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(54) **Convertible electrical switch device**

Umwandelbare elektrische Schaltvorrichtung

Dispositif de commutation électrique convertible

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(73) Proprietor: **Berker GmbH & Co. KG**
58579 Schalksmühle (DE)

(72) Inventor: **Guidetti, Fabrizio**
25015 Desenzano del Garda (IT)

(74) Representative: **Nuss, Laurent et al**
Cabinet Nuss
10, rue Jacques Kablé
67080 Strasbourg Cedex (FR)

(56) References cited:
EP-A1- 1 713 107 DE-A1- 19 745 017
FR-A1- 2 917 858 GB-A- 2 401 723

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Description

[0001] The present invention is related to electrical installation devices, more particularly to electrical switching devices commonly used in domestic, commercial and industrial wiring installations and more specifically to switches and push button functions.

[0002] The present invention concerns a convertible electrical switch device, which can perform selectively either a proper two state switch function (as a so-called bistable mechanical switch, ON/OFF rocker switch or toggle switch) or a push-button function (as a so-called pulse, push or pressure switch).

[0003] The prior art already proposes switching devices which can perform various types of switching functions, by using the same basic components and construction.

[0004] Nevertheless, in these known adaptable switch solutions, the device is adapted during its manufacturing in order to perform one of the possible functions: it is therefore constructively "programmed" for one dedicated specific function at the manufacturing site and cannot be, at least not easily, readapted later on, for example at the installation site (during its first time mounting or later on).

[0005] EP-A-0 921 547 for example discloses such an adaptable switch assembly known from the prior art, which can be adapted to perform in particular either a rocker switch function or a push button function, depending on whether or not a return spring has been incorporated during manufacturing of the device.

[0006] Document GB 2,401,723 A discloses a convertible switch according to the preamble of claim 1. In order to convert the switch from one function to the other, an intermediate member of the switch needs to be displaced. To gain access to the intermediate member, the switch needs to be partially disassembled. In particular, a digital operating member needs to be removed by use of a specific tool.

[0007] Thus, when leaving the production plant, these known devices are set in one of their possible functions (i.e. they are differentiated products) and no later possible function modification is foreseen or even materially feasible without a tedious and complicated disassembling or dismantling of said device (if at all possible).

[0008] It is a main goal of the present invention to provide a multifunctional electrical switch device whose function can be easily modified, preferably in a reversible way, by the installer upon installation of said device on the mounting site, or even later on.

[0009] This goal is achieved by the invention by providing a convertible electrical switch device according to claim 1. Additional features or alternative embodiments of the invention are mentioned in the dependent claims 2 to 15. The invention will be better understood thanks to the following description and drawings of embodiments of said invention given as non limitative examples thereof.

[0010] In the accompanying drawings:

Figure 1 is a partially exploded view of a convertible electrical switch device according to a first embodiment of the invention (the cover plate is not shown); Figures 2A to 2D are sectional views, in a plane perpendicular to the toggling axis of the rocker of the double switch device shown on figure 1, in an ON/OFF switch configuration (figures 2A and 2B) and in a push-button configuration (figures 2C and 2D), the device being respectively open (figures 2A and 2C) and closed (figures 2B and 2D); Figure 3 is a partially exploded view of a convertible electrical switch device according to a second embodiment of the invention (bracket 5 and rocker 2 form a single piece);

Figures 4A to 4D are perspective sectional views of the convertible double switch device shown on figure 3, with a first device set in an ON/OFF switch configuration (figure 4A and 4B) and a second device set in a push-button configuration (figures 4C and 4D), the devices being respectively open (figures 4A and 4C) and closed (figures 4B and 4D);

Figure 5 is a sectional view of the switch device of figure 3, along a plane perpendicular to the switching axis of the rocker, shown in an ON/OFF switch configuration;

Figure 6 is a perspective view of the actuation rocker of the switch device shown on figures 4 and 5, and, Figures 7A and 7B are respectively a perspective view and a top view of the actuation rocker of figure 6, before folding of the force transmission bracket or beam into the rocker head.

[0011] Figures 1 to 5 show a convertible electrical switch device 1 comprising an actuation means 2 which is drivingly engaging a selective electrical connection element 3 and movable between two opposed positions, each position inducing one of a connected state and a disconnected state (or position) of said connection element 3.

[0012] According to the invention, said device 1 also comprises an elastic force generating means 4 and an associated force transmission means 5, said force transmission means 5 being either i): functionally disconnected from said actuation means 2, and said device 1 thus functioning as an ON-OFF type switch device with two opposed stable positions, or ii): operatively linked to the actuation means 2 so that the force generating means 4 elastically urge said actuation means 2 towards one of the two opposed positions, and said device 1 thus functioning as a push-button device.

[0013] Thus, the same device 1 comprising the same components, in the same places, can be configured to perform two different functions, only by establishing or not an operative link between means 5 and 2. More precisely, and as illustrated on the enclosed figures, the actuation means 2 is a T-shaped actuation rocker with a hollow head portion 2' on which the press button or cover plate 8 of the device is mounted and a stem portion

2" engages directly or not the associated selective connection element 3. On the other hand, the elastic force generating means 4 comprise a spring, preferably a compression spring, able to urge the actuation means 2 into its position corresponding to the disconnected state of the associated connection element 3 (in the absence of pressure from the user), when said actuation means 2 and said force transmission means 5 are mutually and rigidly connected together (figures 2C and 4C).

[0014] Preferably, the potential operative link between the actuation means 2 and the force transmission means 5 is a mechanical link established by a clipping or snap-fitting assembly 6, 7 of said two means 2 and 5. Therefore, a rigid link is created between means 5 and 2 without using any additional fastening or connection means and without using a specific tool or having to execute a complicated manual operation or handling.

[0015] In order to prevent any unintentional disconnection between means 5 and 2, when the device is configured into a push button, the invention advantageously provides that the potential operative link between the actuation means 2 and the force transmission means 5 is a settable link which, once established, is maintained during normal use or actuation of said device 1, but could possibly be undone, if appropriate, upon specific action by the user on at least one of said means 2, 5.

[0016] As the space within such electrical devices is limited, an other issue which is dealt with by the invention can be seen as providing a solution calling for minimum space requirement to be implemented.

[0017] Thus, referring to a preferred practical construction of the inventive device, the force transmission means 5 can be accommodated or lodged within the actuation means 2, as a separate part or preferably an integrally formed part, the two means 2 and 5 being rigidly coupled together, and possibly uncoupled (after having been coupled), by means of a relative movement between them, resulting in a mechanical connection or engagement, or respectively a possible disconnection or disengagement.

[0018] As illustrated by way of example on the enclosed drawings, the actuation means can consist of an actuation means 2 is an actuation rocker, pivotably mounted so as to be able to swivel between the two opposed determined positions, said rocker 2 having a head portion 2' for bearing the press button or cover plate 8 and for lodging the force transmission means 5.

[0019] According to a preferred structural design of the device, the selectively connectable force transmission means 5 consists in an elongated bracket swively mounted within the hollow head portion 2' of the pivoting actuation rocker 2, preferably within lateral walls 9 of said head portion 2'.

[0020] Said walls 9 define an open receiving chamber 9' for said elongated bracket 5, form an elevated mounting support for the press button or cover plate 8 and are provided with means 10 for a hinged assembly with said bracket 5, such as bearing means (able to cooperate with pegs or turnions formed on said bracket 5), and with re-

tention means 10' in order to hold the bracket 5 within the head portion 2', such as lateral pegs or shoulders (able to cooperate with recesses or complementary shoulders of the bracket 5).

[0021] Advantageously, the pivoting axis X' of the elongated force transmission bracket 5 and the pivoting axis X of the actuation rocker 2 are coplanar, preferably parallel to each other, and said elongated bracket 5 is permanently cinematically engaged at one end 5' with said actuation rocker 2, in one or a first direction of rotation, or physically linked to it, the other end 5" of said elongated bracket 5 being provided with clipping means 6 able to cooperate with complementary means 7 of said actuation rocker 2 to cinematically subject it to the latter in the opposite or second direction of rotation, whereby providing a rigid rotational linkage between said bracket 5 and said rocker 2 in both direction of rotation of said bracket 5.

[0022] The functioning of the device 1 is better understood by comparing figures 2A and 2B to figures 2C and 2D (or similarly figures 4A and 4B to figures 4C and 4D).

[0023] When considering figure 2A (or 4A), one can see that the beam like bracket 5 is only positively and rigidly driven by the rocker head 2' in figure 2A (or 4A) when the transverse lateral wall portion 9" presses on the end portion 5' of the bracket 5, i.e. in one direction of rotation.

[0024] More precisely, when said retention means 10' is cooperating with the hinged assembly between head portion 2' and bracket 5, this latter is maintained within the head portion 2' in a loose way, i.e. with a limited freedom of movement around the axis X' of the hinged assembly, when the means 6 and 7 are not mutually engaged (figures 2A and 2B - figures 4A and 4B).

[0025] This disposition allows to absorb the possible action of the compression means 4 when the rocker 2 is pivoted in its position in which it comes into bearing contact or abutment on said spring 4 (figure 2B or figure 4B). Indeed, the bracket 5 then freely swivels around axis X' without transmitting any pressure force to the head portion 2' (which would urge the rocker 2 back into its position of figure 2A or 4A).

[0026] Once the complementary snap fitting linking means 6 and 7 are mutually engaged, the bracket 5 is rotationally rigidly subjected or linked to the rocker 2 and then transmits the pressure force through the bracket 5 to the head portion 2' when said bracket 5 comes into bearing contact on said spring 4 (figure 2D or 4D).

[0027] As it is apparent on the enclosed figures, the top part of the compression spring 4 extends freely into the chamber 9' of the head portion 2', its end portion only engaging bracket 5.

[0028] In order to avoid an accidental engagement or disengagement of the complementary means 6, 7 of the snap-fitting assembly, during the use of the device 1 after installation and function setting, the invention may provide that the press button or cover plate 8 is mounted on the head portion 2' with a given distance to the force transmission means 5, in particular by providing lateral

walls 9 having a sufficient height, with regard to said means 5, so as to prevent any contact between said button or plate 8 and said force transmission means 5, in particular when said button or plate 8 is moved by a user (plate 8 is only in contact with the walls 9 of head 2).

[0029] Furthermore, in order to prevent any non wanted resetting of the device 1 (from a planned function into an unplanned function), during manipulation and/or installation of said device 1 on the site, in particular during test operations needing actuation of the rocker 2 by the installer, it can be foreseen that the chamber 9' defined by the lateral walls 9 and lodging the force transmission means 5 has a top access passage or opening which is designed, in relation to shape and dimensions, so as to prevent the accidental use, or engagement with the actuation means 2, of said force transmission means 5, when the head portion 2' is contacted or moved by the user or installer, even without the button or plate 8 mounted on it.

