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(54) **Fuse holder base**

(57) The present invention relates to a fuse holder base that allows easily, comfortably and safely releasing fuses from the outside, without independent parts or springs that would increase manufacturing and assembly costs, said fuse holder base (1) comprising: a socket (10) that has contacts for connecting at least one fuse (2); a fuse holder cover (20) attached to the socket (10) in an articulated manner and having at least one housing (21) for receiving at least one extractable fuse (2); and a fuse retaining device (30), mounted on the fuse holder cover (20), such that said retaining device (30) is movable between two positions, a locking position for locking fuses (2) and a release position for releasing fuses (2).

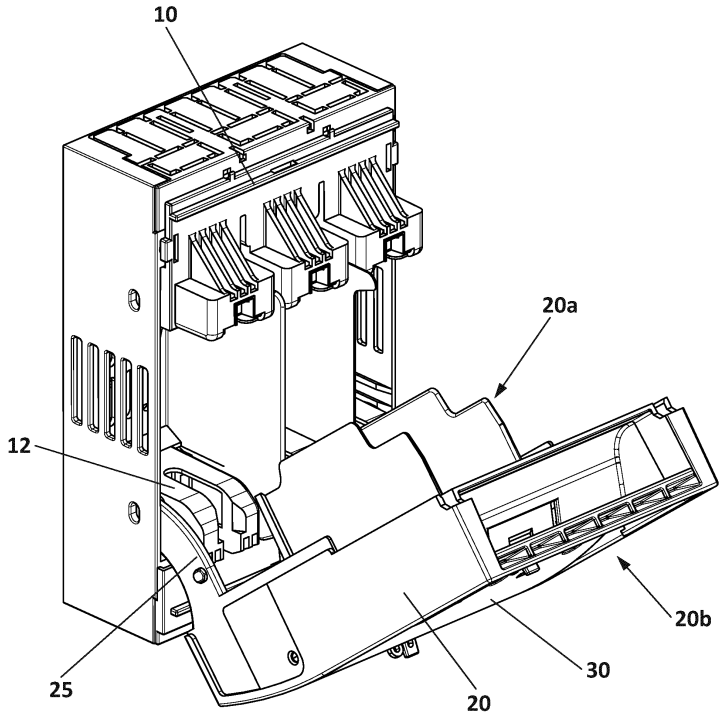

FIG. 2

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Description

Object of the Invention

[0001] The present invention belongs to the field of electric switches, and more specifically to protection devices or fuse holders for unlocking or releasing electric fuses.

[0002] The object of the present invention is a fuse holder base that allows easily, comfortably and safely releasing fuses from the outside, avoiding possible burns and minimizing the number of parts required, accordingly reducing the probabilities of operating malfunctions or errors, as well as reducing manufacturing costs.

Background of the Invention

[0003] Electric switches with fuses are extremely well known today, such switches with fuses generally consisting of a rail or socket, which supports connection contacts and is connected to the respective busbars or power cables, a casing that protects contacts from accidental contacts, and at least one fuse holder arranged in an articulated manner on the socket and in which the corresponding fuses or cartridges are mounted. Said fuses incorporate locking tabs which are fitted into housings of the fuse holder itself, the fuses being retained by locking means, generally consisting of auxiliary parts mounted on the fuse holder.

[0004] The fuse holder can have two positions: an operative or locking position, in which connection is established; and a non-operative or release position, in which the fuse holder is tilted with respect to the socket and the fuse, mounted in the fuse holder, therefore disconnected. Nevertheless, not all fuse holder covers tilt with respect to the socket; some models in which the fuse holder cover goes in and out of the socket by means of a straight movement, such that the handle goes in and out of the socket perpendicular thereto, are also known. Switches with fuses of this type are described, for example, in international patent application WO2004030007 A1 belonging to the owner of this invention, or in the German patent documents DE4310638, DE10059698, DE29908804U, DE29791446U.

[0005] A large window in which a protective, generally transparent plastic sheet is mounted that allows checking the state of the fuse and reading the characteristics thereof without having to extract the fuse is established in the front portion of the fuse holder. This protective sheet can also incorporate printed information corresponding to the characteristics of the switch. The protective sheet takes up virtually the entire front portion of the fuse holder because, as mentioned above, its primary function principal is to allow inspecting the fuse which generally has dimensions similar to those of the fuse holder, in the case of single-pole fuse holder bases, i.e., a single phase and a single fuse. As a result, printed information containing the characteristics of the base cannot be provided on the transparent sheet and must be included on the side edges of the fuse holder.

[0006] One of the drawbacks existing today is that for the type of fuse holder mentioned above, when a damaged or deteriorated fuse is to be replaced, the fuse holder must be opened, separating it from the corresponding socket, and then the fuse must be released from the fuse holder, therefore making it necessary to act on the locking means which are generally mounted in the inner portion of the fuse holder, such that when being handled by technical operators it is quite easy to touch the fuse, which is very hot, with the subsequent risk of burns.

[0007] In addition, when the size of the fuse holder so allows, locking devices can be accessed from outside same. A device of this type is described for example in international patent application WO02089164 A1, belonging to the same applicant, in which the fuse locking/unlocking means consist of a spring part mounted in a sliding manner on the front portion of the transparent sheet of the fuse holder having a bent internal prolongation determining an elastic strip which immobilizing the fuse in its housing, such that by transversely moving the spring part movement of the leg takes place which allows removing the fuse.

[0008] In this regard, another detected drawback is that all these solutions mean that the fuse holder incorporates a series of auxiliary parts, springs, tilting parts, etc., to lock or release the fuse, which entails an increase in the costs of manufacturing the switch, as well as lower reliability thereof as it incorporates a larger number of parts, and therefore a higher probability of malfunctions and errors.

[0009] Furthermore, another additional drawback results from the fact that fuse unlocking systems are often based on side operation, so if the fuse holder base is fitted in a cabinet that does not provide enough side space, therefore hindering being able to access and act thereon, and accordingly making the job of replacing damaged fuses more tedious and complex, even more so when taking into account that these operations are performed by an operator who is wearing somewhat thick gloves, so it is difficult to act with precision.

Description of the Invention

[0010] The drawbacks mentioned above are solved by means of the present invention, providing a fuse holder base in which fuses can be released from the outside, which allows not only demounting and extracting fuses comfortably, easily and safely from the outside, without the operator contacting the fuses, but it is also an alternative that reduces to a minimum the required external auxiliary parts, such as levers, springs or sliding elements, therefore reducing manufacturing and assembly costs.

[0011] The fuse holder base in which fuses can be released from the outside of the invention comprises: a socket having contacts for connecting at least one fuse;

a fuse holder cover attached to the socket in an articulated manner and having at least one housing for receiving at least one extractable fuse.

[0012] It should be indicated at this point that when the term socket is used herein, it also refers to so-called "contact covers".

[0013] Furthermore, the fuse holder base additionally comprises a preferably transparent or translucent fuse retaining device to allow inspecting fuses, mounted on the fuse holder cover, such that said retaining device is a front push-button that is movable between two positions, a locking position for locking fuses and a release position for releasing fuses.

[0014] It has furthermore been envisaged that the fuse retaining device has fuse locking means on an inner face, which are preferably protrusions acting like stop elements for fixing the at least one fuse in the locking position. The locking means are preferably located in an inner half of the fuse retaining device, whereas the front push-button is located in the opposite half with respect to the axis of rotation of the retaining device.

[0015] Said fuse retaining device is preferably a tilting device that tilts between two positions, a locking position in which the fuses are locked by the locking means, and a release position in which the fuses are movable so they can be extracted, said retaining device being operable from the outside.

