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(54) Rotary switch for electrical appliances or the like

Drehschalter für Haushaltsgeräte oder dergleichen

Commutateur rotatif pour appareils électriques ou analogue

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Description

[0001] The present invention relates to rotary switches for electrical appliances or the like.

[0002] The present invention especially relates to switches that are mounted on different electrical appliances, although they are not exclusive to said appliances.

[0003] The present invention also relates to switches for other types of applications in the industrial field or professional applications.

Background of the invention

[0004] Electrical appliances have usually used electromechanical switches for different functions. Various types of switching devices satisfy the application functionalities, but the different types of switching devices have different functionalities and affect the costs of a satisfactory application differently.

[0005] In the current high-cost situation of raw materials, there are different solutions which entail different costs, even if they satisfy the functionality of the application.

[0006] The geometry and make-up of the electrical circuit is a determining factor regarding the functionality and safety of the electrical switching, and also determines the cost of the elementary circuit, making a more or less efficient use of the materials with relation to their type and quantity.

[0007] There are three essential ways of breaking the current in electromechanical switches for electrical appliances which are sliding systems, pivoting opening systems and vertical opening systems. The overall efficiency of the switching and the cost are related to the current breaking system applied. The geometry of the different current breaking systems also affects the physical dimensions of the global switch and, therefore, its cost.

[0008] The pivoting opening breaking systems and the vertical opening systems are generally associated with rotating manoeuvre systems.

[0009] Rotary switches for electrical appliances are known which comprise a rotating control shaft rotatably mounted on a frame, said rotating control shaft being provided with a plurality of cam disks respectively associated to a plurality of current breaking devices, each current breaking device being faced to a cam disk and housed in a base pertaining to the frame, and being linearly displaceable within the base between a connected position and a disconnected position of a pair of electrical connecting strips integrally joined to the frame, so that each cam disk, depending on the rotational position of the rotating control shaft, is able to connect or disconnect said current breaking device.

[0010] All of the current breaking devices are tightly linked to the safety of the user and submitted to strict legal regulations which must be complied with.

[0011] Nevertheless, there are imprecise elements that affect the safety and functionality of the switch. These imprecise elements are related to the geometry of the mobile element or elements of the current breaking device. A uniform and balanced movement of the current breaking device improves the efficiency of the breaking capacity of this device. The efficiency in the breaking capacity of the corresponding device greatly influences the life of the electrical contact elements and, consequently, the reliability and durability of the switch.

[0012] Also known are rotary switches whose current breaking device comprises a metal bridge housed in a base and coupled on two compression springs. Said metal bridge can be moved linearly along the walls of the base between the connected position with the metal strips and disconnected position when said metal bridge is pushed by the cam disk.

[0013] However, this type of rotary switch has the drawback that the metal bridge directly receives the mechanical fatigue stress produced at the cyclical closure of the circuit, with the consequent deterioration and bad operation of the switch.

[0014] Another drawback is that there is a certain hollow space between the metal bridge and the walls of the housing of the base, which leads to undesired movements being produced in both directions perpendicular to the direction of displacement of the metal bridge within the base.

[0015] The known rotary switches additionally comprise a positioning device of said rotating control shaft which can define a series of preset radial positions associated to different switch functions.

[0016] Positioning devices for the rotating control shaft are known which comprise a positioning wheel housed in a base pertaining to the frame, mounted on elastic means and facing a rotating manoeuvre organ integrally joined to the rotating control shaft, said manoeuvre organ including a toothed profile in the shape of a ratchet. Said positioning wheel comprises a central protuberance which can fit into cavities between every two cogs of the manoeuvre organ, said positioning wheel being displaceable linearly inside the base between a coupling position, wherein it is fixed between two cogs by means of the release force of the elastic means, and an uncoupling position, wherein it is pushed by one of the cogs compressing the elastic means, depending on the rotational position of the rotating control shaft.

[0017] Therefore, the systems with rotating manoeuvre organs are associated to a toothing system and to pressure elements to guarantee proper electrical contact and positioning reliability. The rotating manoeuvre systems with toothing systems must make it possible to change from one position to the adjacent position and must keep the resting position fixed.

[0018] However, these types of positioning devices have the drawback that they have a certain hollow space between the wheel and the housing walls of the base, which leads to an incorrect accuracy of the positioning of the manoeuvre organ and negatively influences the

positioning guarantee of the actuation elements of the mobile systems of the current breaking device.

[0019] Document EP0443075 discloses a device according to the preamble of claim 1.

Description of the invention

[0020] The object of the rotary switch for electrical appliances or the like of the present invention is to resolve the drawbacks featured by the known rotary switches in the state of the art, providing a more effective rotary switch with a current breaking device and a manoeuvre organ positioning device optimised and with a lower assembly cost.

[0021] The rotary switch for electrical appliances or the like of the present invention is of the type which comprises a rotating control shaft rotatably mounted on a frame, said rotating control shaft being provided with a plurality of cam disks, respectively, associated to a plurality of current breaking devices, each current breaking device being faced to a cam disk and housed in a base pertaining to the frame, and being linearly displaceable within the base between a connected position and a disconnected position of a pair of electrical connecting strips integrally joined to the frame, so that each cam disk, depending on the rotational position of the rotating control shaft, is able to connect or disconnect said current breaking device, and comprising a positioning device of said rotating control shaft that is able to define a series of preset radial positions associated with different functions of the switch, and is **characterised in that** each current breaking device comprises a mobile bridge assembly provided with a plastic support mounted on elastic means and a metal bridge coupled on said plastic support, said metal bridge being able to maintain direct contact with the respective strips by means of the release force of the elastic means in the connected position, and to move away from said strips when the mobile bridge assembly is pushed by the cam disk, compressing said elastic means in the disconnected position.

[0022] The mobile bridge assembly therefore is positioned in the electric connected position thanks to the fixed arrangement of the strip ends and the action of the elastic means, which keep it in its place within the housing of the base. In this way, said mobile bridge assembly and the fixed strip ends form the elementary circuit of the current circulation.

[0023] The geometry of the plastic support which supports the metal bridge permits the mechanical design of said metal bridge to be optimised, since all of the mechanical fatigue stress produced upon the cyclical closure of the circuit are not supported by the metal bridge, as occurs with the switches known in the state of the art, but are rather supported by the plastic support. This geometry is that permits the design of the metal bridge to be optimised with the use of reduced material thickness and, therefore, optimised as regards the production costs.

[0024] According to a preferred embodiment of the present invention, the plastic support of the mobile bridge assembly comprises a core provided with fitting means for coupling with the metal bridge, a protuberance incorporated in a central zone of the core intended to make contact with the cam disk, and two pins substantially parallel to the direction of displacement of said mobile bridge assembly within in the base.

[0025] Advantageously, the plastic support includes means for guiding the displacement of said mobile bridge assembly.

[0026] Preferably, the means for guiding the plastic support include first guiding surfaces on each lateral end of the core intended to respectively slide on first walls of the base, and second guiding surfaces on each lateral end of the pins intended to, respectively, slide on second walls of the base.

[0027] Thanks to the guiding surfaces of the plastic support, the mobile bridge assembly is capable of sliding according to a direction parallel to the walls of the base at the moment when the electrical circuit is opened, without undesired displacements being produced in the directions perpendicular to the linear direction of movement of the mobile bridge assembly, so that the current breaking features remain optimised and the electrical arc effects randomly produced during breaking are minimised.