[0030] In particular, the elongated gap between the two longitudinal walls 9 has a width limited to a fraction (for example 2/3 or 1/2) of the width of a human finger (preferably the thumb or the index).

[0031] So as to allow the setting of the device 1 into push-button function, a slot or cross-shaped recess 17 can be arranged in the bracket 5 in its corresponding end 5" for the tip of a screwdriver.

[0032] The snap-fitting engagement between 6' and 7 may be released by acting on wing 6.

[0033] According to a practical embodiment of the invention, the compression spring 4 forming the elastic force generating means presses against the elongated bracket 5 between its swivelling axis towards the actuation rocker 2 and its end 5" provided with clipping means 6, the pushing force of said compression spring 4 generating a torque directed in the opposite or second direction of rotation of said bracket 5.

[0034] As can be seen on figures 1, 4 and 7, the pivoting axis X' is advantageously shifted closely towards the end of the chamber 9' opposite the site 7.

[0035] Concerning the snap fit assembly, two practical alternate constructions are possible, one being shown on figures 1 and 2 and the other one being shown on figures 3 to 7.

[0036] Thus, the invention can provide that the clipping means 6 of said elongated bracket 5 or the complementary site 7 of the head portion 2' consist of an elastically deformable wing or flange part provided with hooking or notching means designed to come into engagement with the other component of the dual clipping arrangement 6, 7, in the form of a shoulder, a cut-out or an opening, and that said elongated bracket 5 also comprises a nipple, a chuck or a similar nesting formation 11 cooperating with the compression spring 4.

[0037] In the embodiment shown on figures 1 and 2, the beam like bracket 5 is made as a separate part.

[0038] Nevertheless, in order to facilitate the production and to reduce the costs, it can be envisaged, as

shown on figures 3 to 7, that the actuation rocker 2 and the elongated bracket 5 are a single piece, preferably a single molded piece of plastic material, the elongated bracket 5 being linked through at least one foldable material bridge 14 to the head portion 2', opposite the means 7 intended to cooperate with the clipping means 6 of said bracket 5.

[0039] Advantageously, the elongated bracket 5 is formed with an integral trunnion 15 able to cooperate with bearing means 10 provided in the head portion 2' in order to constitute a swivelling or pivot link between said head portion 2' and said bracket 5.

[0040] In both illustrated embodiments, the device 1 comprises a housing 13 lodging at least one, preferably at least two set(s) of components incorporating each an actuation rocker 2 with an elongated force transmission bracket 5, a selective electrical connection element 3 and an elastic force generating means 4.

[0041] The rockers 2 are mounted in a swivelly manner on a platform 13' provided with support brackets 16 and forming a closing cover for the insulated electrical part of the device 1.

[0042] Said platform 13' also incorporates the mounting sites 12. Preferably, each elastic force generating means 4 is maintained uncompressed or under slight compression within a corresponding mounting site 12 arranged in said device 1 (connexion element 3).

[0043] The present invention is, of course, not limited to the preferred embodiments described and represented herein, changes can be made or equivalents used without departing from the scope of the claims.

Claims

1. Convertible electrical switch device comprising an actuation means which is drivingly engaging a selective electrical connection element and movable between two opposed positions, each position inducing one of a connected and a disconnected state or position of said connection element, wherein the device (1) also comprises an elastic force generating means (4) and an associated force transmission means (5), said force transmission means (5) being either i): functionally disconnected from said actuation means (2), and said device (1) thus functioning as an ON-OFF type switch device with two opposed stable positions, or ii): operatively linked to the actuation means (2) so that the elastic force generating means (4) elastically urge said actuation means (2) towards one of the two opposed positions, and said device (1) thus functioning as a push-button device, wherein the actuation means (2) is a T-shaped actuation rocker comprising a stem portion (2") engaging directly or not the associated selective connection element (3), and wherein the elastic force generating means (4) comprise a spring, preferably a

compression spring,

characterized in that

the T-shaped actuation rocker comprises a hollow head portion (2') on which the press button or cover plate (8) of the device is mounted, and **in that** the elastic force generating means (4) are able to urge the actuation means (2) into its position corresponding to the disconnected state of the associated connection element (3) when said actuation means (2) and said force transmission means (5) are mutually and rigidly connected together.

2. Electrical switch device according to claim 1, **characterized in that** the potential operative link between the actuation means (2) and the force transmission means (5) is a mechanical link established by a clipping or snap-fitting assembly (6, 7) of said two means (2 and 5).
3. Electrical switch device according to claim 1 or 2, **characterized in that** the potential operative link between the actuation means (2) and the force transmission means (5) is a settable link which, once established, is maintained during normal use or actuation of said device (1), but could possibly be undone, if appropriate, upon specific action by the user on at least one of said means (2, 5).
4. Electrical switch device according to anyone of claims 1 to 3, **characterized in that** the force transmission means (5) is accommodated within the actuation means (2), as a separate part or preferably an integrally formed part, the two means (2, 5) being rigidly coupled together, and possibly uncoupled, by means of a relative movement between them, resulting in a mechanical connection or engagement, or respectively a possible disconnection or disengagement.
5. Electrical switch device according to anyone of claims 1 to 4, **characterized in that** the actuation means (2) is an actuation rocker, pivotably mounted so as to be able to swivel between the two opposed determined positions, said rocker (2) having a head portion (2') for bearing the press button or cover plate (8) and for lodging the force transmission means (5).
6. Electrical switch device according to any one of the claims 1 to 5, **characterized in that** the selectively connectable force transmission means (5) consists in an elongated bracket swively mounted within the hollow head portion (2') of the pivoting actuation rocker (2), preferably within lateral walls (9) of said head portion (2'), which define an open receiving chamber (9') for said elongated bracket (5), form an elevated mounting support for the press button or cover plate (8) and are provided with means (10) for a hinged assembly with said bracket (5), such as

bearing means, and with retention means (10') in order to hold the bracket (5) within the head portion (2'), such as lateral pegs or shoulders.

7. Electrical switch device according to claim 6, **characterized in that** the pivoting axis (X') of the elongated force transmission bracket (5) and the pivoting axis (X) of the actuation rocker (2) are coplanar, preferably parallel to each other, and **in that** said elongated bracket (5) is permanently cinematically engaged at one end (5') with said actuation rocker (2), in one or a first direction of rotation, or physically linked to it, the other end (5'') of said elongated bracket (5) being provided with clipping means (6) able to cooperate with complementary means (7) of said actuation rocker (2) to cinematically subject it to the latter in the opposite or second direction of rotation, whereby providing a rigid rotational linkage between said bracket (5) and said rocker (2) in both direction of rotation of said bracket (5).
8. Electrical switch device according to claim 6 or 7, **characterized in that** the press button or cover plate (8) is mounted on the head portion (2') with a given distance to the force transmission means (5), in particular by providing lateral walls (9) having a sufficient height, with regard to said means (5), so as to prevent any contact between said button or plate (8) and said force transmission means (5), in particular when said button or plate (8) is moved by a user.
9. Electrical switch device according to anyone of claims 6 to 8, **characterized in that** the chamber (9') defined by the lateral walls (9) and lodging the force transmission means (5) has a top access passage or opening which is designed, in relation to shape and dimensions, so as to prevent the accidental use, or engagement with the actuation means (2), of said force transmission means (5), when the head portion (2') is contacted or moved by the user or installer, even without the button or plate (8) mounted on it.
10. Electrical switch device according to anyone of claims 6 to 9, **characterized in that** the compression spring (4) forming the elastic force generating means presses against the elongated bracket (5) between its swivelling axis towards the actuation rocker (2) and its end (5'') provided with clipping means (6), the pushing force of said compression spring (4) generating a torque directed in the opposite or second direction of rotation of said bracket (5).
11. Electrical switch device according to anyone of claims 7 to 9, **characterized in that** the clipping means (6) of said elongated bracket (5) or the complementary site (7) of the head portion (2') consist of an elastically deformable wing or flange part pro-

vided with hooking or notching means designed to come into engagement with the other component of the dual clipping arrangement (6, 7), in the form of a shoulder, a cut-out or an opening, and **in that** said elongated bracket (5) also comprises a nipple, a chuck or a similar nesting formation (11) cooperating with the compression spring (4).

12. Electrical switch device according to anyone of claims 6 to 11, **characterized in that** the actuation rocker (2) and the elongated bracket (5) are a single piece, preferably a single molded piece of plastic material, the elongated bracket (5) being linked through at least one foldable material bridge (14) to the head portion (2'), opposite the means (7) intended to cooperate with the clipping means (6) of said bracket (5).
13. Electrical switch device according to claim 12, **characterized in that** the elongated bracket (5) is formed with an integral trunnion (15) able to cooperate with bearing means (10) provided in the head portion (2') in order to constitute a swivelling or pivot link between said head portion (2') and said bracket (5).
14. Electrical switch device according to anyone of claims 1 to 13, **characterized in that** the elastic force generating means (4) is maintained uncompressed or under slight compression within a corresponding mounting site (12) arranged in said device (1).
15. Electrical switch device according to anyone of claims 1 to 14, **characterized in that** it comprises a housing (13) lodging at least one, preferably at least two set(s) of components incorporating each an actuation rocker (2) with an elongated force transmission bracket (5), a selective electrical connection element (3) and an elastic force generating means (4).

Patentansprüche

1. Wandelbare elektrische Schaltvorrichtung umfassend eine Betätigungseinrichtung, die treibend in ein selektives elektrisches Verbindungselement eingreift und zwischen zwei gegenüberliegenden Positionen bewegbar ist, wobei jede Position eine(n) verbundene(n) oder eine(n) nicht verbundene(n) Zustand oder Position des Verbindungselements heraufruft,

wobei die Vorrichtung (1) ebenfalls eine eine elastische Kraft erzeugende Einrichtung (4) und eine zugeordnete Kraftübertragungseinrichtung (5) aufweist, wobei die Kraftübertragungseinrichtung (5) entweder i): funktionsmäßig von der Betätigungseinrichtung (2) getrennt ist und die Vorrichtung (1) somit als eine Schaltvorrichtung

des Typs AN-AUS mit zwei gegenüberliegenden stabilen Positionen ist oder ii): operativ mit der Betätigungseinrichtung (2) verbunden ist, so dass die eine elastische Kraft erzeugende Einrichtung (4) die Betätigungseinrichtung (2) elastisch in Richtung einer der zwei gegenüberliegenden Positionen zwingt und die Vorrichtung (1) somit als Druckstastenvorrichtung funktioniert, wobei die Betätigungseinrichtung (2) eine T-förmige Betätigungswippe ist, die einen Schaftabschnitt (2'') aufweist, der direkt in oder nicht in das zugeordnete selektive Verbindungselement (3) eingreift und wobei die eine elastische Kraft erzeugende Einrichtung (4) eine Feder, vorzugsweise eine Druckfeder aufweist,

dadurch gekennzeichnet, dass

die T-förmige Betätigungswippe einen hohlen Kopfabschnitt (2') aufweist, an dem die Drucktaste oder Abdeckplatte (8) der Vorrichtung angebracht ist und dass die eine elastische Kraft erzeugende Einrichtung (4) geeignet ist, die Betätigungseinrichtung (2) in ihre Position zu zwingen, die dem nicht verbundenen Zustand des zugeordneten Verbindungselements (3) entspricht, wenn die Betätigungseinrichtung (2) und die Kraftübertragungseinrichtung (5) miteinander starr verbunden sind.

