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(54) **MECHANISM FOR SWITCHES WHICH COMPRISES TWO SWINGING MOBILE CONTACTS**  
MECHANISMUS FÜR SCHALTER MIT ZWEI BEWEGLICHEN SCHWINGKONTAKTEN  
MÉCANISME POUR COMMUTATEURS COMPRENANT DEUX CONTACTS MOBILES PIVOTANTS

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(56) References cited:  
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## Description

### TECHNICAL FIELD

[0001] The invention focuses on the field of mechanisms for switches and switches intended for having several positions and preventing undesired configurations of the underlying contacts, which may lead to short-circuits that could cause damage to drive motors. The invention therefore has a preferred application in the field of reversible drive motors for blinds.

### BACKGROUND

[0002] Mechanisms for switches which are based on two swinging mobile contacts, also generally assembled adjacent to one another and swinging about a common axis, such that each of the mobile contacts can swing between two end positions, are known. These end positions are determined by respective fixed contacts connected to the input/output terminals of the switch. WO-A-2019/239225 discloses a prior art switch mechanism.

[0003] The mobile contacts are moved by means of two actuating levers, also referred to as rocker arms, one for each mobile contact. These levers can in turn rotate about a common shaft, arranged parallel to the axis of the mobile contacts.

[0004] Each lever has an actuating end which is arranged away from the rotating shaft of the lever and mechanically connected with the respective mobile contact. This mechanical connection is made by means of a spring housed in the generally hollow body of the lever, having one end supported inside the lever and another end supported on the edge of the mobile contact.

[0005] Since there are two pairs of lever/mobile contact, in the absence of mechanical link between the levers, there are four possible configurations.

[0006] When these switches are used for actuating reversible motors, for example, for raising and lowering blinds or for extending and drawing back awnings, only three out of the four configurations are of interest. The fourth configuration corresponds to a short-circuit situation that must be avoided. The mechanism must prohibit that configuration.

[0007] To allow the three operating configurations and at the same time prohibit the short-circuit configuration, the interposition of a mechanism between the levers which prohibits said configuration is known in the state of the art.

[0008] However, the known mechanisms are complex because they involve a large number of parts.

### DESCRIPTION OF THE INVENTION

[0009] To overcome the drawbacks of the state of the art, the present invention proposes a mechanism for switches according to claim 1.

[0010] The invention therefore consists of directly link-

ing the levers to one another. This reduces the complexity of the mechanisms and their costs, as well as provides greater reliability.

[0011] Furthermore, these features can be formed during lever manufacture. The invention can also be implemented with a single lever design.

[0012] In some embodiments, each lever is made up of a rod joining the actuating end with the common shaft.

[0013] In some embodiments, each lever comprises two opposite extensions with respect to the common shaft which are perpendicular to the rod, these extensions comprising ends provided on an upper side with pressure application surfaces intended for the actuation of the levers.

[0014] In some embodiments, each lever comprises two support surfaces intended for being supported on the support surface of the other lever, the two surfaces of each of the levers being arranged opposite one another with respect to the common shaft.

[0015] By making the forces symmetrical, a pure moment is thereby achieved without any forces being applied on the shaft.

[0016] In some embodiments, each lever comprises in one of the extensions a projection extending according to the direction of the common shaft and towards the other lever, the projection being provided with one of the support surfaces, and the other extension of each lever being provided with the other support surface for the corresponding projection.

[0017] This is a symmetrical way of implementing the invention which allows the two levers to be made with a single design.

[0018] In some embodiments, the pressure application surfaces have a V-shaped section such that they are made up of two inclined planes defining a concavity.

[0019] In some embodiments, the actuating end of each lever is made up of U-shaped grooves in which the push areas for pushing the mobile contacts snugly fit.

[0020] In some embodiments, the mechanism comprises stabilising springs for stabilising the lever/mobile contact assemblies, in which the rods of the levers comprise a cavity at the actuating end and house the spring therein.

[0021] In some embodiments, the mobile contacts have a common axis of rotation.

[0022] In some embodiments, the mobile contacts are made up of two segments, a first push or actuating segment which is pushed or actuated by the corresponding lever and provided with a projection for the fitting of the end of a spring arranged in the cavity of the actuating end of the lever and a second contact segment provided with a tab which comprises at its end a contact point.

[0023] In some embodiments, the mobile contacts are arranged in a manner relative to one another with their actuating segments being adjacent, such that their contact segments are arranged more towards the outside.

[0024] In some embodiments, the mechanism comprises a main terminal, a first terminal, and a second ter-

minal, which are made up of a board provided at one end with a connection post, the main terminal being provided, at an end opposite the connection post, with a strip with a V-shaped section the vertex of which constitutes the common axis of rotation of the mobile contacts, such that there are defined in the strip a support segment for the first mobile contact and a support segment for the second mobile contact.

**[0025]** In some embodiments, the first terminal is arranged opposite the main terminal with respect to the axis of rotation of the first mobile contact, in which the second terminal is arranged facing the support segment for the second mobile contact and beside the main terminal, the first terminal being provided with a contact point, the second terminal being provided with a contact point, such that as a result of the support surfaces of the levers, only the following configurations are allowed:

- a first configuration in which the first mobile contact is not connected with the contact point of the first terminal, and in which the second mobile contact is not connected with the contact point of the second terminal, such that the connection post of the main terminal is electrically isolated from the connection terminals of the first terminal and the second terminal;
- a second configuration in which the first mobile contact is connected with the contact point of the first terminal, and in which the second mobile contact is not connected with the contact point of the second terminal, such that the connection post of the main terminal is in electrical contact with the connection post of the first terminal; and
- a third configuration in which the first mobile contact is not connected with the contact point of the first terminal, and in which the second mobile contact is connected with the contact point of the second terminal, such that the connection post of the main terminal is in electrical contact with the connection post of the terminal second;

with a configuration in which the first mobile contact is connected with the contact point of the first terminal, and in which the second mobile contact is connected with the contact point of the second terminal, not being possible.

**[0026]** In some embodiments, the surfaces for the mutual support of the levers are arranged such that when they come into contact with one another, the main axes of the rods of the two levers form an angle, preferably of 3° or greater.

**[0027]** In some embodiments, the mechanism comprises three buttons or pushbuttons:

- a first button provided with a pressure application end for applying pressure on the pressure application surface of the first lever leading to the second configuration;
- a second button provided with a pressure application

end for applying pressure on the pressure application surface of the second lever leading to the third configuration; and

- a third button provided with two pressure application ends for simultaneously applying pressure on the application surfaces of the first lever and the second lever leading to the first configuration.

**[0028]** Lastly, the invention relates to a system for actuating blinds, comprising a reversible motor provided with three posts and a mechanism according to any of the variants, such that the motor can only be in:

- a forward movement operating mode;
- a backward movement operating mode; and
- an unpowered mode, with a short-circuit connection being impeded.

## BRIEF DESCRIPTION OF THE FIGURES

**[0029]** To complete the description and for the purpose of providing a better understanding of the invention, a set of drawings is provided. The drawings comprise the following figures:

Figures 1 and 2 show the mechanism of the invention according to a preferred embodiment.

Figures 3 and 4 show two configurations of the relative position of the actuating levers.

Figure 5a shows a front view of the mechanism in a configuration in which the mobile contacts are inclined to the left, and therefore connection is established between terminals B1 and BF. The levers are in the corresponding position.

Figure 5b is a plan view corresponding to Figure 5a, showing herein that the terminal B2 is isolated.

Figure 5c schematically shows the connection established in the configurations shown in Figure 5a. Figures 6a, 6b, and 6c are similar to Figures 5a, 5b, and 5c, respectively, but for a configuration in which the mobile contacts are arranged away from the first terminal and the second terminal, and therefore there is no conduction.

Figures 7a, 7b, and 7c are similar to Figures 5a, 5b, and 5c, respectively, but in the third stable configuration in which both mobile contacts are inclined to the right, and therefore the main terminal and the second terminal are electrically connected.

Figures 8 and 9 show two elevational sections of an embodiment provided with a button intended for bringing the mechanism to the configuration illustrated in Figures 6a to 6c.

Figure 10 shows the embodiment of Figures 8 and 9, but arranged in the crossed configuration, in a section to which there has been added, in order to facilitate viewing, the part provided with an extension and a leg on the side of the second lever.

Figure 11 shows a perspective view of the button

with the relative position of the extensions and the legs which, together, perform the guiding and retention functions in the standby configuration.

## DESCRIPTION OF PREFERRED EMBODIMENTS

**[0030]** As can be seen in Figure 1, the invention relates to a mechanism for switches S comprising two swinging mobile contacts P1, P2 each swinging according to an axis of rotation  $\Gamma P$ , such that each of the mobile contacts P1, P2 can swing between two end positions.

