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(54) **Box-like housing for a control station of an electric plant**

(57) A box-like housing for a control station of a plant comprises a hollow body (2) defining a longitudinal axis (x) which is designed to house therein at least one electrical element having a control button and electrically connectable to an electric circuit of a plant to be controlled, wherein said hollow body (2) comprises a bottom wall (3) designed to be anchored to a support or wall of the plant, a top wall (4) with at least one opening (5) for housing the button of the electrical element, a plurality of substantially longitudinal passages (6) formed in the bottom wall (3) and in the top wall (4) for the insertion of corresponding screws for anchoring thereof to the support or wall of the plant, a plurality of closing members (7) which are removably inserted in corresponding passages (6) to prevent access by unauthorized persons and removal or tampering of the housing.

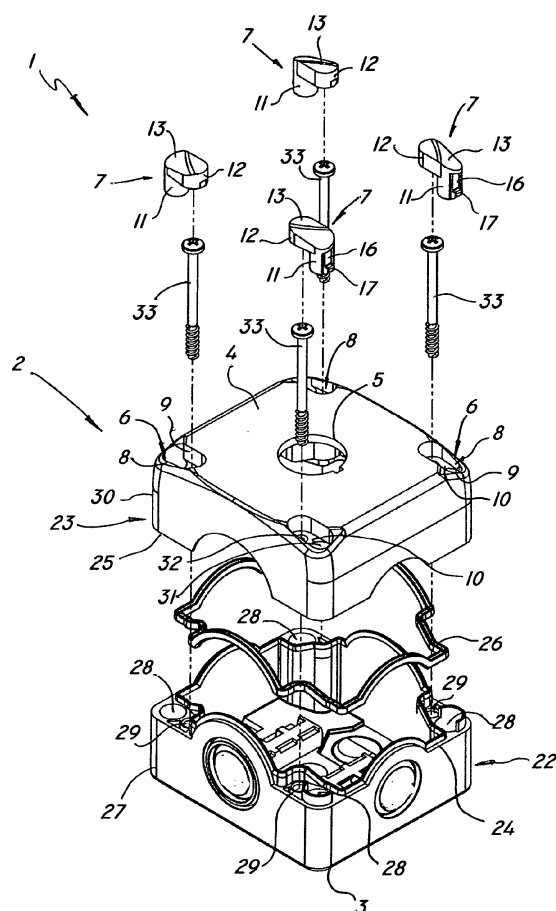


FIG. 2

Description

Field of the invention

[0001] The present invention generally finds application in the field of electrical devices for controlling electric plants and particularly relates to a housing for a control station of an electric or electromechanical plant.

Background art

[0002] Control push-button stations, also known as control stations, are known to be used in electric plants for handling or transportation, such as elevators, hoists, cranes, bridge cranes and the like, or in signaling systems, such as traffic lights and highway display signs.

[0003] Prior art control stations include a hollow box-like housing, or case, which accommodates one or more electrical elements designed to be electrically connected to respective circuits of the system to be controlled and having respective control buttons. One example of a prior art control station is disclosed in JP10162678.

[0004] The case has a bottom wall which is designed to be anchored to a support or wall, generally using screws, and a top wall with one or more openings formed therein for housing corresponding pushbuttons, such as emergency or stop mushroom switches, plant driving buttons, switch buttons and the like.

[0005] In a particular embodiment, the case is composed of two portions or half-shells, which are mutually connected by screw members or the like at mutually facing peripheral edges.

[0006] The lower half-shell is designed to be anchored to the support or wall, whereas the upper half-shell has the pushbutton openings.

[0007] Typically, the lower half-shell has both through holes receiving the screws for fastening the control station to the support or wall, and further holes, usually blind holes, which are designed to be aligned with corresponding through holes formed in the upper half-shell, receiving the screws for assembling the case.

[0008] One of the main drawbacks of these prior art cases is that the anchor and/or assembly screws of the half-shells are always accessible from outside.

[0009] This may cause build-up of dust or dirt in the holes for receiving the screws or similar members, and accordingly involves frequent maintenance requirements.

[0010] Furthermore, due to open access to the screws, control stations are not protected from unauthorized or undesired accesses, possibly aimed at removing or tampering the case, e.g. by removing the upper shell and disconnecting electrical components.

Disclosure of the invention

[0011] The object of the present invention is to obviate the above drawbacks, by providing a box-like housing

for control stations of electric plants that achieves high safety and relative cost effectiveness.

[0012] A particular object is to provide a box-like housing for a control station of an electric plant that ensures adequate protection against actions by unauthorized personnel, by increasing the complexity of removing or disassembling the control station by unauthorized or ill-intentioned persons.

[0013] A further object of the invention is to provide a box-like housing for control stations of electric plants, that ensures high protection against the ingress of polluting particles and moisture.

[0014] These and other objects, as better explained hereinafter, are fulfilled by a box-like housing for a control station of a system, as defined in claim 1, which comprises a hollow body defining a longitudinal axis which is designed to house therein at least one electrical element having a control button and electrically connectable to an electric circuit of an implant to be controlled, wherein said hollow body comprises a bottom wall designed to be anchored to a support or wall of the plant, a top wall with at least one opening for housing a respective button of an electrical element, a plurality of substantially longitudinal passages formed in said bottom and top walls for the insertion of corresponding screws for anchoring thereof to a support or a wall of the plant.