[0016] It has furthermore been envisaged that the fuse holder cover and/or fuse retaining device comprise elastic means, preferably a pair of facing elastic strips, for pushing the retaining device from the release position to the locking position.

[0017] Therefore, in the locking position of the fuse retaining device the elastic strips are in contact with one another and apply pressure, and the retaining device remains in its locking situation.

[0018] In addition, if a fuse is to be released and extracted, for example because it is damaged, by means of a simple pressure movement and manual pushing on the actual outer surface of the fuse retaining device, said fuse retaining device is tilted until it reaches the release position, in which the locking means no longer act on locking tabs of the fuses. Therefore, due to the pressure applied by the operator, said pressure being greater than the pressure applied by the elastic strips, slight deformation of the strips takes place.

[0019] This tilting of the fuse retaining device through an imaginary transverse axis, in which the lower portion of the fuse retaining device moves towards the inside of the fuse holder cover, and the upper portion of the fuse retaining device moves towards the outside, moving away from the fuse holder cover, is what causes integral backward movement of the protrusions, which causes them to no longer act on the locking tabs of the fuses, and accordingly allowing upward movement of the fuses through the housings for the subsequent release and/or extraction thereof.

[0020] At this point it should be indicated that to keep the fuse retaining device in the release position and to allow releasing the fuses, the user must maintain pressure on the operating push-button, additionally being pressure that is enough so that the push-button is not operated by any contact, but not so much pressure that it entails such excessive force that prevents the operation thereof when so desired.

[0021] Therefore, once the operator is no longer acting on the operating push-button, and due to the deformation produced in the elastic strips, the fuse retaining device automatically returns to the locking position because the mentioned elastic strips, in order to return to their rest position, cause the fuse retaining device to tilt from the release position to the locking position.

[0022] According to another preferred embodiment, the possibility of the fuse holder base additionally comprising movable closure elements fixed to the inner face of the fuse retaining device through auxiliary tabs for blocking the at least two through holes of the fuse retaining device, is contemplated. It has furthermore been envisaged that the fuse holder cover can have a window that allows seeing the fuses installed therein, and in which the fuse retaining device is located such that it covers at least one portion of the window.

[0023] Some of the improvements and advantages obtained by means of the fuse holder base herein described are listed below:

- It enables directly, comfortably and intuitively releasing the fuses, avoiding any possible contact with the fuses and their corresponding locking tabs, and without needing to have external side push-buttons hindering access and the release operation.
- It has greater applicability and a larger number of installation possibilities because the fuse holder base of the invention is not affected by space limitations existing in fuse cabinets, being operated entirely from the front, with direct access thereto.
- Fuses are easily and comfortably released, there being a large surface where an operator can press on the fuse retaining device to cause same to tilt and accordingly release the fuses. Therefore, no specific concrete button, which is generally small and hidden on a side and difficult to locate when using conventional work gloves, is required.
- As no additional independent parts that need to be mounted, such as levers, sliders or metal springs, are required, manufacturing, material and assembly costs are considerably reduced because the parts, specifically the fuse holder cover and the fuse retaining device, are obtained by a molding process in which the locking means, elastic means or lugs are already incorporated and formed.

Description of the Drawings

[0024] To complement the description that is being made and for the purpose of aiding to better understand

the features of the invention according to a preferred practical embodiment thereof, a set of drawings is attached as an integral part of said description in which the following has been depicted with an illustrative and non-limiting character:

Figure 1 shows a general perspective view of the fuse holder base in which fuses can be released from the outside according to a preferred embodiment.
Figure 2 shows a perspective view in which the articulated attachment between the socket and the rear face of the fuse holder cover can be seen.
Figure 3 shows a perspective view of the rear face of the fuse holder cover, in which three fuses fixed in respective housings of the fuse holder cover can be seen.
Figure 4 shows a perspective view of the front face of the fuse holder cover, in which the locking tabs of the fuses, as well as the elastic means of the fuse holder cover for pushing the fuse retaining device back towards the locking position can be seen.
Figures 5A, 5B and 5C show perspective views of the inner face of the fuse retaining device, in which the interaction between the locking tabs for locking the fuses and the locking means for locking the fuse retaining device as said device tilts from the locking position to the release position can be seen.
Figure 6 shows a perspective view of the outer face of the fuse retaining device, in which retaining notches in its upper corners for limiting the tilting movement of the fuse retaining device, as well as through holes for tapping the voltage of the fuses, can be seen.
Figure 7 shows a view of the inner face of the fuse retaining device according to a second preferred embodiment, in which movable closure elements that prevent tapping the voltage of the fuses through the through holes of Figure 6 are included.
Figures 8A, 8B and 8C show front views of the fuse holder base in different positions that enable tapping the voltage depending on the location of the closure elements of Figure 7.
Figure 9 shows a detail view in which projections on the inner face of the closure elements, suitable for forming a stop element with respect to extensions existing in the socket, can be seen.

Preferred Embodiment of the Invention

[0025] Several preferred embodiments are described below in reference to the aforementioned drawings, without limiting or reducing the scope of protection of the present invention.

[0026] Figure 1 shows the fuse holder base (1) in which fuses can be released from the outside of the invention, said fuse holder base (1) comprising:

- a socket (10), shown in Figures 1, 2 and 9, that has contacts for connecting in the present example three fuses (2), which are shown in Figure 3;
- a fuse holder cover (20) having a rear face (20a) and a front face (20b), in which said fuse holder cover (20) is attached to the socket (10) in an articulated manner through the rear face (20a), as shown in Figure 2, said fuse holder cover (20) furthermore having three housings (21), shown in Figures 3 and 4, for fixing the fuses (2);
- a tilting fuse retaining device (30) mounted on the front face (20b) of the fuse holder cover (20), in which said fuse retaining device (30) has on its inner face locking means (34) for locking the fuses (2), consisting in the present embodiment of three protrusions (34), shown in Figures 5A, 5B and 5C, acting like stop elements for fixing each of the three fuses (2) in the locking position.

[0027] Said fuse retaining device (30) is a device that can tilt between two positions, a locking position, shown in Figure 5B, in which the fuses (2) are locked by the protrusions (34); and a release position, shown in Figure 5C, in which the fuses (2) are upwardly movable so they can be freely extracted.

[0028] As can be seen in said Figures 5A, 5B and 5C, according to the present example the protrusions (34) are located on the inner face of the fuse retaining device (30) for locking upper locking tabs (3) of the fuses (2). These locking tabs (3), shown in Figures 3 and 4, can be fitted into the housings (21) of the fuse holder cover (20), in which said housings (21) in the present example have a wider upper portion with respect to the lower portion. This special configuration of the housings (21) allows a faster and more comfortable extraction of the fuses (2) once the fuse retaining device (30) is in the release position.

[0029] It can be seen in Figures 5A-5C and 6 that the fuse holder cover (20) and/or fuse retaining device (30) comprise elastic means (23, 35) for pushing the fuse retaining device (30) from the release position to the locking position. More particularly, said elastic means comprise in the present embodiment first elastic strips (23) attached to the fuse holder cover (20) and second elastic strips (35) attached to the fuse retaining device (30), the elastic strips (35) attached to the fuse retaining device (30) being located behind the elastic strips (23) attached to the fuse holder cover (20).

[0030] Manual operation of the fuse retaining device (30) by a qualified technician or operator causes slight deformation of said elastic strips (23, 35) and tilting of the fuse retaining device (30) with respect to the fuse holder cover (20), which causes movement of the protrusions (34) which no longer act on the fuses (2) until the release thereof in the release position.

[0031] In addition, when the fuse retaining device (30) is no longer acted on, it immediately returns to its locking position as a result of the pressure applied by the elastic strips (23) of the fuse holder cover (20) on the elastic

strips (35) of the fuse retaining device (30).

