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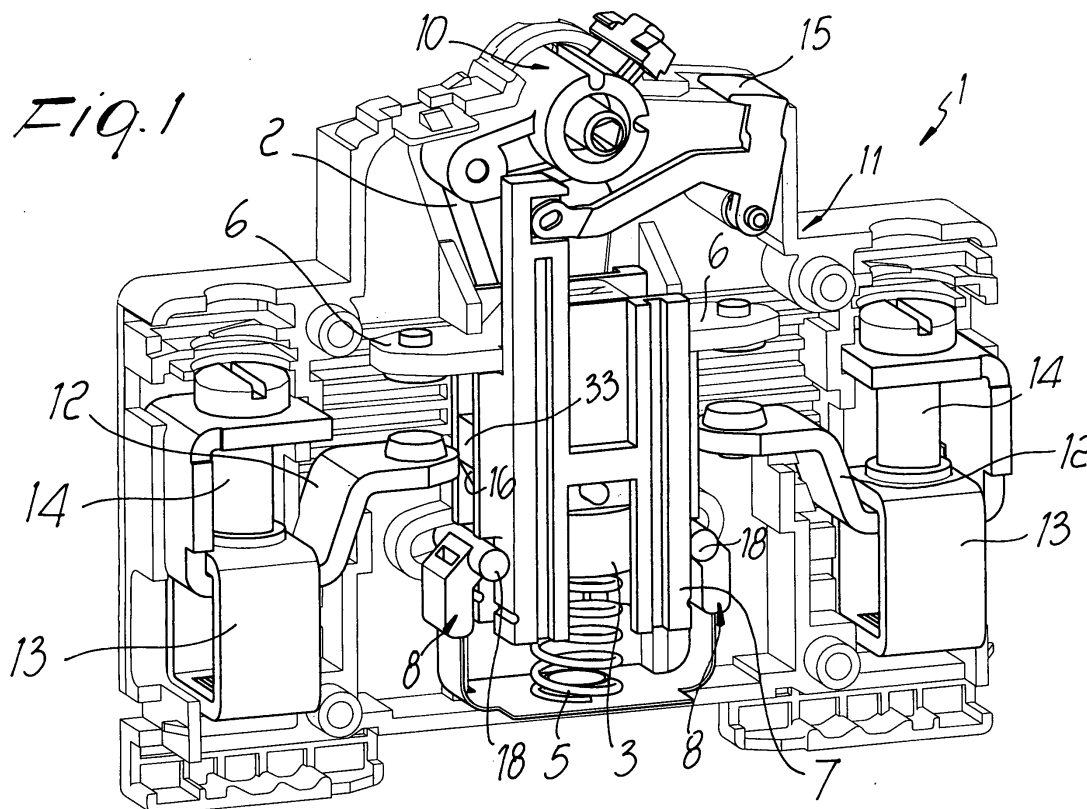
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(54) **Modular disconnecter with snap closing mechanism**

(57) A modular disconnecter with independent moving contact closure comprising a casing that encloses various components including an actuation lever or handle that can be operated from the outside in order to control a kinematic chain adapted to open and close at least one moving contact and a respective fixed contact, each

fixed contact being associated with a respective terminal. The kinematic chain includes a lever system that actuates a slider associated with the moving contact by the interposition of a pusher that is actuated by at least one elastic member for controlling the closure speed of the contacts and the contact pressure in the closed position.



EP 1 387 377 A2

Description

[0001] The present invention relates to a modular disconnecter with independent moving contact closure, capable of interrupting and disconnecting one or more electric circuits, which can be mounted in control units or panels or containers suitable for the purpose.

[0002] Disconnecters are electrical actuation devices provided with mechanisms that allow the opening and closure of one or more moving contacts by means of an external lever or handle that can be accessed by the user.

[0003] Generally, the problems that occur in the design and manufacture of these devices are fundamentally of two kinds.

[0004] A first problem is that of limiting the number of components that constitute the actuation mechanism, in order to contain both the costs of the individual parts and the costs of their assembly.

[0005] Another important problem is to reduce the wear of the contacts during opening and closure, in order to ensure the correct operation of the product for a longer period of time.

[0006] Generally, in order to obviate this last problem, the trend is to ensure that the mechanisms are capable of moving the contacts as rapidly as possible during closure.

[0007] This allows to limit the generation of the electric arc which, as is known, is the main cause of contact wear.

[0008] Since the actuation mechanism of the actuation lever is normally rigidly coupled to the contact supporting member, the closure speed is actually directly proportional to the speed of actuation of the actuation lever.

[0009] The aim of the present invention is to provide a disconnecter with independent moving contact closure that overcomes the drawbacks of the cited prior art.

[0010] An object of the invention is to provide a disconnecter that is economical also from the point of view of production.

[0011] Another object of the invention is to provide a device that can be installed inside control units, control panels, and containers in general suitable for the purpose.

[0012] Another object is to provide a device that is reliable and durable.

[0013] This aim and these and other objects that will become better apparent hereinafter are achieved by a modular disconnecter with independent moving contact closure, as claimed in the appended claims.

