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(71) Applicant: **Tosi, Giampietro**
Via Piazza 3
I-20072 Castiglione D'Adda, Milan(IT)

(72) Inventor: **Tosi, Giampietro**
Via Piazza 3
I-20072 Castiglione D'Adda, Milan(IT)

(74) Representative: **De Carli, Erberto et al**
ING. BARZANO' & ZANARDO MILANO S.p.A.
Via Borgonuovo, 10
I-20121 Milano(IT)

(54) Compact device for the manual control of operating switches.

(57) A compact device for the manual control of operating switches, comprising a handle (11) mountable on a wall of switchgear containing a switch operated by rotating a rod (20) provided with projecting elements (21) which is able to be removably connected to an inner portion of the handle and is rotatably associated with a baseplate (12), the rod being rotatable from a position in which internal electrical contacts are open and in which it can be released from the handle, to a position in which the internal electrical contacts are closed and in which it is locked to the handle. Within the body of the handle there is provided an aperture (19) arranged to receive the rod and the projecting elements, on the baseplate there being positioned an elastic (35) element which is aligned with the aperture and with the extensions provided in the handle when the baseplate is in a first position, and is superposed on and engaged with the rod and the projecting elements contained in the extensions when in a second position. The baseplate is recessed and is closable by a cover element which is also provided with an aperture for the passage of the rod and the projecting elements.

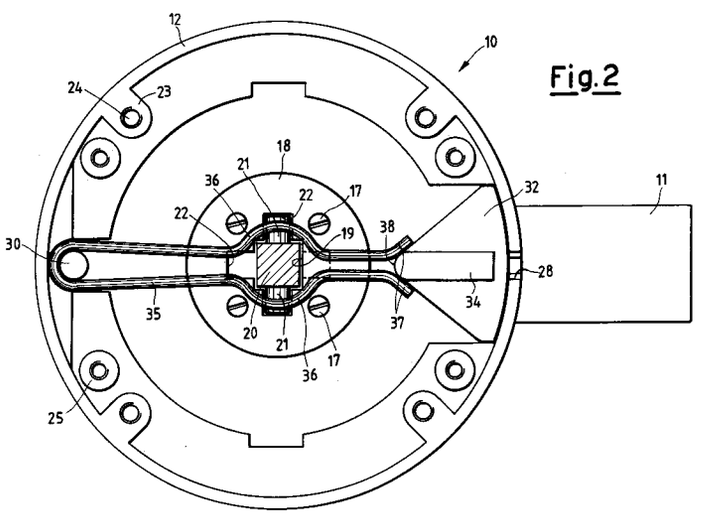

Fig.2

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This invention relates to a compact device for the manual control of operating switches.

Various manual control devices of handle type are known for activating and deactivating operating switches, by which the relative electrical equipment is simultaneously switched on or off.

Their constituent handle is generally rotatable between a position in which the switch is closed and a position in which the switch is open, elements being associated with it for its stable retention in these two positions.

Various devices are provided with separate locking means on the side of a plate which rotates the handle. This however does not result in a compact device, and auxiliary lock operating means have to be used which the operator is obliged to always carry with him in order to carry out maintenance and/or repair work with safety. In addition, in these devices the connection portions for the operating rod project considerably towards the interior of the switchgear, with consequent bulk and the possibility of disturbance to the operator.

Other known devices have a complicated coupling between the handle and the base on the switchgear door which although allowing discrete operation is rather costly. In addition, to allow intervention when the rod is operationally inserted, this device is provided on the base rotation plate with an aperture having a diaphragm which if necessary can be broken in order to act to release the mechanism. Because of this, such action is not always easy to undertake.

An object of the present invention is to provide a manual control device both for switches and for switchgear cubicles which is extremely compact and of small overall size.

A further object is to provide such a device which although offering considerable safetu can with difficulty be disengaged or operated at the specific requirement of the operator alone.

A further object is to provide a device of simple construction which is easy and inexpensive to mount, while maintaining its strength and effectiveness.