[0032] The elastic strips (23, 35) comprise a vertical section (23a, 35a) and are attached by the proximal end of which to the fuse holder cover (20) and to the fuse retaining device (30), respectively, and from the distal end of which respective inclined sections (23b, 35b) arise, as depicted in Figures 4 and 5B, such that in the release position of the fuse retaining device (30) the elastic strips (23) of the fuse holder cover (20) deform, experience slight movement towards the rear portion thereof.

[0033] The fuse holder cover (20) further comprises in the present embodiment a pair of vertical side walls (22) each having a hole (26) positioned such that they are facing one another, as shown in Figure 4.

[0034] In turn, the fuse retaining device (30) comprises a pair of inner lugs (31), shown in Figures 6 and 7, which have respective outer protuberances (32) for the insertion thereof into holes (26) of side walls (22) of the fuse holder cover (20), such that operation of the fuse retaining device (30) causes it to tilt with respect to the fuse holder cover (20) from the locking position to the release position, in which said tilting is through an imaginary transverse axis (E), shown in Figure 4, located between the holes (26) of the fuse holder cover (20).

[0035] As can be seen in Figures 5A-5C, 6 and 7, the lugs (31) are located on the side edges of the fuse retaining device (30), in a position perpendicular to the inner surface of the fuse retaining device (30), and in a position that is lower in height than the elastic strips (35) of said fuse retaining device (30). This special relative position between both elements, i.e., lugs (31) and elastic strips (35), allows the tilting movement of the fuse retaining device (30) from the locking position to the release position, and vice versa, to take place without any interruption at any time.

[0036] It should be indicated at this point that both the elastic strips (23, 35) and the lugs (31) and their protuberances (32) are manufactured in a plastic material, such that both the fuse holder cover (20) and the fuse retaining device (30) are manufactured quickly and easily in one and the same injection or extrusion molding process, without requiring additional external parts, such as levers, springs or metal springs, whereby manufacturing, material and assembly costs of the fuse holder base (1) of the invention are considerably reduced.

[0037] Furthermore, as can be seen in Figures 5A-5C and 6, the fuse retaining device (30) additionally comprises a horizontal skirt (33) arranged on its upper edge, in which said skirt (33) having a length such that in the release position of the fuse retaining device (30) there are no gaps or free spaces between the fuse holder cover (20) and said fuse retaining device (30). This allows providing a barrier element against the possible entry of dust particles, small insects or foreign bodies that may affect normal operation of the fuses (2) or the tilting movement of the fuse retaining device (30).

[0038] The fuse retaining device (30) additionally comprises a pair of retaining notches (36), depicted in Figure 6, located in each of its upper corners, in which said retaining notches (36) include a stop surface (36s) for contact thereof in the release position of the fuse retaining device (30) with a pair of projecting side branches (24) of the fuse holder cover (20), which are shown in Figure 1. This feature allows preventing extreme tilting of the fuse retaining device (30), providing an additional safety mechanism against a possible attempt to extract the fuse retaining device (30) by unauthorized third parties.

[0039] It can be seen in Figures 2, 3 and 4 that the fuse holder cover (20) in the present example furthermore has a pair of anchoring hooks (25) for the articulated attachment between socket (10) and fuse holder cover (20), inner slots (12) having been provided to that end in the socket (10). Said anchoring hooks (25) have an inverted U shape and are located at respective lower side ends of the rear face (20a) of the fuse holder cover (20) for tilting and V-shaped separation between the socket (10) and the fuse holder cover (20), as can be seen in Figure 2.

[0040] Likewise, as can be seen in Figures 1, 6, 8A-8C, the fuse retaining device (30) in the present example comprises six through holes (37), three in the upper half and three in the lower half, in correspondence with the three fuses (2) fixed in the fuse holder cover (20). These through holes (37) are suitable for allowing tapping the voltage in the fuses (2).

[0041] According to a second preferred embodiment, the fuse holder base (1) additionally comprises closure elements (40), shown in Figures 7, 8A-8C and 9, that are horizontally movable and fixed to the inner face of the fuse retaining device (30) through auxiliary tabs (41) for blocking the through holes (37) of the fuse retaining device (30), such that tapping the voltage of the fuses (2) is prevented.

[0042] Figures 8A-8C show three front views of the fuse holder base (1), depending on the position of the closure elements (40), in which said closure elements (40) in the present embodiment have a pair of holes (44), shown in Figure 7, having the same diameter as the through holes (37) of the fuse retaining device (30).

[0043] Therefore, in a first position shown in Figure 8A the closure elements (40) are in the open position, being moved towards the right portion of the fuse retaining device (30). More specifically, in this first position the two holes (44) of the closure elements (40) are located such that they are facing and coinciding with the central and right through holes (37) of the fuse retaining device (30) itself, and in which the third through hole (37) located more to the left as can be seen in Figure 8A is completely open and free, without any opposition by the closure elements (40) because the latter have a shorter length with respect to the total width of the fuse retaining device (30). The voltage of the fuses (2) can be tapped in this first position through said through holes (37) of the fuse retaining device (30).

[0044] In a second position shown in Figure 8B, the closure elements (40) are in the closed position, in which the three through holes (37) of the fuse retaining device

(30) are completely covered by the closure elements (40) after slight horizontal movement thereof to the left, as can be seen in Figure 8B. Therefore, in this second position voltage cannot be tapped through said through holes (37) of the fuse retaining device (30).

[0045] Finally, in a third position shown in Figure 8C, the closure elements (40) are also in the closed position; but greater safety and integrity of the fuse holder base (1) are further assured as any subsequent movement towards the first position or second position is prevented, unless such movement is by means of a prior opening and separation between the socket (10) and the fuse holder cover (20) through the aforementioned anchoring hooks (25), as shown in Figure 2.

[0046] The possibility of said closure elements (40) being able to additionally comprise first projections (42) on the inner face thereof, suitable for forming a stop element with respect to extensions (11) existing in the socket (10), such that horizontal movement of the closure elements (40) is prevented when said first projections (42) laterally impact against the extensions (11) of the socket, as shown in Figure 9, is furthermore contemplated.

[0047] The closure elements (40) therefore cannot slide from the second position to the third position, and vice versa, unless the socket (10) and the fuse holder cover (20) are pivoted and separated from one another, as discussed above. Proceeding in this manner allows preventing incorrect use of the fuse holder base (1) by unauthorized third parties attempting to fraudulently extract electric energy through the holes (37) intended for tapping the current. Therefore, the fact that it is necessary to separate the socket (10) from the fuse holder cover (20) means that if an unauthorized person performs said separation, the power supply is cut off, and this is recorded in a control unit so that the electric energy provider can subsequently verify incorrect use thereof.

[0048] In addition, it has been envisaged that the fuse retaining device (30) can comprise through grooves (38) on its surface and the closure elements (40) have seconds projections (43) that can be fitted into said grooves (38) and facilitate the position change operation of the closure elements 40, as can be seen in Figures 8A-8C.

[0049] In turn, the aforementioned second projections (43) can have a hole, such that a seal, not depicted in the drawings, can be placed between the closure elements (40) and the fuse retaining device (30), such that the closure elements (40) can be secured in the second closed position, shown in Figure 8B, or such that it at least allows showing incorrect use by a third party.

[0050] It can be seen in Figures 5A-5C that the fuse retaining device (30) comprises a pair of flexible tabs (39) arranged in the lower area thereof for optimal coupling between the fuse retaining device (30) and the fuse holder cover (20).

