

## Device for coupling two attached modular electrical elements

5 The present invention concerns an electrical unit composed of two modular elements attached by one of their side faces and including a fixing system which maintains them in mutual contact in that configuration.

Although the invention is potentially applicable to all modular elements for which coupling is essential, the description which follows is provided for the purposes of clarification by reference to a preferred example in which one of the elements is a differential unit and the other is a circuit breaker.

10 These elements, fitted in series in electrical cabinets, must necessarily be in contact with each other, because the electrical link is associated with a mechanical link which ensures triggering of the circuit breaker when the differential unit detects a leak in the network which it is monitoring.

15 The standard configuration of these elements is however such that the axis of rotation of the mechanical lock is perpendicular to the direction of electrical connection in the terminals provided for the purpose in the differential unit and in the circuit breaker. In order for these mechanical and electrical links to function, there is of course interpenetration of components from one unit into the space of the other (locating pins, lever from the lock, rigid conductors).

20 This interpenetration occurs on two perpendicular axes without the said components fixed to one of the elements and penetrating into the volume of the other generally having a degree of freedom which allows attachment to be achieved first on one axis then on the other. In order to attach the two elements, the assembly electrician makes use of the play available, such as the lateral play  
25 which remains when the rigid conductors are inserted into the connecting terminals. This nevertheless sometimes means complicated manipulations, which can be enough to bend or twist the conductors, in order to succeed in achieving attachment on the two non-colinear axes, before proceeding to install the unit thus formed on a rail in the equipment cabinet.

30 One solution to this problem is to allow mobility of the conductors connected to the differential unit, which is possible in all cases where they are flexible. The disadvantages resulting from the use of flexible conductors are however

sufficiently numerous (connection one-by-one, risk of mistakes etc.) for most manufacturers of electrical equipment to have adopted solutions using rigid conductors.

5 A solution which allows this mobility of conductors is also described in the European Patent EP-A-0 806 784 of FELTEN and GUILLEAUME, which uses a proportion of rigid conductors combined with an element which slides in the body of the differential unit. The configuration revealed suffers however from the major disadvantage of not functioning correctly when the electrical power increases, since the movement of the sliding element is mechanically dependent upon the  
10 components of the differential unit. Thus this element incorporates rigid conductors soldered to flexible conductors inside the said unit, these flexible conductors extending - in particular through the detector ring - over the distance through which the said element is supposed to move when the lateral movement occurs.

15 The normal purpose of the movement of the sliding element is to separate the ends of the rigid conductors from the space potentially occupied by the circuit breaker to be attached, such that they do not interfere with the movement which is intended to place the two elements in contact with each other, a movement which develops perpendicularly to the direction of connection of the said ends in their terminals.

20 It is therefore necessary to be able satisfactorily to extract the said sliding element from its housing, in this case the body of the differential unit. With the above-mentioned configuration, the flexible conductors exercise an action which tends to oppose the extraction of the sliding element, due to their own elasticity which tends to bring them back to the extended position, parallel to the sliding  
25 travel, whereas the exit of the said component tends to fold them back on themselves.

30 When the nominal power (and hence the nominal current) increases, the cross-section of the flexible conductors rises correspondingly and it becomes more and more difficult to manipulate the slider. The sliding function is thus no longer ensured in a satisfactory manner, due in fact to the interdependence of the electrical and mechanical functions which results from this design.

The present invention surmounts these limitations and offers a complete solution to the problem of double coupling on two axes which are not co-linear. The suggested solution is also less costly and considerably increases reliability because it avoids all soldering between the moving and fixed components.

5 Finally, a major objective of the invention is to offer, simultaneously with the sequential implementation of the said couplings, the mutual fixing of the attached elements, which must in any event be carried out by the fitting electrician.

10 In a general manner, the invention concerns, as has been mentioned, a compact electrical unit composed of two modular units attached by one of the lateral faces and including a fixing system maintaining them in mutual contact in that configuration which allows two operations to take place in conjunction:

- a mechanical operation via a mechanical connection which operates through, and in a direction perpendicular to the plane of, the said lateral faces
- 15 – an electrical operation via an interconnection effected in a direction perpendicular to that of the mechanical connection

and is characterised by the fact that one of the elements includes a sliding component in one of the said directions which ensures the simultaneous implementation of the means of fixing the components to each other and:

- 20 – either the electrical connection when the mechanical connection is effected
  - or the mechanical connection when the electrical connection is effected
- the power and control electrical components of the element which includes the slider, including the connecting terminals and all of the conductors, being
- 25 separated from the components which effect the mechanical connection by the slider, driven by a relative movement when the latter is in motion.