These and further objects are attained according to the present invention by a compact device for the manual control of operating switches comprising a handle mountable on a wall of switchgear containing a switch operated by rotating a rod provided with projecting elements which is able to be removably connected to an inner portion of said handle, and is rotatably associated with a baseplate, said rod being rotatable from a first position in which internal electrical contacts within said switchgear are open and in which it can be released from said handle, to a second position in which said internal electrical contacts are closed and in which it is locked to said handle, characterised in that within a part of said handle there is provided an aperture having lateral extensions and arranged to receive said rod and said projecting elements, on said baseplate there being positioned an elastic element which is aligned with said aperture and with said extensions provided in said handle when said baseplate is in a first position, and is superposed on and engaged with said rod and said projecting elements contained in said extensions when in a second position, said baseplate being recessed and being closable by a cover element which is also provided with an aperture for the passage of said rod and said projecting elements.

The structural and functional characteristics and advantages of a device according to the present invention will be more apparent from the description thereof given hereinafter by way of non-limiting example with reference to the accompanying schematic drawings, in which:

Figure 1 is a side elevational section through a control device according to the present invention;

Figure 2 is a view from below showing the device of Figure 1 without its cover element; and

Figure 3 is a view from below showing the same device when closed.

With reference to the figures, a particularly compact device for the manual control of operating switches is indicated overall by 10 and comprises essentially a handle 11 rotatably mounted on a cylindrical baseplate 12 of box structure which is fixed by screws 13 to a wall 14 of switchgear, shown only partly, containing a switch (not shown) operated by rotating an operating rod 20 which can be connected to said control device.

A plate 18 is fixed by screws 17 to a hollow part 15 of the handle 11 in its central portion 16, and centrally comprises a square aperture 19 which also extends into the central portion 16. Into the aperture 19 there is inserted one end of the square operating rod 20 which projects from the interior of the operating switches and is provided with pins 21 on two of its opposing faces. On its opposing sides, the square aperture 19 in the plate 18 comprises recessed extensions 22 into which the pins 21 of the square operating rod 20 can be passingly inserted.

In the inner recessed portion of the baseplate 12 there are provided a series of enlarged cylindrical portions 23 which project radially inwards and comprise fixing holes such as the hole 24 or the screw 13, and further holed cylindrical portions 25 of lesser height than the preceding cylindrical portions 23 and arranged to receive fixing screws 26 for fixing a cover element 27 for the baseplate 12. Correct positioning between the baseplate 12

and the cover element 27 is determined by the presence of an aperture 28 provided in the side edge wall of the baseplate and an appendix 29 projecting radially outwards from the cover element 27.

Again within the recessed portion of the baseplate 12 there are provided at one end of a diameter a pin 30 projecting along an axis parallel to the axis of rotation of the handle 11, and at the other end of this diameter a radial recess 31 aligned with the aperture 28. A flat wedge element 32 of triangular shape is provided on its opposing faces with two projecting portions 33 and 34 of shape complementary to that of the recess 31 but of different lengths. Specifically, the projecting portion 33 is of rather lesser length than the recess 31, whereas the projecting portion 34 differs only slightly from this recess in length. The flat wedge element 32 acts as the element for disengaging the rod 20 from the control device.

A spring 35 essentially of elongate U-shape comprises central arched portions 36 projecting outwards from the U, and end portions 37 inclined outwards from the U. The spring 35 is arranged within the recessed portion of the baseplate 12 so that the lower rounded end of the U abuts against the pin 30 while its inclined end portions 37 lie against the inwardly facing tip 38 of the fat wedge element 32. In this manner the central arched portions 36 lie in correspondence with the aperture 19 in the plate 18, this spring acting as the engagement element for the operating rod 20 and its pins 21.

The cover element 27 arranged on the baseplate 12 has a radial slot 39 for receiving the projecting portion 34 of the flat wedge element 32.