[0014] Further characteristics and advantages of the invention will become better apparent from the following detailed description of preferred but not exclusive embodiments thereof, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

necter according to the invention;

Figure 2 is a cutout side view of the disconnecter, shown in the open-contact position;

Figure 3 is a view similar to Figure 2 but in which the disconnecter is shown in an intermediate condition during transition from the open-contact position to the closed-contact position;

Figure 4 is a view similar to Figure 3 but in which the device is shown in a closed-contact position.

[0015] With reference to the cited figures, the disconnecter according to the invention, generally designated by the reference numeral 1, comprises a casing 11 that encloses various components including an actuation lever or handle 10, which can be operated from the outside and is associated with a linkage or cross-member 2, which is in turn connected to an intermediate member or pusher 3.

[0016] A traction spring 4 and a compression spring 5 are applied respectively to the pusher 3 and are adapted to determine the contact pressure and the closure speed.

[0017] A double moving contact 6 is rigidly coupled to a slider 7, which is connected to a double elastic hook 8. The double moving contact is adapted to make contact with fixed contacts 12, each being associated with a respective terminal 13 provided with a locking screw 14.

[0018] An indicator 15 is kinematically associated with the slider 7 in order to indicate the position of the moving contact.

[0019] The operation of the disconnecter according to the invention is as follows.

[0020] By operating the handle 10, the motion is transmitted, by means of the linkage 2, to the pusher 3, to which the springs 4 and 5 are applied. The first spring 4 determines the contact pressure and the closure speed, which is independent of the speed with which the handle is operated, while the second spring 5 causes the contacts to open.

[0021] The moving contact 6 is rigidly coupled to the slider 7, which is retained in position by the double elastic hook 8.

[0022] The system remains open, as shown in Figure 3, until the pusher 3 reaches the position that releases the slider 7 from the retention of the double hook 8.

[0023] The pusher 3 has a wider portion 33, which is blended with inclined portions 16, so that by lowering the pusher the wider portion 33 divaricates the ends 18 of the double hook 8, moving them outside the step 17 of the slider 7.

[0024] At this point the slider and the moving contact are moved, by means of the spring 4, until the double moving contact 6 and the fixed contacts 12 close together. The closed position is shown in Figure 4.

[0025] In this manner, the closure speed of the contact is independent of the speed with which the actuation lever is operated.

Figure 1 is a cutout perspective view of the discon-

[0026] For the opening step, the motion is ensured by the spring 5, which during closure is kept compressed by passing beyond the dead center of the toggle constituted by the pusher 3, the linkage 2 and the actuation lever, while during the opening step, as soon as the conditions are restored, the spring 5 pushes the pusher 3, which in turn moves the slider 7, the moving contact 6, the linkage 2 and the actuation lever 10 into the open position, shown in Figures 1 and 2.

[0027] In practice it has been found that the invention achieves the intended aim and objects, a disconnecter having been provided in which the dimensions of the most expensive active components, such as for example the silver plates, are reduced with respect to similar conventional systems.

[0028] Since the mechanism has an independent closure action, it in fact allows the user to operate the actuation lever in any manner, ensuring in any case the maximum contact closure speed.

[0029] Among the advantages of the invention, attention is drawn to the reduced wear of the active parts of the contacts and to the reduced dimensions of the active parts of the contacts, with consequent cost recovery.

[0030] The disconnecter also reduces the formation of electric arcs, which as is known causes deterioration of the insulating parts.

[0031] The device according to the invention is susceptible of numerous modifications and variations, within the scope of the appended claims. All the details may furthermore be replaced with technically equivalent elements.

[0032] The materials used, as well as the dimensions, may of course be any according to requirements and to the state of the art.

in that said at least one elastic member comprises two springs: a traction spring, adapted to determine the contact pressure and the mutual contact closure speed, and a compression spring, adapted to determine the mutual opening of the contacts.

4. The device according to one or more of the preceding claims, **characterized in that** said moving contact is constituted by a double contact that is rigidly coupled to said slider, which is in turn connected to a double elastic hook, said double moving contact being adapted to make contact with the fixed contacts, each of which is associated with a respective terminal.
5. The device according to one or more of the preceding claims, **characterized in that** it comprises an indicator that is kinematically associated with said slider in order to indicate the position of the moving contact.

Claims

1. A modular disconnecter with independent moving contact closure, comprising a casing that encloses various components including an actuation lever or handle that can be operated from the outside in order to control a kinematic chain adapted to open and close at least one moving contact and a respective fixed contact, each fixed contact being associated with a respective terminal, **characterized in that** said kinematic chain comprises a lever system adapted to actuate a slider associated with said moving contact by the interposition of a pusher that is actuated by at least one elastic member for controlling the closure speed of the contacts and the contact pressure in the closed position.
2. The disconnecter according to claim 1, **characterized in that** said lever system comprises a linkage associated with said handle and with said pusher.
3. The device according to claim 1 or 2, **characterized**