[0028] Advantageously, the plastic support includes means for retaining the mobile bridge assembly within the base.

[0029] Preferably, the retaining means of the plastic support include retaining hooks on both lateral ends of the pins intended to make contact, respectively, with stop surfaces of the base, the current breaking device being held within the base during the assembly thereof prior to the placement of the strips.

[0030] Therefore, the hooks of the plastic support, by sliding in the housing of the base, keep said bridge assembly held in place during specific assembly stages, thanks to the stopping action of said hooks with said stop surface facing the base.

[0031] Preferably, the elastic means comprise a compression spring coupled at one end to the plastic support and housed at its other end in the base.

[0032] According to a preferred embodiment of the invention, the positioning device of the rotating control shaft comprises a positioning wheel housed in a base pertaining to the frame, mounted on elastic means and faced to a rotating manoeuvre organ integrally joined to the rotating control shaft, said manoeuvring organ including a toothed profile in the shape of a ratchet, and said positioning wheel comprising a central protuberance able to fit into cavities between every two cogs of the manoeuvring organ, said positioning wheel being displaceable linearly inside the base between a coupling position, wherein it is fixed between two cogs by means of the release force of the elastic means, and a uncoupling position, wherein it is pushed by one of the cogs compress-

ing the elastic means, depending on the rotational position of the rotating control shaft, and said positioning wheel further comprising two pins substantially parallel to the direction of displacement of said wheel within in the base.

[0033] The positioning wheel is therefore capable of sliding along the toothed surface of the rotating manoeuvre organ, while the elastic means always keep the surface of the positioning wheel in contact with the surface of the corresponding cog of the rotating manoeuvre organ.

[0034] Advantageously, the positioning wheel includes means for guiding the displacement of said wheel.

[0035] Preferably, the means for guiding the positioning wheel included first surfaces at each lateral end intended to slide, respectively, on first walls of the base, and second guiding surfaces at each lateral end of the pins intended to slide, respectively, on second walls of the base.

[0036] The guiding surfaces of the wheel slide on the lateral walls of the base so that their linear displacement is performed with minimal lateral play due to the fact that the wheel, during the movement thereof, is always housed within said lateral guiding walls of the base, even in resting position. This directly leads to a minimisation of the radial play of the manoeuvring organ, which is especially important since it is directly related to maintaining a fixed and stable position of the function indicator in the application of the switch.

[0037] Advantageously, the positioning wheel included means for retaining said wheel within the base.

[0038] Preferably, the retaining means of the positioning wheel include retaining hooks at both lateral ends of the pins intended to make contact, respectively, with stop surfaces of the base, said wheel remaining retained within the base during the assembly thereof prior to the placing of the rotating manoeuvre organ and other components of the switch.

[0039] Therefore, the hooks of the wheel, by sliding in the housing of the base, keep said wheel held in place during specific assembly stages, thanks to the stopping action of said hooks with said stop surface facing the base.

[0040] Preferably, the elastic means comprise a compression spring coupled at one end to the positioning wheel and housed at its other end in the base.

[0041] Likewise, the guiding means of the positioning wheel, apart from eliminating the radial play of the manoeuvring organ, permit the optimisation of the force of the elastic means, which directly leads to the optimisation of the rotational torque of the rotating manoeuvre organ.

[0042] Therefore, thanks to the rotary switch of the present invention, two main advantages are produced:

- the accuracy and regularity of the movement of the current breaking device is improved thanks to the optimisation of its geometry and of the base wherein it is housed, and at the same time the costs of both the materials and the assembly system are optimised; and
- the positioning of the manoeuvring organ is improved and optimised by optimising the geometry and the movement of the positioning device of said manoeuvring organ and the costs related to the assembly system are also optimised.

Brief description of the figures

[0043] In order to facilitate the description as previously disclosed, drawings have been attached wherein, schematically and solely as a non-limitative example, a practical case of embodiment of the rotary switch for electrical appliances or the like of the invention has been represented, wherein:

Figure 1 is a perspective view of the rotary switch of the present invention;

Figure 2 is a plan view of the switch from figure 1;

Figure 3 is a cross-section according to the III-III line from figure 2, showing the current breaking device;

Figure 4 is a perspective and exploded view of the mobile bridge assembly;

Figure 5 is a cross-section according to the V-V line from figure 2, showing the positioning device of the rotating control shaft; and

Figure 6 is a perspective view of the positioning wheel.

Description of a preferred embodiment

[0044] Referring to figures 1 to 3, the rotary switch 1 for electrical appliances of the present invention comprises a rotating control shaft 2 rotatably mounted on a frame 3, said rotating control shaft 2 being provided with a plurality of cam disks 4, respectively, associated to a plurality of current breaking devices 5.

[0045] As can be observed in figure 3, each current breaking device 5 is faced to a cam disk 4 and is housed in a base 6 pertaining to the frame 3, and is displaceable linearly within the base 6 between a connected position and a disconnected position of a pair of electrical connecting strips 7 integrally joined to the frame 3, so that each cam disk 4, depending on the rotational position of the rotating control shaft 2, is able to connect or disconnect said current breaking device 5.

[0046] As can be observed in figure 5, the rotary switch 1 also comprises a positioning device 8 of said rotating control shaft 2 that is able to define a series of preset radial positions associated with different functions of the switch 1, as will be explained below.

[0047] Each current breaking device 5 comprises a

mobile bridge assembly 9 (see figure 4) provided with a plastic support 10 mounted on elastic means 11 and a metal bridge 12 coupled on said plastic support 10, said metal bridge 12 being able to maintain direct contact with the respective strips 7 by means of the release force of the elastic means 11 in the connected position (see figure 3), and to move away from said strips 7 when the mobile bridge assembly 9 is pushed by the cam disk 4, compressing said elastic means 11 in the disconnected position.

[0048] The mobile bridge assembly 9 therefore is positioned in the electric connected position thanks to the fixed arrangement of the strip ends 7 and the action of the elastic means 11, which keep it in its place within the housing of the base 6. In this way, said mobile bridge assembly 9 and the fixed strip ends 7 form the elementary circuit of the current circulation.

[0049] The geometry of the plastic support 10 which supports the metal bridge 12 permits the mechanical design of said metal bridge 12 to be optimised, since all of the mechanical fatigue stress produced upon the cyclical closure of the circuit are not supported by the metal bridge 12, as occurs with the switches known in the state of the art, but are rather supported by the plastic support 10. This geometry is that permits the design of the metal bridge 12 to be optimised with the use of reduced material thickness and, therefore, optimised as regards the production costs.

[0050] According to this embodiment, the plastic support 10 of the mobile bridge assembly 9 comprises a core 13 provided with fitting means for coupling with the metal bridge 12, a protuberance 14 integrated in a central zone of the core 13 intended to make contact with the cam disk 4, and two pins 15 substantially parallel to the direction of displacement Z of said mobile bridge assembly 9 within in the base 6.

[0051] In this case, the metal bridge 12 remains fixed by fitting into the plastic support 10 via the riveting of two stubs 16 which keep said metal bridge 12 integrally joined to said support 10. Nevertheless, other types of known coupling could also be used to fix the metal bridge 12 to the plastic support 10.

[0052] The plastic support 10 includes guiding means for the displacement of said mobile bridge assembly 9, which include first guiding surfaces 13a at each lateral end of the core 13 intended to slide, respectively, on first walls 6a of the base 6, and second guiding surfaces 15a on each lateral end of the pins 15 intended to slide, respectively, on second walls 6b of the base 6.