2. Elektrische Schaltvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die potenzielle operative Verbindung zwischen der Betätigungseinrichtung (2) und der Kraftübertragungseinrichtung (5) eine mechanische Verbindung ist, die durch eine Clipanordnung oder eine Schnappverbindungsanordnung (6, 7) der zwei Einrichtungen (2 und 5) hergestellt wird.
3. Elektrische Schaltvorrichtung nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die potenzielle operative Verbindung zwischen der Betätigungseinrichtung (2) und der Kraftübertragungseinrichtung (5) eine festlegbare Verbindung ist, die, wenn sie einmal hergestellt ist, während des normalen Gebrauchs oder bei Betätigung der Vorrichtung (1) beibehalten wird, jedoch gegebenenfalls möglicherweise durch eine spezifische Maßnahme seitens des Benutzers an mindestens einer der Einrichtungen (2, 5) gelöst werden könnte.
4. Elektrische Schaltvorrichtung nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** die Kraftübertragungseinrichtung (5) innerhalb der Betätigungseinrichtung (2) untergebracht ist als ein separates Teil oder vorzugsweise als ein einstückig ausgebildetes Teil, wobei die zwei Einrichtungen (2, 5) mittels einer relativen Bewegung zwischen diesen starr miteinander gekoppelt und möglicherweise

voneinander gelöst werden, was eine mechanische Verbindung oder Eingriff bzw. eine mögliche Trennung oder Lösen des Eingriffs zur Folge hat.

5. Elektrische Schaltvorrichtung nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** die Betätigungseinrichtung (2) eine Betätigungswippe ist, die schwenkbar gelagert ist, so dass sie zwischen den zwei gegenüberliegenden bestimmten Positionen schwenken kann, wobei die Wippe (2) einen Kopfabschnitt (2') zum Lagern der Drucktaste oder Abdeckplatte (8) und zur Aufnahme der Kraftübertragungseinrichtung (5) hat. 5
6. Elektrische Schaltvorrichtung nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** die selektiv verbindbare Kraftübertragungseinrichtung (5) aus einem länglichen Bügel besteht, der schwenkbar innerhalb des hohlen Kopfabschnitts (2') der Schwenk-Betätigungswippe (2) angebracht ist, vorzugsweise innerhalb seitlicher Wände (9) des Kopfabschnitts (2'), die eine offene Aufnahmekammer (9') für den länglichen Bügel (5) definieren, eine erhöhte Befestigungsstütze für die Drucktaste oder Abdeckplatte (8) bilden und mit einer Einrichtung (10) für eine schwenkbare Anordnung mit dem Bügel (5), wie beispielsweise einer Lagereinrichtung, und mit Rückhaltemitteln (10'), wie beispielsweise einem seitlichen Zapfen oder Schultern, versehen sind, um den Bügel (5) innerhalb des Kopfabschnitts (2') zu halten. 10
7. Elektrische Schaltvorrichtung nach Anspruch 6, **dadurch gekennzeichnet, dass** die Schwenkachse (X') des länglichen Kraftübertragungsbügels (5) und die Schwenkachse (X) der Betätigungswippe (2) koplanar, vorzugsweise parallel zueinander, sind und dass der längliche Bügel (5) permanent kinematisch an einem Ende (5') mit der Betätigungswippe (2) in einer bzw. einer ersten Rotationsrichtung in Eingriff ist, oder physisch damit verbunden ist, wobei das andere Ende (5'') des länglichen Bügels (5) mit einer Clipseinrichtung (6) versehen ist, die mit einer Komplementäreinrichtung (7) der Betätigungswippe (2) zusammenwirken kann, um diesen mit der letzteren in der entgegengesetzten bzw. zweiten Drehrichtung kinematisch zu befestigen, wodurch eine starre Drehverbindung zwischen dem Bügel (5) und der Wippe (2) in beide Rotationsrichtungen des Bügels (5) bereitgestellt wird. 15
8. Elektrische Schaltvorrichtung nach Anspruch 6 oder 7, **dadurch gekennzeichnet, dass** die Drucktaste oder Abdeckplatte (8) an dem Kopfabschnitt (2') mit einem gegebenen Abstand zu der Kraftübertragungseinrichtung (5) angebracht ist, insbesondere durch Bereitstellen von Seitenwänden (9) mit einer ausreichenden Höhe in Bezug auf die Einrichtung 20

(5), um jeglichen Kontakt zwischen der Taste oder Platte (8) und der Kraftübertragungseinrichtung (5) zu verhindern, insbesondere wenn die Taste oder Platte (8) von einem Benutzer bewegt wird.

9. Elektrische Schaltvorrichtung nach einem der Ansprüche 6 bis 8, **dadurch gekennzeichnet, dass** die Kammer (9'), die durch die Seitenwände (9) definiert ist und die Kraftübertragungseinrichtung (5) aufnimmt, einen oberen Zugriffsdurchgang oder Öffnung hat, der/die in Bezug auf Form und Abmessungen so ausgebildet ist, dass der unbeabsichtigte Gebrauch oder Eingriff mit der Betätigungseinrichtung (2) der Kraftübertragungseinrichtung (5) verhindert wird, wenn der Kopfabschnitt (2') von dem Benutzer oder Monteur berührt oder bewegt wird, selbst wenn die Taste oder Platte (8) nicht daran befestigt ist. 25
10. Elektrische Schaltvorrichtung nach einem der Ansprüche 6 bis 9, **dadurch gekennzeichnet, dass** die Druckfeder (4), welche die die elastische Kraft erzeugende Einrichtung bildet, gegen den länglichen Bügel (5) zwischen seiner Schwenkachse in Richtung der Betätigungswippe (2) und seinem Ende (5''), das mit der Clipseinrichtung (6) versehen ist, drückt, wobei die Druckkraft der Druckfeder (4) ein Drehmoment erzeugt, das in die entgegengesetzte bzw. zweite Rotationsrichtung des Bügels (5) gerichtet ist. 30
11. Elektrische Schaltvorrichtung nach einem der Ansprüche 7 bis 9, **dadurch gekennzeichnet, dass** die Clipseinrichtung (6) des länglichen Bügels (5) oder der komplementäre Ort (7) des Kopfabschnitts (2') aus einer elastisch verformbaren Flanke oder Flanschteil besteht, die/das mit einer Haken- oder Kerbeinrichtung versehen ist, die so ausgebildet ist, um in Eingriff mit der anderen Komponente der dualen Clipanordnung (6, 7) in Form einer Schulter, eines Ausschnitts oder einer Öffnung zu kommen, und dass der längliche Bügel (5) auch eine Noppe, eine Spannvorrichtung oder eine ähnliche verschachtelnde Ausbildung (11) aufweist, die mit der Druckfeder (4) zusammenwirkt. 35
12. Elektrische Schaltvorrichtung nach einem der Ansprüche 6 bis 11, **dadurch gekennzeichnet, dass** die Betätigungswippe (2) und der längliche Bügel (5) einstückig sind, vorzugsweise ein einzelnes Formteil aus Plastikmaterial, wobei der längliche Bügel (5) durch mindestens eine Brücke (14) aus klappbarem Material mit dem Kopfabschnitt (2') gegenüber der Einrichtung (7), die zum Zusammenwirken mit der Clipseinrichtung (6) des Bügels (5) vorgesehen ist, verbunden ist. 40
13. Elektrische Schaltvorrichtung nach Anspruch 12, **dadurch gekennzeichnet, dass** der längliche Bü- 45

gel (5) mit einem einstückigen Drehzapfen (15) gebildet ist, der mit der Lagereinrichtung (10), die in dem Kopfabschnitt (2') vorgesehen ist, zusammenwirken kann, um eine Dreh- oder Schwenkverbindung zwischen dem Kopfabschnitt (2') und dem Bügel (5) zu bilden.

14. Elektrische Schaltvorrichtung nach einem der Ansprüche 1 bis 13, **dadurch gekennzeichnet, dass** die eine elastische Kraft erzeugende Einrichtung (4) nicht unter Druck oder unter einem geringen Druck im Bereich eines entsprechenden Befestigungsorts (12), der in der Vorrichtung (1) angeordnet ist, gehalten wird.
15. Elektrische Schaltvorrichtung nach einem der Ansprüche 1 bis 14, **dadurch gekennzeichnet, dass** sie ein Gehäuse (13) aufweist, das mindestens einen Satz, vorzugsweise mindestens zwei Sätze von Komponenten aufnimmt, die jeweils eine Betätigungswippe (2) mit einem länglichen Kraftübertragungsbügel (5), ein selektives elektrisches Verbindungselement (3) und eine eine elastische Kraft erzeugende Einrichtung (4) beinhalten.

Revendications

1. Dispositif de commutation électrique convertible comprenant un moyen d'actionnement qui coopère en entraînement avec un élément de connexion électrique sélective et qui est mobile entre deux positions opposées, chaque position induisant un état ou une position parmi un état ou une position connecté(e) et un état ou une position déconnecté(e) dudit élément de connexion, dans lequel le dispositif (1) comprend également un moyen de génération de force élastique (4) et un moyen de transmission de force (5) associé, ledit moyen de transmission de force (5) étant soit i) : fonctionnellement déconnecté dudit moyen d'actionnement (2), et ledit dispositif (1) fonctionnant ainsi comme un dispositif de commutation de type marche-arrêt avec deux positions stables opposées, soit ii) : fonctionnellement relié au moyen d'actionnement (2) de sorte que le moyen de génération de force élastique (4) pousse élastiquement ledit moyen d'actionnement (2) vers l'une des deux positions opposées, et ledit dispositif (1) fonctionnant alors comme un dispositif de type bouton-poussoir, dans lequel le moyen d'actionnement (2) est une bascule d'actionnement en forme de T comprenant une partie tige (2'') en contact direct ou non avec l'élément de connexion sélective (3) associé, et dans lequel le moyen de génération de force élastique (4) comprend un ressort, de préférence un ressort de compression, **caractérisé en ce que**

la bascule d'actionnement en forme de T comprend une partie tête creuse (2') sur laquelle est monté le bouton-poussoir ou la plaque de recouvrement (8) du dispositif, et **en ce que** le moyen de génération de force élastique (4) est capable de pousser le moyen d'actionnement (2) dans sa position correspondant à l'état déconnecté de l'élément de connexion (3) associé lorsque ledit moyen d'actionnement (2) et ledit moyen de transmission de force (5) sont mutuellement et rigidement connectés ensemble.