Claims

1. Fuse holder base (1) comprising a socket (10) that has contacts for connecting at least one fuse (2); a fuse holder cover (20) attached to the socket (10) in an articulated manner and having at least one housing (21) for receiving at least one extractable fuse (2); **characterized in that** it additionally comprises a fuse retaining device (30), mounted on the fuse holder cover (20), such that said fuse retaining device (30) is a front push-button that is movable between two positions, a locking position for locking fuses (2) and a release position for releasing fuses (2).

2. Fuse holder base (1) according to claim 1, **characterized in that** the fuse retaining device (30) is a tilting device.

3. Fuse holder base (1) according to claim 1, **characterized in that** the fuse retaining device (30) can be operated from the outside.

4. Fuse holder base (1) according to claim 1, **characterized in that** the fuse retaining device (30) has locking means (34) on an inner face.

5. Fuse holder base (1) according to claim 4, **characterized in that** the locking means are protrusions (34) acting like stop elements for fixing the at least one fuse (2) in the locking position.

6. Fuse holder base (1) according to any one of claims 4 or 5, **characterized in that** the locking means (34) are located in an inner half of the fuse retaining device (30), whereas the front push-button is located in the opposite half with respect to the axis of rotation of the retaining device (30).

7. Fuse holder base (1) according to claim 1, **characterized in that** the fuse holder cover (20) and/or the fuse retaining device (30) comprise elastic means (23, 35) for pushing the fuse retaining device (30) from the release position to the locking position.

8. Fuse holder base (1) according to claim 7, **characterized in that** the elastic means comprise at least one elastic strip (23, 35), such that operation of the fuse retaining device (30) causes slight deformation of said elastic strip (23, 35) and tilting of the fuse retaining device (30) with respect to the fuse holder cover (20), and where when said fuse retaining device (30) is no longer acted on, it immediately returns to its locking position as a result of the pressure applied by the elastic strip (23, 35).

9. Fuse holder base (1) according to claim 1, **characterized in that** the fuse holder cover (20) comprises

a window that allows seeing the fuses (2) installed therein, and where the fuse retaining device (30) is located such that it covers at least one portion of the window.

10. Fuse holder base (1) according to claim 1, **characterized in that** the fuse retaining device (30) comprises at least one through hole (37) for tapping the voltage of said fuse (2).

11. Fuse holder base (1) according to claim 10, **characterized in that** it additionally comprises closure elements (40) that are movable between two positions, a closed position and another open position of the at least one through hole (37) of the fuse retaining device (30), arranged between the fuse holder cover and the retaining device.

12. Fuse holder base (1) according to claim 11, **characterized in that** the closure elements (40) additionally comprise first projections (42) on the inner face thereof, suitable for forming a stop element with respect to extensions (11) of the socket (10).

13. Fuse holder base (1) according to any one of claims 11 or 12, **characterized in that** the fuse retaining device (30) comprises through grooves (38) on its surface, and the closure elements (40) have seconds projections (43) that can be fitted into said grooves (38).

14. Fuse holder base (1) according to claim 1, **characterized in that** the fuse holder cover (20) has three housings (21) for receiving three fuses (2), and where the fuse retaining device (30) has at least three through holes (37) in correspondence with each of the three fuses (2).