[0053] Therefore, the guiding surfaces 13a, 15a of the plastic support 10 prevent said mobile bridge assembly 9 from rocking in its housing along any of the two axes X and Y, perpendicular to the direction of linear displacement Z of the mobile bridge assembly 9.

[0054] Thanks to the guiding surfaces 13a, 15a of the plastic support 10, the mobile bridge assembly 9 is capable of sliding according to a direction parallel to the walls 6a, 6b of the base 6 at the moment when the electrical circuit is opened, so that the current breaking features are optimised and the electrical arc effects randomly produced during breaking are minimised.

[0055] Likewise, the plastic support 10 includes retaining means of the mobile bridge assembly 9 within the base 6, which include retaining hooks 17 on both lateral ends of the pins 15 intended to make contact, respectively, with stop surfaces 6c of the base 6, the current breaking device 5 being held within the base 6 during the assembly thereof prior to the placement of the strips 7.

[0056] Therefore, the hooks 17 of the plastic support 10, by sliding in a housing 6d of the base 6, keep said bridge assembly 9 held in place during specific assembly stages, thanks to the stopping action of said hooks 17 with said stop surface 6c facing the base 6.

[0057] This geometry of the bridge assembly 9 is what makes it possible for said assembly to remain held in place before the strips 7 are mounted, forming independent sub-arrays, which can be assembled regardless of the final assembly of the switch 1 in specific optimised systems.

[0058] In this embodiment, the elastic means 11 comprise a compression spring coupled at one end to the plastic support 10 and housed at its other end in the base 6.

[0059] As can be observed in figures 5 and 6, the positioning device 8 of the rotating control shaft 2 comprises a positioning wheel 18 housed in a base 19 pertaining to the frame 3, mounted on elastic means 20 and faced to a rotating manoeuvre organ 21 integrally joined to the rotating control shaft 2, said manoeuvring organ 21 including a toothed profile in the shape of a ratchet.

[0060] Said positioning wheel 18 comprises a central protuberance 22 which is able to fit into cavities between every two cogs of the manoeuvring organ 21, said positioning wheel 18 being displaceable linearly within the base 19 between a coupling position, wherein it is fixed between two cogs by means of the release force of the elastic means 20, and an uncoupling position (see figure 5), wherein it is pushed by one of the cogs compressing the elastic means 20, depending on the rotational position of the rotating control shaft 2. The positioning wheel 18 includes two pins 23 substantially parallel to the direction of displacement Z of said wheel 18 within in the base 19.

[0061] The positioning wheel 18 is therefore capable of sliding along the toothed surface of the rotating manoeuvre organ 21, while the elastic means 20 always keep the surface of the positioning wheel 18 in contact with the surface of the corresponding cog of the rotating manoeuvre organ 21.

[0062] The positioning wheel 18 includes displacement guiding means of said wheel, which include first guiding surfaces 18a at each lateral end intended to slide, respectively, on first walls 19a of the base 19, and second guiding surfaces 23a at each lateral end of the pins 23 intended to slide, respectively, on second walls 19b of the base 19.

[0063] The guiding surfaces 18a, 23a of the wheel 18 prevent said wheel 18 from rocking in its housing along either of the two axes X and Y, perpendicular to the linear direction of displacement Z of the wheel 19.

[0064] Therefore, the guiding surfaces 18a, 23a of the wheel 18 slide, respectively, on the lateral walls 19a, 19b of the base 19 so that their linear displacement is performed with minimal lateral play due to the fact that the wheel 18, during the movement thereof, is always housed within said lateral guiding walls 19a, 19b of the base 19, even in resting position. This directly leads to a minimisation of the radial play of the manoeuvring organ 21, which is especially important since it is directly related to maintaining a fixed and stable position of the function indicator in the application of the switch 1.

[0065] Likewise, the positioning wheel 18 includes retaining means of said positioning wheel within the base 19, which include retaining hooks 24 at both lateral ends of the pins 23 intended to make contact, respectively, with stop surfaces 19c of the base 19, said wheel 18 remaining retained within the base 19 during the assembly thereof prior to the placing of the rotating manoeuvre organ 21 and other components of the switch 1.

[0066] Therefore, the hooks 24 of the wheel 18, by sliding inside the base 19, keep said wheel 18 held in place during specific assembly stages, thanks to the stopping action of said hooks 24 with said stop surface 19c facing the base 19.

[0067] This geometry of the positioning wheel 18 is what makes it possible for said wheel 18 to be held within the base 19, forming independent sub-arrays, which can be assembled regardless of the final assembly of the switch 1 in specific optimised systems.

[0068] In this embodiment, the elastic means 20 comprise a compression spring coupled at one end to the positioning wheel 18 and housed at its other end in the base 19.

[0069] Likewise, the guiding means of the positioning wheel 18, apart from eliminating the radial play of the manoeuvring organ 21, permit the optimisation of the force of the elastic means 20, which directly leads to the optimisation of the rotational torque of the rotating manoeuvre organ 21.

Claims

1. Rotary switch (1) for electrical appliances or the like, which comprises a rotating control shaft (2) rotatably mounted on a frame (3), said rotating control shaft (2) being provided with a plurality of cam disks (4), respectively, associated to a plurality of current breaking devices (5), each current breaking device (5) being faced to a cam disk (4) and housed in a base (6) pertaining to the frame (3), and being linearly displaceable within the base (6) between a connected position and a disconnected position of a pair of electrical connecting strips (7) integrally joined to the frame (3), so that each cam disk (4), depending on the rotational position of the rotating control shaft (2), is able to connect or disconnect said current breaking device (5), and comprising a positioning device (8) of said rotating control shaft (2) that is able to define a series of preset radial positions associated with different functions of the switch (1), **characterised in that** each current breaking device (5) comprises a mobile bridge assembly (9) provided with a plastic support (10) mounted on elastic means (11) and a metal bridge (12) coupled on said plastic support (10), said metal bridge (12) being able to maintain direct contact with the respective strips (7) by means of the release force of the elastic means (11) in the connected position, and to move away from said strips (7) when the mobile bridge assembly (9) is pushed by the cam disk (4), compressing said elastic means (11) in the disconnected position.

2. Switch (1) according to claim 1, wherein the plastic support (10) of the mobile bridge assembly (9) comprises a core (13) provided with fitting means (16) for coupling with the metal bridge (12), a protuberance (14) integrated in a central zone of the core (13) intended to make contact with the cam disk (4), and two pins (15) substantially parallel to the direction of displacement (Z) of said mobile bridge assembly (9) within in the base (6).

3. Switch (1) according to claim 2, wherein the plastic support (10) included guiding means (13a, 15a) for displacing said mobile bridge assembly (9).

4. Switch (1) according to claim 3, wherein the guiding means of the plastic support (10) include first guiding surfaces (13a) at each lateral end of the core (13) intended to slide, respectively, on first walls (6a) of the base (6), and second guiding surfaces (15a) intended to slide, respectively, on second walls (6b) of the base (6).

5. Switch (1) according to claim 2, wherein the plastic support (10) includes means (17) for retaining the mobile bridge assembly (9) within the base (6).

6. Switch (1) according to claim 5, wherein the retaining means of the plastic support (10) include retaining hooks (17) on both lateral ends of the pins (15) intended to make contact, respectively, with stop surfaces (6c) of the base (6), the current breaking device (5) being held within the base (6) during the assembly thereof prior to the placement of the strips (7).

