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(54) ELECTRIC SWITCH FOR DEVICES

ELEKTRISCHER SCHALTER FÜR GERÄTE

COMMUTATEUR ELECTRIQUE POUR APPAREILS

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DE-U- 9 211 229

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Description

[0001] The subject of the invention is an electric switch for devices in accordance with the preamble of claim 1, especially a switch to be built on a lath. whereat the switch can be implemented in the same housing with a fuse, preferably a fuse with a fuse-link. Such a switch is known from DE-U-86 11 082.

[0002] The technical problem solved by this invention is how to conceive an electric switch with the smallest possible number of simple component parts, which would make possible a simple and quick mounting and at the same time comply with all required standards and quality. Furthermore, the product should also be price-effective and competitive.

[0003] A similar switch according to the German patent DE 26 18 360 (Lindner GmbH), the housing of which contains a fuse with a fuse-link, contains a break handle with an eccentrically arranged lever which momentarily shifts a movable contact from fixed contacts when the handle is in switch-on or in switch-off position. With the fuse-link removed, the fixed contacts shift apart by means of a special spring, simultaneously a fork shifts, one free end of which prevents the turning of the break handle with which a contact would be closed in absence of a fuse-link in its bed. To assure a balanced position of contacts in both open and closed states, a handle assembly and a three-member lever are used, on the latter there is a movable contact supported by three springs. One fixed contact is also supported by a special spring and contains a fork which prevents the handle from closing when a fuse-link is not it its place.

[0004] Said switch complies with all regulations but it is expensive because it contains elements the production of which is very complicated due to demanding tools needed. A great number of component parts call for a time-consuming mounting of the switch, which also renders the product ever more expensive.

[0005] In the next similar switch according to German Gebrauchsmuster DE -U-86 11 082 (Lindner GmbH) the number of parts of the electrical brake assembly is reduced if compared to the said patent DE 26 18 360. It only contains a handle, a lever and an electrical movable contact, whereat the upper end of the lever rests in the two-position bearing in the handle just by the spring force pushing the said movable contact in the direction to the handle. To assure a secure position of the contact brake in open position a nose designed on the lever rests in the convexity in the fuse housing being a part of the electric switch housing.

[0006] This embodiment of the electric switch for devices comprises fewer parts than the former switch but the rest assembly (the nose on the lever and the convexity in the fuse housing) demands a larger quantity of material, which can cause troubles while cooling the housing in the mould.

[0007] The technical problem of the present invention lies in a concept of a switch assembly which would perform all operations with a smaller number of simpler component parts that will be cheap to produce and will make possible a quicker and simpler mounting. The new concept must, however, comply with all regulations and standards.

[0008] This problem is solved by a switch as defined in claim 1.

[0009] An essential feature of said switch is in that its break handle contains an eccentric wing, into which only one rod is put and which lies with its opposite end directly in a movable contact. The handle also contains a material-locking spring assuring the closed position of the handle when the contacts are closed and at the same time provides for the clearance of the rod and the handle in this position so that an appropriate pressure of the closed contacts is assured, the pressure being determined by the spring under the movable contact. The eccentric wing in the housing also regulates and positions the rod during its movement and holds it in both extreme positions. Only one spring operating directly on the movable contact assures the force to preserve the position of the movable contact in both extreme positions and the pressure pushes both movable contacts to both fixed contacts.

[0010] The switch part of the switch according to the invention comprises only a handle, a rod, contacts and a spring as well as shaped wings and guides positioned directly in the housing and a spring in the handle. Such structure based on a simple shape of individual parts requires a simple tool for thermoplastic casting of the housing, the handle and the rod. The contacts are also designed in a known way, which does not require any special manufacturing technology. The result is a quick and simple assembling with simple insertion of all elements into one half of the housing and then this part is closed with another half. All elements are mutually permanently connected.

[0011] The characteristics of the invention are explained in more detail in the continuation by means of two embodiments and drawings. Figures show:

Fig. 1 a switch for the device with a fuse with a fuse-link in the state of closed contact in cross-section along the connection surface of both halves of the housing,

Fig. 2 the same in the state of an open handle, open contact and removed bed of the fuse-link, and

Fig. 3 the same in the state of closing the handle or switch-on.