**[0031]** The mechanism comprises actuating levers L1, L2, i.e., first actuating lever L1 and second actuating lever L2, for each mobile contact P1, P2, the levers L1, L2 being able to rotate about a common shaft  $\Gamma L$ .

**[0032]** Each lever L1, L2, also referred to as rocker arms, has an actuating end L1D, L2D intended for directly and/or indirectly pushing the mobile contacts L1, L2 in a push area P11, P12 for pushing the mobile contacts P1, P2.

**[0033]** A direct push is possible because the end itself can directly push the mobile contacts. However, generally, that push will occur as a result of a push through a spring M inserted in a cavity of the lever, at the actuating end L1D, L2D thereof.

**[0034]** Positive and negative directions of rotation of the levers L1, L2 can also be defined.

**[0035]** According to the invention, as can be seen in Figures 3 and 4, the first lever L1 comprises a support surface LS1 and the second lever L2 comprises a support surface LS2 intended for being supported on the support surface LS1 of the first lever L1. These surfaces LS1, LS2 are oriented such that the mutual support thereof can exert a moment on the levers L1, L2 with respect to the common shaft  $\Gamma L$  and such that:

- the first lever L1 causes the rotation of the second lever L2 when rotating according to the positive direction of rotation + and when the support surfaces LS1, LS2 come into contact with one another; and
- the first lever L1 constitutes a stop for stopping the rotation of the second lever L2 when the second lever L2 rotates according to the negative direction of rotation.

**[0036]** In other words, in the operating interval of the levers which is demarcated by the contacts which limit the angular working interval of the mobile contacts, the lever L1 can push the lever L2 according to one of the directions and the lever L2 can push L1 according to the opposite direction. However, the lever L1 cannot 'pull' the lever in the opposite direction. In other words, the lever L1 constitutes a stop for the lever L2, and from the configuration viewpoint, there is a prohibited configuration, which is that in which the lever L2 is arranged on the right and the lever 1 on the left (in reference to the part arranged below the rotating shaft  $\Gamma L$  of the levers, when viewing the levers from a front view in which the

first lever is arranged in front of the second lever).

**[0037]** Each lever L1, L2 is made up of a rod LH1, LH2 joining the actuating end L1D, L2D with the common shaft  $\Gamma L$  and comprises two opposite extensions E11, E12, E21, E22 with respect to the common shaft  $\Gamma L$  which are perpendicular to the rod LH1, LH2, these extensions E11, E12, E21, E22 comprising ends provided on an upper side with pressure application surfaces L11, L12, L21, L22 intended for the actuation of the levers L1, L2.

**[0038]** The mutual push is implemented by means of two support surfaces LS1, LS2 in each lever L1, L2. These two surfaces LS1, LS2 of each of the levers L1, L2 are arranged opposite one another with respect to the common shaft  $\Gamma L$ .

**[0039]** One of the extensions E11, E22 of each lever L1, L2 comprises a projection S11, S21 extending according to the direction of the common shaft  $\Gamma L$  and towards the other lever L1, L2, the projection S11, S21 being provided with one of the support surfaces LS1, LS2, and the other extension E12, E21 of each lever L1, L2 being provided with a support surface for the corresponding projection S11, S21.

**[0040]** The pressure application surfaces L11, L12, L21, L22 have a V-shaped section such that they are made up of two inclined planes defining a concavity. The concavities resulting from these V-shaped sections are intended for receiving the push of non-depicted buttons that can be directly actuated by the user and arranged above the depicted mechanism.

**[0041]** According to a preferred embodiment, the actuating end L1D, L2D of each lever L1, L2 is made up of U-shaped grooves in which the push areas P11, P12 for pushing the mobile contacts P1, P2 snugly fit.

**[0042]** In a preferred embodiment, the actuating ends L1D, L2D of the levers L1, L2 are connected to a push area or actuating segment TA for pushing or actuating the mobile contact P1, P2, with the interposition of a stabilising spring M.

**[0043]** The stabilising springs M for stabilising the lever/mobile contact assemblies L1/P1, L2/P2, are housed in a cavity inside the rods LH1, LH2 which are hollow at least at their actuating end L1D, L2D.

**[0044]** Moreover, an embodiment in which the mobile contacts P1, P2 have a common axis of rotation  $\Gamma P$  is preferred. An embodiment in which the mobile contacts P1, P2 are made up of two segments TA, TC is also preferred. A first actuating segment TA or push area that is actuated or pushed by the corresponding lever L1, L2 and provided with a projection F1A, F2A for the fitting of the end of a spring M arranged in the lever L1, L2 and a second contact segment TC provided with a tab which comprises at its end a contact point F1, F2.

**[0045]** The mobile contacts P1, P2 are therefore arranged in a manner relative to one another with their actuating segments TA being adjacent, such that their contact segments TC are arranged more towards the outside.

**[0046]** Besides the movable mechanism of the switch,

the invention comprises a main terminal F, a first terminal 1, and a second terminal 2, which are made up of a board provided at one end with a connection post BF, B1, B2, the main terminal F being provided, at an end opposite the connection post BF, with a strip with a V-shaped section the vertex of which constitutes the common axis of rotation  $\Gamma P$  of the mobile contacts P1, P2, such that there are defined in the strip a support segment for the first mobile contact P1 and a support segment for the second mobile contact P2.

**[0047]** As shown in Figures 5a to 7c, the first terminal 1 is arranged opposite the main terminal F with respect to the common axis of rotation  $\Gamma P$  of the mobile contacts P1, P2, in which the second terminal 2 is arranged facing the support segment for the second mobile contact P2 and beside the main terminal F, the first terminal 1 being provided with a contact point C1, the second terminal 2 being provided with a contact point C2, such that as a result of the support surfaces LS1, LS2 only the following configurations are allowed:

- a first configuration, shown in Figures 6a to 6c, in which the first mobile contact P1 is not connected with the contact point C1 of the first terminal 1, and in which the second mobile contact P2 is not connected with the contact point C2 of the second terminal 2, such that the connection post BF of the main terminal F is electrically isolated from the connection terminals B1, B2 of the first terminal 1 and the second terminal 2.
- a second configuration, shown in Figures 5a to 5c, in which the first mobile contact P1 is connected with the contact point C1 of the first terminal 1, and in which the second mobile contact P2 is not connected with the contact point C2 of the second terminal 2, such that the connection post BF of the main terminal F is in electrical contact with the connection post B1 of the first terminal 1; and
- a third configuration, shown in Figures 7a to 7c, in which the first mobile contact P1 is not connected with the contact point C1 of the first terminal 1, and in which the second mobile contact P2 is connected with the contact point C2 of the second terminal 2, such that the connection post BF of the main terminal F is in electrical contact with the connection post B2 of the second terminal 2;

with a configuration in which the first mobile contact P1 is connected with the contact point C1 of the first terminal 1, and in which the second mobile contact P2 is connected with the contact point C2 of the second terminal 2, not being possible.

**[0048]** The described mechanism is designed for operating with three buttons or pushbuttons:

- a first button provided with a pressure application end for applying pressure on the pressure application surface L11 of the first lever L1 leading to the

second configuration;

- a second button provided with a pressure application end for applying pressure on the pressure application surface L22 of the second lever L2 leading to the third configuration; and
- a third button provided with two pressure application ends for simultaneously applying pressure on the application surfaces of the first lever L1 and the second lever L2 leading to the first configuration.

**[0049]** The present invention therefore has advantageous application in a system for actuating blinds, comprising a reversible motor provided with three posts and a mechanism for switches according to the invention, such that the motor can only be in: a forward movement operating mode;

a backward movement operating mode; and  
an unpowered mode,  
with a short-circuit connection being impeded.

**[0050]** So far, the part of the levers has been described in detail up until the axis level. However, it is also envisaged that the mechanism comprises, as shown in Figures 8 and 9, a button BO1 comprising a body BB and having an axis of movement  $\Gamma B$  perpendicular to the common shaft  $\Gamma L$  of the levers L1, L2.

**[0051]** As shown in Figures 8 to 11, this button BO1 comprises a body BB and having an axis of movement  $\Gamma B$  perpendicular to the common shaft  $\Gamma L$ .

**[0052]** This button BO1 comprises on one side a first leg B11 extending in the direction of the axis of movement  $\Gamma B$  and is arranged for pressing on a first pressure application surface L12 of the first swinging lever L1.

**[0053]** In turn, the first swinging lever L1 comprises an upper extension LU1 opposite its rod LH1 with respect to the common shaft  $\Gamma L$ . This upper extension LU1 comprises, in a very advantageous manner, an oblique surface LB1 with respect to the rod LH1.