7. Switch (1) according to claim 1, wherein the elastic means (11) comprise a compression spring coupled at one end to the plastic support (10) and housed at the other end thereof in the base (6).

8. Switch (1) according to claim 1, wherein, the positioning device (8) of the rotating control shaft (2) comprises a positioning wheel (18) housed in a base (19) pertaining to the frame (3), mounted on elastic means (20) and faced to a rotating manoeuvre organ (21) integrally joined to the rotating control shaft (2), said manoeuvring organ (21) including a toothed profile in the shape of a ratchet, and said positioning wheel (18) comprising a central protuberance (22) able to fit into cavities between every two cogs of the manoeuvring organ (21), said positioning wheel (18) being linearly displaceable within the base (19) between a coupling position, wherein it is fixed between two cogs by means of the release force of the elastic means (20), and an uncoupling position, wherein it is pushed by one of the cogs compressing the elastic means (20), depending on the rotational position of the rotating control shaft (2), and said positioning wheel (18) further comprising two pins (23) substantially parallel to the direction of displacement (Z) of said wheel (18) within in the base (19).

9. Switch (1) according to claim 8, wherein the positioning wheel (18) includes guiding means (18a, 23a) for displacing said wheel (18).

10. Switch (1) according to claim 9, wherein the guiding means of the positioning wheel (18) include first guiding surfaces (18a) at each lateral end intended to slide, respectively, on first walls (19a) of the base (19), and second guiding surfaces (23a) at each lateral end of the pins (23) intended to slide, respectively, on second walls (19b) of the base (19).

11. Switch (1) according to claim 8, wherein the positioning wheel (18) includes means (24) for retaining said wheel (18) within the base (19).

12. Switch (1) according to claim 11, wherein the retaining means of the positioning wheel (18) include retaining hooks (24) at both lateral ends of the pins (23) intended to make contact, respectively, with stop surfaces (19c) of the base (19), said wheel (18) remaining retained within the base (19) during the assembly thereof prior to the placing of the rotating manoeuvre organ (21) and other components of the switch (1).

13. Switch (1) according to claim 8, wherein the elastic means (20) comprise a compression spring coupled at one end to the positioning wheel (18) and housed at its other end in the base (19).

Patentansprüche

1. Drehschalter (1) für elektrische Geräte oder dergleichen, der eine sich drehende Steuerwelle (2) aufweist, die drehbar an einem Rahmen (3) angebracht ist, wobei die sich drehende Steuerwelle (2) mit einer Mehrzahl von Nockenscheiben (4) versehen ist, die jeweils einer einer Mehrzahl von Stromabschaltvorrichtungen (5) zugeordnet sind, wobei jede Stromabschaltvorrichtung (5) einer Nockenscheibe (4) zugewandt ist und in einer auf den Rahmen (3) bezogenen Basis (6) untergebracht ist und in der Basis (6) zwischen einer verbundenen Position und einer getrennten Position eines Paares elektrischer Verbindungsstreifen (7), die einstückig an den Rahmen (3) angefügt sind, linear verschiebbar ist, so dass jede Nockenscheibe (4) in Abhängigkeit von der Drehposition der sich drehenden Steuerwelle (2) in der Lage ist, die Stromabschaltvorrichtung (5) zu verbinden oder zu trennen, und eine Positionierungsvorrichtung (8) der sich drehenden Steuerwelle (2) aufweist, die in der Lage ist, eine Serie voreingestellter radialer Positionen, die verschiedenen Funktionen des Schalters (1) zugeordnet sind, zu definieren, **dadurch gekennzeichnet, dass** jede Stromabschaltvorrichtung (5) eine mobile Brückenanordnung (9), die mit einem an einer elastischen Einrichtung (11) angebrachten Kunststoffträger (10) versehen ist, und eine mit dem Kunststoffträger (10) gekoppelte Metallbrücke (12) aufweist, wobei die Metallbrücke (12) in der Lage ist, anhand der Freigabekraft der elastischen Einrichtung (11) in der verbundenen Position einen direkten Kontakt mit den jeweiligen Streifen (7) aufrechtzuerhalten und sich von den Streifen (7) wegzubewegen, wenn die mobile Brückenanordnung (9) seitens der Nockenscheibe (4) gedrückt wird, wobei die elastische Einrichtung (11) in der getrennten Position zusammengedrückt wird.

2. Schalter (1) gemäß Anspruch 1, bei dem der Kunststoffträger (10) der mobilen Brückenanordnung (9) einen Kern (13), der mit einer Passeinrichtung (16) zum Koppeln mit der Metallbrücke (12) versehen ist, eine in eine zentrale Zone des Kerns (13), die mit der Nockenscheibe (4) in Kontakt treten soll, integrierte Ausstülpung (14) und zwei Zapfen (15), die im Wesentlichen parallel zu der Verschiebungsrichtung (Z) der mobilen Brückenanordnung (9) in der Basis (6) sind, aufweist.

3. Schalter (1) gemäß Anspruch 2, bei dem der Kunststoffträger (10) Führungseinrichtungen (13a, 15a) zum Verschieben der mobilen Brückenanordnung (9) umfasst.

4. Schalter (1) gemäß Anspruch 3, bei dem die Führungseinrichtungen des Kunststoffträgers (10) erste Führungsoberflächen (13a) an jedem lateralen Ende des Kerns (13), die jeweils an einer von ersten Wänden (6a) der Basis (6) gleiten sollen, und zweite Führungsoberflächen (15a), die jeweils an einer von

zweiten Wänden (6b) der Basis (6) gleiten sollen, umfassen.

5. Schalter (1) gemäß Anspruch 2, bei dem der Kunststoffträger (10) eine Einrichtung (17) zum Halten der mobilen Brückenanordnung (9) in der Basis (6) umfasst.

6. Schalter (1) gemäß Anspruch 5, bei dem die Halteeinrichtung des Kunststoffträgers (10) Haltehaken (17) an beiden lateralen Enden der Zapfen (15) umfasst, die jeweils mit einer von Anschlagoberflächen (6c) der Basis (6) in Kontakt treten sollen, wobei die Stromabschaltvorrichtung (5) während der Montage derselben vor der Platzierung der Streifen (7) in der Basis (6) gehalten wird.

7. Schalter (1) gemäß Anspruch 1, bei dem die elastische Einrichtung (11) eine Druckfeder aufweist, die an einem Ende mit dem Kunststoffträger (10) gekoppelt ist und an dem anderen Ende derselben in der Basis (6) untergebracht ist.

8. Schalter (1) gemäß Anspruch 1, bei dem die Positionierungsvorrichtung (8) der sich drehenden Steuerwelle (2) ein Positionierungsrad (18) aufweist, das in einer auf den Rahmen (3) bezogenen Basis (19) untergebracht ist, an einer elastischen Einrichtung (20) angebracht ist und einem sich drehenden Manövrierelement (21) zugewandt ist, das einstückig an die sich drehende Steuerwelle (2) angefügt ist, wobei das Manövrierelement (21) ein gezahntes Profil in der Form einer Ratsche umfasst und das Positionierungsrad (18) eine zentrale Ausstülpung (22) aufweist, die in der Lage ist, in Hohlräume zwischen jedem zweiten Zahn des Manövrierelements (21) zu passen, wobei das Positionierungsrad (18) zwischen einer Kopplungsposition, in der es anhand der Freigabekraft der elastischen Einrichtung (20) zwischen zwei Zähnen befestigt ist, und einer Entkopplungsposition, in der es durch einen der Zähne, der die elastische Einrichtung (20) zusammendrückt, gedrückt wird, in der Basis (19) linear verschiebbar ist, je nach der Drehposition der sich drehenden Steuerwelle (2), und wobei das Positionierungsrad (18) ferner zwei Zapfen (23) aufweist, die im Wesentlichen parallel zu der Verschiebungsrichtung (Z) des Rades (18) in der Basis (19) sind.