2. Dispositif de commutation électrique selon la revendication 1, **caractérisé en ce que** le lien fonctionnel potentiel entre le moyen d'actionnement (2) et le moyen de transmission de force (5) est un lien mécanique établi par un assemblage par clipsage ou par encliquetage (6, 7) desdits deux moyens (2 et 5).
3. Dispositif de commutation électrique selon la revendication 1 ou 2, **caractérisé en ce que** le lien fonctionnel potentiel entre le moyen d'actionnement (2) et le moyen de transmission de force (5) est un lien réglable qui, une fois établi, est maintenu pendant l'utilisation normale ou l'actionnement dudit dispositif (1), mais pourrait possiblement être défait, le cas échéant, par une action spécifique de l'utilisateur sur au moins l'un desdits moyens (2, 5).
4. Dispositif de commutation électrique selon l'une quelconque des revendications 1 à 3, **caractérisé en ce que** le moyen de transmission de force (5) est logé dans le moyen d'actionnement (2), en tant que partie séparée ou de préférence en tant que partie intégrante, les deux moyens (2, 5) étant couplés rigidement ensemble, et possiblement désaccouplés, au moyen d'un mouvement relatif entre eux, résultant en une connexion ou un engagement mécanique, ou respectivement une déconnexion ou un désengagement possible.
5. Dispositif de commutation électrique selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** le moyen d'actionnement (2) est une bascule d'actionnement montée pivotante de manière à pouvoir pivoter entre les deux positions opposées déterminées, ladite bascule (2) ayant une partie tête (2') pour porter le bouton-poussoir ou la plaque de recouvrement (8) et pour loger le moyen de transmission de force (5).
6. Dispositif de commutation électrique selon l'une quelconque des revendications 1 à 5, **caractérisé en ce que** le moyen de transmission de force (5) connectable sélectivement consiste en un bras allongé monté pivotant à l'intérieur de la partie tête creuse (2') de la bascule d'actionnement pivotante (2), de préférence à l'intérieur de parois latérales (9)

de ladite partie tête (2'), qui définissent une chambre de réception ouverte (9') pour ledit bras allongé (5), forment un support de montage surélevé pour le bouton-poussoir ou la plaque de recouvrement (8) et sont pourvues de moyens (10) pour un assemblage articulé avec ledit bras (5), tels que des moyens d'appui, et de moyens de retenue (10') pour maintenir le bras (5) dans la partie tête (2'), tels que des tenons ou des épaulements latéraux.

7. Dispositif de commutation électrique selon la revendication 6, **caractérisé en ce que** l'axe de pivotement (X') du bras de transmission de force allongé (5) et l'axe de pivotement (X) de la bascule d'actionnement (2) sont coplanaires, de préférence parallèles l'un à l'autre, et **en ce que** ledit bras allongé (5) est en prise cinématique permanente à une extrémité (5') avec ladite bascule d'actionnement (2), dans un ou un premier sens de rotation, ou physiquement relié à celle-ci, l'autre extrémité (5'') dudit bras allongé (5) étant pourvue de moyens de clipsage (6) aptes à coopérer avec des moyens complémentaires (7) de ladite bascule d'actionnement (2) pour la soumettre cinématiquement à cette dernière dans le sens de rotation opposé ou deuxième sens de rotation, fournissant ainsi une liaison rotative rigide entre ledit bras (5) et ladite bascule (2) dans les deux sens de rotation dudit bras (5).
8. Dispositif de commutation électrique selon la revendication 6 ou 7, **caractérisé en ce que** le bouton-poussoir ou la plaque de recouvrement (8) est monté(e) sur la partie tête (2') à une distance donnée du moyen de transmission de force (5), en particulier en prévoyant des parois latérales (9) ayant une hauteur suffisante par rapport audit moyen (5), de manière à empêcher tout contact entre ledit bouton ou ladite plaque (8) et ledit moyen de transmission de force (5), en particulier lorsque ledit bouton ou ladite plaque (8) est déplacé(e) par un utilisateur.
9. Dispositif de commutation électrique selon l'une quelconque des revendications 6 à 8, **caractérisé en ce que** la chambre (9') définie par les parois latérales (9) et logeant le moyen de transmission de force (5) présente un passage ou une ouverture d'accès supérieur(e) qui est conçu(e), en ce qui concerne la forme et les dimensions, de manière à empêcher l'utilisation accidentelle, ou l'engagement avec le moyen d'actionnement (2), dudit moyen de transmission de force (5), lorsque la partie tête (2') est contactée ou déplacée par l'utilisateur ou l'installateur, même sans bouton ou plaque (8) monté(e) sur elle.
10. Dispositif de commutation électrique selon l'une quelconque des revendications 6 à 9, **caractérisé en ce que** le ressort de compression (4) formant le

moyen de génération de force élastique exerce une pression sur le bras allongé (5) entre son axe de pivotement vers la bascule d'actionnement (2) et son extrémité (5'') pourvue de moyens de clipsage (6), la force de poussée dudit ressort de compression (4) générant un couple dirigé dans le sens de rotation opposé ou deuxième sens de rotation dudit bras (5).

11. Dispositif de commutation électrique selon l'une quelconque des revendications 7 à 9, **caractérisé en ce que** les moyens de clipsage (6) dudit bras allongé (5) ou le site complémentaire (7) de la partie tête (2') consistent en une partie aile ou bride élastiquement déformable pourvue de moyens d'accrochage ou d'encoche conçus pour venir en prise avec l'autre composant de l'agencement de clipsage double (6, 7) sous la forme d'un épaulement, d'une découpe ou d'une ouverture, et **en ce que** ledit bras allongé (5) comprend également un mamelon, un mandrin ou une formation d'emboîtement similaire (11) coopérant avec le ressort de compression (4).
12. Dispositif de commutation électrique selon l'une quelconque des revendications 6 à 11, **caractérisé en ce que** la bascule d'actionnement (2) et le bras allongé (5) sont une seule pièce, de préférence une seule pièce moulée en matière plastique, le bras allongé (5) étant relié par au moins un pont en matériau pliable (14) à la partie tête (2'), à l'opposé des moyens (7) destinés à coopérer avec les moyens de clipsage (6) dudit bras (5).
13. Dispositif de commutation électrique selon la revendication 12, **caractérisé en ce que** le bras allongé (5) est formé avec un tourillon intégré (15) apte à coopérer avec des moyens d'appui (10) prévus dans la partie tête (2') afin de constituer une liaison pivotante ou articulée entre ladite partie tête (2') et ledit bras (5).
14. Dispositif de commutation électrique selon l'une quelconque des revendications 1 à 13, **caractérisé en ce que** le moyen de génération de force élastique (4) est maintenu sans compression ou sous légère compression dans un site de montage correspondant (12) disposé dans ledit dispositif (1).
15. Dispositif de commutation électrique selon l'une quelconque des revendications 1 à 14, **caractérisé en ce qu'il** comprend un boîtier (13) logeant au moins un, de préférence au moins deux ensemble(s) de composants incorporant chacun une bascule d'actionnement (2) avec un bras de transmission de force allongé (5), un élément de connexion électrique sélective (3) et un moyen de génération de force élastique (4).

