

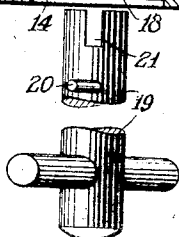
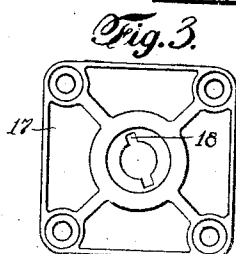
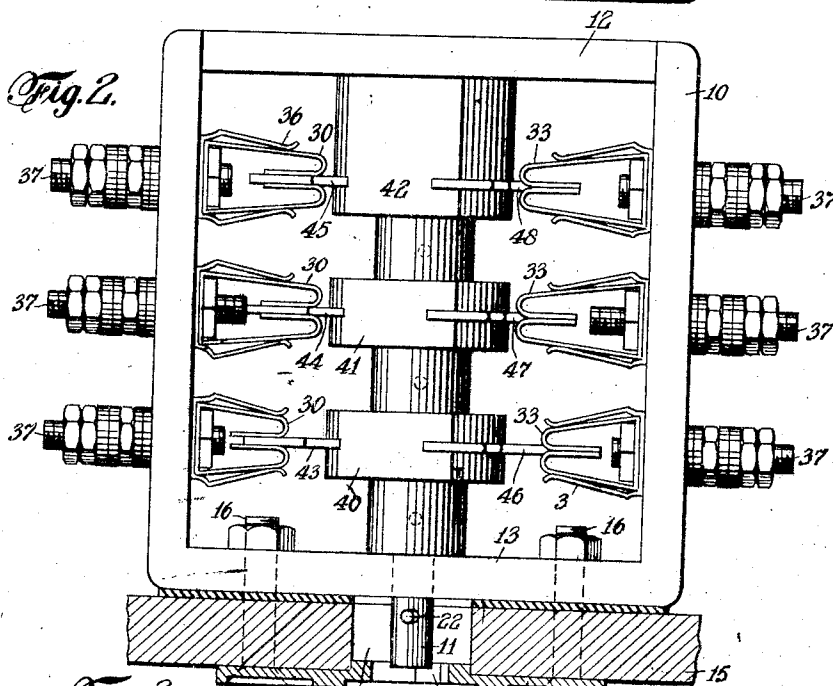
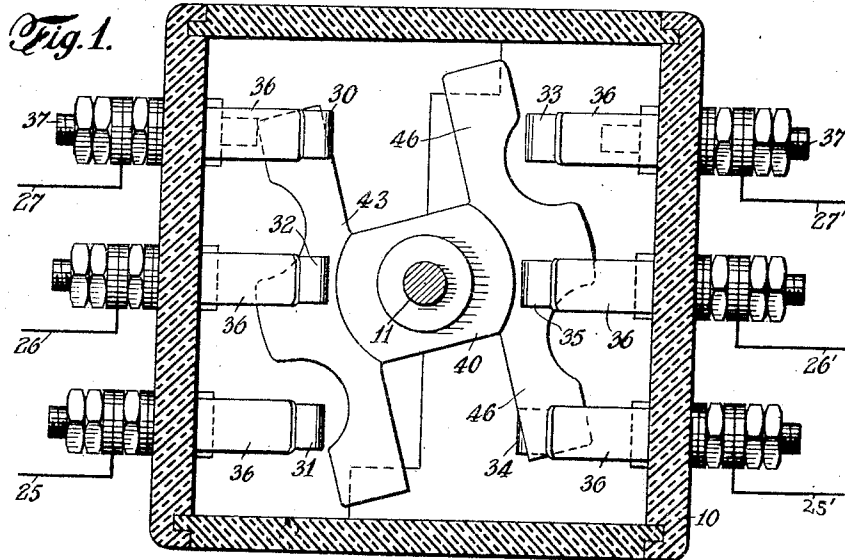
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RELAY AND METER TESTING AND CALIBRATING SWITCH

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RELAY AND METER TESTING AND CALIBRATING SWITCH

Application filed June 13, 1930. Serial No. 460,823.

The invention relates to electrical switching apparatus, more especially for use in the testing and calibrating of relay and meter installations; and it has for its object to render this possible, without dismounting an instrument or getting in back of a panel board, merely by the insertion of a suitable key into the switching apparatus and the turning of the same to cut out the particular instrument or instruments from the line and effect connection temporarily to test apparatus located at some convenient point.

In a previous application, Serial No. 738,272, filed by us September 17, 1924 for a similar device, we have disclosed sets of outer and intermediate contact fingers arranged in pairs with an oscillatable shaft between, the said shaft carrying contact blades which are pivotally secured thereto as well as to the intermediate finger.

The present embodiment, however, contemplates an arrangement wherein permanent contact is also had with the intermediate finger but the contact element is not in any way secured to said finger, merely effecting a wiping contact therewith as the shaft is oscillated in either direction; and the said contact element is, furthermore, fixedly secured to the shaft and not pivotally. By this modification a more simple and rugged switch device is attained and more perfect contact had between the contact elements and the respective intermediate fingers.

The nature of the invention, however, will best be understood when described in connection with the accompanying drawings, in which:

Fig. 1 is a vertical section through the novel switch apparatus.

Fig. 2 is a plan view thereof with lid of enclosing casing removed and panel to which the casing is shown attached indicated in section.

Fig. 3 is an elevation, on a reduced scale, of the escutcheon plate by which the switch may be secured to its panel.