9. Schalter (1) gemäß Anspruch 8, bei dem das Positionierungsrad (18) Führungseinrichtungen (18a, 23a) zum Verschieben des Rades (18) umfasst.

10. Schalter (1) gemäß Anspruch 9, bei dem die Führungseinrichtungen des Positionierungsrades (18) erste Führungsoberflächen (18a) an jedem lateralen Ende, die jeweils an einer von ersten Wänden (19a) der Basis (19) gleiten sollen, und zweite Führungsoberflächen (23a) an jedem lateralen Ende der Zapfen (23), die jeweils an einer von zweiten Wänden (19b) der Basis (19) gleiten sollen, umfassen.

11. Schalter (1) gemäß Anspruch 8, bei dem das Positionierungsrad (18) eine Einrichtung (24) zum Halten des Rades (18) in der Basis (19) aufweist.

12. Schalter (1) gemäß Anspruch 11, bei dem die Halteeinrichtung des Positionierungsrades (18) Haltehaken (24) an beiden lateralen Enden der Zapfen (23) umfasst, die jeweils mit einer von Anschlagoberflächen (19c) der Basis (19) in Kontakt treten sollen, wobei das Rad (18) während der Montage desselben vor dem Platzieren des sich drehenden Manövrierelements (21) und anderer Komponenten des Schalters (1) in der Basis (19) gehalten bleibt.

13. Schalter (1) gemäß Anspruch 8, bei dem die elastische Einrichtung (20) eine Druckfeder aufweist, die an einem Ende mit dem Positionierungsrad (18) gekoppelt ist und an ihrem anderen Ende in der Basis (19) untergebracht ist.

Revendications

1. Commutateur rotatif (1) pour appareils électriques et analogues, comprenant un arbre de commande rotatif (2) qui est monté de façon rotative sur un cadre (3), ledit arbre de commande rotatif (2) étant pourvu d'une pluralité de disques à cames (4), respectivement, associés à une pluralité de dispositifs de coupure de courant (5), chaque dispositif de coupure de courant (5) faisant face à un disque à cames (4) et étant logé dans une base (6) appartenant au cadre (3), et pouvant être déplacé de façon linéaire à l'intérieur de la base (6) entre une position connectée et une position déconnectée d'une paire de bandes de connexion électrique (7) qui sont intégralement jointes au cadre (3), de telle sorte que chaque disque à cames (4), en fonction de la position de rotation de l'arbre de commande rotatif (2), soit capable de connecter et de déconnecter ledit dispositif de coupure de courant (5), et comprenant un dispositif de positionnement (8) dudit arbre de commande rotatif (2) qui est capable de définir une série de positions radiales prédéterminées associées à différentes fonctions du commutateur (1), **caractérisé en ce que** chaque dispositif de coupure de courant (5) comprend un ensemble de pont mobile (9) pourvu d'un support de plastique (10) monté sur des moyens élastiques (11) et d'un pont métallique (12) qui est couplé audit support de plastique (10), ledit pont métallique (12) étant capable de maintenir un contact direct avec les bandes respectives (7) au moyen de la force de relâchement des moyens élastiques (11) dans la position connectée, et de s'éloigner desdites

bandes (7) lorsque l'ensemble de pont mobile (9) est poussé par le disque à cames (4), comprimant lesdits moyens élastiques (11) dans la position déconnectée.

2. Commutateur (1) selon la revendication 1, dans lequel le support de plastique (10) de l'ensemble de pont mobile (9) comprend un noyau (13) pourvu de moyens d'agencement (16) à coupler au pont métallique (12), une protubérance (14) intégrée dans une zone centrale du noyau (13) destinée à entrer en contact avec le disque à cames (4), et deux broches (15) sensiblement parallèles à la direction de déplacement (Z) dudit ensemble de pont mobile (9) à l'intérieur de la base (6).

3. Commutateur (1) selon la revendication 2, dans lequel le support de plastique (10) comprend des moyens de guidage (13a, 15a) pour déplacer ledit ensemble de pont mobile (9).

4. Commutateur (1) selon la revendication 3, dans lequel les moyens de guidage du support de plastique (10) présentent des premières surfaces de guidage (13a) à chaque extrémité latérale du noyau (13) destinées à coulisser, respectivement, sur des premières parois (6a) de la base (6), et des deuxièmes surfaces de guidage (15a) destinées à coulisser, respectivement, sur des deuxièmes parois (6b) de la base (6).

5. Commutateur (1) selon la revendication 2, dans lequel le support de plastique (10) comprend des moyens (17) pour retenir l'ensemble de pont mobile (9) à l'intérieur de la base (6).

6. Commutateur (1) selon la revendication 5, dans lequel les moyens de retenue du support de plastique (10) comprennent des crochets de retenue (17) sur les deux extrémités latérales des broches (15) destinés à entrer en contact, respectivement, avec des surfaces d'arrêt (6c) de la base (6), le dispositif de coupure de courant (5) étant maintenu à l'intérieur de la base (6) pendant l'assemblage de celle-ci avant la mise en place des bandes (7).

7. Commutateur (1) selon la revendication 1, dans lequel les moyens élastiques (11) comprennent un ressort de compression qui est couplé à une première extrémité au support de plastique (10) et qui est logé à l'autre extrémité de celui-ci dans la base (6).

8. Commutateur (1) selon la revendication 1, dans lequel le dispositif de positionnement (8) de l'arbre de commande rotatif (2) comprend une roue de positionnement (18) logée dans une base (19) appartenant au cadre (3), montée sur des moyens élastiques (20) et faisant face à un organe de manoeuvre rotatif (21) qui est intégralement joint à l'arbre de commande rotatif (2), ledit organe de manoeuvre (21) présentant un profil denté sous la forme d'un rochet, et ladite roue de positionnement (18) comportant une protubérance centrale (22) capable de s'agencer dans des cavités entre chaque paire de dents de l'organe de manoeuvre (21), ladite roue de positionnement (18) pouvant être déplacée de façon linéaire à l'intérieur de la base (19) entre une position de couplage, dans laquelle elle est fixée entre deux dents au moyen de la force de relâchement des moyens élastiques (20), et une position de découplage, dans laquelle elle est poussée par l'une des dents qui comprime les moyens élastiques (20) en fonction de la position de rotation de l'arbre de commande rotatif (2), et ladite roue de positionnement (18) comprenant en outre deux broches (23) sensiblement parallèles à la direction de déplacement (Z) de ladite roue (18) à l'intérieur de la base (19).

9. Commutateur (1) selon la revendication 8, dans lequel la roue de positionnement (18) comprend des moyens de guidage (18a, 23a) pour déplacer ladite roue (18).

10. Commutateur (1) selon la revendication 9, dans lequel les moyens de guidage de la roue de positionnement (18) présentent des premières surfaces de guidage (18a) à chaque extrémité latérale destinées à coulisser, respectivement, sur des premières parois (19a) de la base (19), et des deuxièmes surfaces de guidage (23a) à chaque extrémité latérale des broches (23) destinées à coulisser, respectivement, sur des deuxièmes parois (19b) de la base (19).