The second of the sequential connections along the two axes therefore in all cases causes the activation of the means of fixing the elements.

30 More precisely, according to a possible principal variant, the sliding component is a moving drawer in one of the elements, to which are fixed the conductors which are to be inserted in the terminals of the other element, the said drawer, when it reaches the vicinity of the internal stop position, the said

conductors then being within the terminals of the other element, activating the means of fixing to the latter.

These means of fixing preferably consist of at least one hook which is part of the element housing the sliding drawer, able to pivot towards the outside in the vicinity of the ridge in its lateral surface opposite the insertion aperture of the said drawer, so as to penetrate into at least one opening made for that purpose in the second element, together with at least one locating lug fixed to the slider and able to penetrate in the vicinity of the said insertion orifice of the drawer into at least one corresponding housing of the other element, the directions of insertion of the hook and the lug being opposed.

In the case of the hook or hooks, the sliding movement of the slider is then converted into the rotary movement of a piece which is attached to the element housing the drawer.

The existence of two coupling axes, imposing two sequential movements, gives rise to the existence of two possible variants, depending on the execution of the sequence. In the preceding hypothesis, electrical connection takes place last, hence the need for a drawer sliding along the axis of this connection.

It is however possible to make the opposite choice i.e. to make the electrical connection first, the mechanical connection taking place thereafter. In this case, the slider must be capable of movement along the axis mechanical connection.

Therefore in a second variant of the invention the sliding component moves in a direction parallel to that of mechanical coupling and comprises the cover of one of the two attached elements, to which are fixed the parts accomplishing mechanical coupling which can be moved between two extreme positions, one position in which they do not pass through the plane of the lateral coupling face of the element on which the sliding part of the cover moves, and one position in which they can perform their mechanical coupling.

As in the previous variant, the said sliding component of the cover can actuate, when it arrives in the vicinity of the position where mechanical coupling occurs, the fixing devices to the other element.

In both hypotheses, fixing between the two attached elements is preferably achieved in an antagonistic manner on two opposite faces of the unit by insertion

of male components into housings in which they are fitted, producing locking on the three axes.

As mentioned above as a preference the first element is a differential unit and second element is a circuit breaker.

5 In this hypothesis and according to one of the variants, the sliding component is fitted to the differential unit and is composed of a drawer in which are fitted the connecting terminals, the detector ring and the control and power conductors, together with a lateral wing extending parallel to the sides fitted with the connection terminals of the differential unit and the circuit breaker which is  
10 attached to it, the said wing including conductors linking the two elements, of which the extremities extend beyond it parallel to the axis of movement of the slider.

This drawer moves between two extreme positions, a closed position in which the extremities of the conductors extending beyond the above-mentioned wing are  
15 within the connection terminals of the circuit breaker, and an open position in which the said extremities are clear of the said terminals.

This is simply the implementation of the second sequential coupling, the electrical connection.

In one possibility, the part of the drawer which includes the connection  
20 terminals of the differential unit and the lateral wing are covered by a protective cover masking the said terminals, leaving free access for tightening/untightening, and covering the conductors located in the said wing.

This cover has a cover plate situated on the slider, masking the components of the differential unit in the open position of the slider.

25 These last technical features cover more particularly the safety requirements applying to the electrical components of the differential unit. With regard to the circuit breaker, the said cover includes a terminal masking plate situated at the level of the lateral wing, designed to protect access to the tightening devices of the circuit breaker.

30 This terminal masking plate preferably slides in a housing in the cover between a parked position and a deployed position, in which the shape of the housing permits an axial rotation parallel to the direction of mechanical coupling,

between the said deployed position and a rest position where the connecting terminals of the circuit breaker are masked.

A lead seal could be applied in this position.

5 After operating the two connections, when the electrical connection is ready to be tightened i.e. when the slider is at its stop position inside the differential unit, the fixing systems to the circuit breaker have in principle been activated.