[0012] The switch for devices, which can be arranged with a fuse with a fuse-link or without a fuse, basically consists of a housing 1 having two equal halves 2, whereat the housings differ in that the housing with the fuse is extended for the width of a bed 3 for a fuse-link 4. However, the arrangement of the bed 3 for the fuse-link 4 is neither an object of this invention nor has any influence on it. As far as the outer shape and measures

of the housing 1 are concerned, it is executed in compliance with standards and is preferably arranged to be placed on a lath which is not shown on drawings, by means of a groove 5 at its rear side.

[0013] The halves 2 of the housing 1 have beds 6, 7, 8 in the shape of ribs for fixed contacts 9, 10 and a contact 11 of the fuse-link 4. A movable contact 12 is controlled in rib guides 13 and supported by a spring 14. The movable contact 12 is directly controlled by a rod 15, which is controlled in its axial direction in rib guides 16 lying on the halves of the housing 1 in the area of the movable contact 12. On its opposite side the rod 15 reaches into a break handle 17, which is used to manually break the switch. The handle 17 has a bearing on an axle 18 lying in both halves 2 in the housing 1. In relation to the axle 18, the handle has an eccentric circle arch 19 forming an angle of approximately 45° and is limited by limit fences 20 and 20' on both sides. The rod 15 near the handle 17 is additionally guided in each half 2 of the housing 1 with an arch-shaped rib 21, the centre of which lies in the centre of the axle 18. Each rib 21 lies so as to reach into an arch-shaped slot 22 arranged on the handle 17. An external arch-shaped segment 23 of the handle 17 near the slot 22 acts as a spring and is executed with a small projection 24 at its free end. The projection 24 leans against a similar projection 25 on the housing 1, when the handle 17 lies in the closed position, i.e. with the contact closed. In both halves 2 of the housing 1 there are two arch-shaped wings 26 arranged near the axle 18, and the centre of the said arches lies concentrically to the axle 18 and the rib 21. In the area of the position of the rod 15 with the electric contacts open, the wing 26 is arranged with a step indentation 27 as a bed of the rod 15. The indentation 27 lies in direction of an imaginary extension of rib guides 16 of the rod 15 and is closed by a limit fence 28.

[0014] The arch 19 is eccentrically positioned with respect to the axle 18 and to the wing 26 in such a way that in the position of the handle 17 with the electric contacts open, one end of the arch 19 lies near the limit fence 20 between the indentation 27 and the axle 18, the opposite end of the arch 19 near the limit fence 20' lies on the imaginary arch extension of the wing 26 via the indentation 27. Thus at the most open position of the handle 17 the rod 15 fits into the indentation 27 and the handle 17 is released off the pressure of the spring 14 via the rod 15.

[0015] The handle 17 and the housing 1 have holes 28 for fastening elements which are not shown in the drawings.

[0016] The switch is opened by turning the handle 17 from its final position when it lies inside the halves 2 of the housing 1 (Fig. 1), whereby a seal, which is not shown in the drawings, can be broken. When rotating the handle 17, the projection 24 of the handle 17 first overcomes the projection 25 on the housing 1, which gives the feeling that the handle 17 is in the working field. Then the limit fence 20 leans against the rod 15 guided by the rib 21 and the circle arch 19 of the handle 17. When rotating the handle 17 further, the movable contact 12 temporarily moves away from the fixed contacts 9, 10 and breaks the circuit. By turning the handle 17 toward its open position, the rod 15 moves along the wing 26 until it is pushed to the indentation 27 near the wing 26. Due to the position of the arch 19 between the indentation 27 and the axle 18, the rod slips off the wing 26 into the indentation in which it remains due to the force of the spring 14.

[0017] With the contacts in switched-off position the spring 14 does not any longer act on the handle 17 or the axle 18 via the rod 15 (Fig. 3). The released handle 17, with the contacts switched off, can be freely turned for an angle determined by the width of the indentation 27.

[0018] In its switch-off position the handle 17 releases the bed 3 of the fuse 4, so that it can be removed without any tool in order to replace the fuse. In the bed 3 of the fuse 4 there is a spring tooth 29 arranged on the side of the handle 17 which, when the bed 3 is removed from the housing, leans against the tooth of the handle 17 and prevents a direct removal of the bed 3 from the housing 1. Only by bending the spring tooth 29 by means of a small screw-driver or a similar tool, the bed 3 can be entirely taken out of the housing 1.