11. Commutateur (1) selon la revendication 8, dans lequel la roue de positionnement (18) comprend des moyens (24) pour retenir ladite roue (18) à l'intérieur de la base (19).

12. Commutateur (1) selon la revendication 11, dans lequel les moyens de retenue de la roue de positionnement (18) comprennent des crochets de retenue (24) aux deux extrémités latérales des broches (23) destinés à entrer en contact, respectivement, avec des surfaces d'arrêt (19c) de la base (19), ladite roue (18) restant retenue à l'intérieur de la base (19) pendant l'assemblage de celle-ci avant la mise en place de l'organe de manoeuvre rotatif (21) et des autres composants du commutateur (1).

13. Commutateur (1) selon la revendication 8, dans lequel les moyens élastiques (20) comprennent un ressort de compression qui est couplé à une première extrémité à la roue de positionnement (18) et qui est logé à son autre extrémité dans la base (19).

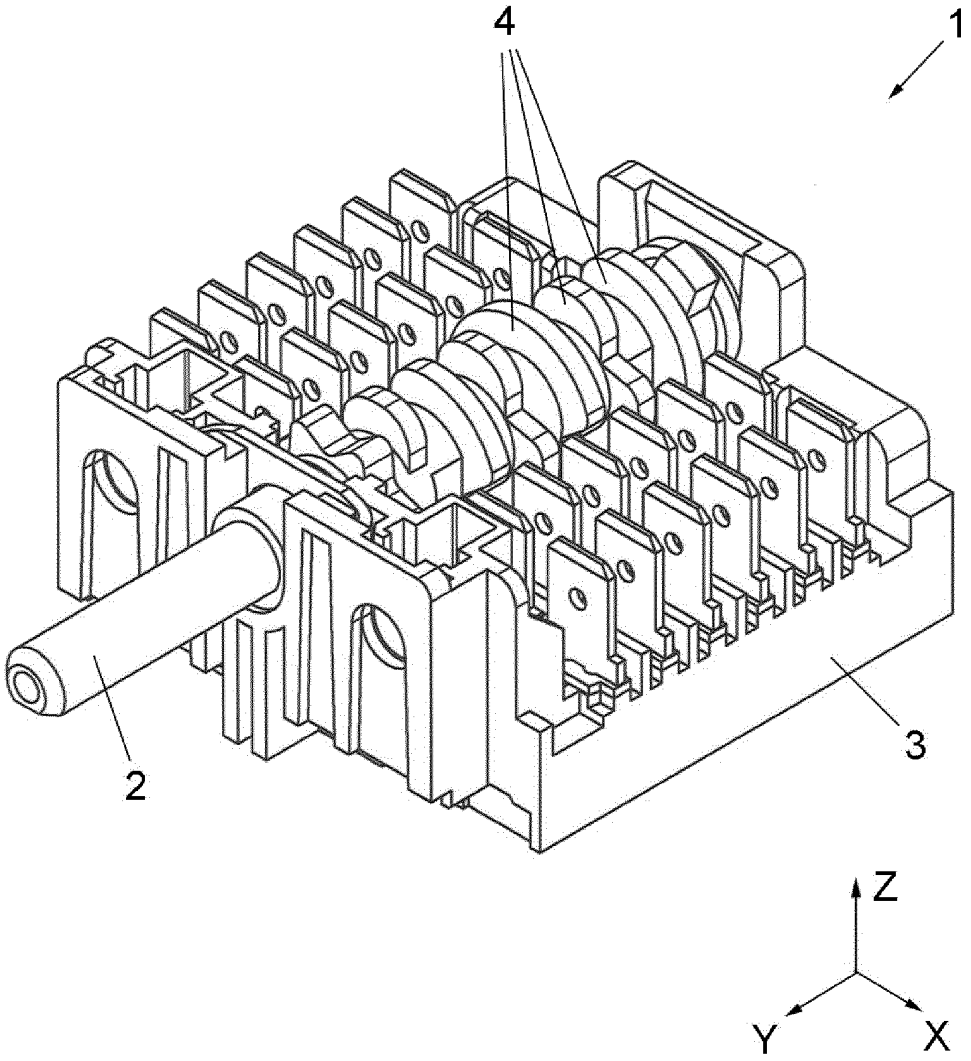

FIG. 1

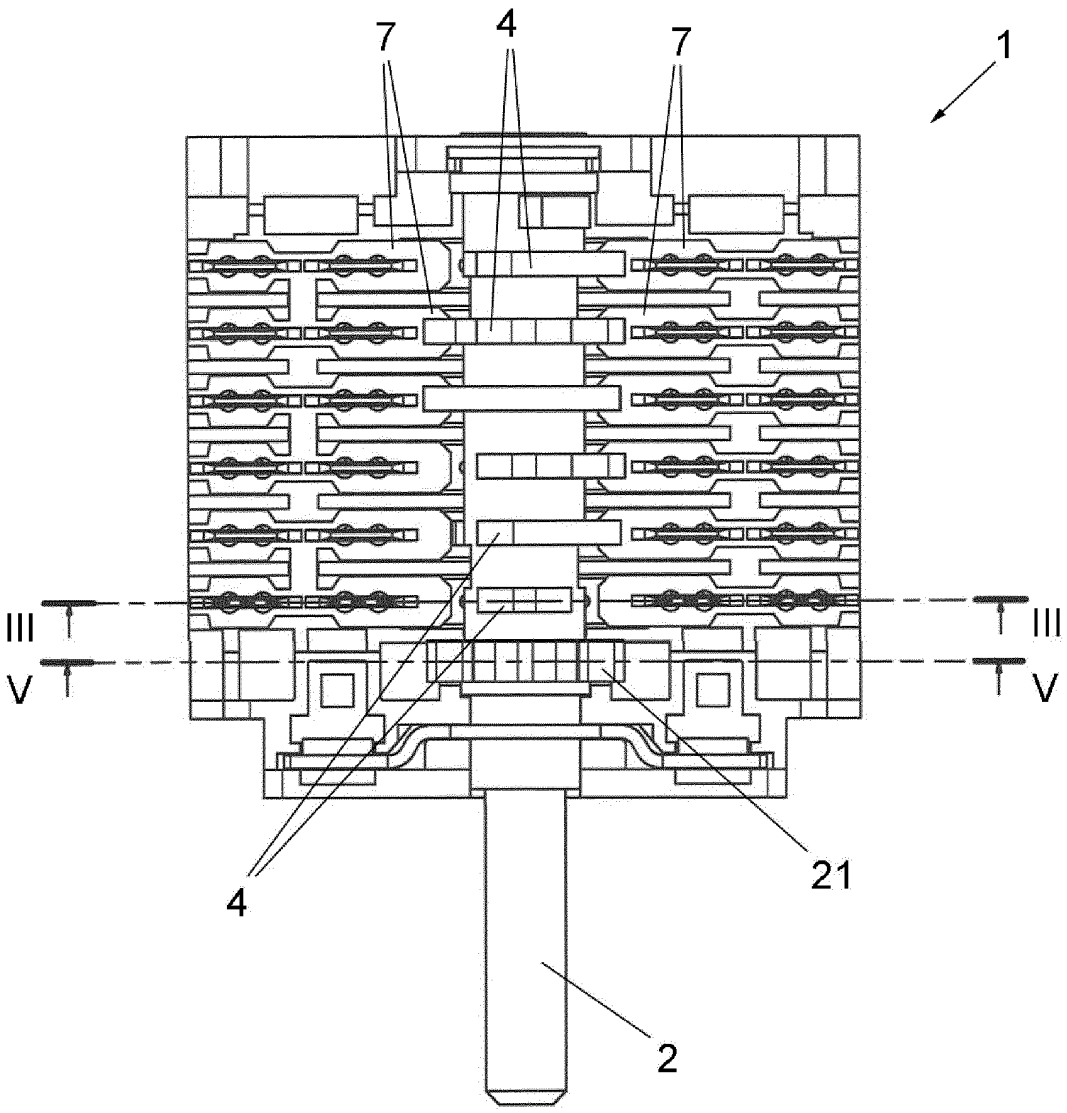

FIG. 2

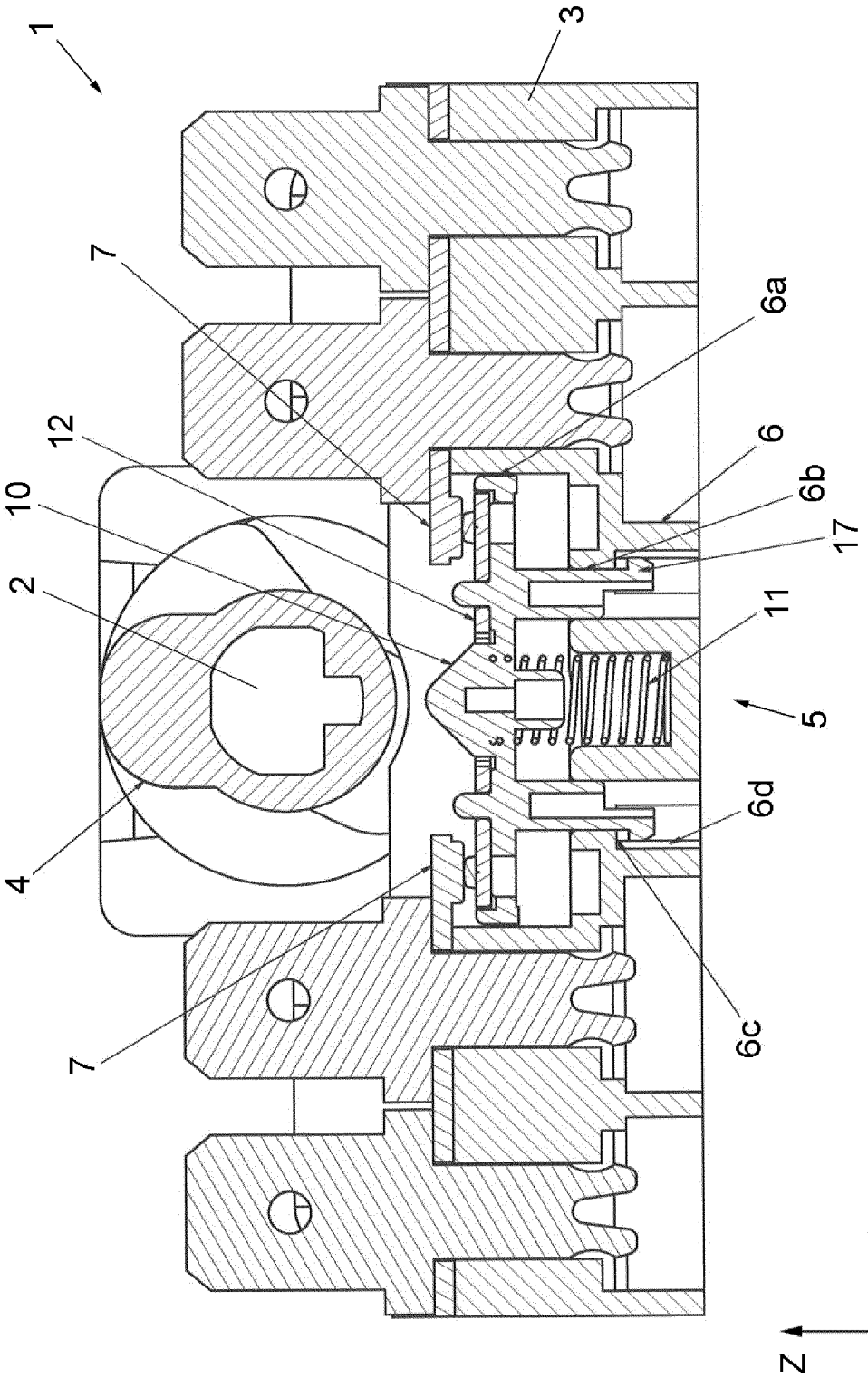

FIG. 3

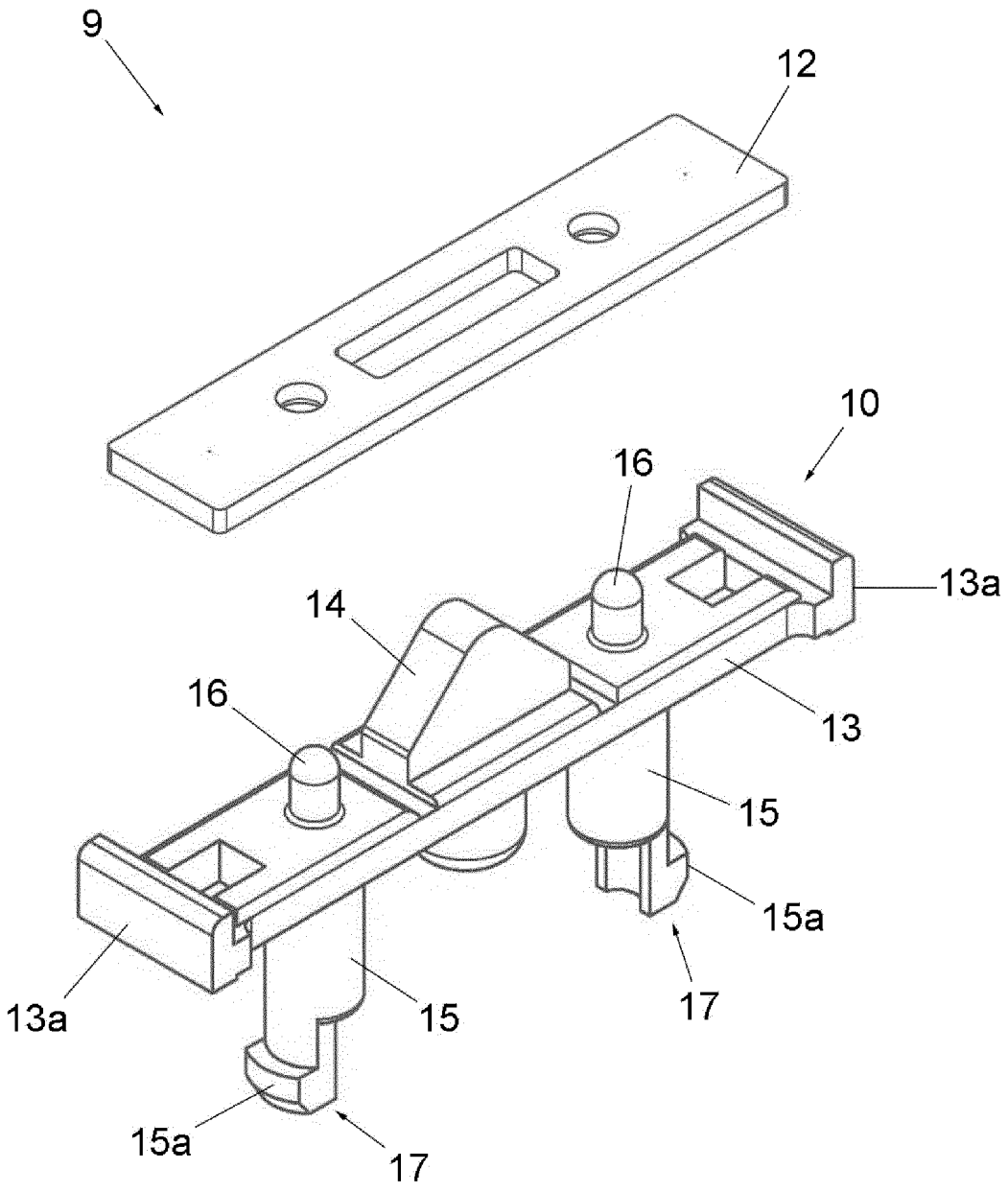

FIG. 4

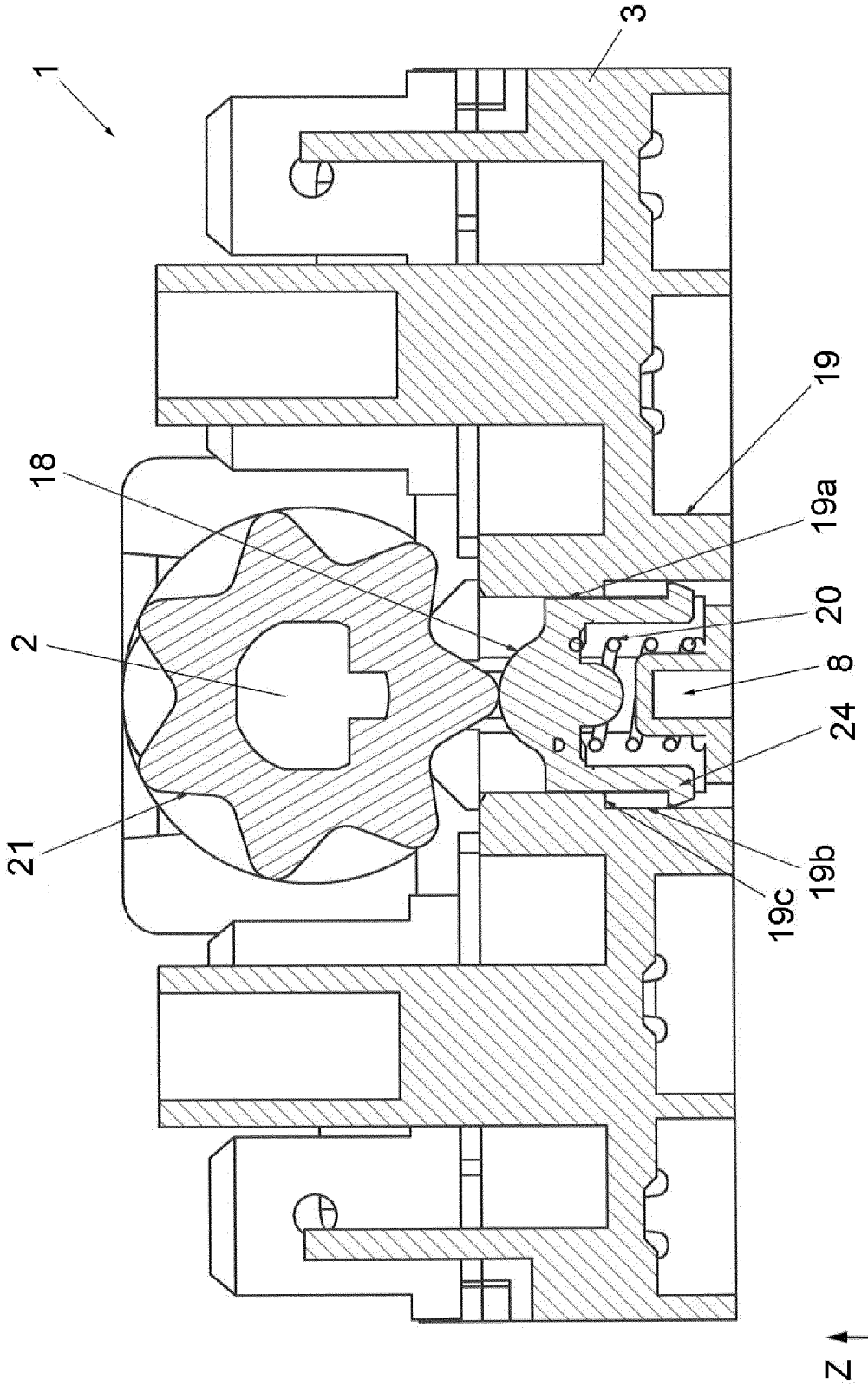

FIG. 5

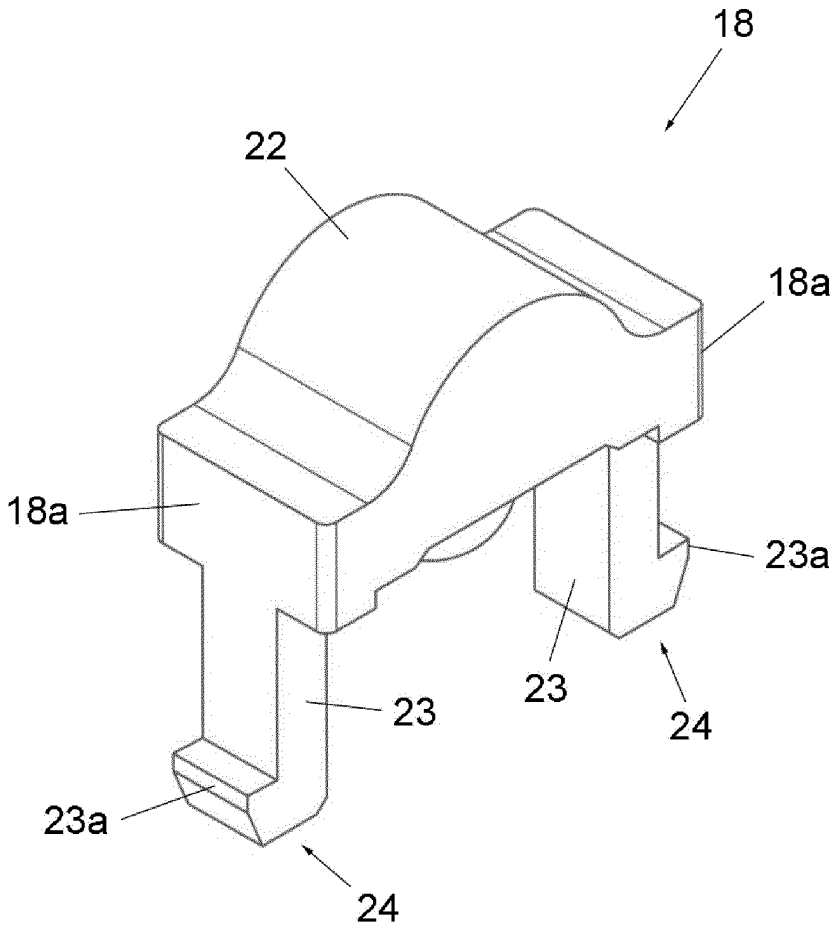

FIG. 6

REFERENCES CITED IN THE DESCRIPTION

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