10 The differential unit includes for this purpose a lug linked to a pivoting shaft which has two hooks, the assembly being positioned at the ridge opposite the slider aperture on the internal surface of the lateral face attached to the circuit breaker, the said lug working in conjunction with the internal extremity of the slider in order to produce a rotary movement in the said hooks.

15 It is preferable for the said lug to be fixed to the said shaft and rotate with it and to insert itself into a housing located at the internal extremity of the drawer via an opening of which the edges perpendicular to the bottom of the drawer exercise a reciprocating action on the lug with the intention of communicating to it a rotating movement in both directions.

20 More precisely, this lug is an elbowed lever of which the faces perpendicular to the bottom of the drawer allow the said edges of the opening of the housing to perform a relative movement along the said faces, converting the sliding movement of the drawer into a rotation of the lug and of the shaft carrying the hooks.

25 Simultaneously with the operation of the said fixing devices on one side of the unit, other devices operate as already mentioned on the other side. According to one possibility, the lateral wing extending from the drawer incorporates locating devices arranged parallel to the axis of sliding in the direction of the terminals of the circuit breaker, under which housings are provided able to receive the said locating devices.

30 In the second variant applied to the pair composed of the differential unit and the circuit breaker, the sliding component is a part of the cover of the differential unit including the lock of the said unit, the actuating lever of the circuit breaker lock and the locating pins acting in the direction of mechanical coupling.

Coupling therefore occurs at several points, which guarantees perfect alignment of the two elements forming the electrical unit, this alignment also being necessary so that the unit can be fitted on the rail under good conditions.

Furthermore, the differential unit may incorporate a error-prevention protuberance arranged in the direction of mechanical coupling and operating in  
5 conjunction with a corresponding aperture in the circuit breaker, the said error-prevention protuberance also being fixed to the sliding part of the cover.

For reasons of safety, the standard requires that the two elements forming the electrical unit be finally locked to each other so that it is no longer possible to  
10 separate them without destroying a visible zone which proves the intention to separate them.

Thus it is preferable for the element which includes the slider to be equipped with a locking button which, when it is actuated, prevents the sliding movement of the slider, it being possible to actuate the button only once in only one direction.

15 In the configuration which is the subject of the preferred example, the differential unit includes a plunger which slides perpendicularly to the electrical and mechanical coupling directions. The said plunger, accessible from the cover of the differential unit, is extended in the direction of sliding by a rod which fits into a housing provided for the purpose in the sliding drawer and prevents all movement  
20 of the latter, the said plunger then being in light contact with the cover and no longer able to be operated after fitting the extremity of the rod in the said housing.

We have mentioned the elements being fitted to rails in electrical cabinets, but the invention also offers a considerable improvement in the removal of a single element if required, since the travel of the slider is sufficient to allow total  
25 mechanical independence on an axis.

The invention will now be described in greater detail, referring to the appended Figures, in which:

- Figure 1 illustrates a differential unit associated with a tetrapolar circuit breaker
- 30 – Figure 2 illustrates the method of connection used for sequential coupling (mechanical then electrical)

- Figure 3 is an exploded perspective view of the differential unit with the drawer and its cover
- Figure 4 shows the items of Figure 3 from a different angle
- Figure 5 is a perspective view of the assembled sliding drawer
- 5    – Figure 6 represents an enlarged detail of the previous Figure, showing the pivoting fixing system of the elements of the electrical unit
- Figure 7 covers the same items as Figure 5 except for the lateral face of the differential unit
- the purpose of Figure 8 is to explain the operation of the locking plunger
- 10   – and Figure 9 is a perspective view of the sequential fitting of the two elements which form the electrical unit in the context of the second variant with a sliding cover

The same numerical references correspond, from one Figure to another, to the same items. The configuration illustrated in Figure 1 constitutes the preferred example used in the context of this description.

15    The differential unit (B) is shown attached to a circuit breaker (D), in this case tetrapolar. It is clear, however, that the invention applies to bipolar and tripolar circuit breakers with exactly identical implementation to that in the following explanation.

20    Without entering into details which are not within the scope of the invention, the differential unit has a control lever (1) of a triggering lock (not visible) mechanically connected to the locks of the circuit breaker (D), also controllable v by means of the buttons (2). This mechanical link forms in fact the essential part of the mechanical coupling.