[0015] The housing is **characterized in that** the hollow body comprises a plurality of closing members removably inserted in corresponding passages of said plurality.

[0016] With this configuration, the closing members will prevent or at least increase the complexity of unauthorized access to the anchor screws in the passages, and hence removal or tampering of the box-like housing, which will be safer and more effectively protected.

[0017] Advantageous embodiments of the invention are obtained in accordance with the dependent claims.

Brief description of the drawings

[0018] Further features and advantages of the invention will become more apparent from the detailed description of a few preferred, non-exclusive embodiments of a box-like housing of the invention, which are described as non-limiting examples with the help with the accompanying drawings in which:

FIG. 1 is a top view of a few preferred embodiments of a box-like housing of the invention;

FIG. 2 is a perspective exploded view of the box-like housing of the invention in a first preferred configuration;

FIG. 3 is a perspective exploded view of the box-like housing of the invention in a second preferred configuration;

FIG. 4 is a partially broken-away side view of the box-like housing of Fig. 2;

FIG. 5 is an enlarged view of a detail of Fig. 4;

FIG. 6 is a partially broken-away side view of the box-like housing of Fig. 3;

FIG. 7 is an enlarged view of a detail of Fig. 6.

Detailed description of a preferred embodiment

[0019] Referring to the above figures, there is shown a box-like housing or case for control stations of electric or electromechanical plants, such as plants for handling and/or transportation, for example elevators, hoists, bridge cranes and the like, or in signaling systems, such as traffic lights and highway display signs and similar devices.

[0020] Particularly, the box-like housing or case of the invention will be designed for forming control stations having one or more command or control push-buttons associated with electrical elements, which are connected to corresponding electric circuits of the plant to be controlled.

[0021] Both the pushbuttons and the electrical elements are not shown, as they are known per se.

[0022] As shown in Fig. 1, the case of the invention, generally referenced 1, may be designed to accommodate one or more control buttons, e.g. three in the last two configurations of the figure.

[0023] Nevertheless, the number and arrangement of the buttons may also be considerably different, as required by the wiring diagrams of the control station, without departure from the scope of the invention.

[0024] Likewise, the types and numbers of electrical elements may be selected according to the configuration of the plant to be controlled, in response to special requirements, as is obvious to the skilled person.

[0025] The box-like housing or case 1 may comprise a hollow body 2 defining a longitudinal axis X and designed to house therein one or more electrical elements having respective control buttons.

[0026] The hollow body 2 may in turn comprise a bottom wall 3 which is designed to be anchored to a support or wall of the plant, not shown, and a closing top wall 4 with one or more openings 5 for housing respective buttons.

[0027] A plurality of substantially longitudinal passages 6, four passages in the illustrated configurations, are formed in the bottom wall 3 and the top wall 4 for the insertion of corresponding screws, not shown, for anchoring the case 1 to the support or wall of the plant.

[0028] In a peculiar aspect of the invention, the case 1 may include a closing member 7 for each passage 6, which is removably inserted therein to prevent access to the anchor screws in the passages 6 by personnel not involved in the maintenance or management of the control station, to avoid removal or tampering of the case 1 and the control station associated therewith.

[0029] Conveniently, the closing members 7 may be fully inserted in corresponding recesses, depressions or seats 8 formed in the top wall 4 of the hollow body 2 and having respective side surfaces 9 and bottom surfaces

10 where the passages 6 are formed.

[0030] Particularly, the closing members 7 may be fully inserted in the corresponding recess 8, and not protrude out of the top wall 4, which will impart a high aesthetic quality to the case.

[0031] As shown in the figures, each closing member 7 may include a substantially longitudinal stem, which is designed to be introduced into a corresponding passage 6.

[0032] Furthermore, the closing members 7 may have a closing head 12 which is adapted to be held in a corresponding recess 8 and has a top surface 13 with a specially shaped profile, smoothly conforming to the profile of the top wall 4.

[0033] As a result, once the closing members 7 are placed on the case 1, the top wall 3 will have a substantially seamless appearance.

[0034] The closing members 7 may be stably connected to the hollow body 2 by suitable coupling means 14, preferably snap-fit coupling means, which are associated with each of the closing members 7 and the side walls 15 of the longitudinal passages 6.

[0035] As more clearly shown by the details of Figs. 5 and 7, the snap-fit coupling means 14 include, for each closing member 7, a substantially longitudinal flexible tongue 16 attached to an end 16' of the stem 11.

[0036] The opposite end 16" of the tongue 16 is free and has a substantially transverse projection 17, which is adapted for snap engagement into a corresponding groove 18 formed in the side wall 15 of the corresponding passage 6.

[0037] Particularly, the projection 17 may have a substantially flat top surface 19, which is designed to abut against a facing bottom surface 20 of the groove 18, to prevent removal of the closing member 7.

[0038] In the configuration of Figs. 2, 4 and 5, the head 12 of the closing member 7 has a plan size substantially mating with that of the corresponding recess 8.

[0039] This will allow the head 12 to seal its respective recess 8 and prevent access to the transverse projection 17 and the corresponding longitudinal passage 6.