[0019] When switching on the switch (Fig. 3), the handle 17 is turned in the opposite direction. When the handle 17 has been turned freely, so that the limit fence 20' leans against the top of the rod 15, the eccentric arch 19 lifts the rod 15 from the indentation 27. If the handle 17 is further turned, the arch 19 near the limit fence 20' of the handle 17 moves the rod 15 so that the latter travels along the wing 26. In its unbalanced position on the arch 19 it temporarily trips over the bar 15 due to the operation of the spring 14 from position on the arch 19 at the limit fence 20' into the position on the arch 19 near the opposite limit fence 20 and momentarily closes the electric contacts 9, 10 via the contact 12. With the movable contact 12 positioned on fixed contacts 9, 10 and with the spring 14 operating, the rod 15 and the handle 17 get rid of the force of the spring 14 which assures a long life and thus the required minimum number of switch-ons and switch-offs of the switch.

Claims

1. A switch for devices, comprising

fixed contacts (9,10), a movable contact (12) and, preferably, a contact (11) for a fuse link (4);
a housing (1) having two halves (2) containing first rib guides (13) for guiding the movable contact (12), beds (6,7,8) in the shape of ribs for the fixed contacts (9, 10), and, preferably, for the contact (11) for the fuse link (4);
a spring (14) supporting the movable contact

(12);
a handle (17) for the manual switch-on and switch-off of the switch, the handle having bearings on an axle (18) lying in both halves of the housing and a circular arch (19) limited at both ends by first (20) and second (20') limit fences;
a rod (15) for directly controlling the movable contact, one end of the rod being guided in second rib guides (16) provided in the housing halves (2) in the area of the movable contact and the other end reaching into the groove defined by the circular arch (19) and the first and second limit fences (20, 20');

characterized in that,

near the axle (18), both housing halves have arch-shaped wings (26) positioned with the centre of their arch lying concentrically to the axle (18), whereby the wings (26) in the area of contact with the rod (15), in the position of the handle (17) with the contacts open, have on one end an indentation (27), which lies in the direction of an imaginary extension of the second rib guides (16) and is closed by a third limit fence (28);
and the arch (19) is eccentrically positioned with respect to the axle (18) such that in the position of the handle (17) with the contacts open, the end of the arch lying near the first limit fence (20) is positioned between the indentation (27) and the axle (18), and the end of the arch (19) lying near the second limit fence (20') lies on the imaginary arch shaped extension of the wings (26) beyond the indentation (27).

2. The switch for devices according to claim 1, **characterized in that** the circular arch (19) forms an angle of approximately 45°.

3. The switch for devices according to claims 1 and 2, **characterized in that** the rod (15) near the handle (17) is guided in each half (2) of the housing (1) by an arch-shaped rib (21), the centre of which lies in the centre of the axle (18), whereat each rib (21) lies in such a way that it reaches into an arch-shaped slot (22) arranged in the handle (17), whereby an external arch-shaped segment (23) of the handle (17) near the slot (22) is executed as a spring and contains a small projection (24) leaning against a similar projection (25) on the housing (1) when the handle (17) lies in its closed position, i.e. with the electric contact closed.

Patentansprüche

1. Schalter für Geräte, mit

festen Kontakten (9,10), einem beweglichen Kontakt (12) und vorzugsweise einem Kontakt (11) für eine Sicherungsverbindung (4),
einem Gehäuse (1), das zwei Hälften (2) hat, die erste Rippenführungen (13) zum Führen des beweglichen Kontaktes (12), Unterbaue (6, 7, 8) in Form von Rippen für die festen Kontakte (9, 10) und vorzugsweise für den Kontakt (11) für die Sicherungsverbindung (4) aufweisen;
einer Feder (14), die den beweglichen Kontakt (12) stützt,
einer Handhabe (17) für das manuelle Anschalten und Ausschalten des Schalters, wobei die Handhabe auf einer Achse (18) Lager in beiden Hälften des Gehäuses und einen Kreisbogen (19) hat, der an beiden Enden durch einen ersten (20) und einen zweiten (20 ') Begrenzungsanschlag begrenzt ist,
einer Stange (15) zum direkten Steuern des beweglichen Kontaktes, wobei ein Ende der Stange in zweiten Rippenführungen (16) geführt ist, die in den Gehäusehälften (2) im Bereich des beweglichen Kontaktes vorgesehen sind, und wobei das andere Ende in die von dem Kreisbogen (19) und dem ersten und dem zweiten Begrenzungsanschlag (20, 20') definierte Rille reicht,