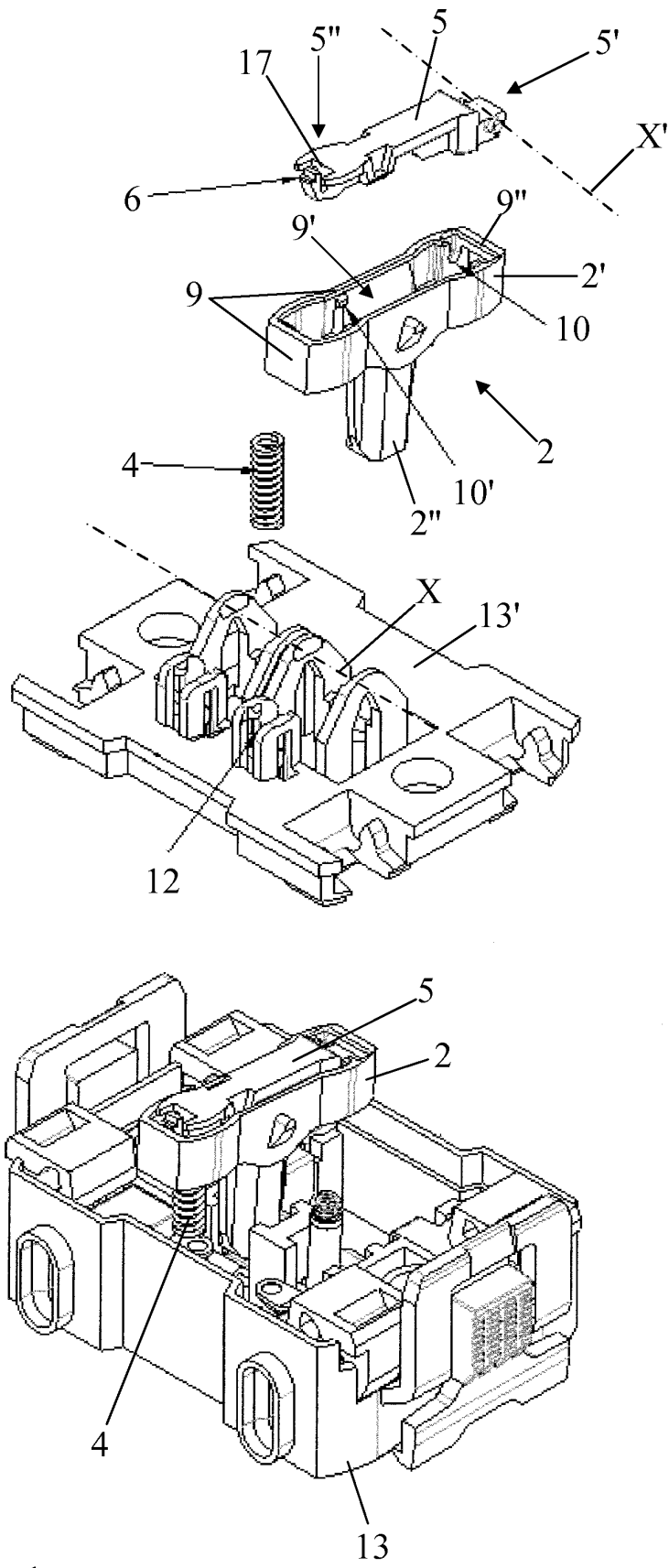


Fig. 1

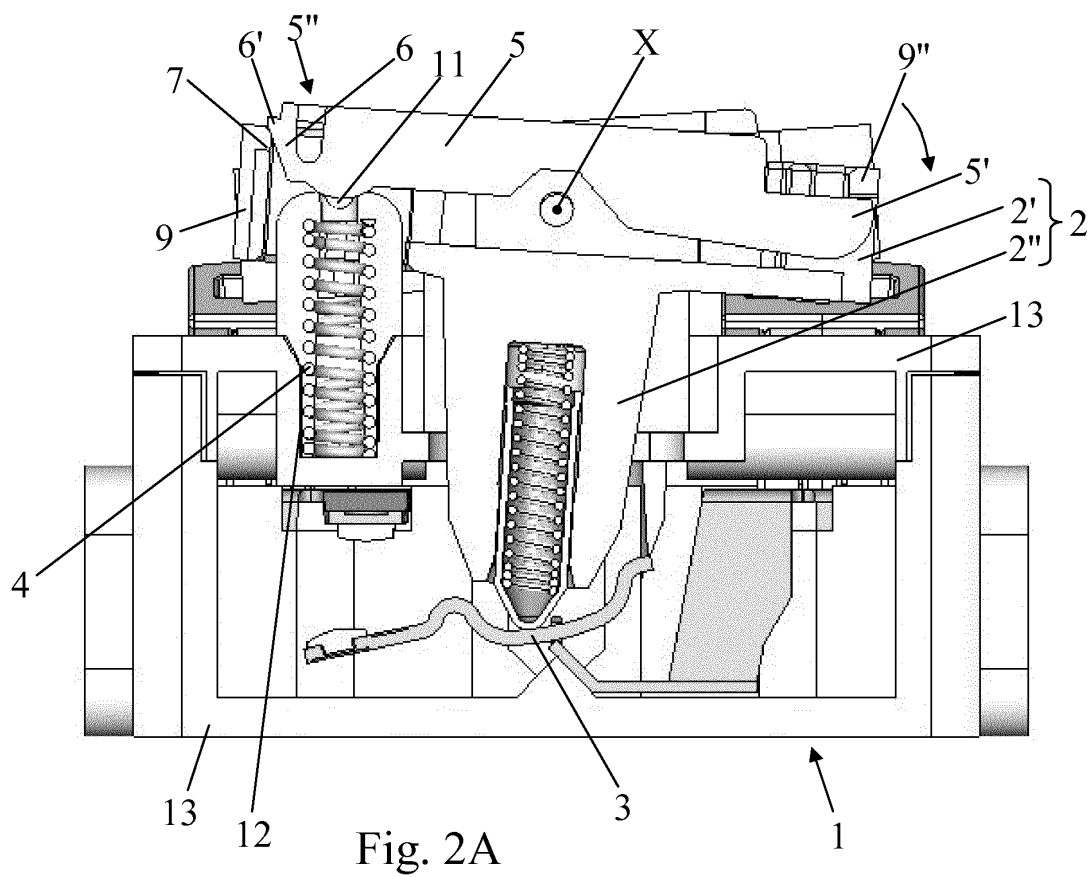
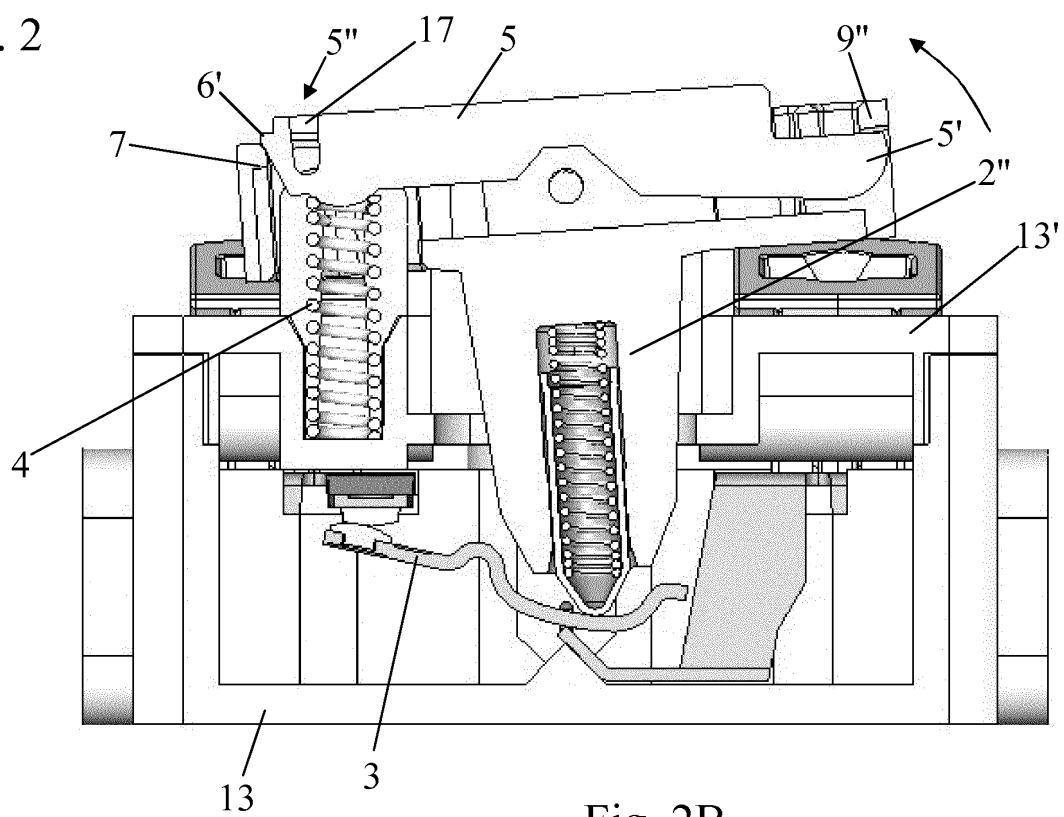


Fig. 2



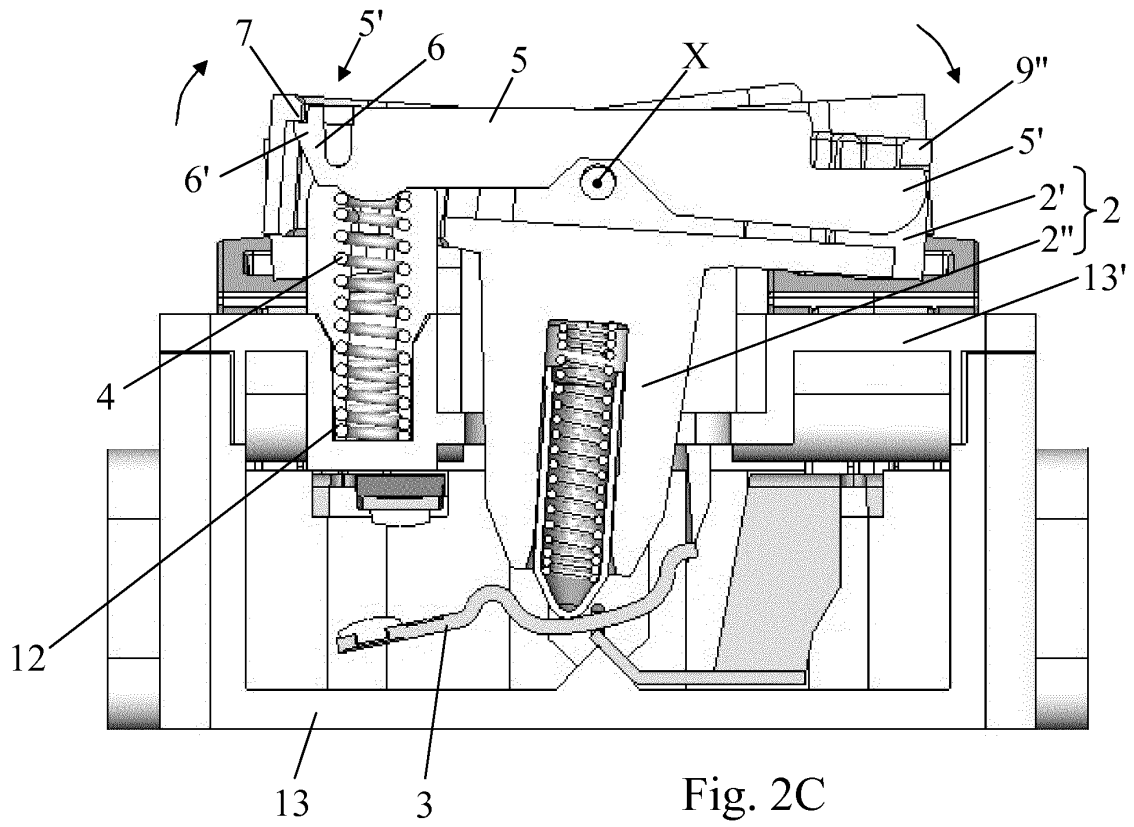
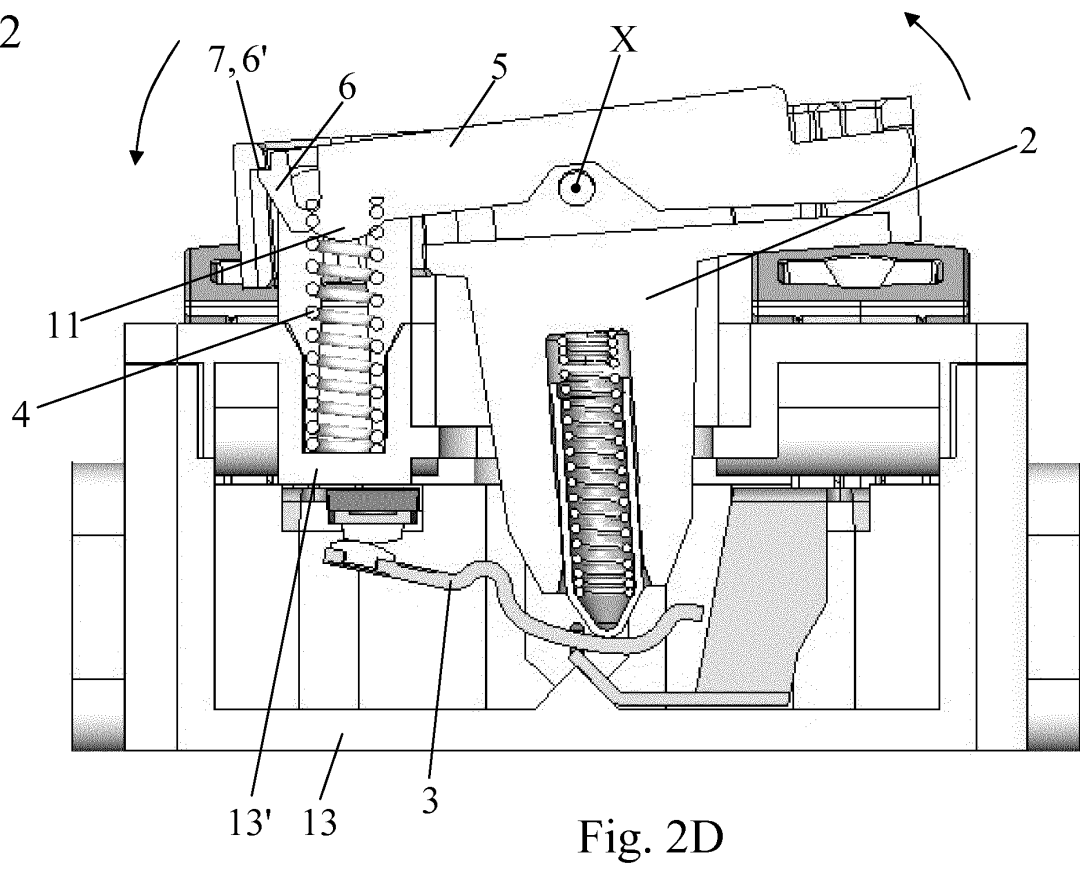