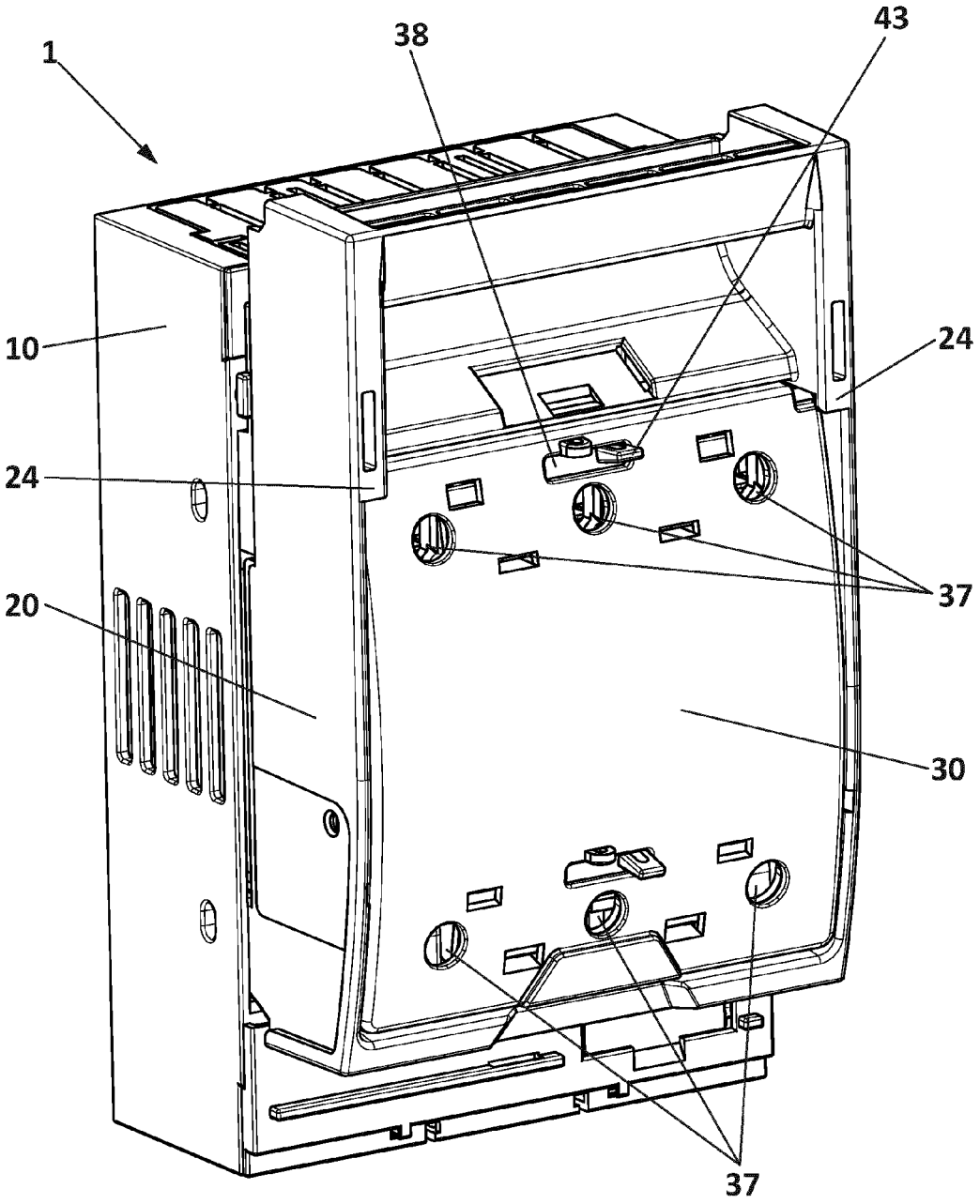

FIG. 1

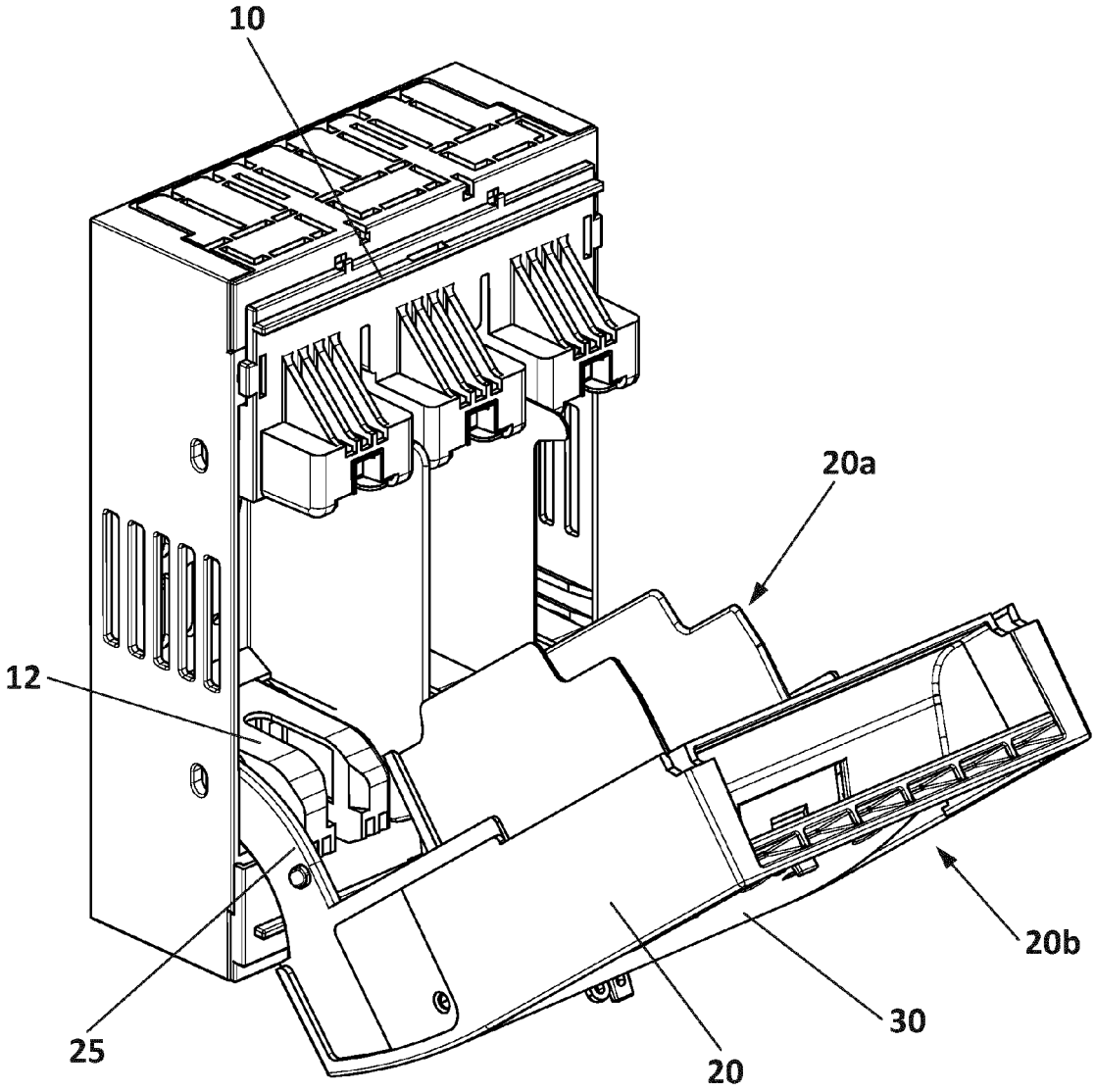

FIG. 2

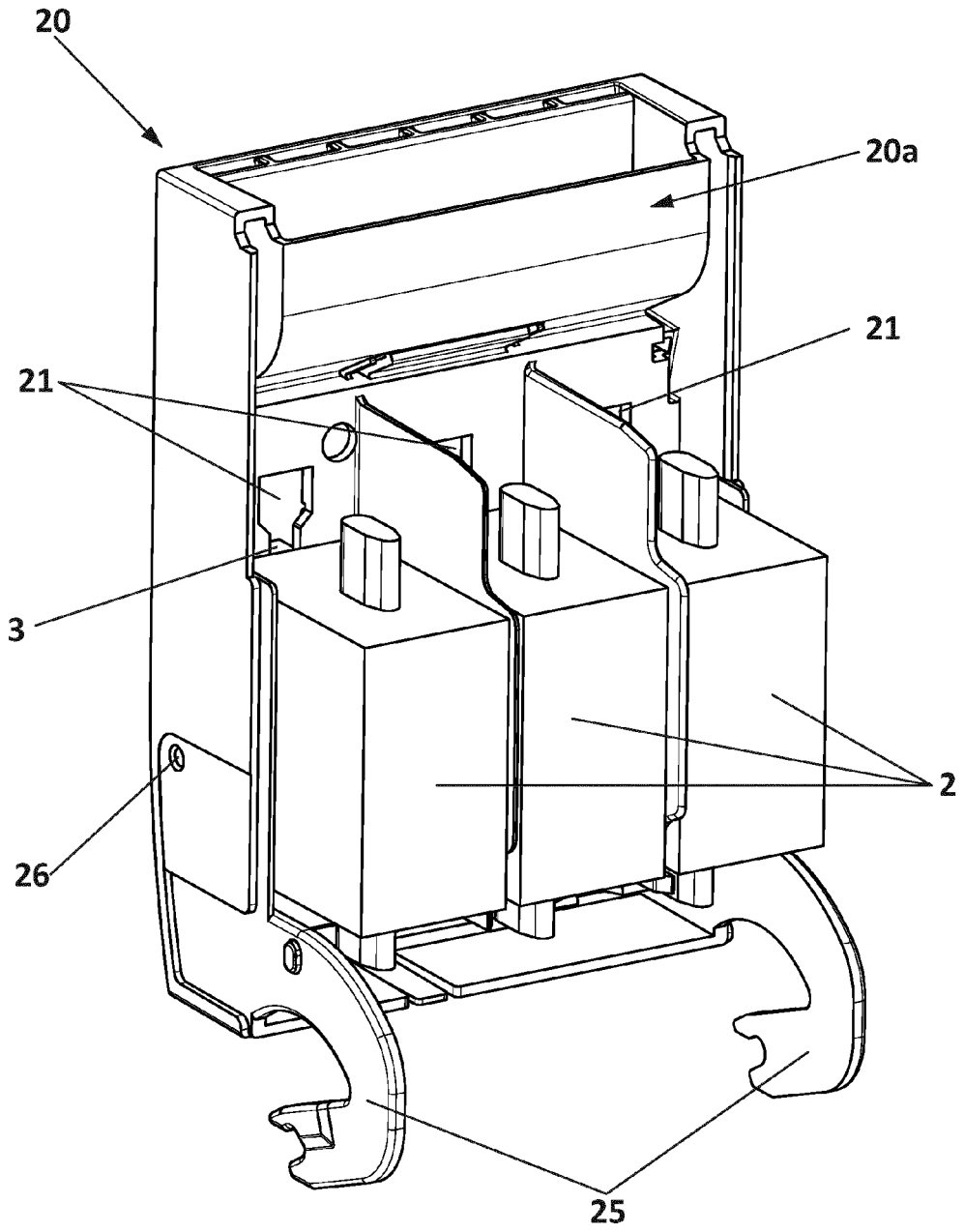

FIG. 3