[0040] Thus, the closing members 7 can be only removed by forcing them out, e.g. using a drill bit inserted in their heads. As a result, once the closing members 7 are removed, they will be damaged and provide evidence of a legitimate or fraudulent action to remove the case 1 from the support.

[0041] However, in the configuration of Figs. 3, 6 and 7, the specially shaped head 12 and the side wall 15 of the corresponding passage 6 define a channel or undercut 21, extending substantially parallel to the tongue 16.

[0042] The channel 21 is designed to provide access to the transverse projection 17 by a pointed member or the like, e.g. a screwdriver bit.

[0043] Here, the closing members 7 can be removed without damaging the hollow body 2.

[0044] In a preferred, non-exclusive configuration of the invention, the hollow body 2 comprises a lower half-

shell 22 having the bottom wall 3 and an upper half-shell 23 having the closing top wall 4.

[0045] The half-shells 22, 23 substantially have the same plan shape and are removably coupled to each other at their respective mutually facing peripheral edges 24, 25, possibly with a seal 26 interposed therebetween, and associated with the edges 24, 25.

[0046] The lower half-shell 22 has a side wall 27 with a plurality of first substantially longitudinal first through holes 28 defining lower portions of the passages 6 and a plurality of second substantially longitudinal holes 29, preferably blind holes, in side-by-side relation with corresponding first holes 28.

[0047] On the other hand, the upper half-shell 23 has a side wall 30 having a plurality of third through holes 31 defining the upper portions of corresponding passages 6, and designed to be in superimposed and longitudinally aligned relation with respective first holes 28 to define the passages 6 for the anchor screws.

[0048] The upper half-shell 23 also has a plurality of fourth substantially longitudinal holes 32, which are also through holes, and in side-by-side relation with corresponding third holes 31.

[0049] The fourth holes 32 are substantially coaxial with respective second holes 29 to define respective longitudinal seats for the screws 33 that couple together the half-shells 22, 23.

[0050] The side walls of the second 29 and/or fourth 32 holes may conveniently have threads, for the screws 33 to be locked in the longitudinal seats.

[0051] Conveniently, the inlets of the third 32 and fourth 32 holes are in the bottom surface 10 of the recesses 8.

[0052] The head 12 of each closing member 7 is suitably sized to cover both inlets of a corresponding pair of mutually adjacent third and fourth holes 31, 32.

[0053] The longitudinal stem 11 of each closing member 7 is in turn removably inserted in a corresponding third hole 31.

[0054] Furthermore, the head 12 of each closing member 7 comprises a substantially tubular and substantially longitudinal hollow projection 34, which is designed to abut against the bottom surface 10 of its respective recess 7 and is adapted to be longitudinally aligned with a corresponding fourth hole 32 for press-fit to the head of a screw 33 inserted in the corresponding longitudinal seat.

[0055] This will impart improved flexural strength to the closing members 7 and avoid failure thereof as a result of excessive pressure thereupon.

[0056] The above disclosure clearly shows that the invention fulfills the intended objects and particularly meets the requirement of providing a box-like housing for control stations of plants, that has improved protection both against the ingress of impurities and moisture into the anchor screw passages and against any action by unauthorized or ill-intentioned persons, aimed at removing the case or any part thereof from the support to which it is

affixed.

[0057] The box-like housing of the invention is susceptible to a number of changes and variants, within the inventive principle disclosed in the appended claims. All the details thereof may be replaced by other technically equivalent parts, and the materials may vary depending on different needs, without departure from the scope of the invention.

[0058] While the box-like housing has been described with particular reference to the accompanying figures, the numerals referred to in the disclosure and claims are only used for the sake of a better intelligibility of the invention and shall not be intended to limit the claimed scope in any manner.

Claims

1. A box-like housing for a control station of a plant, comprising an hollow body (2) defining a longitudinal axis (x) designed to house internally thereof at least one electric element having a control button and electrically connectable to an electric circuit of an implant to be controlled, wherein said hollow body (2) comprises:

- a bottom wall (3) designed to be anchored to a support or wall of the plant;
- a top wall (4) with at least one opening (5) for housing a respective button of an electric element;
- a plurality of substantially longitudinal passages (6) through said bottom wall (3) and said top wall (4) for the insertion of corresponding screws for anchoring thereof to the support or a wall of the plant;

characterized in that said hollow body (2) comprises a plurality of closing members (7) removably inserted into corresponding passages (6) of said plurality to prevent the access by unauthorized persons to the anchoring screws inserted therein and the removal or tampering of the housing.

2. Housing as claimed in claim 1, **characterized in that** said closing members (7) are fully inserted into corresponding recesses (8) formed into said upper wall (4), said recesses (8) having respective side surfaces (9) and bottom surfaces (10) into which said passages (6) are formed.

3. Housing as claimed in claim 2, **characterized in that** each of said closing members (7) comprises a substantially longitudinal stem (11) inserted into a corresponding passage (6) and a head (12) housed in a corresponding recess (8) and having an upper surface (13) with a shaped profile which follows the profile of said top wall (4).