Fig. 2



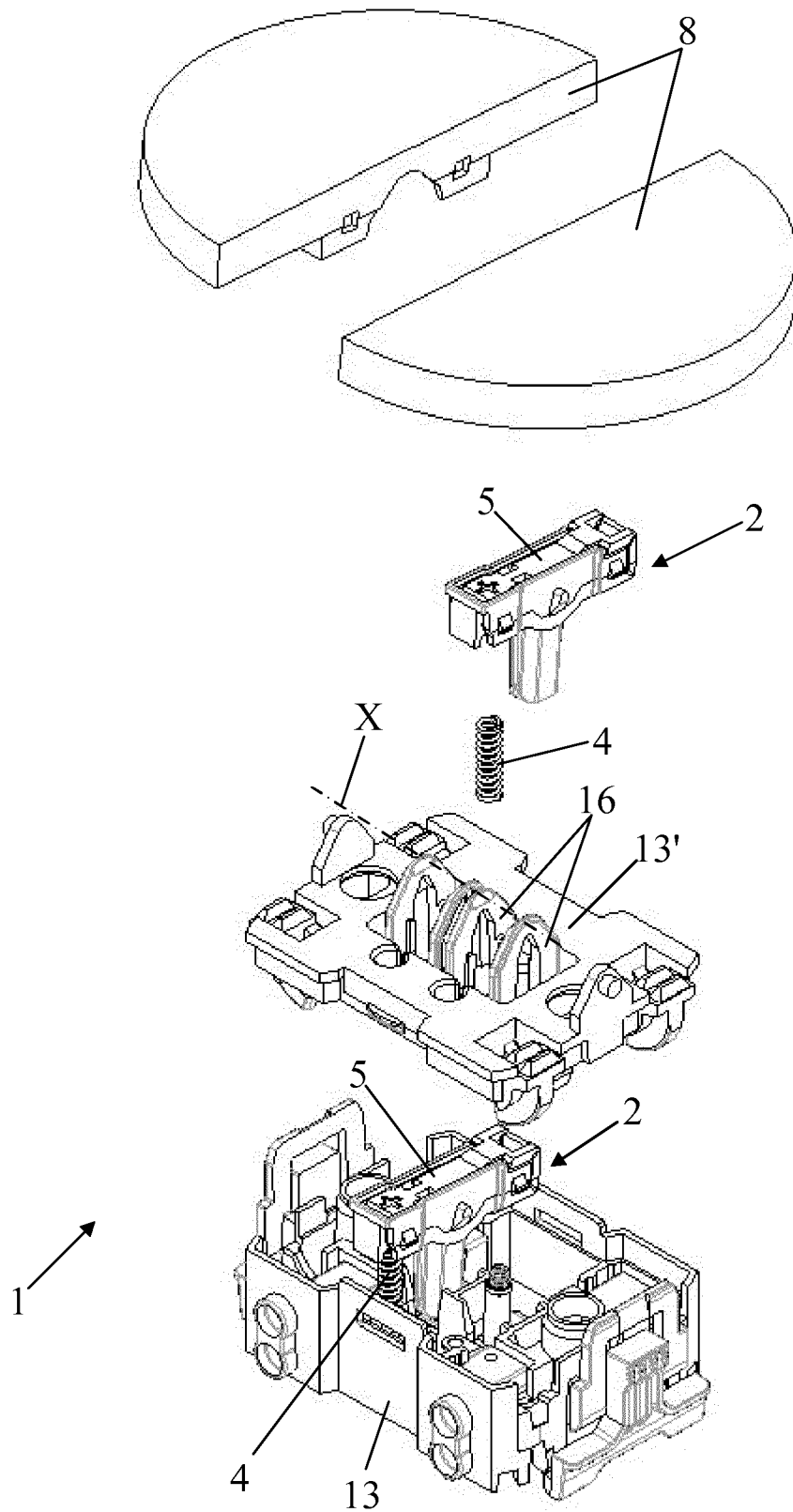


Fig. 3

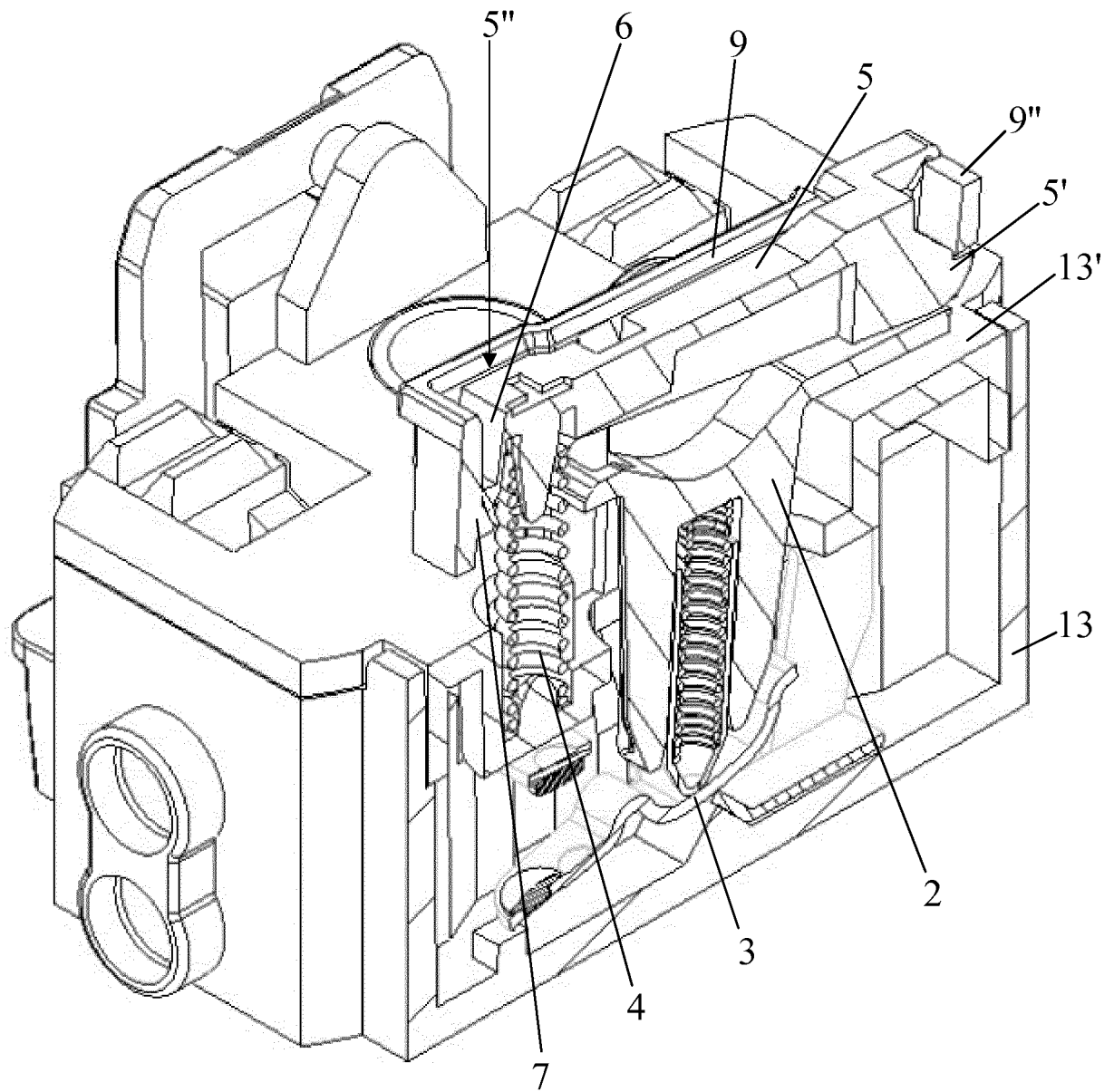


Fig. 4A

Fig. 4

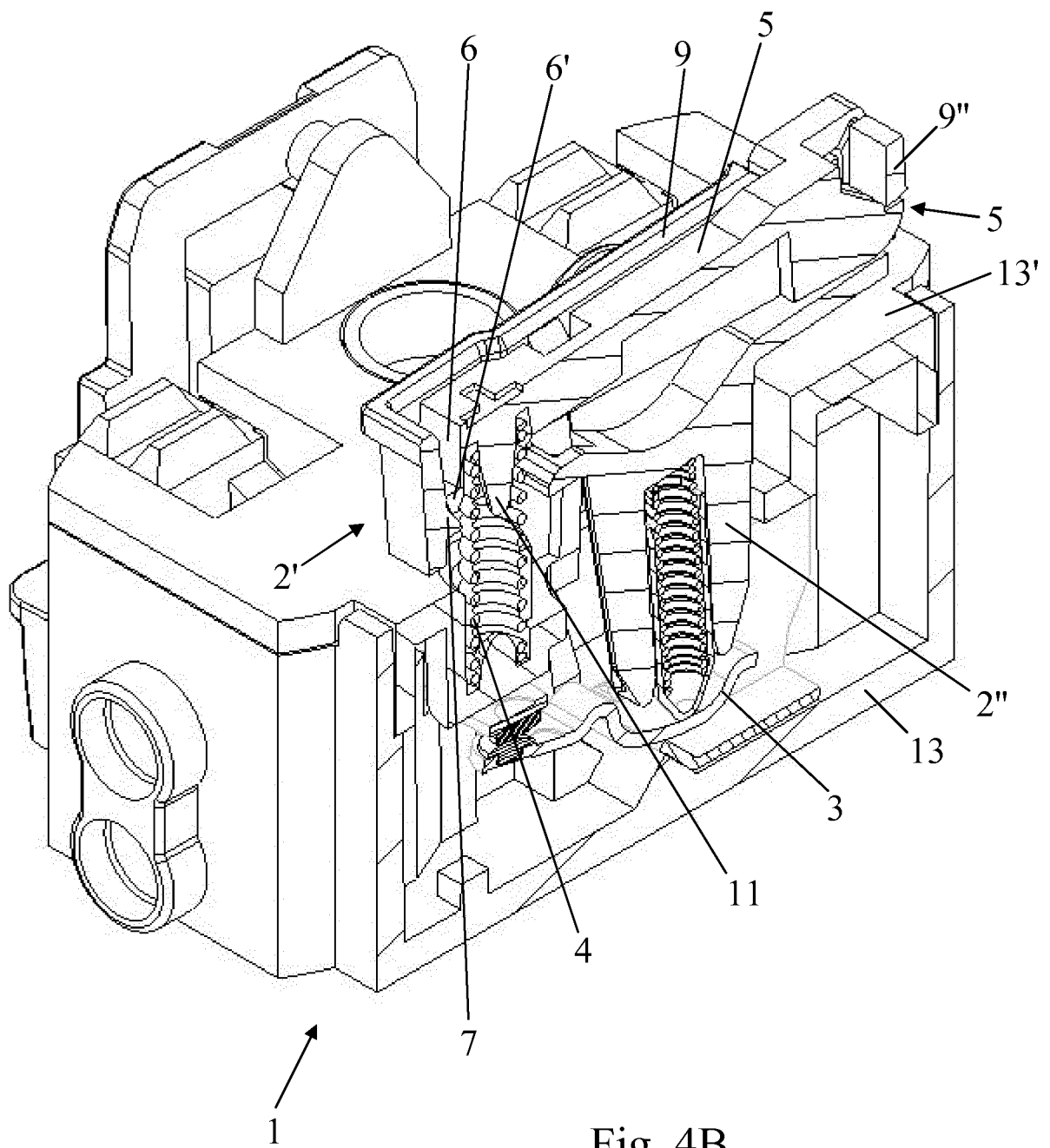


Fig. 4B

Fig. 4

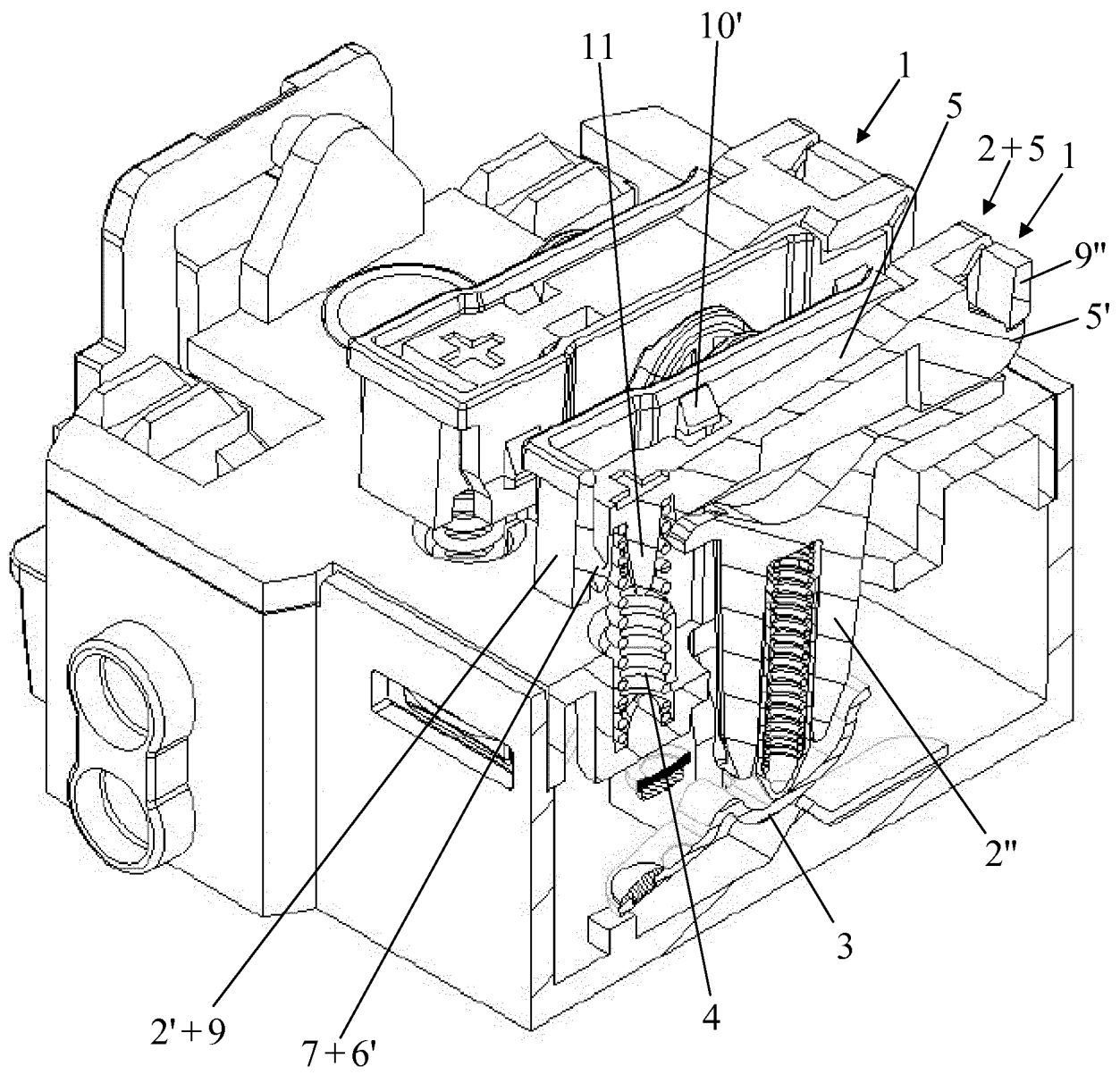