dadurch gekennzeichnet,

dass beide Gehäusehälften nahe der Achse (18) bogenförmige Seitenstücke (26) haben, die mit dem Zentrum ihrer Bogen konzentrisch zur Achse (18) liegend positioniert sind, wobei die Seitenstücke (26) im Bereich des Kontaktes mit der Stange (15) in der Position der Handhabe (17) bei offenen Kontakten an einem Ende eine Einkerbung (27) haben, welche in Richtung einer imaginären Verlängerung der zweiten Rippenführungen (16) liegt und von einem dritten Begrenzungsanschlag (28) begrenzt wird;
und der Bogen (19) in Bezug auf die Achse (18) derart exzentrisch positioniert ist, dass in der Lage der Handhabe (17) bei offenen Kontakten, das Ende des Bogens, welches nahe dem ersten Begrenzungsanschlag (20) liegt, zwischen der Einkerbung (27) und der Achse (18) positioniert ist, und das Ende des Bogens (19), welches nahe dem zweiten Begrenzungsanschlag (20') liegt, auf der imaginären bogenförmigen Verlängerung des Seitenstücks (26) über die Einkerbung (27) hinaus liegt.

2. Schalter für Geräte gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der Kreisbogen (19) einen Winkel von etwa 45 ° bildet.

3. Schalter für Geräte gemäß der Ansprüche 1 und 2, **dadurch gekennzeichnet, dass**
die Stange (15) nahe der Handhabe (17) in jeder Hälfte (2) des Gehäuses (1) durch eine bogenförmige Rippe (21) geführt ist, deren Mitte im Zentrum der Achse (18) liegt, wobei jede Rippe (21) derart liegt, dass sie in eine in der Handhabe (17) vorgesehene bogenförmige Nut (22) reicht, wobei ein externes bogenförmiges Segment (23) von der Handhabe (17) nahe der Nut (22) als Feder ausgeführt ist und einen kleinen Vorsprung (24) aufweist, der sich gegen einen ähnlichen Vorsprung (25) am Gehäuse (1) lehnt, wenn die Handhabe (17) in ihrer Schließposition ist, das heißt bei geschlossenem elektrischem Kontakt.

Revendications

1. Commutateur pour dispositifs, comprenant :

des contacts fixes (9, 10), un contact mobile (12) et de préférence un contact (11) pour une liaison à fusible (4) ;
un boîtier (1) présentant deux moitiés (2) contenant des premières nervures de guidage (13) pour guider le contact mobile (12), des logements (6, 7, 8) présentant la forme de nervures pour les contacts fixes (9, 10) et, de préférence, pour le contact (11) pour la liaison à fusible (4) ;
un ressort (14) soutenant le contact mobile (12) ;
une poignée (17) pour le branchement et le débranchement manuels du commutateur, la poignée présentant des paliers sur un axe (18) situé dans les deux moitiés du boîtier et une arche circulaire (19) délimitée à ses deux extrémités par une première (20) et une deuxième (20') barrière de limitation ;
une tige (15) pour commander directement le contact mobile, une extrémité de la tige étant guidée dans des deuxièmes nervures de guidage (16) prévues dans les moitiés (2) du boîtier dans région du contact mobile, l'autre extrémité pénétrant dans la rainure définie par l'arc de cercle (19), la première et la deuxième barrière de limitation (20, 20') ;

caractérisé en ce que

à proximité de l'axe (18), les deux moitiés de boîtier presentent des ailes (26) en forme d'arche disposées avec le centre de leur arche situé concentriquement par rapport à l'axe (18), et dans la position où la poignée (17) a les contacts ouverts, les ailes (26) présentant à une extrémité, dans la zone du contact avec la tige (15), une indentation (27) qui est située dans la direction d'un prolongement imaginaire des deuxièmes nervures de guidage (16) et qui est fermée par une troisième barrière de limitation (28) ;
et l'arche (19) est disposée en position décentrée par rapport à l'axe (18) de telle sorte que, dans la position où la poignée (17) a les contacts ouverts, l'extrémité de l'arche située à proximité de la première barrière de limitation (20) est située entre l'indentation (27) et l'axe (18), et l'extrémité de l'arche (19) située à proximité de la deuxième barrière de limitation (20') est située sur le prolongement imaginaire en forme d'arche des ailes (26), au-delà de l'indentation (27).