4. Housing as claimed in any preceding claim, **characterized by** comprising means (14) for snap fitting each of said closing members (7) into the inner side wall (15) of the corresponding passage (6).
5. Housing as claimed in claim 4, **characterized in that** said snap fitting means (14) comprises, for each of said closing members (7), a substantially longitudinal flexible tongue (16) fixed at one end (16') to said stem (11) and having the opposite free end (16'') provided with a substantially transverse projection (17) adapted to snap engage a corresponding groove (18) formed into said side wall (15) of said passage (6).
6. Housing as claimed in claim 5, **characterized in that** each of said closing members (7) has a head (12) with a plan-view shape substantially corresponding to that of the respective recess (8) in such a manner to seal it.
7. Housing as claimed in claim 5, **characterized in that** each of said closing members (7) has a head (12) designed to define with the side surface (9) of the corresponding recess (8) a channel (21) which extends substantially parallel to said tongue (16) and which is designed to allow the access to said transverse projection (17) by means of a pointed or the like tool.
8. Housing as claimed in any preceding claim, **characterized in that** said hollow body (2) comprises a lower half-shell (22) provided with said bottom wall (3) and an upper half-shell (23) provided with said closing upper wall (4), said half-shelves (22, 23) having a substantially equally plan-view shape and being removably coupled with each other at respective mutually facing peripheral edges (24, 25).
9. Housing as claimed in claim 8, **characterized in that** said lower half-shell (22) has a side wall (27) having a plurality of substantially longitudinal first through-holes (28) defining lower portions of said passages (6) and a plurality of substantially longitudinal second holes (29) in side-by-side relationship with said corresponding first holes (28).
10. Housing as claimed in claim 9, **characterized in that** said upper half-shell (23) has a side wall (30) having a plurality of substantially longitudinal third through-holes (31) defining upper portions of said passages (6) and a plurality of substantially longitudinal fourth through-holes (32) formed into said recesses (8) and in side-by-side relationship with corresponding third holes (31), these latter being substantially co-axial with respective second holes (29) to define corresponding longitudinal seats for housing screws (33) for the reciprocal coupling of said half-shelves (22,

23).

11. Housing as claimed in claim 10, **characterized in that** each of said closing members (7) comprises a head (12) sized to cover both the inlet of a corresponding couple of reciprocally side-by-side third and fourth holes (31, 32).

Amended claims in accordance with Rule 137(2) EPC.

1. A box-like housing for a control station of a plant, comprising an hollow body (2) defining a longitudinal axis (X) designed to house internally thereof at least one electric element having a control button and electrically connectable to an electric circuit of an implant to be controlled, wherein said hollow body (2) comprises:

- a bottom wall (3) designed to be anchored to a support or wall of the plant;
- a top wall (4) with at least one opening (5) for housing a respective button of an electric element;
- a plurality of substantially longitudinal passages (6) through said bottom wall (3) and said top wall (4) for the insertion of corresponding screws for anchoring thereof to the support or a wall of the plant;

characterized in that said hollow body (2) comprises a plurality of closing members (7) removably inserted into corresponding passages (6) of said plurality to prevent the access by unauthorized persons to the anchoring screws inserted therein and the removal or tampering of the housing.

2. Housing as claimed in claim 1, **characterized in that** said closing members (7) are fully inserted into corresponding recesses (8) formed into said upper wall (4), said recesses (8) having respective side surfaces (9) and bottom surfaces (10) into which said passages (6) are formed.

3. Housing as claimed in claim 2, **characterized in that** each of said closing members (7) comprises a substantially longitudinal stem (11) inserted into a corresponding passage (6) and a head (12) housed in a corresponding recess (8) and having an upper surface (13) with a shaped profile which follows the profile of said top wall (4).

4. Housing as claimed in any preceding claim, **characterized by** comprising means (14) for snap fitting each of said closing members (7) into the inner side wall (15) of the corresponding passage (6).

5. Housing as claimed in claim 4, **characterized in that** said snap fitting means (14) comprise, for each of said closing members (7), a substantially longitudinal flexible tongue (16) fixed at one end (16') to said stem (11) and having the opposite free end (16'') provided with a substantially transverse projection (17) adapted to snap engage a corresponding groove (18) formed into said side wall (15) of said passage (6).

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6. Housing as claimed in claim 5, **characterized in that** each of said closing members (7) has a head (12) with a plan-view shape substantially corresponding to that of the respective recess (8) in such a manner to seal it.

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7. Housing as claimed in claim 5, **characterized in that** each of said closing members (7) has a head (12) designed to define with the side surface (9) of the corresponding recess (8) a channel (21) which extends substantially parallel to said tongue (16) and which is designed to allow the access to said transverse projection (17) by means of a pointed or the like tool.

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8. Housing as claimed in any preceding claim, **characterized in that** said hollow body (2) comprises a lower half-shell (22) provided with said bottom wall (3) and an upper half-shell (23) provided with said closing upper wall (4), said half-shelves (22, 23) having a substantially equally plan-view shape and being removably coupled with each other at respective mutually facing peripheral edges (24, 25).

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9. Housing as claimed in claim 8, **characterized in that** said lower half-shell (22) has a side wall (27) having a plurality of substantially longitudinal first through-holes (28) defining lower portions of said passages (6) and a plurality of substantially longitudinal second holes (29) in side-by-side relationship with said corresponding first holes (28).