Fig. 4C

Fig. 4

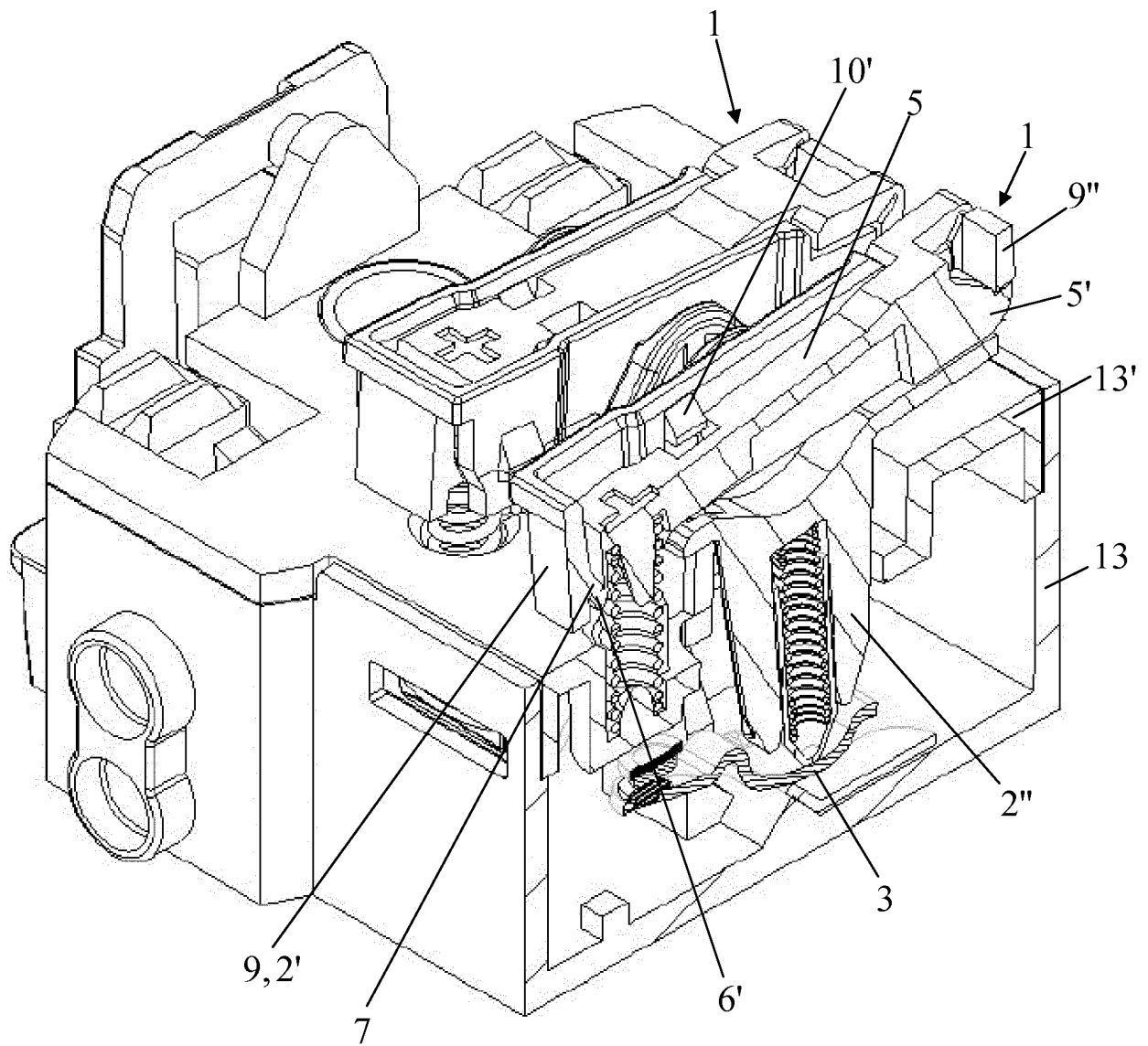


Fig. 4D

Fig. 4

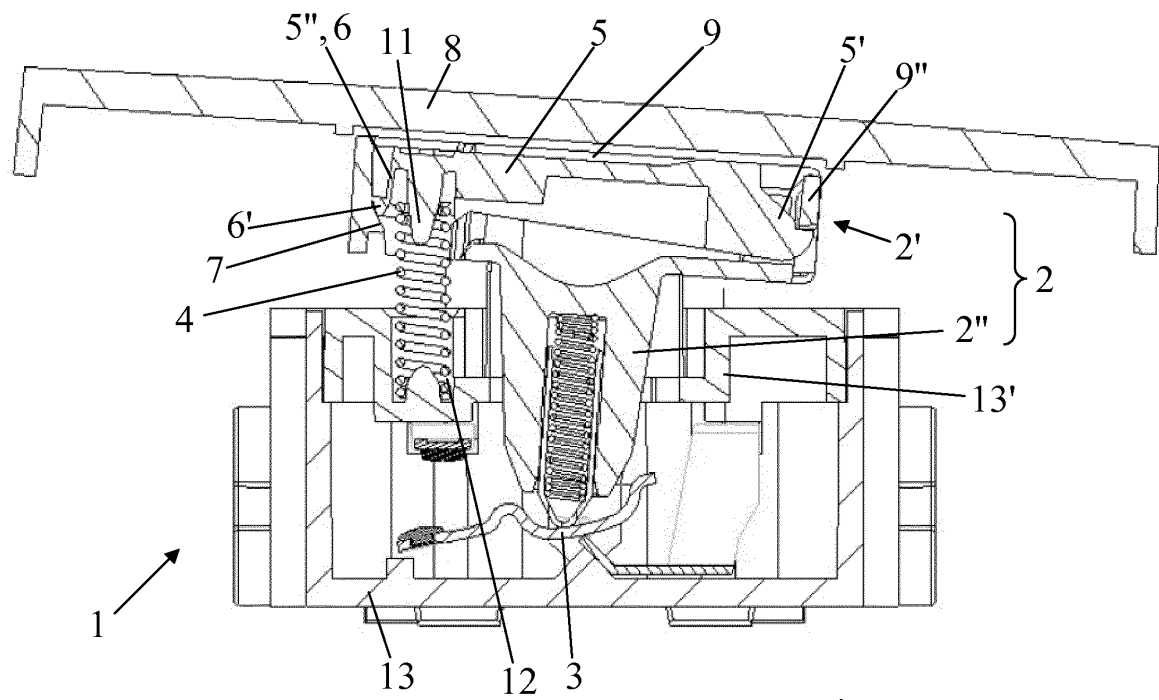


Fig. 5

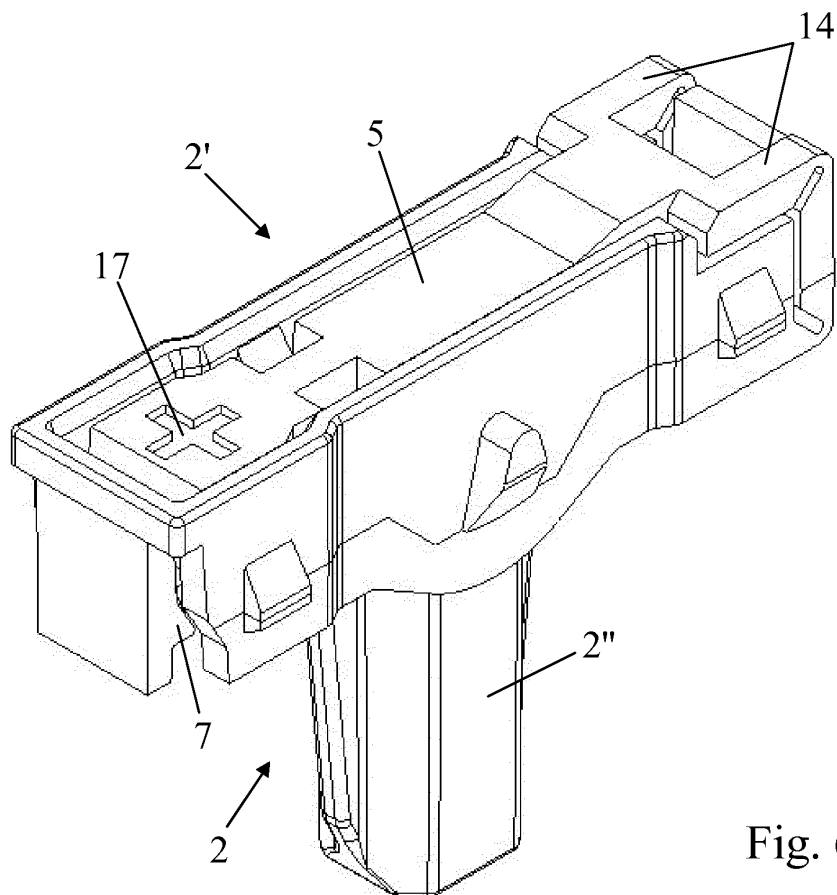


Fig. 6