2. Commutateur pour dispositifs selon la revendication 1, **caractérisé en ce que** l'arche circulaire (19) forme un angle d'environ 45°.

3. Commutateur pour dispositifs selon les revendications 1 et 2, **caractérisé en ce qu'**à proximité de la poignée (17) la tige (15) est guidée dans chaque moitié (2) du boîtier (1) par une nervure (21) en forme d'arche dont le centre est situé au centre de l'axe (18), chaque nervure (21) étant située de telle sorte qu'elle pénètre dans une fente (22) en forme d'arche agencée dans la poignée (17), grâce à quoi un segment (23) externe en forme d'arche de la poignée (17), situé à proximité de la fente (22), est configuré comme ressort et contient une petite saillie (24) s'appuyant contre une saillie (25) similaire prévue sur le boîtier (1) lorsque la poignée (17) se trouve dans sa position fermée, c'est-à-dire avec le contact électrique fermé.

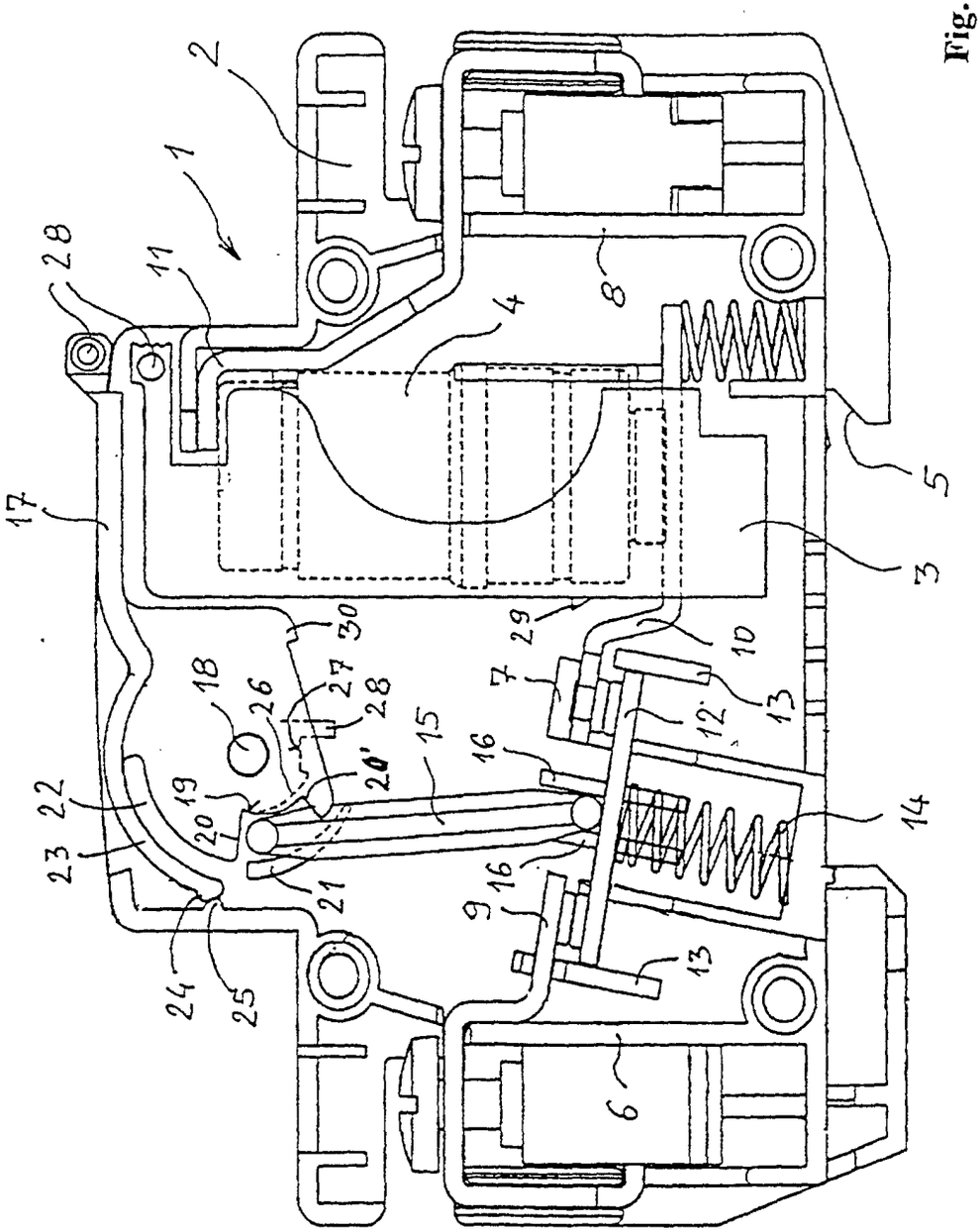
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Fig. 1