**[0054]** Moreover, the body BB comprises a protuberance BP oriented towards the oblique surface LB1 and preferably centred in the axis of movement  $\Gamma B$ . This surface LB1 is oriented such that a force G1, exerted by the protuberance BP, shown in Figure 9, on the oblique surface LB1 exerts a moment MBP1 on the lever L1 with respect to the common shaft  $\Gamma L$  having the same direction as a moment MB11 exerted by the first leg B11 on the pressure application surface L12.

**[0055]** Therefore, when pressing the button at one of its ends, which causes a rotation thereof, and therefore an insufficient movement of the end arranged in the instantaneous axis of rotation of the button, the centre of the button does indeed most certainly move, and said movement is utilised by means of the protuberance BP to exert a moment on the lever.

**[0056]** Figures 8 to 10 depict the first lever L1 in a second plane (in contrast to Figures 1 to 7c), whereas the second lever L2 is in a first plane. Therefore, the part of

the button which is located substantially above the first lever L1 is seen in Figures 8 and 9. Figure 10, however, also depicts a part of the button arranged in front of the section plane of the section, i.e., a part of the button arranged on the second lever L2.

**[0057]** The button comprises a second leg B12 protruding from the body of the button in the direction of the axis of movement  $\Gamma B$  and arranged for pressing on a first pressure application surface L22 of the second swinging lever L2, the second swinging lever L2 comprising an upper extension LU2 opposite its rod LH2 with respect to the common shaft  $\Gamma L$ , the upper extension LU2 comprising an oblique surface LB2 with respect to the rod LH2, the oblique surface LB2 being oriented such that a force G2 (shown in Figure 8) exerted by the protuberance BP on the oblique surface LB2 exerts a moment MBP2 on the swinging lever L2 with respect to the common shaft  $\Gamma L$  having the same direction as a moment MB12 exerted by the second leg B12 on the pressure application surface L21, such that when the button BO1 is pressed, the second lever L2 rotates in the direction opposite the rotation of the first swinging lever L1.

**[0058]** Likewise, there is envisaged a button spring MB which presses on the pushbutton BO1, moving it away from the common shaft  $\Gamma L$ , the button spring MB being supported on an upper end thereof on an inner surface of the button BO1 and on a lower end thereof on a support SB fixed with respect to the body of the switch.

**[0059]** As a retention accessory for the button, and as shown in Figure 11, it is envisaged that the legs B11 and B12 comprise retention projections (of which reference is only made in Figures 10 and 11 to B12S of B12), which are arranged on the outer side of the legs B11 and B12, facing the wall of the switch S in which the button BO1 is housed. The function of the retention projections B12S is to act as means for stopping the button BO1 so as to stabilise same when it is pressed by the button spring MB towards its position farther away with respect to the levers L1, L2. In the wall of the switch containing the button, there is envisaged on the surface facing the extension a recess (not shown in the figures) which will be complementary with the retention projection B12S, to thereby act as a stop. Therefore, in a standby situation, the button BO1 will be in equilibrium pushed at the lower part thereof by a button spring MB and retained in the opposite direction by the retention projections B12S being supported in the recess of the walls.

**[0060]** It can be seen, for example in Figure 11, that the button BO1 comprises a guiding and retention extension RG1 arranged with respect to the first leg B11 on the other side with respect to the plane defined by the common shaft  $\Gamma L$  and the axis of movement  $\Gamma B$ , said guiding and retention extension projecting from the body of the button in the direction of the axis of movement  $\Gamma B$  and being provided with a retention projection R1S.

**[0061]** There can also be envisaged a second guiding and retention extension R2 arranged with respect to the second leg B12 on the other side with respect to the plane

defined by the common shaft  $\Gamma L$  and the axis of movement  $\Gamma B$ , said second guiding and retention extension projecting from the body of the button in the direction of the axis of movement  $\Gamma B$  and being provided with a retention projection R2S.

**[0062]** The button BO1 is designed with a cavity BU oriented towards the swinging levers L1, L2, with the upper extension LU1, LU2 of the levers being housed in said cavity BU.

## Claims

1. A mechanism for a switch (S) comprising two swinging mobile contacts (P1, P2) each swinging according to an axis of rotation ( $\Gamma P$ ), such that each of the mobile contacts (P1, P2) can swing between two end positions, the mechanism comprising a first actuating lever (L1) for the first mobile contact (P1) and a second actuating lever (L2) for the second mobile contact (P2), the levers (L1, L2) being able to rotate about a common shaft ( $\Gamma L$ ) such that positive and negative directions of rotation of the levers (L1, L2) are defined, an actuating end (L1D, L2D) being defined in each lever (L1, L2), the actuating end (L1D, L2D) being intended for directly and/or indirectly pushing the corresponding mobile contact (P1, P2) in a push area for pushing the mobile contacts (P1, P2), **characterised in that** the first lever (L1) comprises a support surface (LS1) and the second lever (L2) comprises a support surface (LS2) intended for contacting the support surface (LS1) of the first lever (L1), the surfaces (LS1, LS2) being oriented such that the mutual contact thereof can exert a moment on the levers (L1, L2) with respect to the common shaft ( $\Gamma L$ ) and such that:

- the first lever (L1) causes the rotation of the second lever (L2) when rotating according to the positive direction of rotation (+) and when the support surfaces (LS1, LS2) come into contact with one another; and
- the first lever (L1) constitutes a stop for stopping the rotation of the second lever (L2) when the second lever (L2) rotates according to the negative direction of rotation (-).

2. The mechanism for a switch according to claim 1, wherein each lever (L1, L2) is made up of a rod (LH1, LH2) joining the actuating end (L1D, L2D) with the common shaft ( $\Gamma L$ ).

3. The mechanism for a switch according to claim 2, wherein each lever (L1, L2) comprises two opposite extensions (E11, E12, E21, E22) with respect to the common shaft ( $\Gamma L$ ) which are perpendicular to the rod (LH1, LH2), these extensions (E11, E12, E21, E22) comprising ends provided on an upper side with

pressure application surfaces (L11, L12, L21, L22) intended for the actuation of the levers (L1, L2).

4. The mechanism for a switch according to any of the preceding claims, wherein each lever (L1, L2) comprises two support surfaces (LS1, LS2) intended for being supported on the support surface of the other lever (L1, L2), the two surfaces (LS1, LS2) of each of the levers (L1, L2) being arranged opposite one another with respect to the common shaft ( $\Gamma$ L). 5 10
5. The mechanism for a switch according to claims 3 and 4, wherein one of the extensions (E11, E21) of each lever (L1, L2) comprises a projection (S11, S21) extending according to the direction of the common shaft ( $\Gamma$ L) and towards the other lever (L1, L2), the projection (S11, S21) being provided with one of the support surfaces (LS1, LS2), and the other extension (E12, E22) of each lever (L1, L2) being provided with a support surface for the corresponding projection (S11, S21). 15 20
6. The mechanism for a switch according to claim 3, wherein the pressure application surfaces (L11, L12, L21, L22) have a V-shaped section such that they are made up of two inclined planes defining a concavity. 25
7. The mechanism for a switch according to claim 2 or any claim depending on said claim, comprising stabilising springs (M) for stabilising first actuating lever (L1), the first mobile contact (P1), the second actuating lever (L2) and the second mobile contact (P2), wherein the actuating ends (L1D, L2D) of the rods (LH1, LH2) are hollow and house the springs (M). 30 35
8. The mechanism for a switch according to any of the preceding claims, wherein the mobile contacts (P1, P2) have a common axis of rotation ( $\Gamma$ P). 40
9. The mechanism for a switch according to claim 8, wherein the mobile contacts (P1, P2) are made up of two segments (TA, TC), a first actuating segment (TA) which is actuated by the corresponding lever (L1, L2) and provided with a projection (F1A, F2A) for the fitting of the end of a spring (M) arranged in the lever (L1, L2) and a second contact segment (TC) provided with a tab which comprises at its end a contact point (F1, F2). 45 50
10. The mechanism for a switch according to claim 9, wherein the mobile contacts (P1, P2) are arranged in a manner relative to one another with their actuating segments (TA) being adjacent, such that their contact segments (TC) are arranged more towards the outside. 55
11. The mechanism for a switch according to claim 8 or

any claim depending on said claim, comprising a main terminal (F), a first terminal (1), and a second terminal (2), which are made up of a board provided at one end with a connection post (BF, B1, B2), the main terminal (F) being provided, at an end opposite the connection post (BF), with a strip with a V-shaped section the vertex of which constitutes the common axis of rotation ( $\Gamma$ P) of the mobile contacts (P1, P2), such that there are defined in the strip a support segment for the first mobile contact (P1) and a support segment for the second mobile contact (P2).