According to the present invention the cover element 27 is provided in its outwardly projecting surface with a cross-shaped aperture 40 to be aligned with the square aperture 19 and with its recess extensions 22. From the aperture 40 there extends a cross-shaped lead-in element 41 with its inner walls 42 inclined so that they widen outwards to facilitate the insertion of the end of the operating rod 20 and its pins 21.

A pushbutton element 44 is provided in the top of the hollow part 15 of the handle 11 within a first cylindrical seat 43 such that its axis is essentially parallel to the axis of rotation of the handle 11, it being maintained in a raised position by an opposing spring 45 and holding by means of an inner screw 46 a plate 47 slidingly guided within the hollow part 15. The plate 47 is provided lowerly with a tooth 48 arranged to engage in a slotted seat 49 in the baseplate 12. In the side of the plate 47 there is provided at least one recess 50 which can be aligned with holes 51 provided in the hollow part 15 so as to receive a closure locking bolt, not shown.

The plate 47 also comprises a rear undercut 52 to receive a pin 53 of a lock 54, for example of cylinder type, positionable in a second shaped seat 55 provided in the body of the handle 11 essentially parallel to the first seat 43.

The use of the manual control device according to the present invention is extremely simple and safe.

Firstly, by releasing the pin 53 of the lock 54 from the undercut 52 in the plate 47 by operating a key 56, the handle 11 can be rotated between its two main operating positions.

In a first position in which the recessed extensions 22 of the square aperture 19 in the plate 18 are aligned with the interior of the spring 35 the handle 11 associated with the wall 14 of the switchgear can be moved forward to close the switchgear. In this position that end of the operating rod 20 provided with the pins 21 has slid along the inner walls 42 of the lead-in element 41 to pass through the spring 35 and become inserted into the recessed extensions 22 and the square hole 19. If the handle 11 is now rotated through 90° the operating rod 20 is rotated so that the pins 21 become perpendicular to the central arched portions 36 of the spring, while remaining secured to the interior of the handle 11. In this second position it is therefore impossible to open the switchgear. The handle of the device according to the invention is therefore rotatable between a position in which the electrical contacts within the switchgear are open and a position in which they are closed. This second position can be fixed by operating the pushbutton element 44 and inserting a locking bolt into the holes 51, and by further rotating the key 56. Thus, the tooth 48 remains inserted in the seat 49 of the baseplate 12 and the pin 53 remains inserted in the undercut 52. Removal of the key prevents the the control device from being released.

According to the invention it is however possible at the express will of the operator to act in order to release the operating rod 20 from its engagement with the spring 35. This is achieved by inserting a needle-pointed tool, indicated schematically by 57, into the aperture 28 and thrusting against the rear of the flat wedge element 32 to push it radially inwards. This movement causes the projecting portion 33 to become inserted between the inclined end portions 37 of the spring 35, so widening them outwards. This widening causes the central arched portions 36 to move apart to allow the pins 21 to withdraw from the interior of the handle as they are no longer locked by the arched portions 36.

This operation is possible because of the positioning of the flat wedge element 32 between the

baseplate 12 and the cover element 27 during assembly, so that the shorter-length projecting portion 33 is positioned within the radial recess 31 and the greater-length portion 34 is positioned within the radial slot 39 in the cover element 27.

A different arrangement is required if the user wishes to totally prohibit any intervention on the switchgear when live, ie when the operating rod is locked within the manual control device according to the present invention. To achieve this, the greater-length projecting portion 34 is positioned in the radial recess 31 and the smaller-length projecting portion 33 is positioned within the radial slot 39. In this case if the flat wedge element 32 is pushed from the outside by the needle tool 57, it cannot move because the projecting portion 34 is engaged in the recess 31 of approximately equal length.

It will be apparent that using a particularly simple and compact structure, the present invention achieves a device for the manual control of operating switches which is safe and functional.

In this respect, all elements projecting into the switchgear are eliminated as the lead-in element 41 can be formed of a height essentially similar to that of the switchgear wall 14. In addition, the particular shape of the outwardly widening inclined inner walls 42 ensures comfortable and reliable insertion of the operating rod 20 even if this is not in its optimum position aligned with the aperture 19 in the control device.