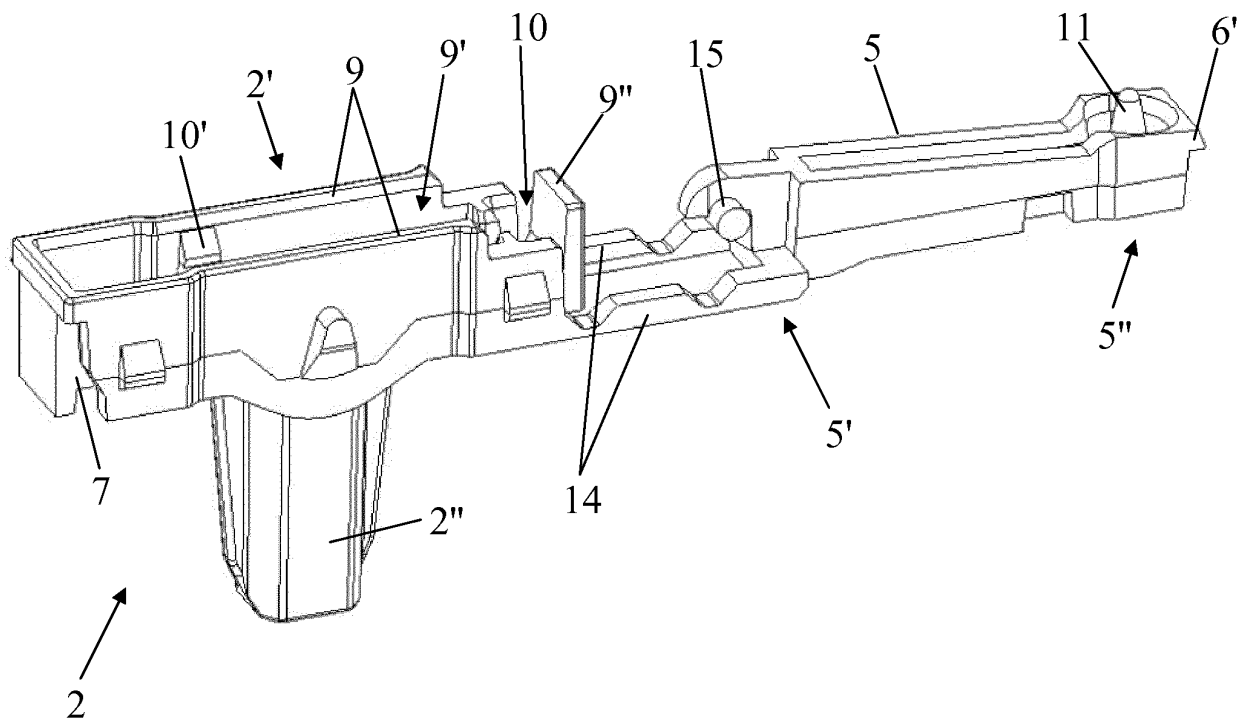


Fig. 7A

Fig. 7

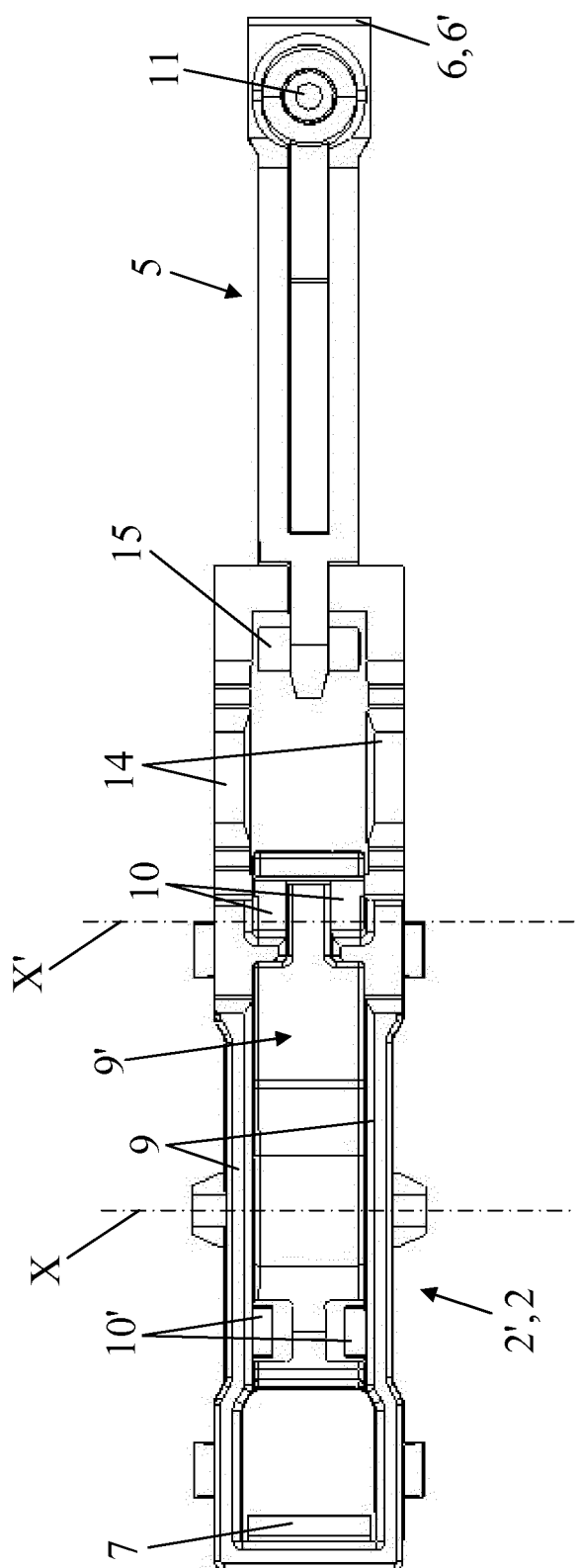


Fig. 7B

Fig. 7

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 0921547 A [0005]
- GB 2401723 A [0006]