25    The connection terminals of the differential unit (B) are hidden by the cover (3) of the drawer (4), of which only the surface situated in the extension of the flat external surface of the said wing (5) is visible. The part of the cover (3a) adjacent to the said wing (5) includes a terminal cover (6) resting on the upper part of the connection terminals (not shown) of the circuit breaker (D).

30    Figure 2 shows more clearly the sliding drawer (4) and its lateral wing (5), covered by the cover (3, 3a). The drawer (4) is in its pulled-out position and the connection terminals (7) of the differential unit (B) are therefore held at a distance

from the body of the said unit (B) since they are fixed to it, but are still accessible via the openings (8) made in the upper part of the cover (3).

The part of the cover (3a) above the lateral wing (5) has a device for storing the terminal cover (6), composed of two lateral sliders (9a, 9b) of complex shape, straight grooves to provide firstly an upward movement of the said terminal cover then offset resistance points to permit rotation of the terminal cover to bring it back to the position shown in Figure 1. This can be regarded as an extension of the cover (3) to cover the terminals of the circuit breaker (D).

This Figure 2 also specifies certain details of the mechanical coupling. The lock of the triggering unit (B), when it is activated, moves a lug or lever (10) which in turn provides triggering of the locks of the tetrapolar circuit breaker (D). This lug is situated in an orifice provided in the lateral wall of the circuit breaker (D) of which the shape permits a movement of the lug (10) when an operating incident occurs.

As well as this lug, the lateral wall (P) of the differential unit (B) has locating pins (11) of which only one is visible here, and an error-prevention lug (12) which enables components of compatible ratings to be attached together.

Finally, Figure 2 allows us to see the linked pivoting fixing hooks (13) of the differential unit (B) which can be inserted into corresponding apertures in the circuit breaker (D) of the invention i.e.:

- the drawer (4) and its lateral wing (5) forming an entity
- the cover (3, 3a) which covers the latter, with a mask (30) to hide the components of the drawer when the latter is open
- the first half-shell of the unit
- and the second half-shell of the said unit

It is in particular obvious that the cover (3) and its lateral wing (3a) cover the parts with which contact may be dangerous i.e. respectively the terminals (7) of the differential unit (B) and the rigid conductors of which the extremities emerge perpendicularly to the slots visible in the two Figures.

The drawer (4) includes all of the power and control parts of the electronic circuit i.e. principally the said terminals (7), the rigid conductors (25) for connection with the circuit breaker (D) and the ring through which they pass. There is thus

virtually total independence between the electrical and mechanical aspects. The control part, the secondary winding of the core, is made of fine flexible wire which does not affect the mechanical function.

5 The upper part of the half-shell (15) possesses a control lever (1) situated above the lock (not shown). The extremity of the drawer (4) works in association with a lug (17) controlling the movement of the pivoting hooks (13). The design of the lug/hook (17/13) assembly and its mechanical link to the half-shell (15) appear more clearly in Figures 5 and 6, while the lateral mechanical coupling devices are better seen in Figure 4, with the locating and error-prevention pins (11 and 12) and  
10 the lug (10) fixed to the lock.

In Figure 5, the lug (17) is inserted into a housing (18) in the drawer (4), presenting an opening (19) limited by two small columns (20 and 20'). The latter slide along the surfaces of the lug (17) when a sliding motion is applied to the drawer, taking the said lug (17) which pivots at the same as the shaft (21) around  
15 an axis next to the ridge in the differential unit. The hooks (13), being themselves attached to the said shaft (21), pivot at the same time and are in the fixing position when the drawer (4) is against its internal stop.

These same elements are shown enlarged in Figure 6. The same Figure 5 also shows the locating lugs (22) which work in conjunction with the apertures (23) located under the terminals of the circuit breaker (see Figure 2).  
20

The locating lugs (22) and the hooks (13) move in the opposite direction relative to the circuit breaker unit (D), ensuring firm fixing of the elements forming the compact electrical unit of the invention.

The respective directions of the extremities of the hooks (13) and the locating  
25 lugs (22) are clearly visible in Figure 7. When fully engaged they are on parallel axes and perfectly lock the circuit breaker in position on the differential unit.

In the vicinity of the housing (18) there is a second, smaller, housing (24) designed to operate in conjunction with the locking plunger appearing in particular in Figure 8 with the reference (26). This plunger (26) is extended by a rod (27)  
30 which can be accommodated in the housing (24) when the plunger is activated. In this case, the plunger (26) is in light contact with the surface of the cover of the differential unit (B) and it is no longer possible to raise it without breaking

something on the said unit (B). The plunger (26) appears in particular in Figure 9 and extends proud of the cover (28) since it has not been activated.