Referring to the drawings, 10 designates a box structure or enclosing casing, of any suitable design, which is adapted to house and support an oscillatable shaft 11, as between

its end walls 12 and 13. The said shaft passes, also, through the front wall 13 and projects beyond the same into a recess 14 provided in the panel 15, to which said casing may be attached by bolts 16 or the like, and through a suitable escutcheon plate 17, having a diametrically slotted opening 18 which is designed to receive a key member 19. The latter has diametrically disposed pins 20 extending from its periphery to fit the slot 18 for insertion of the key and, when turned, to lock the same behind the escutcheon plate to prevent withdrawal of said key.

The key, furthermore, is provided with a slot or socket 21 at its inner edge to fit over and engage with a pin 22 of the shaft for effecting the oscillation of the latter, it being understood that when the key is turned to a position such that it is locked against withdrawal the switch serves to disconnect a particular instrument (not shown) into a test circuit through the leads 25, 26, 27 and 25', 26', 27', for example, in the manner set forth in our aforesaid application. The key is withdrawable then only after it has been turned to again restore the original conditions.

The novel switch mechanism is mounted within the casing 10 and comprises a set of upper and lower (outer) and intermediate contact fingers 30, 31 and 32, and a set of fingers 33, 34 and 35, the fingers of the two sets being arranged in pairs and disposed respectively on opposite sides of the shaft 11, with contact fingers of each set lying in a common plane and the intermediate fingers also in the plane of the shaft.

The said fingers are preferably of the divided spring socket type with embracing spring steel members 36 to normally force the separated socket elements together; and suitable posts 37 extend from the various sockets through the respective side walls of the casing and exteriorly to afford connection of an instrument to the various leads.

Mounted over the oscillatable shaft 11 is a succession of insulation blocks 40, 41 and 42 corresponding to the various pairs of sets of contact fingers; and the same have rigidly attached thereto upon diametrically opposite

sides of the shaft respective triple-contact elements 43, 44, 45 and 46, 47, 48 located in juxtaposition to the respective contact sockets. Each of these contact-making elements, moreover, embodies outer contacts as an upper and a lower prong, for effecting a wiping contact with the respective upper and lower fingers as the shaft is correspondingly oscillated, and an intermediate prong for continuously effecting a wiping contact with an intermediate finger. The radius of an intermediate prong and the contacting surface thereof is such that in either extreme of oscillation of the shaft 11 the said prong will remain in contact with its juxtaposed intermediate contact finger. In other words, an intermediate prong, though not permanently attached, is always in contact with its particular contact finger and a wiping action prevails so that the engaging surface will always be maintained in good condition for contact.

A similar wiping action is effected also between the outer contact prongs and their juxtaposed fingers, the arrangement in view of the position of said prongs above and below the shaft being such that when one prong of a contact element engages one of the outer fingers, the oppositely positioned prong of said element is out of contact with the juxtaposed outer finger, except, if desired, during the immediate period of transition. Moreover, the particular outer prong of one element in engagement with its finger will be opposite the outer one of the other contact element in engagement, as indicated in Fig. 1 which illustrates the position wherein a plurality of instruments are cut into the line for normal operation. If it be desired to place these instruments temporarily on test, shaft 11 would be turned to the right, causing the contact elements 43, 44 and 45 to break engagement between the upper fingers 30 and intermediate fingers 32, and contact elements 46, 47 and 48 to break the engagement between the lower fingers 34 and intermediate fingers 35 and thus changing the circuits of the corresponding instruments. At the same time, the contact elements 43, 44 and 45 will connect the intermediate fingers 32 with fingers 31 and the contact elements 46, 47 and 48 will connect the fingers 33 with intermediate fingers 35. While only one upper and one lower finger has been shown as associated with an intermediate finger, it will be understood, of course, that additional outer fingers and corresponding prongs may be provided to meet special circuit changing conditions.

We claim:

1. In a switch of the class described, two sets of three oppositely disposed contact fingers each, the fingers of each set lying in a common plane and corresponding fingers of the opposite sets lying in a common plane at right angles thereto, an oscillatable shaft

mounted between the sets of fingers and in the plane of the intermediate fingers, and two triple-contact blades rigidly carried by the shaft on opposite sides to move therewith, the said blades being adapted thereby for alternative wiping engagement with the juxtaposed outer fingers of the set located on the corresponding side of the shaft and for continuous engagement with the intermediate finger of said set but unattached thereto.

2. In a switch of the class described, two sets of three oppositely disposed contact fingers each, the fingers of each set lying in a common plane and corresponding fingers of the opposite sets lying in a common plane at right angles thereto, an oscillatable shaft mounted between the sets of fingers and in the plane of the intermediate fingers, and two triple-contact blades rigidly carried by the shaft on opposite sides to move therewith, the said blades being adapted in accordance with the angular position of the shaft for alternative wiping engagement with the juxtaposed outer fingers of the set located on the corresponding side of the shaft and for continuous engagement with the intermediate finger of said set but unattached thereto.

3. In a switch of the class described, comprising a box-like structure, sets of upper, lower and intermediate contact fingers mounted upon oppositely disposed walls of said box, the said fingers of each set lying in a common plane and having means extending exteriorly of the box for connection thereto, a shaft oscillatably journaled in the opposite walls of the box with axis of oscillation at right angles to the plane of said sets of fingers, two oppositely directed contact elements rigidly supported on opposite sides of the shaft to move therewith, each having an intermediate prong permanently in wiping engagement with a juxtaposed intermediate finger and also having outer prongs adapted for wiping engagement with the respective outer fingers of a set, the arrangement being such that as the shaft is rocked one of the outer prongs goes into engagement with its juxtaposed outer finger while the other goes out of engagement with its juxtaposed outer finger and simultaneously the opposite prong of the other contact element goes out of engagement with its juxtaposed finger while the other prong of said last-named contact element goes into wiping engagement with its juxtaposed outer finger.

In testimony whereof we affix our signatures.

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