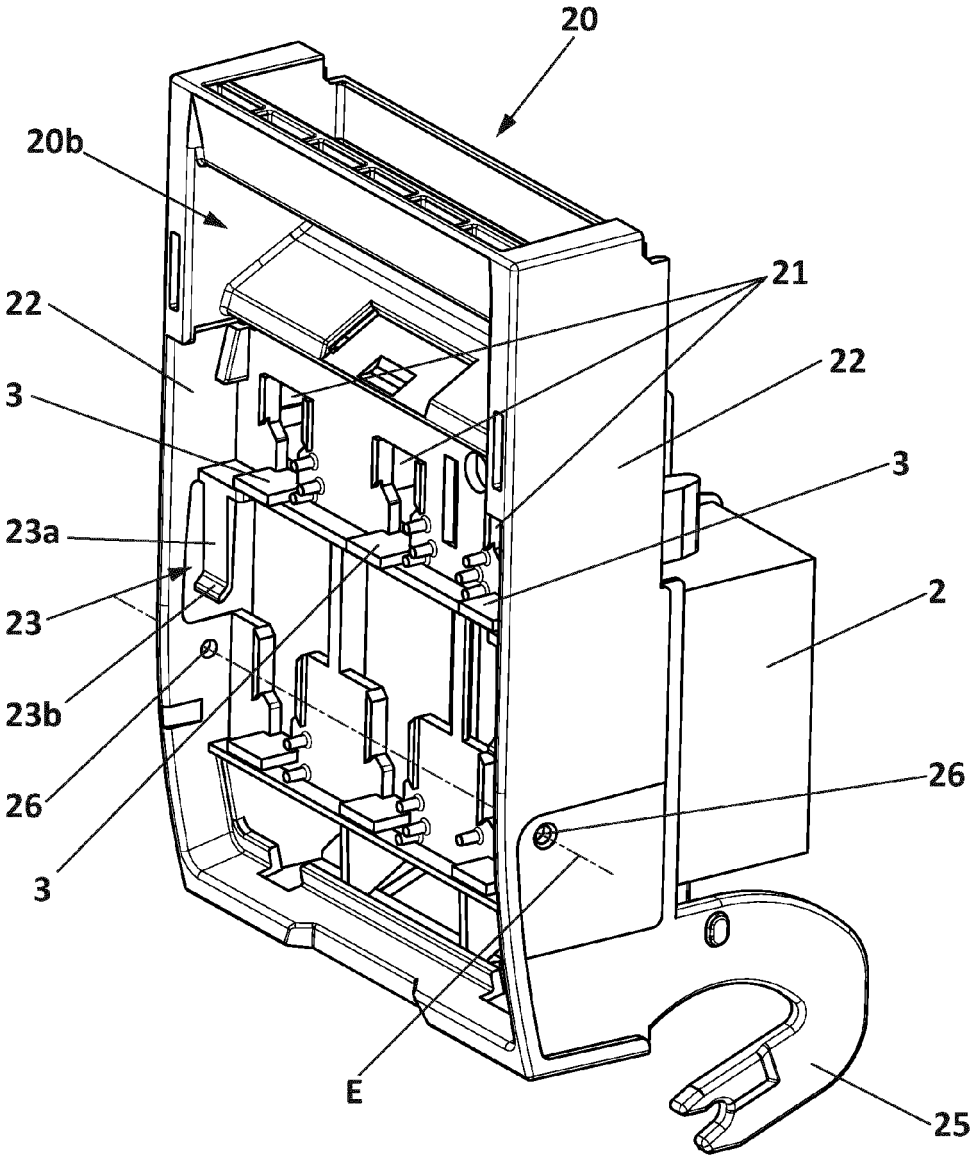

FIG. 4

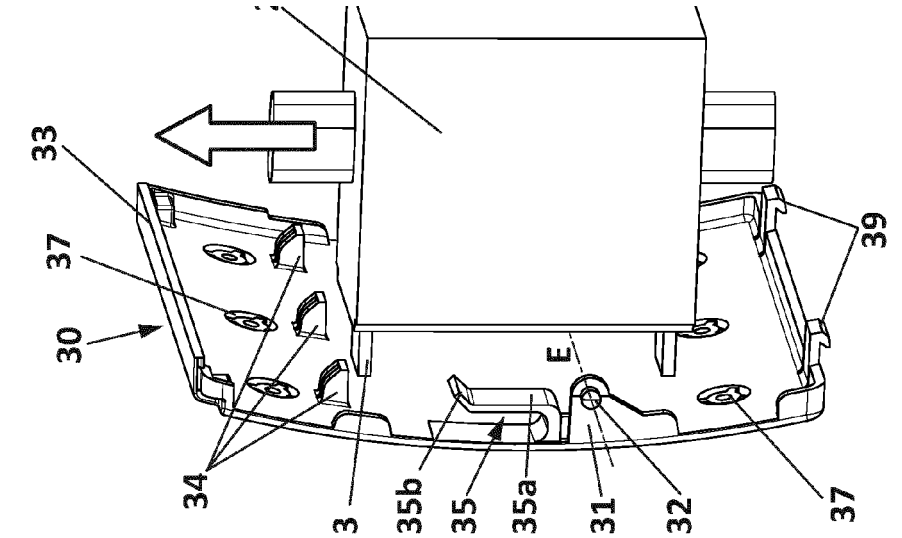

FIG. 5C

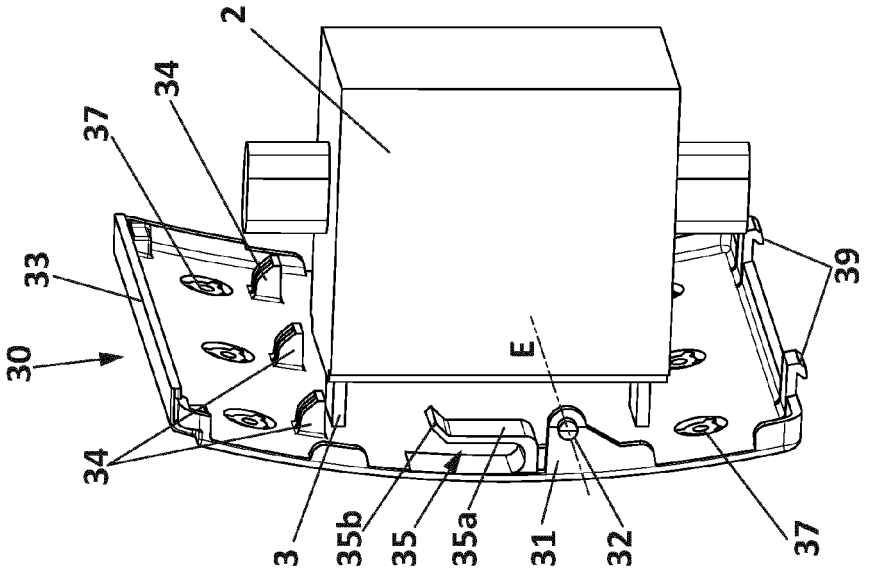

FIG. 5B

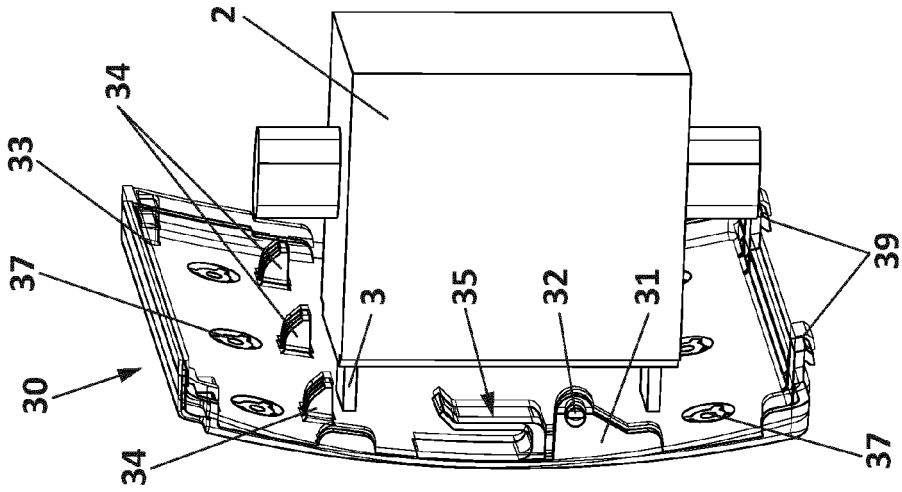

