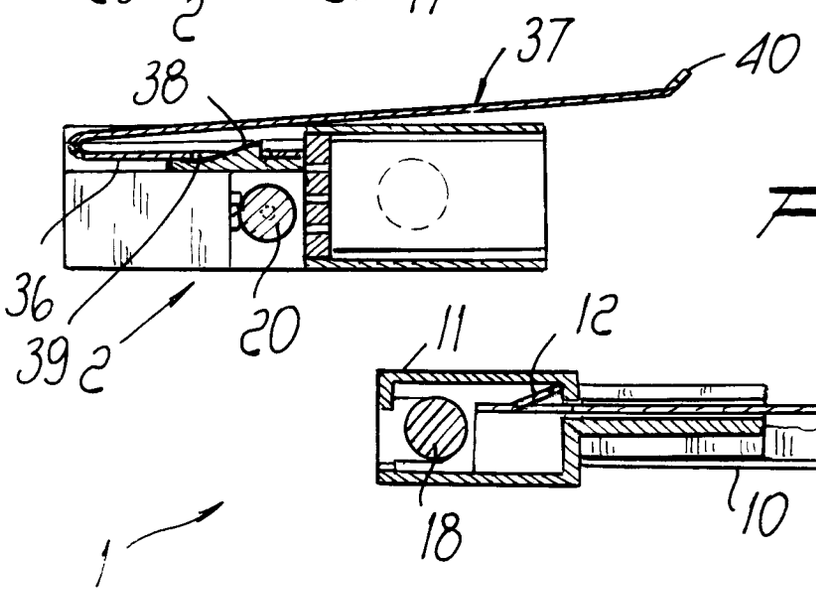


Fig. 5

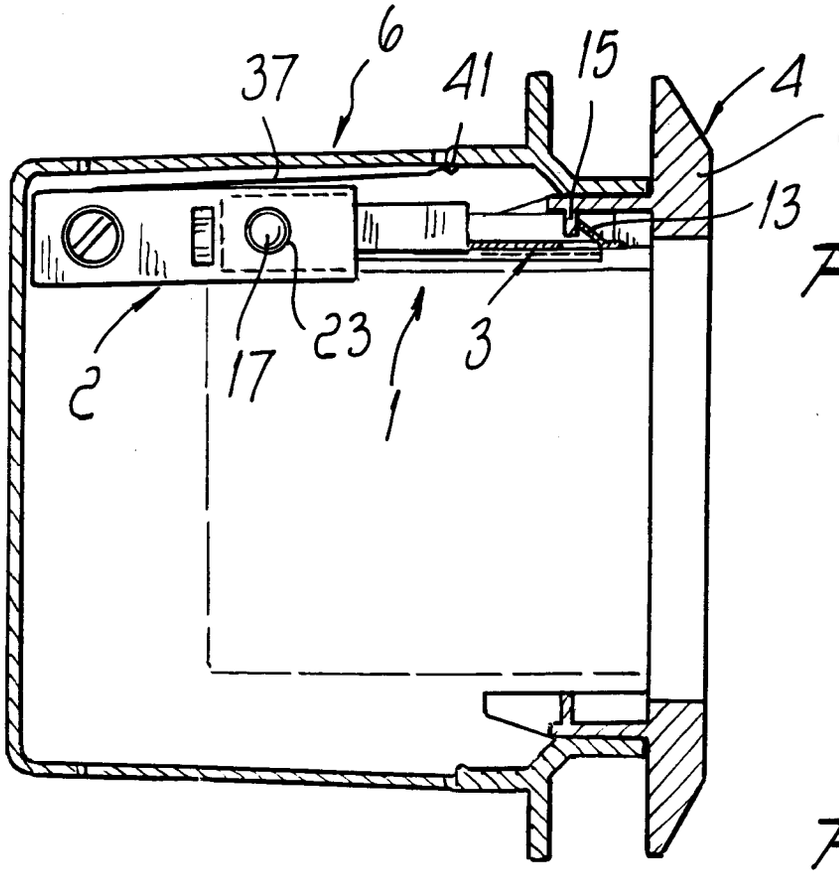


Fig. 7

Fig. 8