March 15, 1932. R. PUDELKO 1,849,724

SWITCH MECHANISM

Filed March 22, 1928

Fig 1

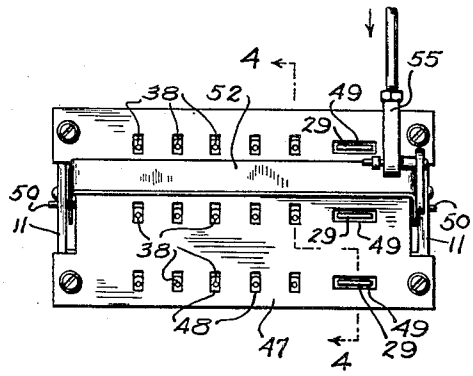


Fig 2

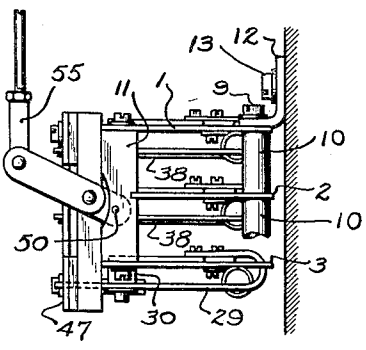
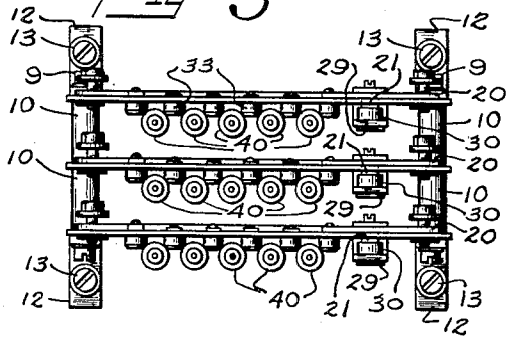


Fig 3



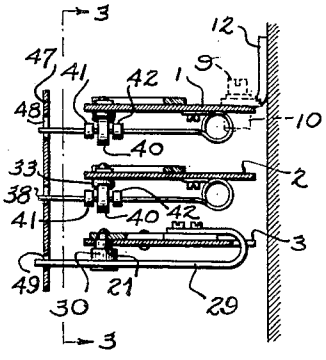


Fig 4

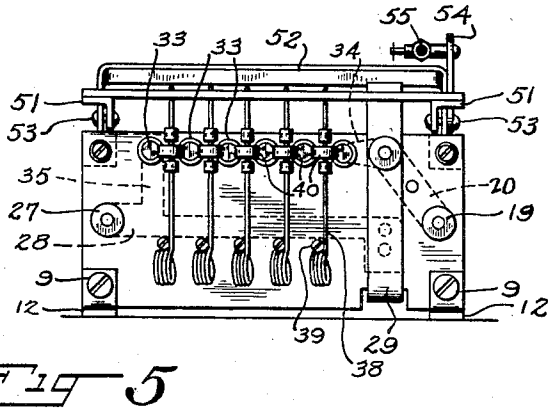


Fig 5

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UNITED STATES PATENT OFFICE

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SWITCH MECHANISM

Application filed March 22, 1928, Serial No. 263,874, and in Switzerland March 30, 1927.

The invention relates to novel and useful improvements in electric switches, and more especially to novel and useful improvements in such switches which are especially designed to prevent arcing.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate one embodiment of the invention, and together with the description serve to explain the principles of the invention.

Of the drawings:

Fig. 1 may be regarded either as a top plan or front elevation of a mechanism embodying the invention;

Fig. 2 is a side elevation corresponding to Fig. 1;

Fig. 3 corresponds to Fig. 1 with the front switch-actuating plate and its operating means removed, and is substantially on the line 3—3 of Fig. 4;

Fig. 4 is a transverse section taken on the line 4—4 of Fig. 1; and

Fig. 5 is a bottom plan view.

The invention is directed primarily to providing a switch mechanism of the type wherein the circuit is simultaneously broken at a plurality of points in order to minimize or prevent arcing, there being usually utilized a main current switch, which is opened just before and closed just subsequent to the opening and closing of the first-mentioned switch mechanism. The present invention is further directed to providing such a mechanism which is of simple and sturdy construction and which is reliable, uniform and quick in its action, which has a minimum of moving parts, and is self-corrective to avoid imperfect contacts at any one of the makes and breaks in the secondary or arc-preventing switch mechanism.

Referring now in detail to the embodiment of the invention illustrated by way of example in the accompanying drawings, the invention is shown applied to a contact switch, although it is applicable to other kinds of switches, and it will be understood that the form of embodiment of the various features of the invention may be widely varied.

In the drawings an embodiment is shown having simultaneously operated and controlled make and break mechanisms for a three wire circuit, or for three circuits; although it will be understood that switch mechanism embodying the invention can be used singly or in other varying numbers as well. In said specific embodiment, supporting plates 1, 2 and 3 of insulating material are provided, and these plates are supported in parallel, spaced relationship by any suitable means, such as screw rods 9 passing through apertures in the corners of the plates and provided with intervening spacing collars 10. The plates may be united at their forward side edges by suitable traverses 11, and the entire mechanism, whether a single switch, or a plurality of switch mechanisms as shown in the present embodiment, may be fixed to any suitable support by angle brackets 12 fixed to the screw rods 9 and also fixed by screws 13 to the supporting structure.