12. The mechanism for a switch according to claim 11, wherein the first terminal (1) is arranged opposite the main terminal (F) with respect to the common axis of rotation ( $\Gamma$ P) of the mobile contacts (P1, P2), in which the second terminal (2) is arranged facing the support segment for the second mobile contact (P2) and beside the main terminal (F), the first terminal (1) being provided with a contact point (C1), the second terminal (2) being provided with a contact point (C2), such that as a result of the support surfaces (LS1, LS2) only the following configurations are allowed:

- a first configuration in which the first mobile contact (P1) is not connected with the contact point (C1) of the first terminal (1), and in which the second mobile contact (P2) is not connected with the contact point (C2) of the second terminal (2), such that the connection post (BF) of the main terminal (F) is electrically isolated from the connection terminals (B1, B2) of the first terminal (1) and the second terminal (2);
- a second configuration in which the first mobile contact (P1) is connected with the contact point (C1) of the first terminal (1), and in which the second mobile contact (P2) is not connected with the contact point (C2) of the second terminal (2), such that the connection post (BF) of the main terminal (F) is in electrical contact with the connection post (B1) of the first terminal (1); and
- a third configuration in which the first mobile contact (P1) is not connected with the contact point (C1) of the first terminal (1), and in which the second mobile contact (P2) is connected with the contact point (C2) of the second terminal (2), such that the connection post (BF) of the main terminal (F) is in electrical contact with the connection post (B2) of the second terminal (2);

with a configuration in which the first mobile contact (P1) is connected with the contact point (C1) of the first terminal (1), and in which the second mobile contact (P2) is connected with the contact point (C2) of the second terminal (2), not being possible.

13. The mechanism for a switch according to claim 3

and claim 12, comprising:

- a first button provided with a pressure application end for applying pressure on the pressure application surface (L11) of the first lever (L1) leading to the second configuration; 5
- a second button provided with a pressure application end for applying pressure on the pressure application surface (L22) of the second lever (L2) leading to the third configuration; and 10
- a third button provided with two pressure application ends for simultaneously applying pressure on the application surfaces of the first lever (L1) and the second lever (L2) leading to the first configuration. 15

14. A system for actuating blinds, comprising a reversible motor provided with three posts and a switch according to claim 12 or 13, such that the motor can only be in: 20

a forward movement operating mode;  
a backward movement operating mode; and  
an unpowered mode,  
with a short-circuit connection being impeded. 25

#### Patentansprüche

1. Mechanismus für einen Schalter (S) mit zwei schwingenden beweglichen Kontakten (P1, P2), die jeweils entsprechend einer Drehachse ( $\Gamma$ P) schwingen, so dass jeder der beweglichen Kontakte (P1, P2) zwischen zwei Endstellungen schwingen kann, wobei der Mechanismus einen ersten Betätigungshebel (L1) für den ersten beweglichen Kontakt (P1) und einen zweiten Betätigungshebel (L2) für den zweiten beweglichen Kontakt (P2) umfasst, wobei die Hebel (L1, L2) in der Lage sind, sich um eine gemeinsame Welle ( $\Gamma$ L) zu drehen, so dass positive und negative Drehrichtungen der Hebel (L1, L2) definiert sind, ein Betätigungsende (L1D, L2D), das in jedem Hebel (L1, L2) definiert ist, wobei das Betätigungsende (L1D, L2D) dazu bestimmt ist, die beweglichen Kontakte (P1, P2) direkt und/oder indirekt in einen Schubbereich zum Drücken der beweglichen Kontakte (P1, P2) **zu drücken, dadurch gekennzeichnet, dass** der erste Hebel (L1) eine Auflagefläche (LS1) und der zweite Hebel (L2) eine Auflagefläche (LS2) umfasst, die dazu bestimmt ist, die Auflagefläche (LS1) des ersten Hebels (L1) zu berühren, wobei die Flächen (LS1, LS2) so ausgerichtet sind, dass deren gegenseitiger Kontakt ein Moment auf die Hebel (L1, L2) in Bezug auf die gemeinsame Welle ( $\Gamma$ L) ausüben kann, und so, dass: 30 35 40 45 50 55
- der erste Hebel (L1) bewirkt die Drehung des zweiten Hebels (L2), wenn er sich in der posi-

ven Drehrichtung (+) dreht und wenn die Auflageflächen (LS1, LS2) miteinander in Berührung kommen; und

- Der erste Hebel (L1) stellt einen Anschlag zum Anhalten der Drehung des zweiten Hebels (L2) dar, wenn sich der zweite Hebel (L2) entsprechend der negativen Drehrichtung (-) dreht.

2. Mechanismus für einen Schalter nach Anspruch 1, wobei jeder Hebel (L1, L2) aus einer Stange (LH1, LH2) aufgebaut ist, die das Betätigungsende (L1D, L2D) mit der gemeinsamen Welle ( $\Gamma$ L) verbindet. 10
3. Mechanismus für einen Schalter nach Anspruch 2, wobei jeder Hebel (L1, L2) zwei gegenüberliegende Verlängerungen (E11, E12, E21, E22) in Bezug auf die gemeinsame Welle ( $\Gamma$ L) aufweist, die senkrecht zu der Stange (LH1, LH2) stehen, wobei diese Verlängerungen (E11, E12, E21, E22) Enden aufweisen, die auf einer Oberseite mit Druckaufbringungsflächen (L11, L12, L21, L22) für die Betätigung der Hebel (L1, L2). 15 20
4. Mechanismus für einen Schalter nach einem der vorhergehenden Ansprüche, wobei jeder Hebel (L1, L2) zwei Auflageflächen (LS1, LS2) aufweist, die dazu bestimmt sind, auf der Auflagefläche des anderen Hebels (L1, L2) abgestützt zu werden, wobei die beiden Flächen (LS1, LS2) jedes der Hebel (L1, L2) in Bezug auf die gemeinsame Welle ( $\Gamma$ L) einander gegenüberliegend angeordnet sind. 25
5. Mechanismus für einen Schalter nach den Ansprüchen 3 und 4, wobei eine der Verlängerungen (E11, E21) jedes Hebels (L1, L2) einen Vorsprung (S11, S21) aufweist, der sich entsprechend der Richtung der gemeinsamen Welle ( $\Gamma$ L) und zu dem anderen Hebel (L1, L2) erstreckt, wobei der Vorsprung (S11, S21) mit einer der Auflageflächen (LS1, LS2) und die andere Verlängerung (E12, E22) jedes Hebels (L1, L2) mit einer Auflagefläche für den entsprechenden Vorsprung (S11, S21) versehen ist. 30 35 40 45 50 55
6. Mechanismus für einen Schalter nach Anspruch 3, wobei die Druckaufbringungsflächen (L11, L12, L21, L22) einen V-förmigen Querschnitt aufweisen, so dass sie aus zwei geneigten Ebenen bestehen, die eine Konkavität definieren.
7. Mechanismus für einen Schalter nach Anspruch 2 oder einem von diesem Anspruch abhängigen Ansprüche, umfassend Stabilisierungsfedern (M) zur Stabilisierung des ersten Betätigungshebels (L1), den ersten beweglichen Kontakt (p1), den zweiten Betätigungshebel (L2) und den zweiten beweglichen Kontakt (P2), wobei die Betätigungsenden (LD1, LD2) der Stangen (LH1, LH2) hohl sind und die Federn (M) aufnehmen. 50 55



8. Mechanismus für einen Schalter nach einem der vorhergehenden Ansprüche, wobei die beweglichen Kontakte (P1, P2) eine gemeinsame Drehachse (ΓP) aufweisen.

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9. Mechanismus für einen Schalter nach Anspruch 8, wobei die beweglichen Kontakte (P1, P2) aus zwei Segmenten (TA, TC) aufgebaut sind, einem ersten Betätigungssegment (TA), das durch den entsprechenden Hebel (L1, L2) betätigt wird und mit einem Vorsprung (F1A, F2A) zum Anbringen des Endes einer in dem Hebel (L1, L2) und ein zweites Kontaktsegment (TC), das mit einer Lasche versehen ist, die an ihrem Ende einen Kontaktpunkt (F1, F2) umfasst.

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10. Mechanismus für einen Schalter nach Anspruch 9, wobei die beweglichen Kontakte (P1, P2) relativ zueinander angeordnet sind, wobei ihre Betätigungssegmente (TA) nebeneinander liegen, so dass ihre Kontaktsegmente (TC) stärker nach außen angeordnet sind.