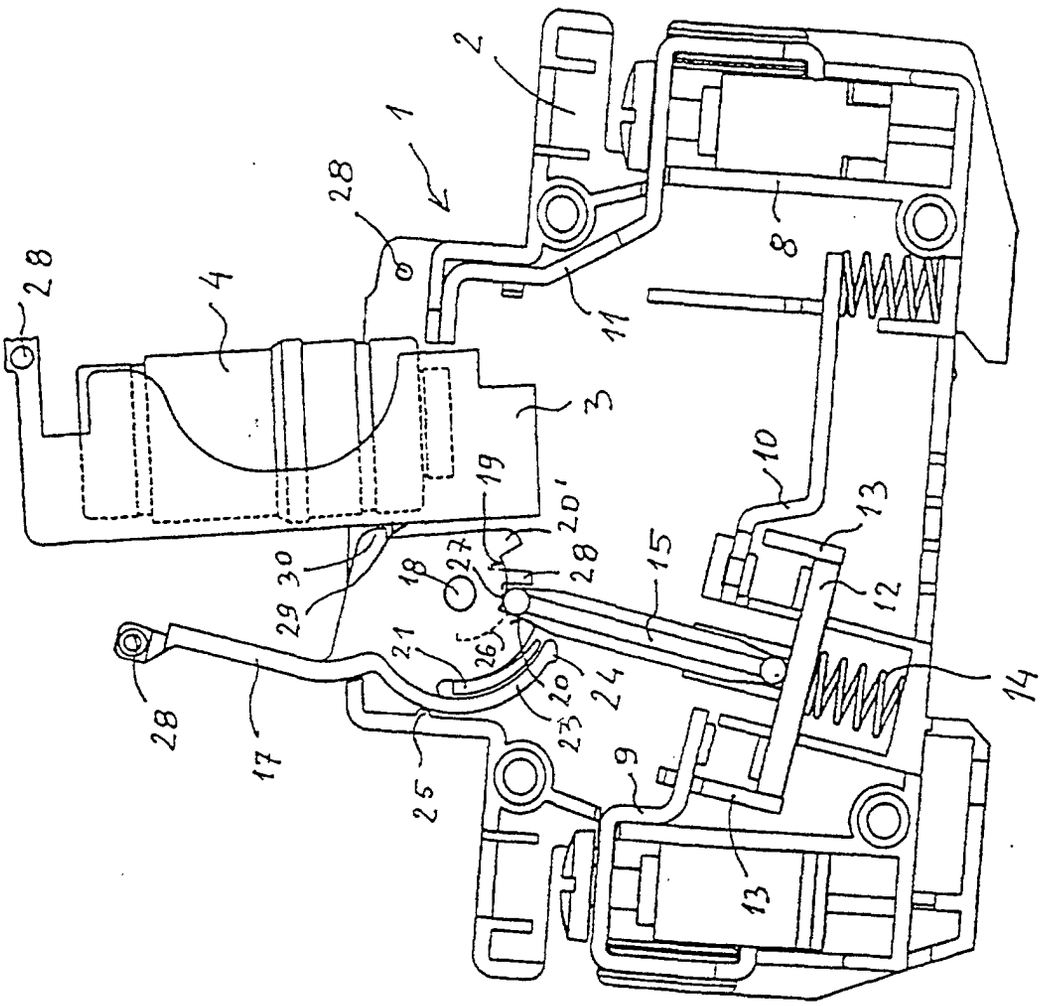

Fig. 2

