Nov. 22, 1932. E. A. FRANCE ET AL 1,888,853

ELECTRIC SWITCH

Filed Sept. 11, 1929

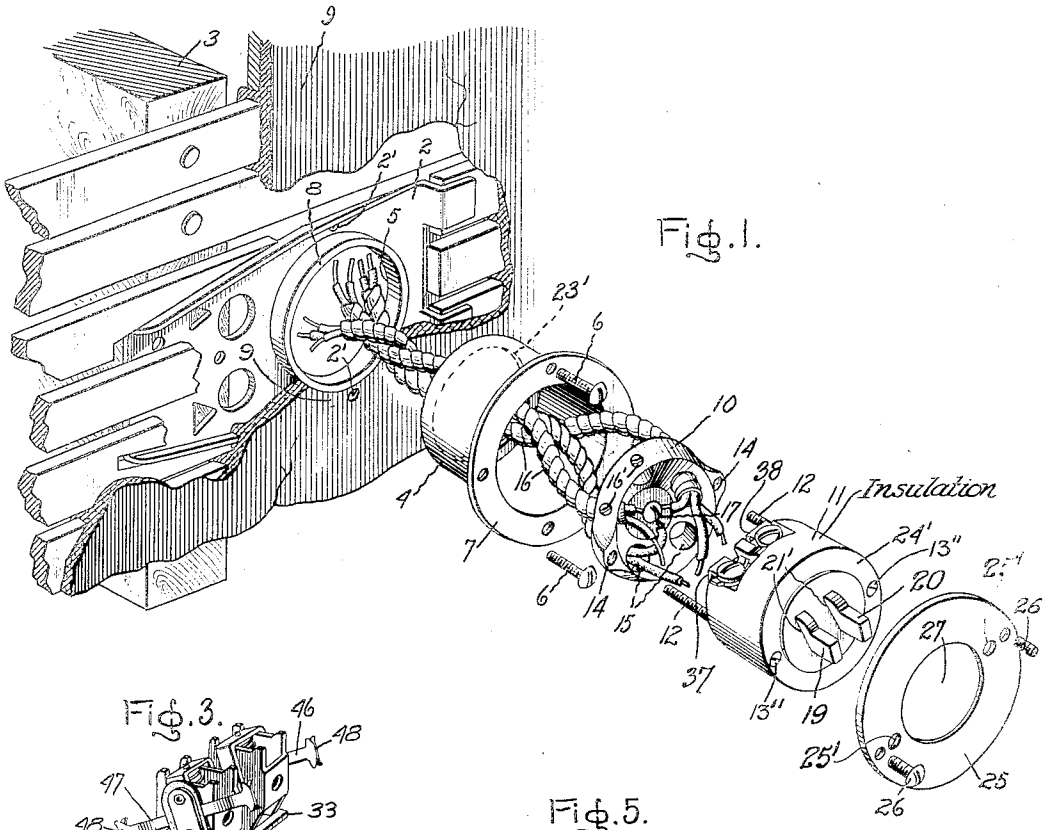



Fig. 1.



Fig. 3.

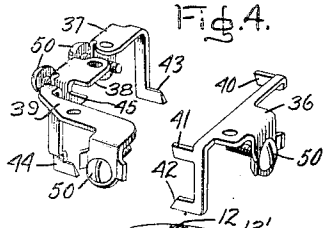


Fig. 4.

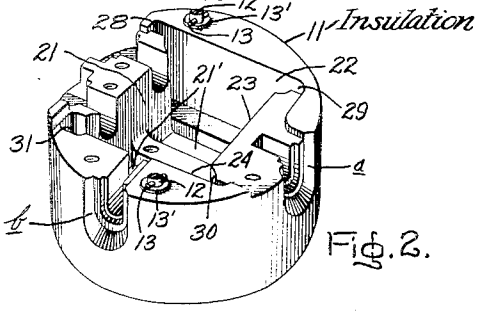



Fig. 2.

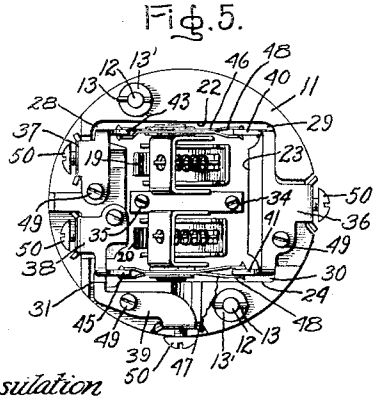


Fig. 5.

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# UNITED STATES PATENT OFFICE

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## ELECTRIC SWITCH

Application filed September 11, 1929. Serial No. 391,878.