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11. Mechanismus für einen Schalter nach Anspruch 8 oder einem von diesem Anspruch abhängigen Ansprüche, umfassend einen Hauptanschluss (F), einen ersten Anschluss (1) und einen zweiten Anschluss (2), die aus einer Platine bestehen, die an einem Ende mit einem Verbindungspol (BF, B1, B2) versehen ist, wobei der Hauptanschluss (F) an einem dem Verbindungspol (BF) gegenüberliegenden Ende vorgesehen ist, mit einem Streifen mit einem V-förmigen Querschnitt, dessen Eckpunkt die gemeinsame Drehachse (ΓP) der beweglichen Kontakte (P1, P2) darstellt, so dass in dem Streifen ein Stützsegment für den ersten beweglichen Kontakt (P1) und ein Stützsegment für den zweiten beweglichen Kontakt (P2) definiert sind.

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12. Mechanismus für einen Schalter nach Anspruch 11, wobei der erste Anschluss (1) gegenüber dem Hauptanschluss (F) in Bezug auf die gemeinsame Drehachse (ΓP) der beweglichen Kontakte (P1, P2) angeordnet ist, wobei der zweite Anschluss (2) dem Trägersegment für den zweiten beweglichen Kontakt (P2) zugewandt und neben dem Hauptanschluss (F) angeordnet ist, wobei der erste Anschluss (1) mit einem Kontaktpunkt (C1) versehen ist, der zweite Anschluss (2) mit einem Kontaktpunkt (C2) versehen ist, so dass aufgrund der Auflageflächen (LS1, LS2) nur die folgenden Konfigurationen zulässig sind:

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- eine erste Konfiguration, bei der der erste bewegliche Kontakt (P1) nicht mit dem Kontaktpunkt (C1) der ersten Klemme (1) verbunden ist und bei der der zweite bewegliche Kontakt (P2) nicht mit dem Kontaktpunkt (C2) der zweiten

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Klemme (2) verbunden ist, so dass der Anschlusspol (BF) der Hauptklemme (F) von den Anschlussklemmen (B1) galvanisch getrennt ist, B2) des ersten Anschlusses (1) und des zweiten Anschlusses (2);

- eine zweite Konfiguration, bei der der erste bewegliche Kontakt (P1) mit dem Kontaktpunkt (C1) der ersten Klemme (1) verbunden ist und bei der der zweite bewegliche Kontakt (P2) nicht mit dem Kontaktpunkt (C2) der zweiten Klemme (2) verbunden ist, so dass der Verbindungspol (BF) der Hauptklemme (F) in elektrischem Kontakt mit dem Verbindungspunkt (B1) der ersten Klemme (1) steht; und

- eine dritte Konfiguration, bei der der erste bewegliche Kontakt (P1) nicht mit dem Kontaktpunkt (C1) der ersten Klemme (1) verbunden ist und bei der der zweite bewegliche Kontakt (P2) mit dem Kontaktpunkt (C2) der zweiten Klemme (2) verbunden ist, so dass der Verbindungspol (BF) der Hauptklemme (F) in elektrischem Kontakt mit dem Verbindungspol (B2) der zweiten Klemme (2) steht;

bei einer Konfiguration, bei der der erste mobile Kontakt (P1) mit dem Kontaktpunkt (C1) des ersten Endgeräts (1) verbunden ist, und in der der zweite mobile Kontakt (P2) mit dem Kontaktpunkt (C2) des zweiten Endgeräts (2) verbunden ist, ist nicht möglich.

13. Mechanismus für einen Schalter nach Anspruch 3 und Anspruch 12, umfassend:

- einen ersten Knopf, der mit einem Druckanlei- tungsende versehen ist, um Druck auf die Druckausübungsfläche (L11) des ersten Hebels (L1) auszuüben, der zur zweiten Konfiguration führt; und

- ein zweiter Knopf, der mit einem Druckaus- übungsende versehen ist, um Druck auf die Druckausübungsfläche (L22) des zweiten Hebels (L2) auszuüben, der zur dritten Konfigu- ration führt; und

- ein dritter Knopf, der mit zwei Druckaufbrin- gungsenden versehen ist, um gleichzeitig Druck auf die Anwendungsflächen des ersten Hebels (L1) und des zweiten Hebels (L2) auszuüben, was zur ersten Konfiguration führt.

14. Vorrichtung zum Betätigen von Jalousien, best-ehend aus einem umkehrbaren Motor, versehen mit drei Pfosten und einem Schalter nach Anspruch 12 oder 13, so dass der Motor nur in folgenden Berei-chen eingesetzt werden kann:

eine Betriebsart für die Vorwärtsbewegung; eine Betriebsart der Rückwärtsbewegung; und ein nicht eingeschalteter Modus,

wobei eine Kurzschlussverbindung verhindert wird.

## Revendications

1. Mécanisme pour un interrupteur (S) comprenant deux contacts mobiles oscillants (P1, P2) oscillant chacun selon un axe de rotation ( $\Gamma$ P), de sorte que chacun des contacts mobiles (P1, P2) puisse pivoter entre deux positions d'extrémité, le mécanisme comprenant un premier levier d'actionnement (L1) pour le premier contact mobile (P1), et un second actionnement des leviers (L2) pour le second contact mobile (P2), les leviers (L1, L2) pouvant tourner autour d'un arbre commun ( $\Gamma$ L) de telle sorte que les sens positif et négatif de rotation des leviers (L1, L2) soient définis, une extrémité d'actionnement (L1D, L2D) étant définie dans chaque levier (L1, L2), l'extrémité d'actionnement (L1D, L2D) étant destinée à pousser directement et/ou indirectement les contacts mobiles (P1, P2) dans une zone de poussée pour pousser les contacts mobiles (P1, P2), **caractérisée en ce que** le premier levier (L1) comprend une surface d'appui (LS1) et le second levier (L2) comprend une surface d'appui (LS2) destinée à entrer en contact avec la surface d'appui (LS1) du premier levier (L1), les surfaces (LS1, LS2) étant orientées de telle sorte que le contact mutuel de celles-ci puisse exercer un moment sur les leviers (L1, L2) par rapport à l'arbre commun ( $\Gamma$ L) et de telle sorte que :

- le premier levier (L1) provoque la rotation du deuxième levier (L2) lors de la rotation selon le sens positif de rotation (+) et lorsque les surfaces d'appui (LS1, LS2) entrent en contact les unes avec les autres ; et
- le premier levier (L1) constitue une butée d'arrêt de la rotation du second levier (L2) lorsque le second levier (L2) tourne selon le sens de rotation négatif (-).

2. Mécanisme d'interrupteur selon la revendication 1, dans lequel chaque levier (L1, L2) est constitué d'une tige (LH1, LH2) joignant l'extrémité d'actionnement (L1D, L2D) à l'arbre commun ( $\Gamma$ L).
3. Mécanisme d'interrupteur selon la revendication 2, dans lequel chaque levier (L1, L2) comprend deux extensions opposées (E11, E12, E21, E22) par rapport à l'arbre commun ( $\Gamma$ L) qui sont perpendiculaires à la tige (LH1, LH2), ces extensions (E11, E12, E21, E22) comprenant des extrémités pourvues sur une face supérieure de surfaces d'application de pression (L11, L12, L21, L22) destinés à l'actionnement des leviers (L1, L2).

4. Mécanisme d'interrupteur selon l'une quelconque des revendications précédentes, dans lequel chaque levier (L1, L2) comprend deux surfaces d'appui (LS1, LS2) destinées à être appuyées sur la surface d'appui de l'autre levier (L1, L2), les deux surfaces (LS1, LS2) de chacun des leviers (L1, L2) étant disposées en face l'une de l'autre par rapport à l'arbre commun ( $\Gamma$ L).

5. Mécanisme d'interrupteur selon les revendications 3 et 4, dans lequel l'une des extensions (E11, E21) de chaque levier (L1, L2) comprend une saillie (S11, S21) s'étendant selon la direction de l'arbre commun ( $\Gamma$ L) et vers l'autre levier (L1, L2), la saillie (S11, S21) étant pourvue de l'une des surfaces d'appui (LS1, LS2), et l'autre extension (E12, E22) de chaque levier (L1, L2) étant pourvue d'une surface d'appui pour la saillie correspondante (S11, S21).

6. Mécanisme d'interrupteur selon la revendication 3, dans lequel les surfaces d'application de pression (L11, L12, L21, L22) ont une section en forme de V telle qu'elles sont constituées de deux plans inclinés définissant une concavité.