Engagement of the operating rod 20 or rather of its pins 21 is achieved by a constructionally simple element in the form of a shaped spring according to the present invention. Release is also possible when in the closed position by the provision of apertures extending to the outside in the baseplate element and of the wedge element acting on the rod locking spring.

Claims

1. A compact device for the manual control of operating switches, comprising a handle mountable on a wall of switchgear containing a switch operated by rotating a rod provided with projecting elements which is able to be removably connected to an inner portion of said handle and is rotatably associated with a baseplate, said rod being rotatable from a first position in which internal electrical contacts within said switchgear are open and in which it can be released from said handle, to a second position in which said internal electrical contacts are closed and in which it is locked to said handle, characterised in that within a part of said handle there is provided an aperture having lateral extensions and arranged to receive said rod and said projecting elements, on said baseplate there being positioned an elastic element which is aligned with said aperture and with said extensions provided in said handle when said baseplate is in a first position, and is superposed on and engaged with said rod and said projecting elements contained in said extensions when in a second position, said baseplate being recessed and being closable by a cover element which is also provided with an aperture for the passage of said rod and said projecting elements.

2. A manual control device as claimed in claim 1, characterised in that said elastic element can be disengaged from said extensions of said aperture by a disengagement element slidable within said baseplate and operable by a tool passing through an aperture in said baseplate.

3. A manual control device as claimed in claim 2, characterised in that said elastic element is an elongate U-shaped spring having outwardly-projecting central arched portions alignable with said extensions of said aperture.

4. A manual control device as claimed in claim 2, characterised in that said disengagement element is a flat wedge element provided on its two opposing faces with at least one projecting portion of shape complementary to a recess provided in said baseplate.

5. A manual control device as claimed in claim 4, characterised in that said flat wedge element comprises on its opposing faces two projecting portions of different lengths, one engageable in said recess in said baseplate and the other engageable in a radial slot provided in said cover element for said baseplate.

6. A manual control device as claimed in claim 1, characterised in that said cover element comprises, in correspondence with the aperture for the passage of said rod and said projecting elements, a cross-shaped lead-in element projecting in the opposite direction to said baseplate and having outwardly widening inclined inner walls extending from said aperture.

7. A manual control device as claimed in claim 1, characterised in that said part of said handle comprises a pushbutton element, located in a first seat provided parallel to the axis of rotation of said handle and arranged to move an engagement plate in a direction perpendicular to said baseplate so that it enters a slotted seat provided in said baseplate, said plate hav-

ing an undercut which can be selectively engaged with the locking pin of a lock positionable within a second seat provided in said part of said handle.

8. A manual control device as claimed in claim 7, characterised in that said engagement plate is provided with vertically aligned spaced-apart recesses which by lowering said pushbutton element are selectively brought into alignment with a like number of through holes provided in said part in correspondence with the sliding portion of said plate.

9. A manual control device as claimed in claim 7, characterised in that said lock incorporated in said handle is of the cylinder type and is provided with a removable key.

10. A manual control device as claimed in claim 7, characterised in that said pushbutton element and said plate are secured to each other by a screw, between said first seat and said pushbutton element there being provided a spring which maintains this latter raised in the position in which said plate is disengaged from said baseplate.