The invention relates to electric switching devices especially adapted for use as equipment in a house wiring system for electric lights and other electrical apparatus. More particularly the invention relates to a type of device of the above character especially adapted to be inserted in a standard form of receptacle for a house system such as may be located in the walls of buildings, and adapted also to be made a part of standard equipment for such a system.

In order to increase the demand and reduce the cost of manufacture, distribution and installation of the equipment above indicated, it is essential to reduce the number of units to a minimum and to standardize units of the system, and to so design such units that they may be readily installed and interchanged by the aid of labor of moderate price.

It is an object of our invention to contribute to the accomplishment of such results by providing an improved form of switch for such a system having a minimum number of parts, simple in design and adapted to be assembled and installed with a minimum of operations and labor, and being easy and inexpensive to maintain.

The invention will be readily understood from the following specification and claims, reference being had to the accompanying drawing, in which Fig. 1 shows in perspective a device having the features of the invention incorporated in a house wiring system, the elements of such system being shown in a so-called exploded view; Fig. 2 shows in perspective from the rear a block in and about which the elements of the switch are assembled; Fig. 3 shows the reciprocating elements of the switch in perspective from the rear comprising the wipers or brushes and the hand control levers; Fig. 4 shows the contact elements between which the device shown in Fig. 3 is located; Fig. 5 shows the switch, with all the elements of Figs. 2, 3 and 4 assembled. In this figure the switch is shown in plan view from the rear.

Referring more in detail to the drawing, in Fig. 1 there is shown a lath and plaster wall with a hanger 2 secured to the stud element 3. The hanger serves to support a receptacle 4, the body of which is adapted to be inserted in the compartment within the wall 5 of the hanger and secured to said hanger by any suitable means, as for example, by screws 6, which extend through the flange 7 and engage threaded holes 2′ in the hanger. This receptacle is the subject matter of application Serial No. 391,900, filed in the names of Carlson and Knoderer, and bearing the same filing dated as this application. When the receptacle is in place, the flange 7 of the box is seated on the rim 8 of the wall 5 or on the plaster 9 about said wall or on both. The box has a removable bottom element 10 to which a block 11 of insulating material may be secured, as for example, by means of screws 12 to form a unit. These screws are free to turn in the block in which they are held against longitudinal movement by pins 13 (see Fig. 5) on the under side of the block 11 and by the heads 13″ on the opposite side shown in Fig. 1. For convenience washers 13′ are inserted between the block and the pins. As shown the threaded portions of these screws are adapted to engage the threaded holes 14 in the base element 10. This element is provided also with holes 15 arranged about the central axis of the base, which holes are adapted to receive one of the cables 16.

In Fig. 1, three such cables are actually shown. The number of cables, however, may be varied, depending upon the capacity of the switch and the object of the apparatus. One conductor in each cable is connected to the base 10, for example, by means of a screw 17 thus grounding one conductor in each cable (all on the grounded side of the system) to the base 10. Furthermore, the armor of each cable is grounded to the same base by means of clamping screw 16′. One of the two-conductor cables is used to make the connection between the source of electrical supply and the switches. The other two-conductor cable is used to connect the single pole switch to a controlled circuit. The three-conductor cable is used to connect the three-way switch to another three-way switch in another con-

trolled circuit. In making the connections to the switch block the cables may be drawn in from behind the wall through the bottom opening 23′ in the receptacle 4, as indicated in Fig. 1, so that the connections may be readily and conveniently made outside the receptacle. After such connections are completed the block 11 is secured to the base 10, as for example, by means of screws 12 to form a unit. The unit is then inserted in the receptacle, the base being seated on the rim of the hole 23′ at the bottom of the receptacle, the diameter of the base 10 being larger than that of the hole 23′, but smaller than the mouth of the receptacle.

It will be seen that the top face 24′ of the switch block should be flush with the face of the flange 7. This relation is obtained by properly adjusting the switch block with respect to the base element 10 by means of the screws 12, which may be turned in the switch block to raise or lower the latter with respect to the base 10. This adjustment may be made before or after the elements 10 and 11 are inserted in the receptacle and in order that it may be made after, the holes 25′ are provided in the cover ring 25 through which the screws 12 may be turned. When the block and base are in place in the receptacle 4 the cover ring 25 may be placed over the mouth thereof and secured to the flange, as for example, by means of the screws 26, thus clamping the base 10 and the switch block 11 securely in place. It will be seen that the cover 25 is provided with an opening 27 through which the switch levers 19 and 20 project.