7. Mécanisme d'interrupteur selon la revendication 2 ou l'une quelconque revendication dépendant de ladite revendication, comprenant des ressorts stabilisateurs (M) pour stabiliser le premier levier d'actionnement (L1), le premier contact mobile (p1), le second levier d'actionnement (L2) et le second contact mobile (P2), dans lequel les extrémités d'actionnement (LD1, LD2) des tiges (LH1, LH2) sont creuses et abritent les ressorts (M).

8. Mécanisme d'interrupteur selon l'une quelconque des revendications précédentes, dans lequel les contacts mobiles (P1, P2) ont un axe de rotation commun ( $\Gamma$ P).

9. Mécanisme d'interrupteur selon la revendication 8, dans lequel les contacts mobiles (P1, P2) sont constitués de deux segments (TA, TC), un premier segment d'actionnement (TA) qui est actionné par le levier correspondant (L1, L2) et pourvu d'une saillie (F1A, F2A) pour le montage de l'extrémité d'un ressort (M) disposé dans le levier (L1, L2) et un second segment de contact (TC) muni d'une languette qui comporte à son extrémité un point de contact (F1, F2).

10. Mécanisme d'interrupteur selon la revendication 9, dans lequel les contacts mobiles (P1, P2) sont disposés de manière à ce que les autres soient disposés les uns par rapport aux autres, leurs segments d'actionnement (TA) étant adjacents, de sorte que leurs segments de contact (TC) sont disposés davantage vers l'extérieur.

11. Mécanisme d'interrupteur selon la revendication 8 ou l'une quelconque revendication dépendant de la dite revendication, comprenant une borne principale (F), une première borne (1) et une seconde borne (2), qui sont constituées d'une carte pourvue à une extrémité d'une borne de connexion (BF, B1, B2), la borne principale (F) étant prévue, à une extrémité opposée à la borne de connexion (BF), avec une bande de section en V dont le sommet constitue l'axe de rotation commun ( $\Gamma$ P) des contacts mobiles (P1, P2), de sorte qu'il est défini dans la bande un segment de support pour le premier contact mobile (P1) et un segment de support pour le second contact mobile (P2).
12. Mécanisme d'interrupteur selon la revendication 11, dans lequel la première borne (1) est disposée en face de la borne principale (F) par rapport à l'axe de rotation commun ( $\Gamma$ P) des contacts mobiles (P1, P2), dans lequel la deuxième borne (2) est disposée face au segment de support pour le second contact mobile (P2) et à côté de la borne principale (F), la première borne (1) étant pourvue d'un point de contact (C1), la seconde borne (2) étant pourvue d'un point de contact (C2), de sorte qu'en raison des surfaces d'appui (LS1, LS2), seules les configurations suivantes sont autorisées :
- une première configuration dans laquelle le premier contact mobile (P1) n'est pas relié au point de contact (C1) de la première borne (1), et dans laquelle le second contact mobile (P2) n'est pas relié au point de contact (C2) de la deuxième borne (2), de sorte que la borne de raccordement (BF) de la borne principale (F) soit isolée électriquement des bornes de raccordement (B1, B2) de la première borne (1) et de la seconde borne (2) ;
  - une seconde configuration dans laquelle le premier contact mobile (P1) est connecté au point de contact (C1) de la première borne (1), et dans laquelle le second contact mobile (P2) n'est pas connecté au point de contact (C2) de la deuxième borne (2), de sorte que la borne de raccordement (BF) de la borne principale (F) soit en contact électrique avec la borne de raccordement (B1) de la première borne (1) ; et
  - une troisième configuration dans laquelle le premier contact mobile (P1) n'est pas connecté au point de contact (C1) de la première borne (1), et dans laquelle le deuxième contact mobile (P2) est connecté au point de contact (C2) de la deuxième borne (2), de sorte que la borne de connexion (BF) de la borne principale (F) soit en contact électrique avec la borne de connexion (B2) de la deuxième borne (2) ;

avec une configuration dans laquelle le premier con-

tact mobile (P1) est connecté au point de contact (C1) du premier terminal (1), et dans laquelle le deuxième contact mobile (P2) est connecté au point de contact (C2) du deuxième terminal (2), ce qui n'est pas possible.

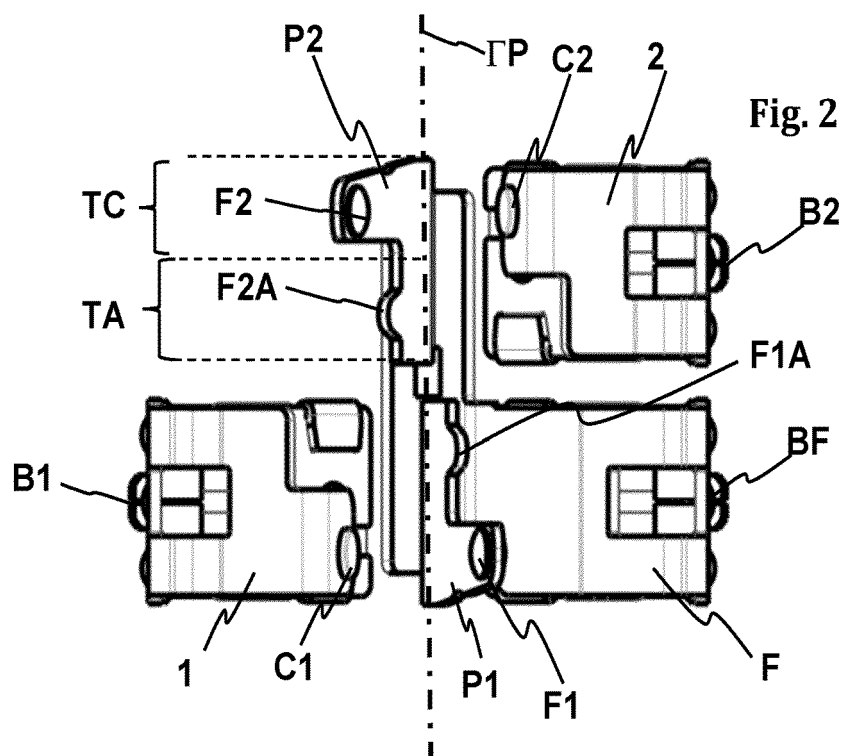
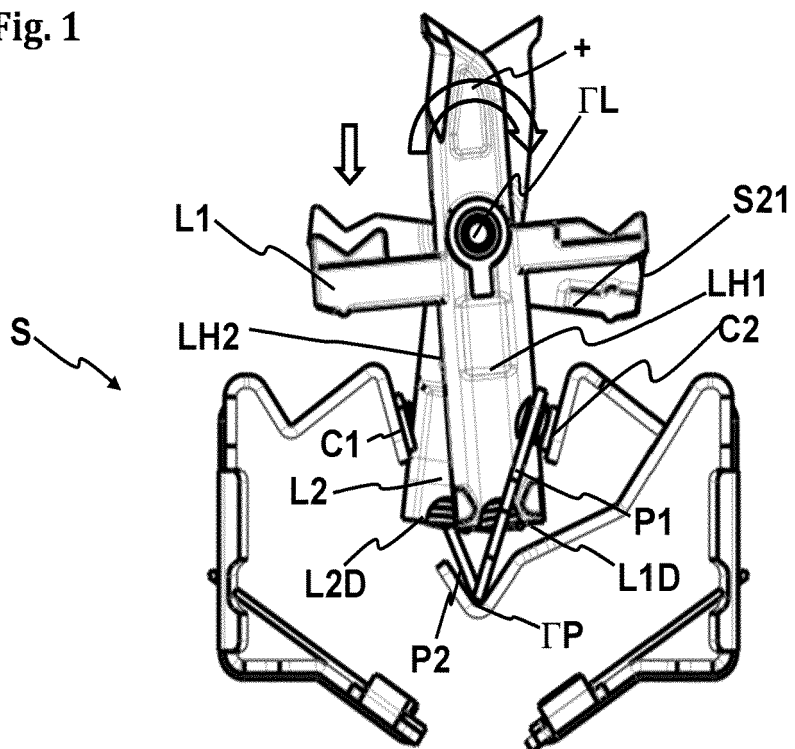
13. Mécanisme d'interrupteur selon la revendication 3 et la revendication 12, comprenant :

- un premier bouton muni d'une extrémité d'application de pression pour appliquer une pression sur la surface d'application de pression (L11) du premier levier (L1) conduisant à la seconde configuration ;
- un second bouton muni d'une extrémité d'application de pression pour appliquer une pression sur la surface d'application de pression (L22) du deuxième levier (L2) conduisant à la troisième configuration ; et
- un troisième bouton muni de deux extrémités d'application de pression permettant d'appliquer simultanément une pression sur les surfaces d'application du premier levier (L1) et du second levier (L2) conduisant à la première configuration.