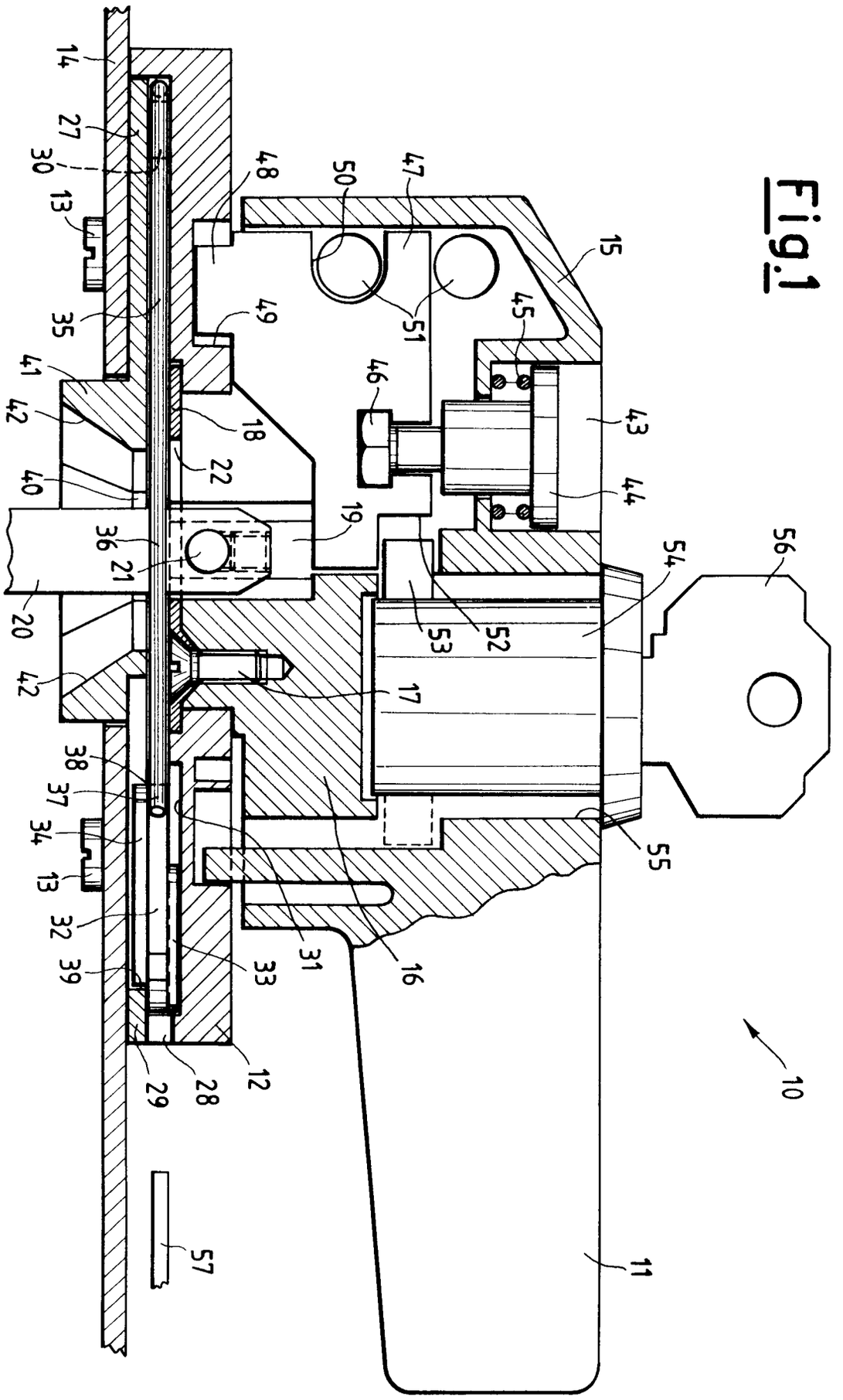
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Fig.1