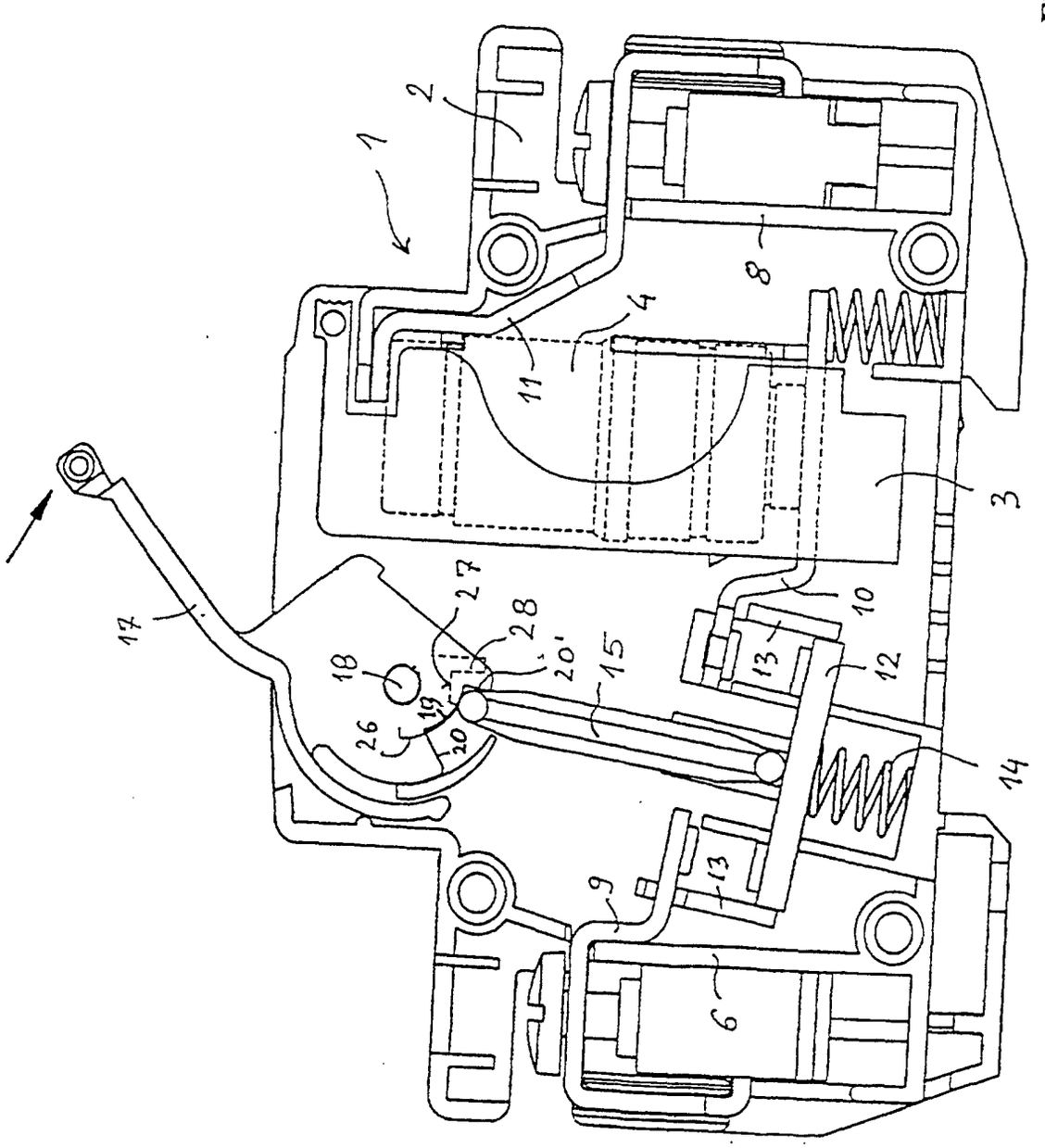

Fig. 3