14. Système d'actionnement de stores, comprenant un moteur réversible muni de trois montants et d'un interrupteur selon la revendication 12 ou 13, de sorte que le moteur ne peut être qu'en :

- un mode de fonctionnement en marche avant ;
  - un mode de fonctionnement en marche arrière ;
  - et
  - un mode non alimenté,
- avec une connexion de court-circuit entravée.

**Fig. 1**



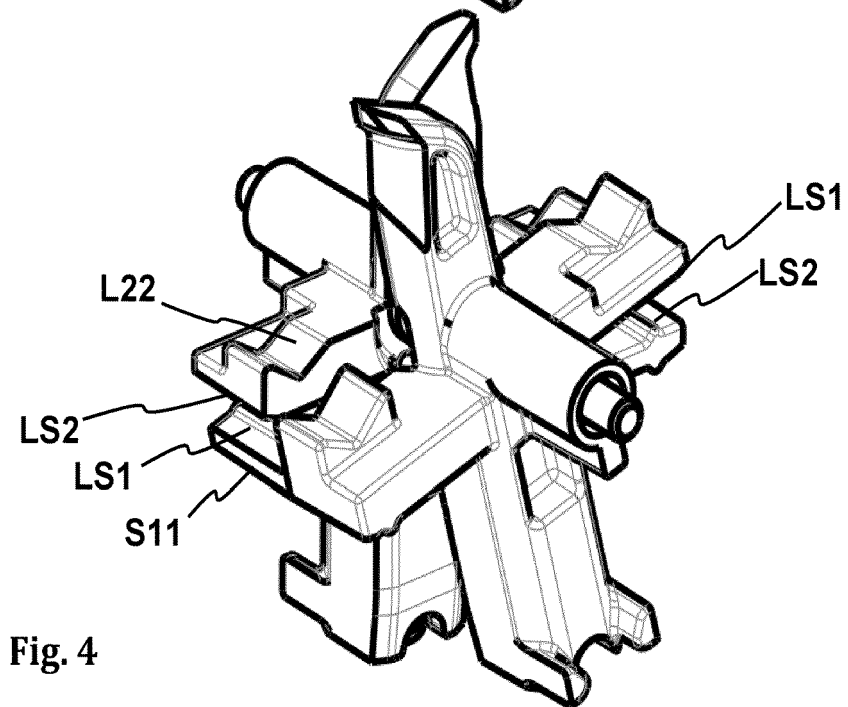
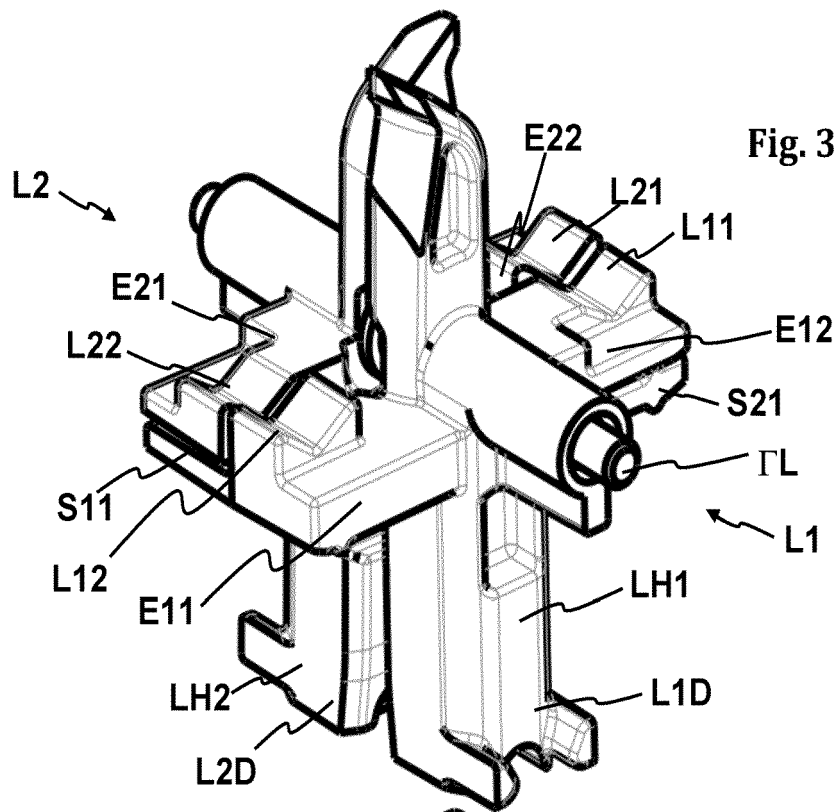


Fig. 5a

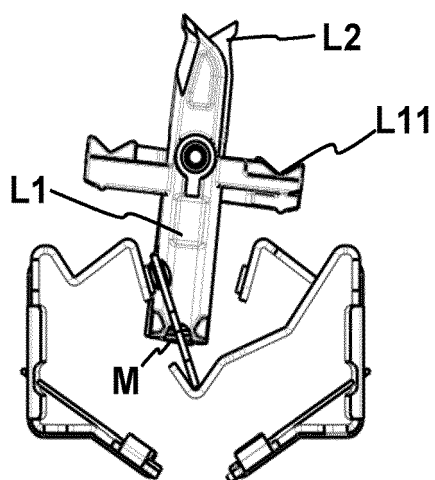


Fig. 6a

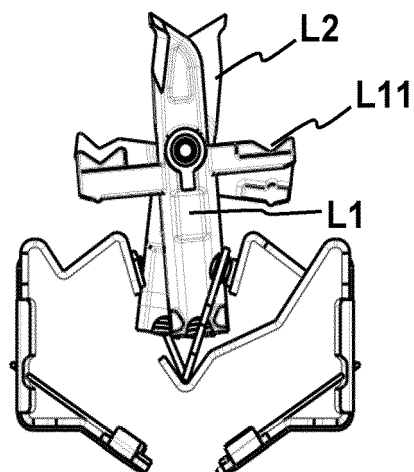


Fig. 5b

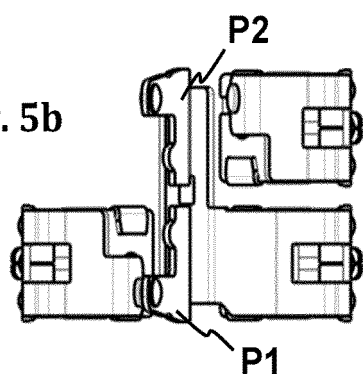


Fig. 6b

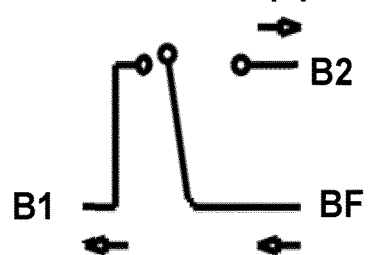
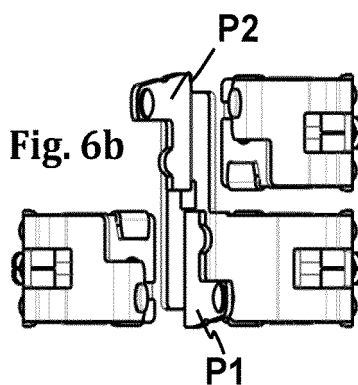