This Figure 9 illustrates a second variant of the invention, with a sliding component acting in the direction of mechanical coupling. This is the cover (28) which is shown offset relative to the plane of the lateral face of attachment.

The stages of coupling are then as follows:

- positioning the circuit breaker according to the arrow (A), achieving electrical connection
- installation of the movable cover (28) in the direction of the arrow (C), achieving mechanical coupling, with introduction of the pins (11) and the lever (10)
- locking of the slider by lowering of the plunger (26) in the direction of the arrow (E)
- fitting of the terminal cover according to the arrow (F)

The invention can also be generally applied to other modular elements such as timers, remotely-controlled switches etc.

## CLAIMS

1. Compact electrical unit composed of two modular elements (D, P) attached by one of their side faces and including a fixing system which maintains them in mutual contact in that configuration and allowing two operations in conjunction:

- 5           – mechanical via a mechanical connection which operates through, and in a direction perpendicular to the plane of, the said lateral faces
- electrical, via an interconnection effected in a direction perpendicular to that of the mechanical connection

10 characterised by the fact that one of the elements (P) includes a component (4, 28) sliding in one of the said directions which ensures the simultaneous implementation of the means of fixing the components to each other and:

- either the electrical connection when the mechanical connection is effected
- or the mechanical connection when the electrical connection is effected
- 15 the power and control electrical components (7, 25, 16) of the element (P) which includes the slider (4, 28), including the connecting terminals (7) and all of the conductors (25), being separated from the components which effect the mechanical connection by the slider (4, 28), operated by a relative movement when the latter is in motion.

20 2. Compact electrical unit according to the previous Claim, characterised by the fact that the sliding component includes a movable drawer (4) in one of the elements (P) to which are fixed the conductors (25) which are to be inserted in the terminals of the other element (D), the said drawer (4), when it reaches the vicinity of the internal stop position, activating, the said conductors (25) then being within

25 the terminals of the other element (D), the means of fixing (13) to the latter.

3. Compact electrical unit according to the previous Claim, characterised by the fact that the said means of fixing consisting of at least one hook (13) which is part of the element (P) housing the drawer (4), able to pivot towards the outside in the vicinity of the ridge in its lateral surface opposite the insertion aperture of the said

30 drawer (4), so as to penetrate into at least one opening made for that purpose in the second element (D), together with at least one locating lug (22) fixed to the sliding drawer (4) and able to penetrate in the vicinity of the said insertion orifice of



the drawer (4) into at least one corresponding housing (23) of the other element (D), the directions of insertion of the hook (13) and the lug (22) being opposed.

4. Compact electrical unit according to the previous Claim, characterised by the fact that the sliding part moves in a direction parallel to that of mechanical coupling and comprises part of the cover (28) of one of the two attached elements (P), to which are fixed the parts (10, 11, 12) accomplishing mechanical coupling which can be moved between two extreme positions, one position in which they do not pass through the plane of the lateral coupling face of the element (P) on which the sliding part of the cover (28) moves, and one position in which they can perform their mechanical coupling.

5. Compact electrical unit according to the previous Claim, characterised by the fact that the said sliding part of the cover (28) can actuate, when it arrives in the vicinity of the position where mechanical coupling occurs, the devices for fixing to the other element (D).

6. Compact electrical unit according to the previous Claim, characterised by the fact that the first element is a differential unit (P) and the second element is a circuit breaker (D).

7. Compact electrical unit according to the previous Claim, characterised by the fact that the slider is fitted to the differential unit (P) and is composed of a drawer (4) in which are fitted the connecting terminals (7), the detector ring (16) and the control and power conductors (25), together with a lateral wing (5) extending parallel to the sides fitted with the connection terminals (7) of the differential unit (P) and the circuit breaker (D) which is attached to it, the said wing (5) including conductors (25) linking the two elements P and D), of which the extremities extend beyond it parallel to the axis of movement of the drawer (4).