FIG. 5A

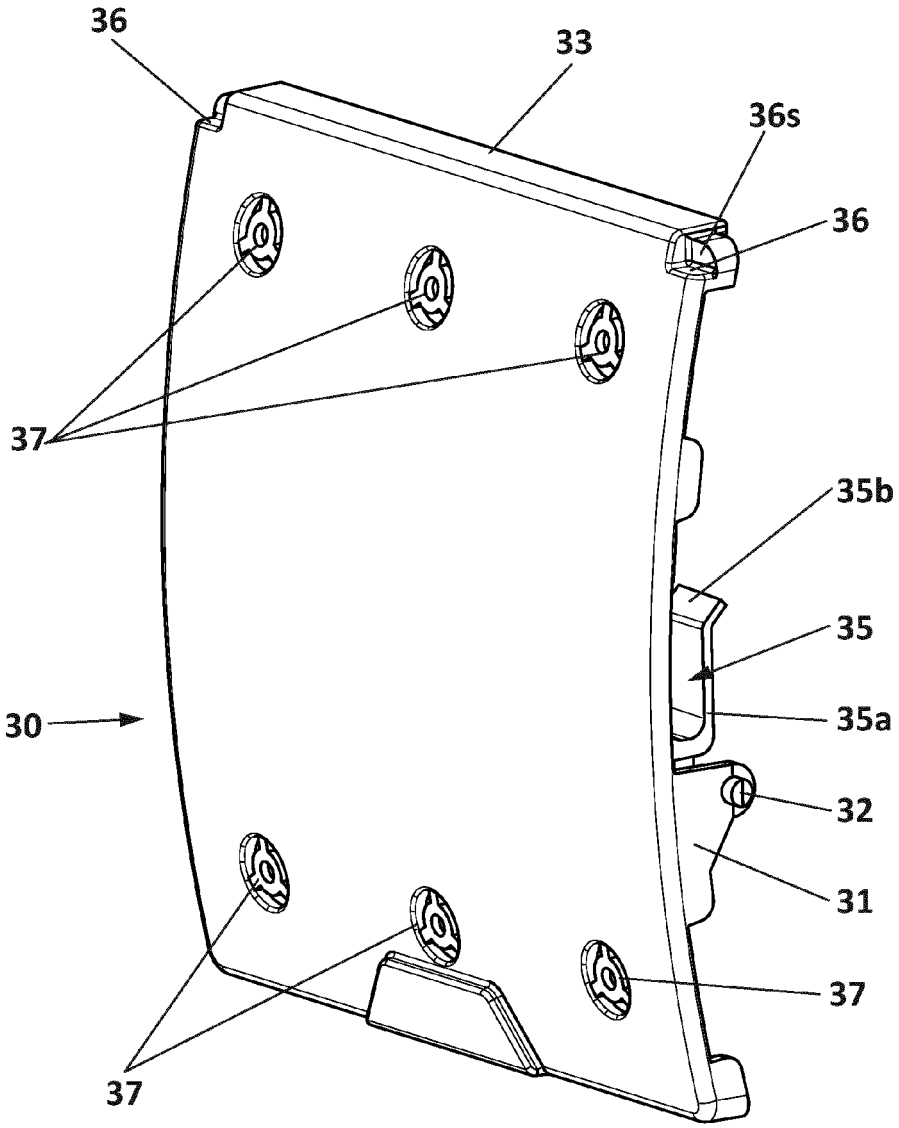

FIG. 6

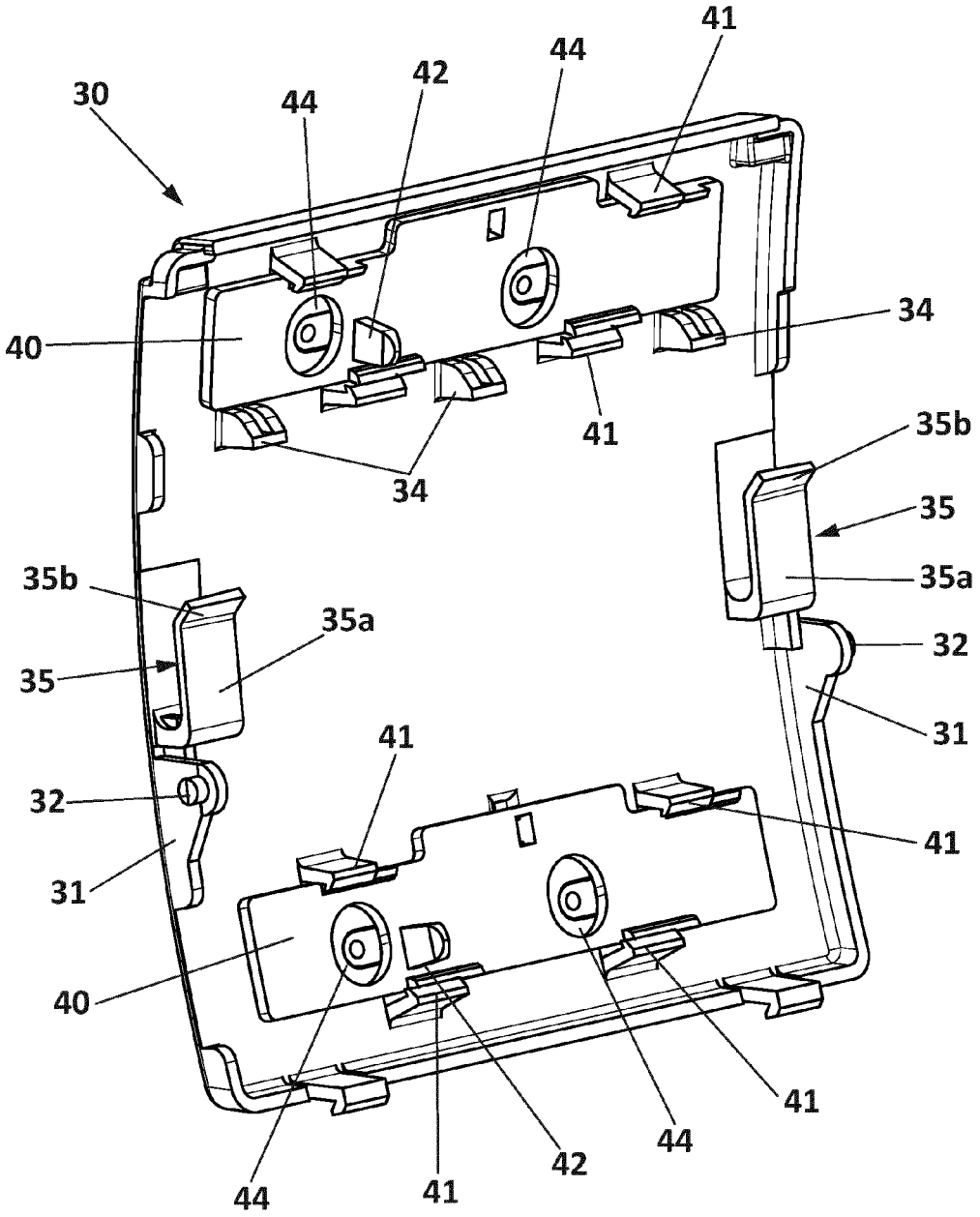
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FIG. 7