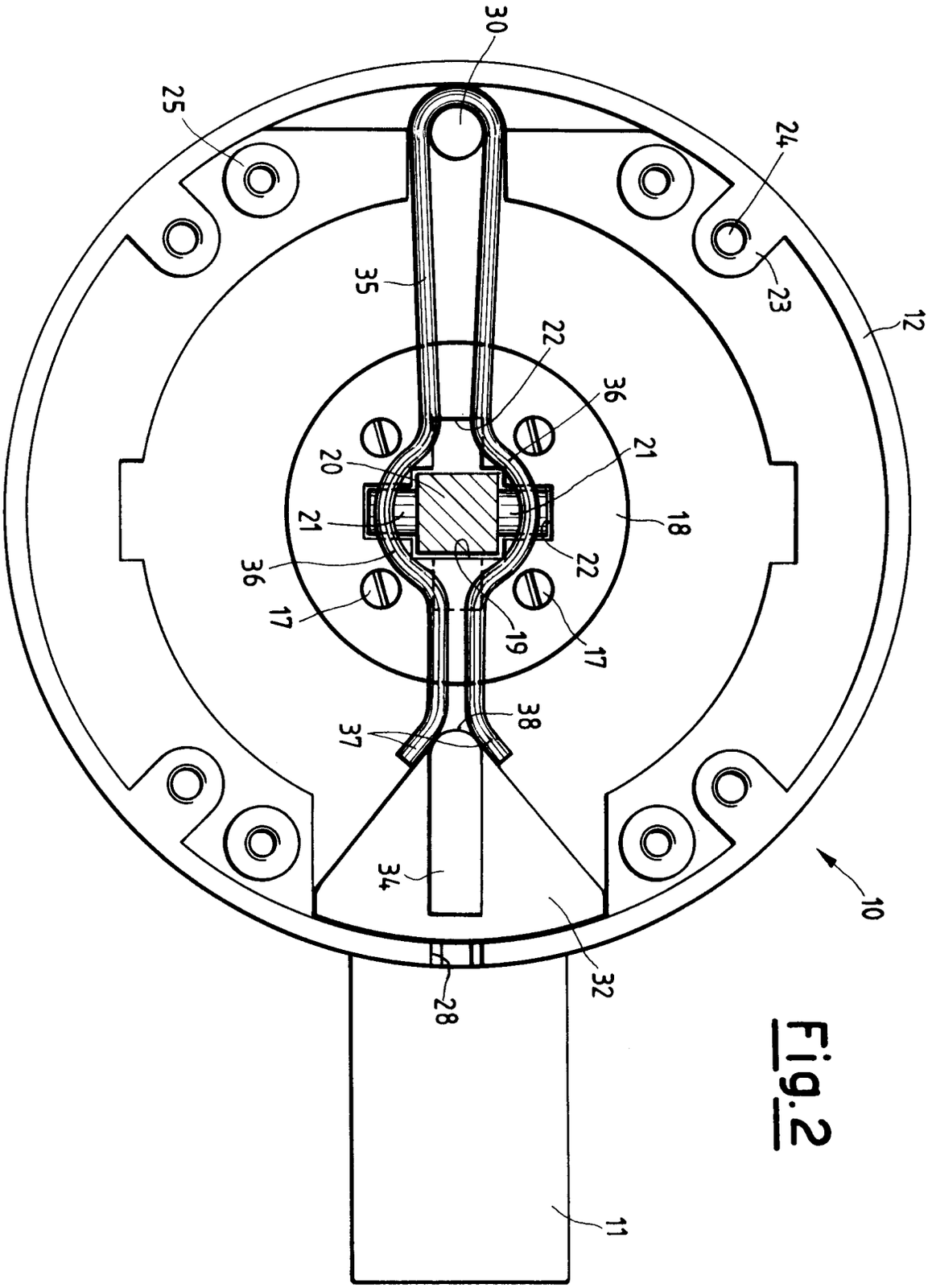

Fig.2

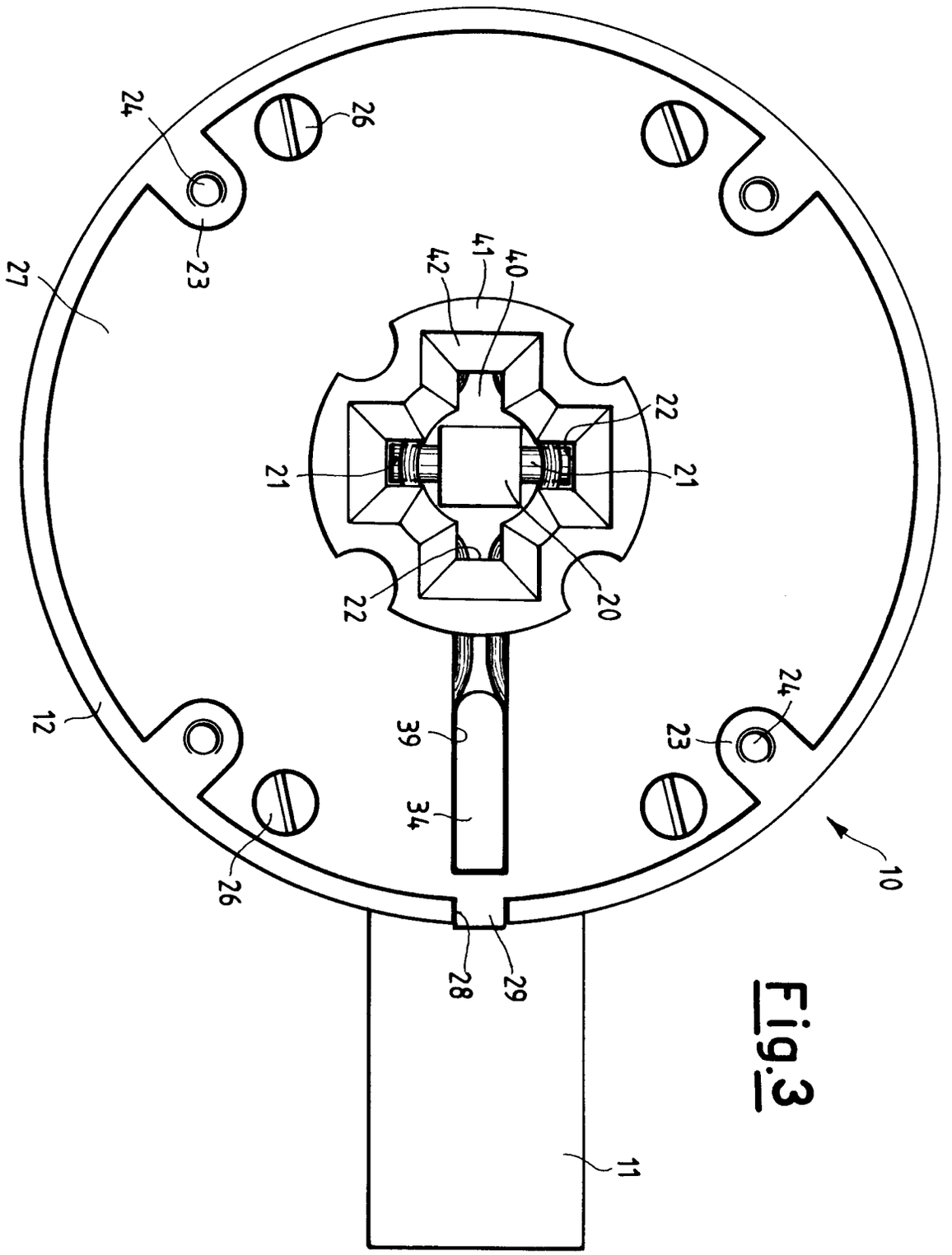

Fig.3

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EUROPEAN SEARCH REPORT

Application Number

EP 92 20 1446

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	SE-B-446 677 (ELDON) * page 1, line 6 - line 24 * * page 2, line 30 - page 5, line 23; claims 1,2; figures 1-3 *	1,2,4	H01H9/22 H01H31/06 H01H33/48
A	SE-B-459 704 (ELDON) * page 2, line 32 - page 3, line 38; claims 1-4; figures 1,2,4 *	1,3	
A	DE-A-3 901 260 (ALLEN-BRADLEY) * column 2, line 19 - line 40; claims *	1	
A	DE-A-3 038 009 (LICENTIA) * page 3, paragraph 2 - page 4, paragraph 1 * * page 6, paragraph 2 - page 7, paragraph 1; figures 1-4 *	1	
A	AU-B-497 112 (WENNERSTEN) * claim 1; figures 1-4 *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)
H01H H02B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	27 JULY 1992	NIELSEN K.G.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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