8. Compact electrical unit according to the previous Claim, characterised by the fact that the drawer (4) moves between two extreme positions, a closed position in which the extremities of the conductors (25) extending beyond the above-mentioned wing (5) are located within the connection terminals of the circuit breaker (D), and an open position in which the said extremities are clear of the said terminals.



9. Compact electrical unit according to one of claims 7 and 8, characterised by the fact that the part of the drawer which includes the connection terminals (7) of the differential unit (P) and the lateral wing (5) are covered by a protective cover (3, 3a) masking the said terminals (7), leaving free access (8) for  
5 tightening/untightening and covering the conductors (25) located in the said wing (5).

10. Compact electrical unit according to one of claims 8 and 9, characterised by the fact that the cover (3, 3a) has a cover plate (30) situated on the drawer (4), masking the components (16, 25) of the differential unit (P) in the open position of  
10 the drawer (4).

11. Compact electrical unit according to one of claims 9 and 10, characterised by the fact that the cover (3, 3a) includes a terminal masking plate (6) situated at the level of the lateral wing (5) and designed to protect access to the tightening devices of the circuit breaker (D).

12. Compact electrical unit according to the previous Claim, characterised by the fact that the said terminal masking plate (6) slides in a housing (9, 9a) in the cover between a parked position and a deployed position, in which the shape of the housing (9, 9a) permits an axial rotation parallel to the direction of mechanical coupling, between the said deployed position and a rest position where the  
15 connecting terminals of the circuit breaker (D) are masked.

13. Compact electrical unit according to the any of Claims 7 to 12, characterised by the fact that the differential unit (P) has a lug (17) linked to a pivoting shaft (21) comprising two hooks (13), the assembly being positioned at the ridge opposite the drawer (4) aperture on the internal surface of the lateral face  
20 attached to the circuit breaker (D), the said lug (17) working in conjunction with the internal extremity of the drawer (4) in order to impart a rotary movement to the said hooks (13).

14. Compact electrical unit according to the previous Claim, characterised by the fact that the said lug (17) is fixed to the said shaft (21) and rotates with it and inserts itself into a housing (18) located at the internal extremity of the drawer (4)  
25 via an opening (19) of which the edges (20, 20') perpendicular to the bottom of the



drawer (4) exercise a reciprocating action on the lug (17) for the purpose of communicating to it a rotating movement in both directions.

5 15. Compact electrical unit according to the previous Claim, characterised by the fact that the said lug (17) is an elbowed lever of which the faces perpendicular to the bottom of the drawer (4) allow the said edges (20, 20') of the opening (19) of the housing (18) to perform a relative movement along the said faces, converting the sliding movement of the drawer (4) into a rotation of the lug (17) and of the shaft (21) supporting the hooks (13).

10 16. Compact electrical unit according to any of Claims 7 to 15, characterised by the fact that the lateral wing (5) extending from the drawer (4) incorporates locating devices (22) arranged parallel to the axis of sliding in the direction of the terminals of the circuit breaker (D), under which housings (23) are provided able to receive the said locating devices (22).

15 17. Compact electrical unit according to the Claim 7, characterised by the fact that the sliding component is a part of the cover (28) of the differential unit (P) including the lock of the said unit (P), the actuating lever (10) of the lock of the circuit breaker (D) and the locating pins (11) acting in the direction of mechanical coupling.

20 18. Compact electrical unit according to the previous Claim, characterised by the fact that the differential unit (P) incorporates an error-prevention protuberance (12) arranged in the direction of mechanical coupling and operating in conjunction with a corresponding aperture in the circuit breaker (D), the said error-prevention protuberance (12) also being fixed to the sliding part of the cover (28).

25 19. Compact electrical unit according to any of the previous Claims, characterised by the fact that the element (D) which includes the slider (4, 28) is equipped with a locking button (26) which, when it is actuated, prevents the sliding movement of the slider (4, 28), it being possible to actuate the button only once in only one direction.

30 20. Compact electrical unit according to any of Claims 7 to 16, characterised by the fact that the differential unit (P) includes a plunger (26) which slides perpendicularly to the electrical and mechanical coupling directions. The said plunger (26), accessible from the cover of the differential unit, is extended in the



direction of sliding by a rod (27) which fits into a housing (24) provided for the purpose in the sliding drawer (4) and prevents all movement of the latter, the said plunger (26) then being in light contact with the cover and no longer able to be operated after fitting of the extremity of the rod (27) in the said housing (24).

5