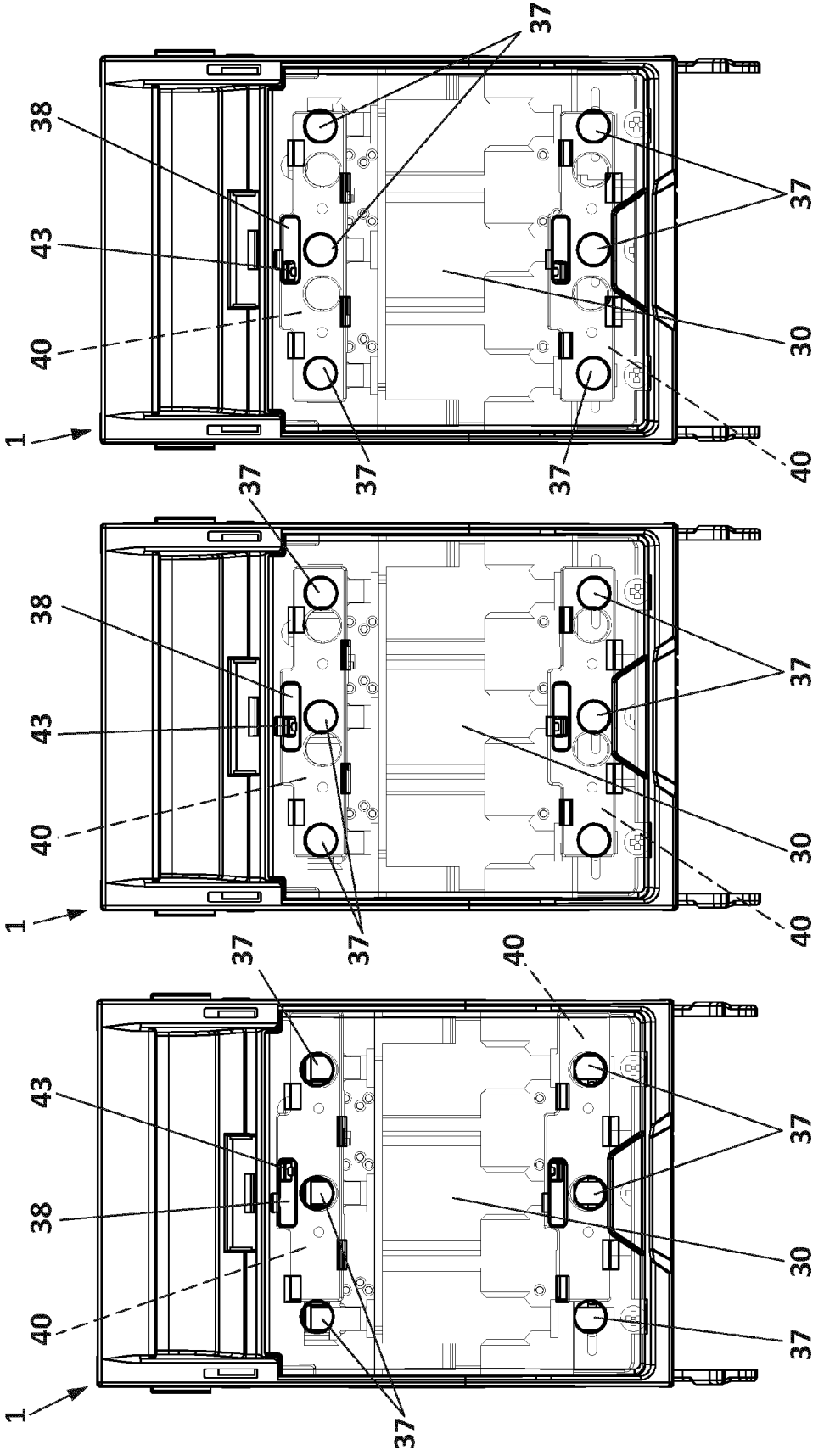

FIG. 8C

FIG. 8B

FIG. 8A

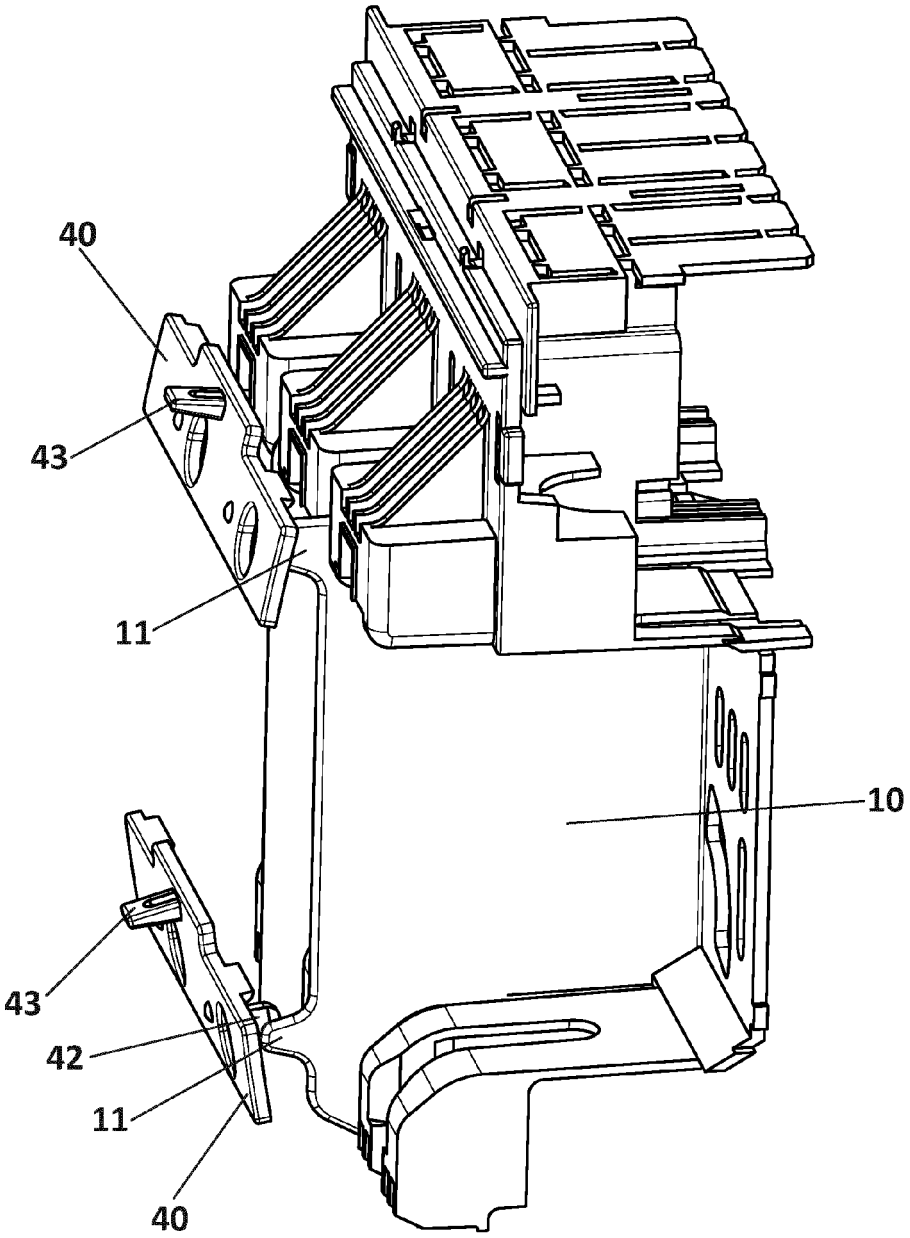

FIG. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 15 38 2134

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 39 31 660 C1 (JEAN MÜLLER GMBH) 7 March 1991 (1991-03-07) * column 4, lines 8-43; figure 1 *	1-14	INV. H01H85/25
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TECHNICAL FIELDS SEARCHED (IPC)

H01H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	27 August 2015	Simonini, Stefano

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