A description of a single circuit switch mechanism will suffice for either a single wire or a multi-wire system or for a group of independent switches mounted together. On the supporting plate 1, 2 or 3 of insulated material is mounted a binding post or other circuit terminal device 19, and electrically connected therewith is a conducting bar 20 fixed upon the insulating supporting plate. The bar 20 is electrically connected to a flat-faced, circular contact piece 21, which projects through the insulating supporting plate to the opposite side thereof, to constitute one terminal of the main current switch.

The opposite line terminal comprises a binding post, or other suitable device 27, which is electrically connected to a conduct-

ing strip 28, mounted on the face of the supporting plate of insulating material, and conductively connected to said plate is the rear end of a bent springy contact strip 29 preferably of J shape, which extends either through or about the supporting plate and parallel to but spaced away therefrom on the opposite side thereof. Plate 29 carries a contact 30, movable to engage with and to be disengaged from the contact 21, to make and break the main current circuit.

In the embodied form of the secondary, delayed-action or arc-preventing switch mechanism, there is provided a plurality of fixed, spaced-apart conducting members 33, shown as six in number, which are insulatedly mounted on the supporting base plate of insulating material and are in series in the secondary switch. At the right-hand end (Fig. 4), the first switch member 33 is electrically connected to the conducting strip 20 of the main current circuit terminal 19 by means of a conducting strip 34, and the left-hand end member 33 is in like manner connected by a conducting strip 35 to the other circuit terminal 27. The main current switch and the arc-preventing switch mechanism are thus in parallel between the switch terminals.

In the embodied form of means for simultaneously making and breaking the circuit between each contiguous pair of contact devices 33, there are provided a number of resilient self-positioning devices equivalent in number to the gaps between the contact pieces 33. As embodied, these devices are preferably cylindrical, or at least curved or shaped, and are carried on a resilient mounting whereby each will aline itself to fit accurately between two of the contacts 33, and make a firm and full contact therebetween when the switch is closed. As embodied, in each of these devices, a wire rod 38 is fastened at 39 upon the insulating supporting plate 1, and is preferably provided with several spring-acting coil turns, and then projects forwardly toward and past the contacts 33. Each of these spring rods 38 carries a gap-closing device of the character described, preferably a roller 40, which is held in its place on the rod between collars 41 and 42. The spring rod 38 tends to hold the roller in engagement with the contacts 33 and thereby maintain the gap electrically closed, and due to its resiliency will tend to force it accurately into the gap with full and firm contact on both contacts 33.

The circuit opening and closing mechanism opens the main circuit first and closes it last, and, after the main switch is open, simultaneously opens all the gaps between the contacts 33 and simultaneously closes them just before the main switch is closed. In the embodied form of actuating mechanism, to open and close the secondary switch, a movable plate 47, of insulating material, is mounted on the top or front of the switch mechanism (Figs. 1, 2 and 5), and is provided with a plurality of slots 48 into which project the forward ends of the respective spring rods 38, so that the contacts 40 are opened and closed by the movement of the plate 47. Similarly, to open and close the main switch, there are provided in the plate 47 apertures 49 into which project the forward ends of the spring members 29 of the main switches, whereby the main switch or switches are likewise operated by the movement of the plate 47.

In the embodied manner of mounting the plate 47, it is fastened to angle pieces 51 which are slidable on the respective traverses 11, and these are mounted on the side reaches of a bail 52, by means of bolts or pivots 53. Bail 52 is pivotally mounted at 50, on either side, upon the members 11. Actuating means are connected to the bail 52 in a suitable manner, and as shown an arm 54 is fixed to one of the side arms of the bail 52, and pivotally connected to the outer end of arm 54 is a rod 55, which may be connected to a time clock or other suitable automatic or manually operated controlling device.

The slots in the plate 47 are so positioned and proportioned that the main current switch will be opened just prior to the simultaneous opening of the secondary switch mechanism between each of the contacts 33, and the secondary switch mechanism will be simultaneously closed between each of the contact pieces 33 just prior to the closing of the main switch, and thereby heavy and undesirable arcing will be obviated. By reason of the strong and simple construction of the switch mechanism, and by reason of the alternate fixed contacts in the secondary switch mechanism, and the shape of the intervening movable members in a secondary switch mechanism, and their universal resilient self-positioning spring action, and the positive form and action of the actuating mechanism, insures a clean and full contact at each of the gaps of the secondary switch mechanism, and a simultaneously make and break at each of these gaps.

It will be understood that the details of construction of the embodied mechanism may be widely varied in so far as concerns the principal aspects of the invention, without departing from the principles of the invention and without sacrificing its chief advantage.

What I claim is:—

1. A switch mechanism including in combination a series of spaced apart stationary contact members adapted to be connected together in series and to be disconnected from one another, a movable series of contacts individually mounted on springs and insulated from each other, a slotted plate parallel to

both series of contacts and having the springs projecting through the slots in the plate and means for moving the plate to move the series of movable contacts into resilient engagement with the stationary contacts to connect the stationary contacts in series.

2. A switch mechanism including in combination a series of stationary contacts, a series of movable contacts to connect the stationary contacts in series, springs on which the movable contacts are mounted, a plate having a plurality of slots through which the free ends of the springs project, the plate lying substantially perpendicular to the springs and means for moving the plate in its own plane to move the movable contacts into and out of contact with the stationary contacts.

In testimony whereof, I have signed my name to this specification.

RICCARD PUDELKO.