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10. Housing as claimed in claim 9, **characterized in that** said upper half-shell (23) has a side wall (30) having a plurality of substantially longitudinal third through-holes (31) defining upper portions of said passages (6) and a plurality of substantially longitudinal fourth through-holes (32) formed into said recesses (8) and in side-by-side relationship with corresponding third holes (31), these latter being substantially co-axial with respective second holes (29) to define corresponding longitudinal seats for housing screws (33) for the reciprocal coupling of said half-shelves (22, 23).

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11. Housing as claimed in claim 10, **characterized in that** each of said closing members (7) comprises a head (12) sized to cover both the inlet of a corre-

sponding couple of reciprocally side-by-side third and fourth holes (31, 32).

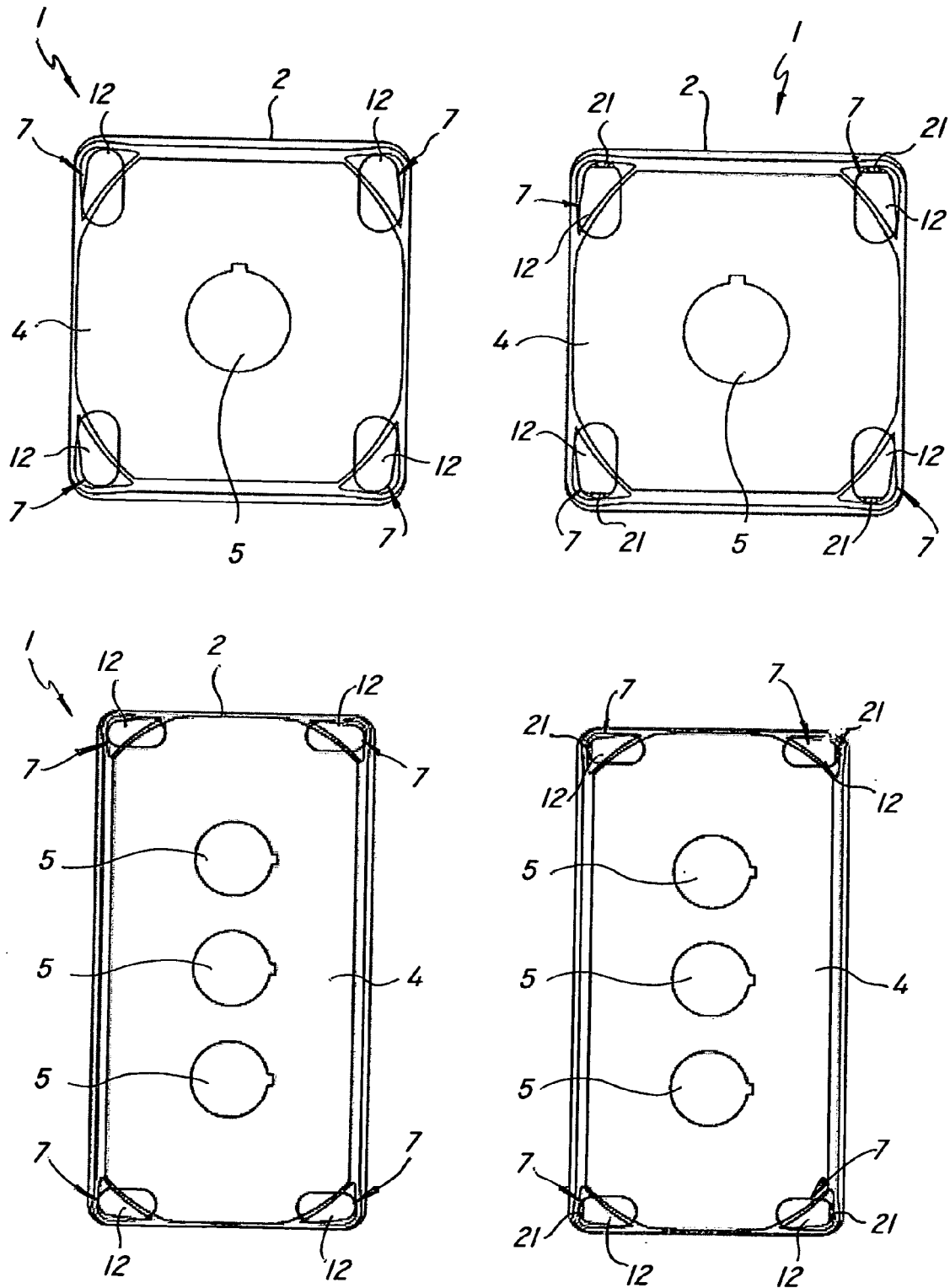


FIG. 1

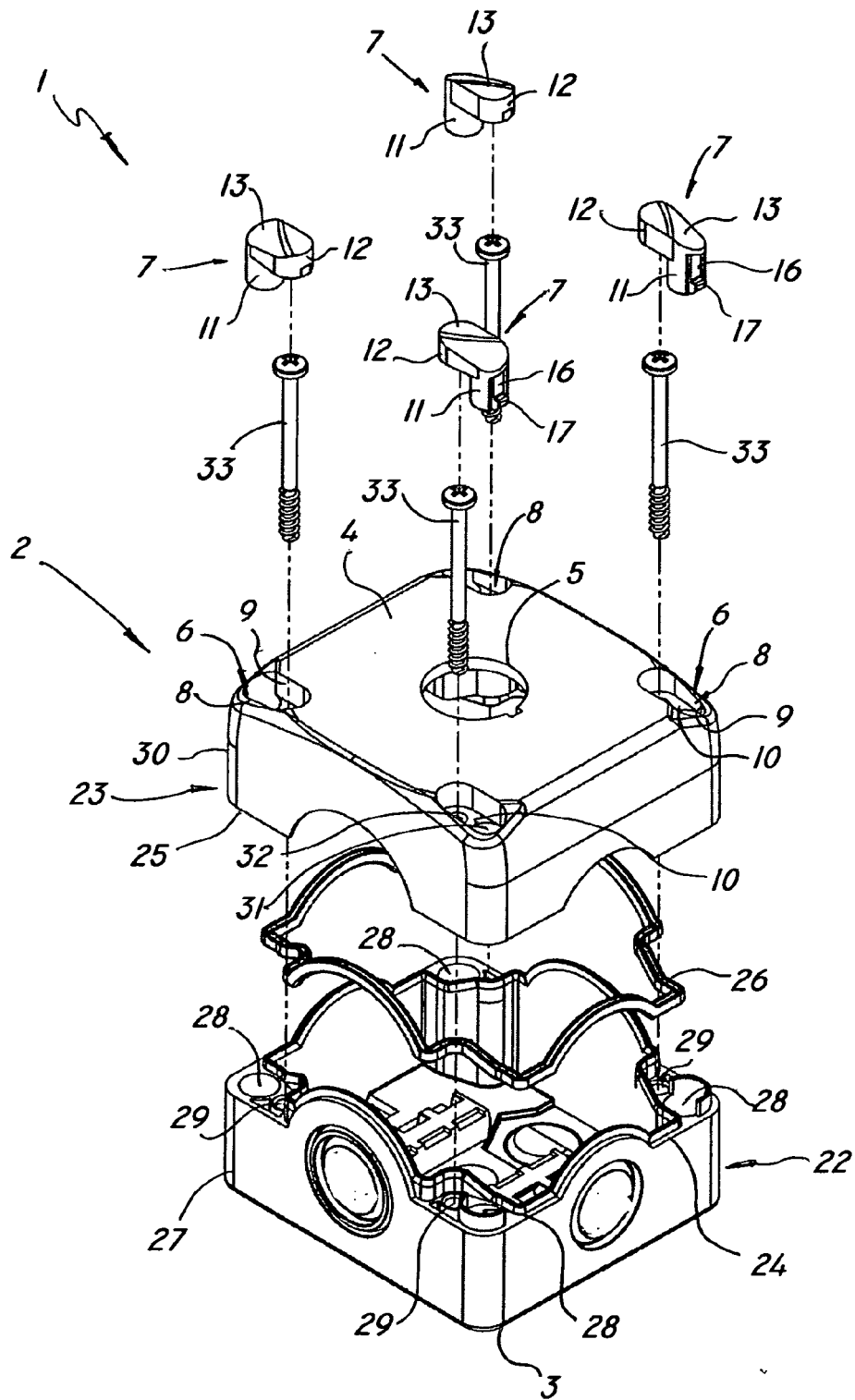


FIG. 2

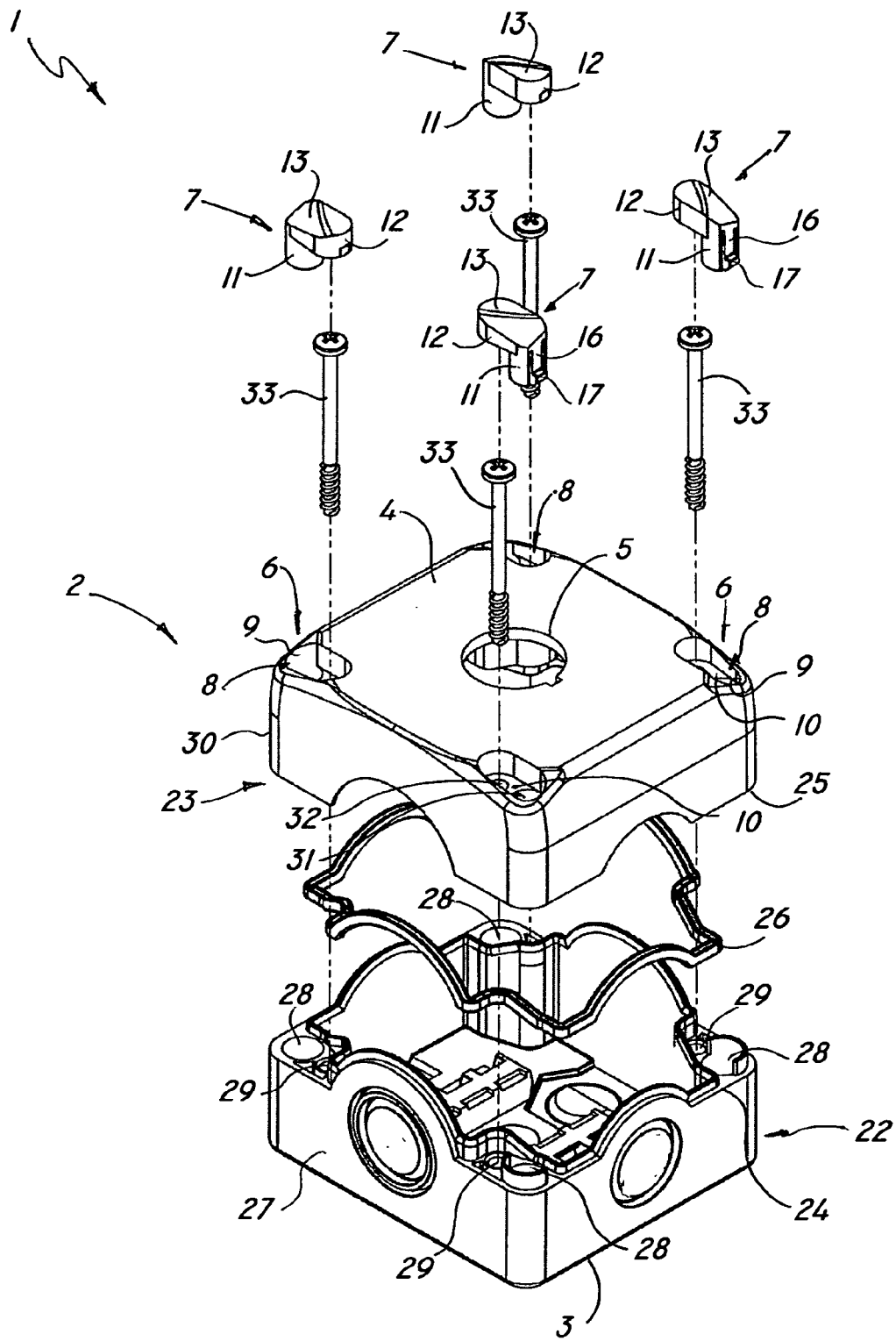


FIG. 3

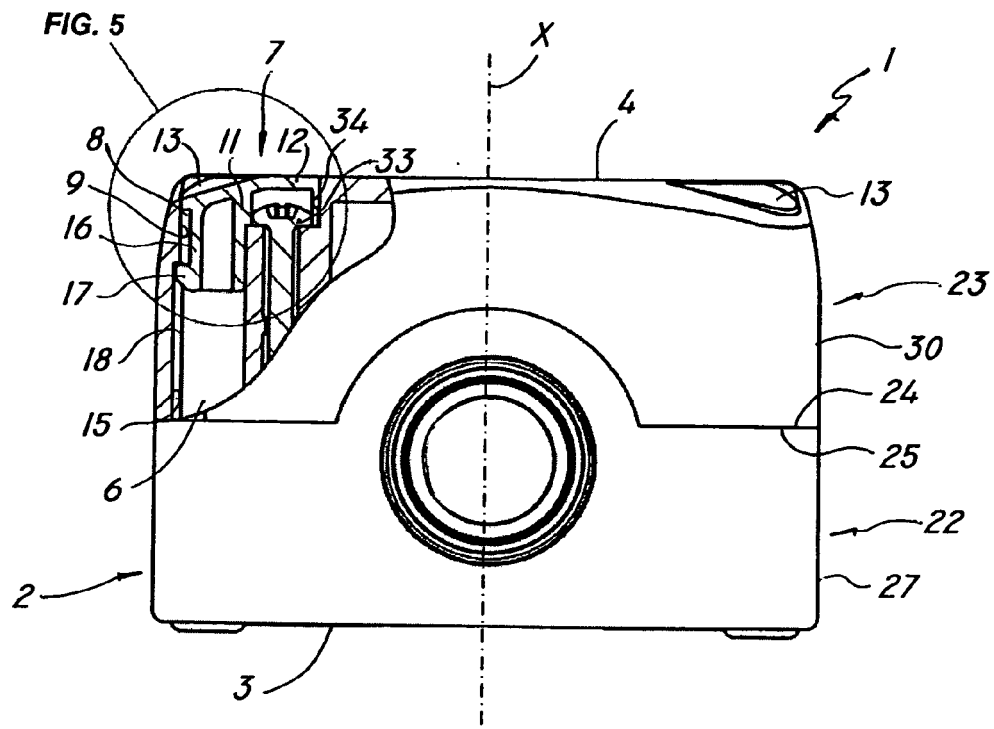


FIG. 4

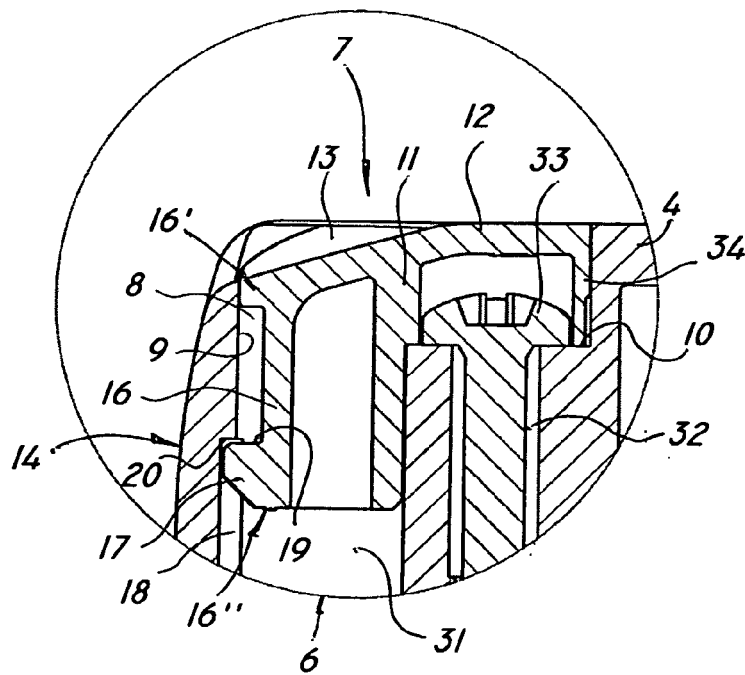
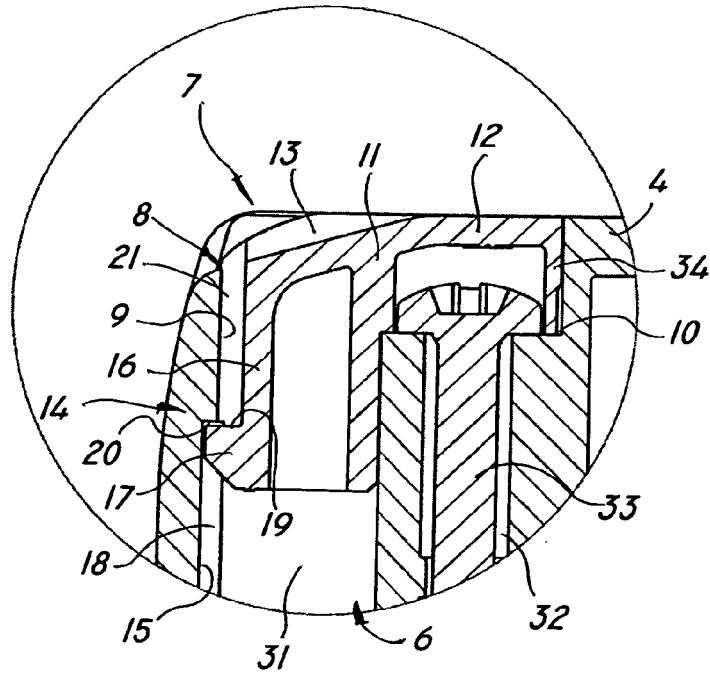
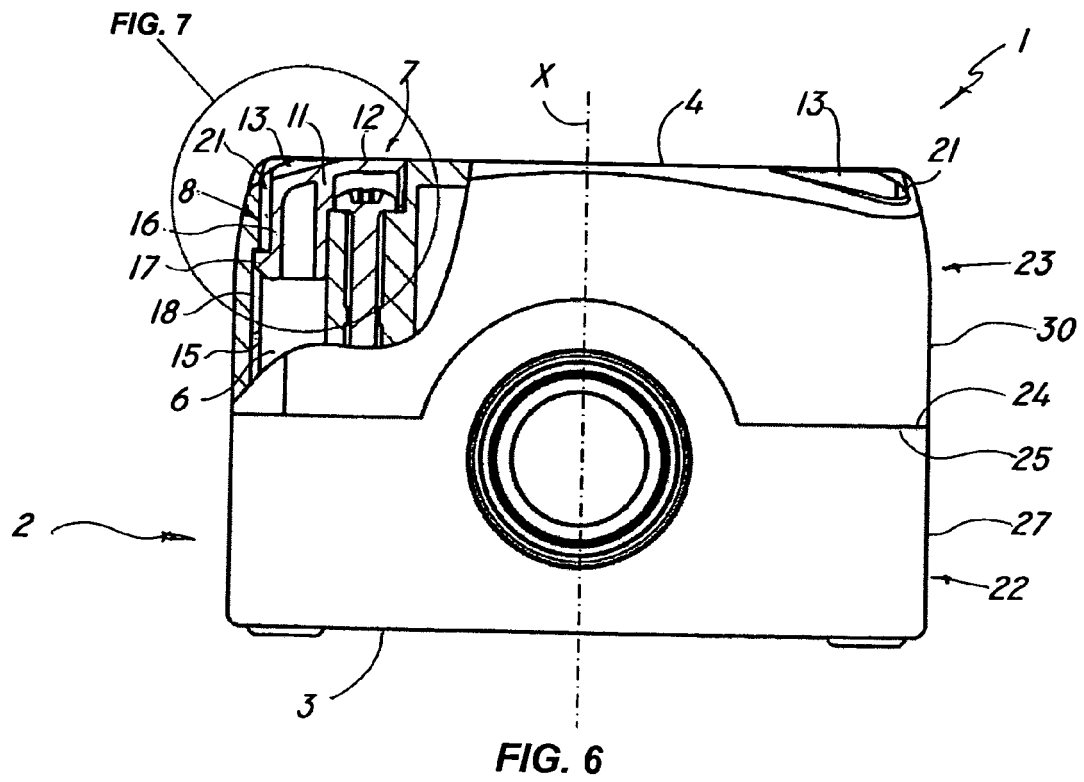


FIG. 5





EUROPEAN SEARCH REPORT

Application Number
EP 11 00 8577

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
			H01H H05K
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 10 September 2012	Examiner Simonini, Stefano
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 11 00 8577

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REFERENCES CITED IN THE DESCRIPTION

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