Fig. 5c

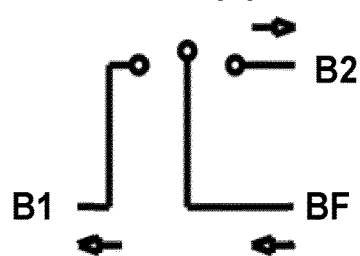


Fig. 6c

Fig. 7a

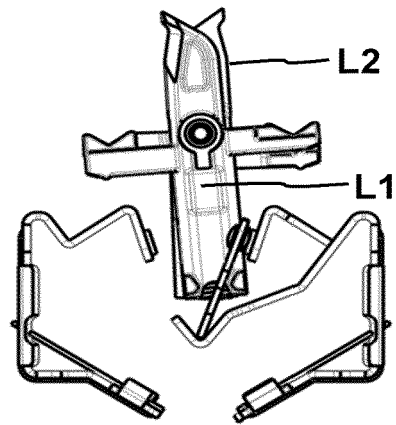


Fig. 7b

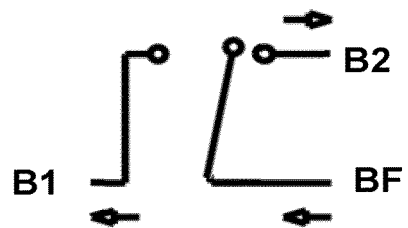
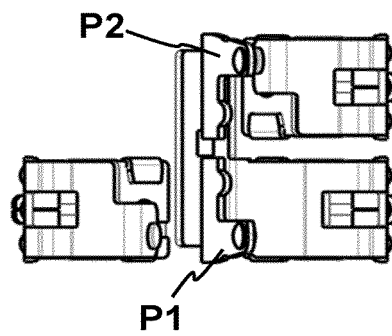
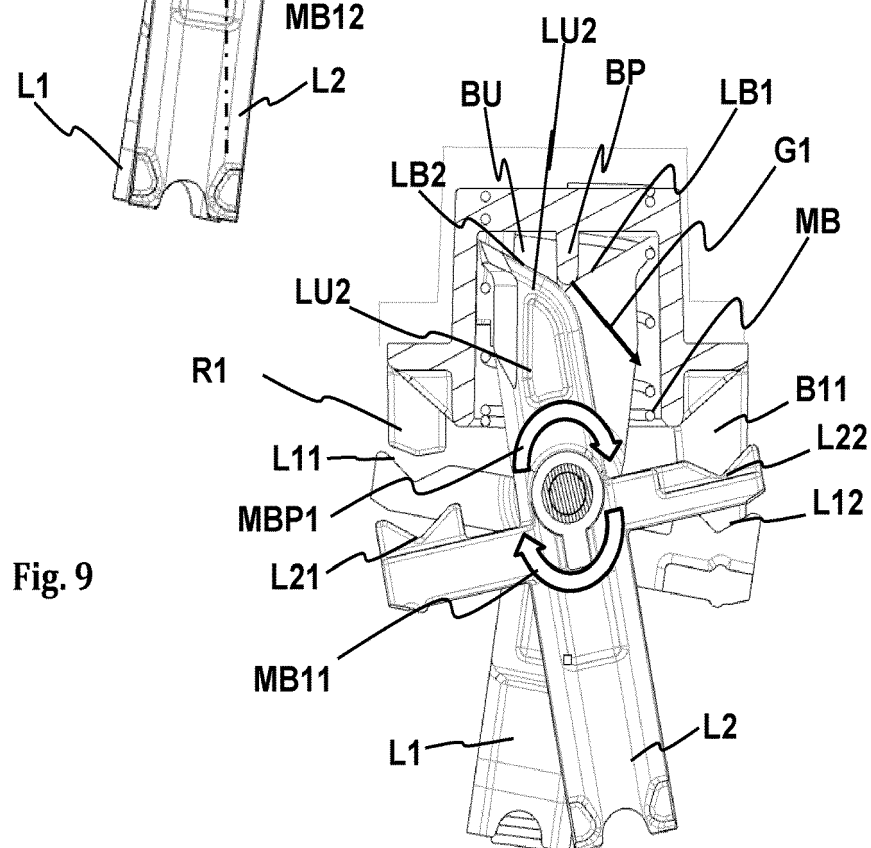
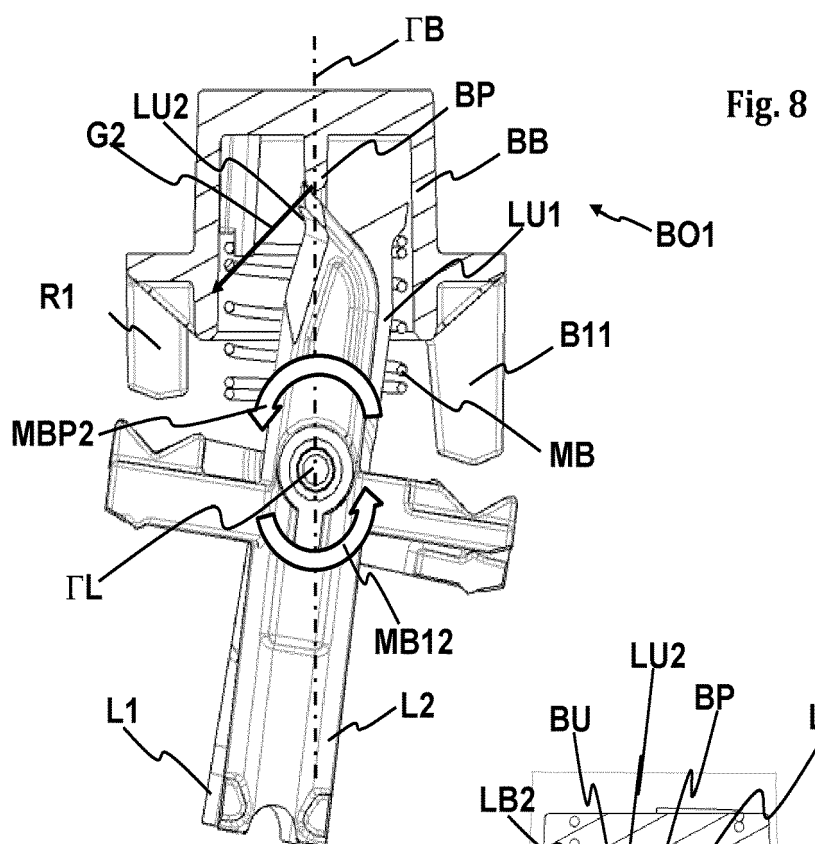
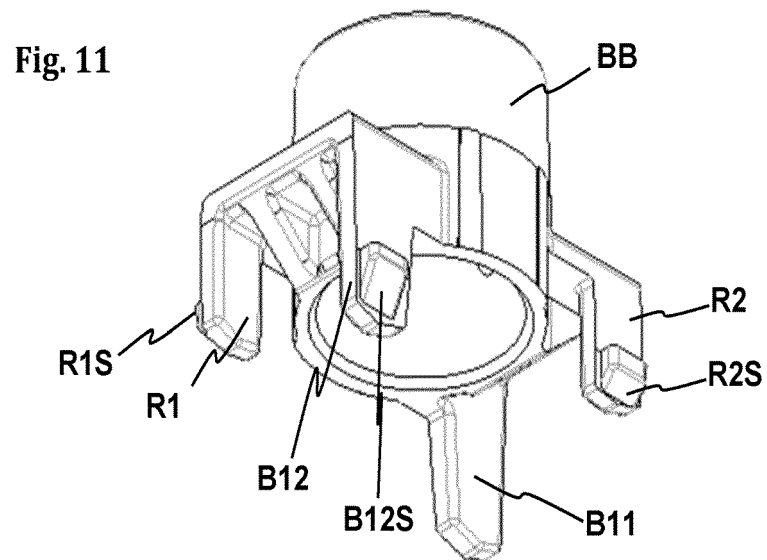
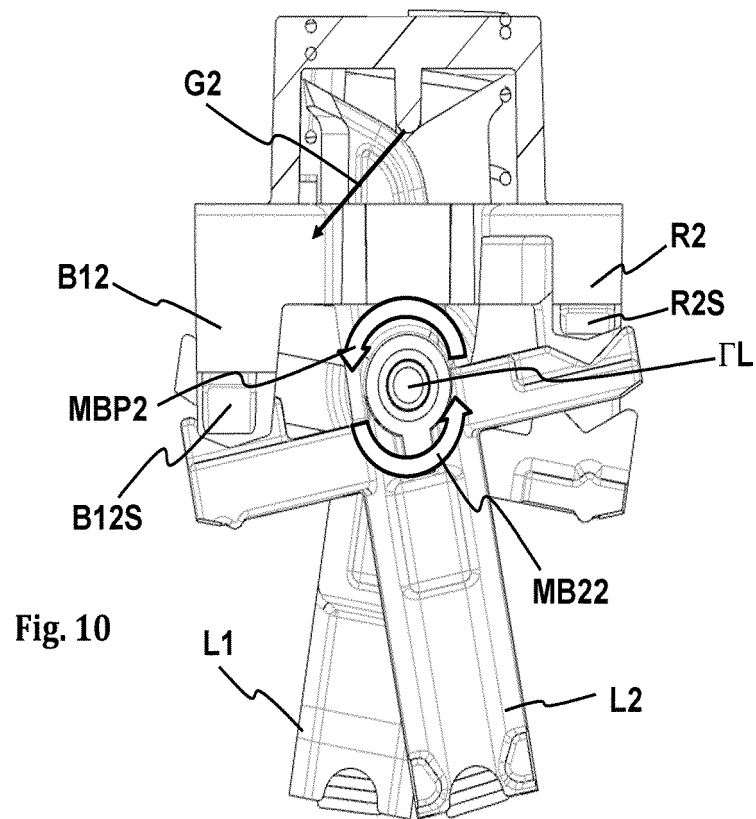


Fig. 7c







**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- WO 2019239225 A [0002]