With reference to the frame of the switch block 11, this frame is provided with a cavity or recess having four sides 21, 22, 23 and 24, as indicated in Fig. 2. The faces of the sides 22 and 24 extend beyond the faces of the sides 21 and 23, thus forming four grooves 28, 29, 30 and 31. As indicated in this figure, and as indicated also in Figs. 1 and 5, the front wall 24′ of the block is provided with a pair of slots or openings 21′ through which the switch levers or operating handles 19 and 20 project. The reciprocating switch mechanism, Fig. 3, which is shown assembled about the plate 33, is located in the cavity between the said walls, as shown in Fig. 5. The plate 33 is provided with a pair of perforations through which screws 34 and 35, Fig. 5, extend for screwing the plate 33 to the switch block 11 in position with the levers 19 and 20 projecting through the slots 21′, as indicated in Fig. 1. The terminal plates 36, 37, 38 and 39, Fig. 4, are secured to the block in any suitable manner, as for example, by means of screws 49, see Fig. 5. These terminal plates are provided with stationary terminal switch contacts 40, 41, 42, 43, 44 and 45, see Fig. 4, which terminal contacts are mounted in operative relation to the switch wipers or brushes 46 and 47, each of these brushes being provided with two sets of wiping contacts of the usual construction, one on each end thereof, such as the contacts 48. With the arrangement shown, the brush 47 stands in alignment with the contacts 41, 42, 44 and 45, said contacts being located in a common plane. On the other hand, the brush 46 stands in alignment with the contacts 40 and 43, which last mentioned contacts are located in a common plane, both of the planes mentioned being parallel with each other and with the longitudinal axis of the switch block. Each of the said terminal plates 36, 37, 38, 39 is provided with means of the usual type for securing wire connections thereto, such as the screws 50.

In one position of the switch lever 19, which controls the brush 46, the contacts 40 and 43 are directly connected through the brush 46. In the reverse position the brush stands disengaged from the contacts 40 and 43. When the switch lever 20 is in one position the contacts 41 and 44 are directly connected by the brush 47 and in the reverse position of this lever the contacts 42 and 45 are directly connected by the brush 47.

Referring to Figs. 2, 4 and 5, it will be seen that the plate 36 is folded and is saddled on the wall 23. See Fig. 5. On the outside the block 11 is provided with a recess extending toward the wall 23, for receiving the screw 50 on plate 36 and its supporting flange, the face of which latter stands parallel to the axis of the switch block. Similarly, the wall 24 serves to support the contact terminal 39, the block being provided with an opening *b* for receiving the screw 50 of the plate 39. Similarly, the wall 21 supports the terminal plates 37 and 38, the upper portion of the face of the block being cut away to receive the screws 50 of the plates 37 and 38. Therefore, with the arrangement shown the various terminals 50 all fall within a circular area equal to the diameter of the switch block, thus making it possible to insert the switch block in the receptacle 4 without having the terminals 50 strike the walls of the receptacle.

It will be seen, therefore, that we provide an improved switch and support in the form of a unit which is adapted to be inserted in a compact receptacle from which it may be withdrawn without having to disconnect the connections between the cable and the unit and which, therefore greatly simplifies the problems and cost of house wiring.

While we have elected to describe our invention with reference to a specific form of device such as illustrated in the drawing, we do not wish to be limited to such form inasmuch as we contemplate variations and modifications within the spirit of the invention and the scope of the claims contained herein, which the disclosure will suggest to those versed in the art.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. A switch comprising a block with a compartment having a pair of walls parallel to each other and having a third wall extending transverse the first two, a plurality of contact plates, one of said plates being folded over each wall, two of said folded plates having each a switch contact in said compartment and another of said folded plates having two contacts in said compartment, all of said contacts being located in a common plane, a brush mounted in said compartment in operative relation and in alignment with said contacts and located along said plane, means for moving said brush into either of two positions, in one position in engagement with two of said contacts to connect two of said plates and in the other of said postions to connect the other two of said contacts and thereby connect one of said last mentioned plates with the third plate.

2. A switch comprising a block with a compartment therein, terminal elements saddled over the walls of said compartment, switch contacts connected to said elements, said contacts being divided into two groups, one group being located along one plane and another group being located along a second plane, switch brushes mounted each in operative relation to the contacts of a different one of said groups to move each along its corresponding plane, and means for moving said brushes from one position to another along said planes to interconnect one of said terminal elements with any one of the other terminal elements.

3. A switch comprising a block with a compartment therein, terminal elements saddled over the walls of said compartment, switch contacts connected to said elements, said contacts being divided into two groups, one group being located along one plane and another group being located along a second plane, and switch brushes mounted each in operative relation to the contacts of a different one of said groups to move each along its corresponding plane, and means for moving said brushes from one position to another along said planes to interconnect one of said terminal elements with any one of the other terminal elements, and line terminals for each of said elements located outside of said frame, some of said contacts being located along a plane near the top of the compartment and some along another plane along the bottom thereof.

4. A switch comprising a block with a compartment therein, terminal elements saddled over the walls of said compartment, switch contacts connected to said elements, said contacts being divided into two groups, one group being located along one plane and another group being located along a second plane, and switch brushes mounted each in operative relation to the contacts of a different one of said groups to move each along its corresponding plane, means for moving said brushes from one position to another along said planes to interconnect one of said terminal elements with any one of the other terminal elements, and line terminals for each of said elements located outside of said frame, some of said contacts being located along a plane near the top of the compartment and some along another plane along the bottom thereof, one of said elements having connected thereto contacts in both of said last planes.

5. A switch comprising a block with a compartment therein, terminal elements saddled over the walls of said compartment, switch contacts connected to said elements, said contacts being divided into two groups, one group being located along one plane and another group being located along a second plane, switch brushes mounted each in operative relation to the contacts of a different one of said groups to move each along its corresponding plane, means for moving said brushes from one position to another along said planes to interconnect one of said terminal elements with any one of the other terminal elements, a support for said switch, and means for adjusting said switch with respect to said support.

6. A switch comprising a block with a compartment therein, terminal elements saddled over the walls of said compartment, switch contacts connected to said elements, said contacts being divided into two groups, one group being located along one plane and another group being located along a second plane, switch brushes mounted each in operative relation to the contacts of a different one of said groups to move each along its corresponding plane, means for moving said brushes from one position to another along said planes to interconnect one of said terminal elements with any one of the other terminal elements, a support for said switch, and means for adjusting said switch with respect to said support, said means comprising rods anchored to said switch block against longitudinal motion, the ends of said rod being threaded, and threaded means in said support engaging the threaded ends of said rods whereby the adjustment between the support and the switch may be obtained by turning said rods.

7. A switch comprising a block with a compartment therein, terminal elements saddled over the walls of said compartment, switch contacts connected to said elements, said contacts being divided into two groups, one group being located along one plane and another group being located along a second plane, switch brushes mounted each in operative relation to the contacts of a different one of said groups to move each along its corresponding plane, means for moving said

brushes from one position to another along said planes to interconnect one of said terminal elements with any one of the other terminal elements, line terminals for each of said elements located outside of said frame, some of said contacts being located along a plane near the top of the compartment and some along another plane along the bottom thereof, one of said elements having connected thereto contacts in both of said last planes, a support for said switch, and means for adjusting the switch with respect to the support.

8. A switch comprising a block with a compartment having a pair of walls parallel to each other and having a third wall extending transverse the first two, a plurality of contact plates, one of said plates being folded over each wall, two of said folded plates having each a switch contact in said compartment and the other of said folded plates having two switch contacts in said compartment, all of said contacts being located in a common plane, a brush mounted in said compartment in operative relation and in alignment with said contacts and located along said plane, means for moving said brush into either of two positions, in one position in engagement with two of said contacts to connect two of said plates and in the other of said positions to connect the other two of said contacts and thereby connect one of said last mentioned plates with the third plate, and a fourth contact plate folded over one of said walls, said fourth plate and one of the first mentioned plates having each a contact located in a common plane parallel to said first plane, and a brush mounted in operative relation and in alignment with said last contacts and said last brush being located along said last plane, and means for moving said last brush into and out of engagement with said last contacts.

9. A switch comprising a block with a compartment therein, terminal elements saddled over the walls of said compartment, switch contacts connected to said elements, said contacts being divided into two groups, one group being located along one plane and another group being located along a second plane, switch brushes mounted each in operative relation to the contacts of a different one of said groups to move each along its corresponding plane, means for moving said brushes from one position to another along said planes to interconnect one of said terminal elements with any one of the other terminal elements, a supporting element for said switch element, means for connecting the two elements to form a unit, a container for said unit, a seat in said container for said unit, and a cover for said container for clamping the unit in its seat, said last means also for adjusting the elements with respect to the said seat and cover.

10. In combination, a block having walls defining a recess open at the rear of the block, said block having a front wall provided with an opening which communicates with said recess, stationary switch contacts mounted on the walls of said block, a switch movement mounted in said recess and including an operating handle which projects through said opening in the front wall, a receptacle, a base element for said receptacle, means to secure said block to said base element, and means to secure said block in said receptacle.

In witness whereof, we have hereunto set our hands this sixth day of Sept. 1929.

ERNEST A. FRANCE.
HOMER G. KNODERER.