

June 30, 1931.

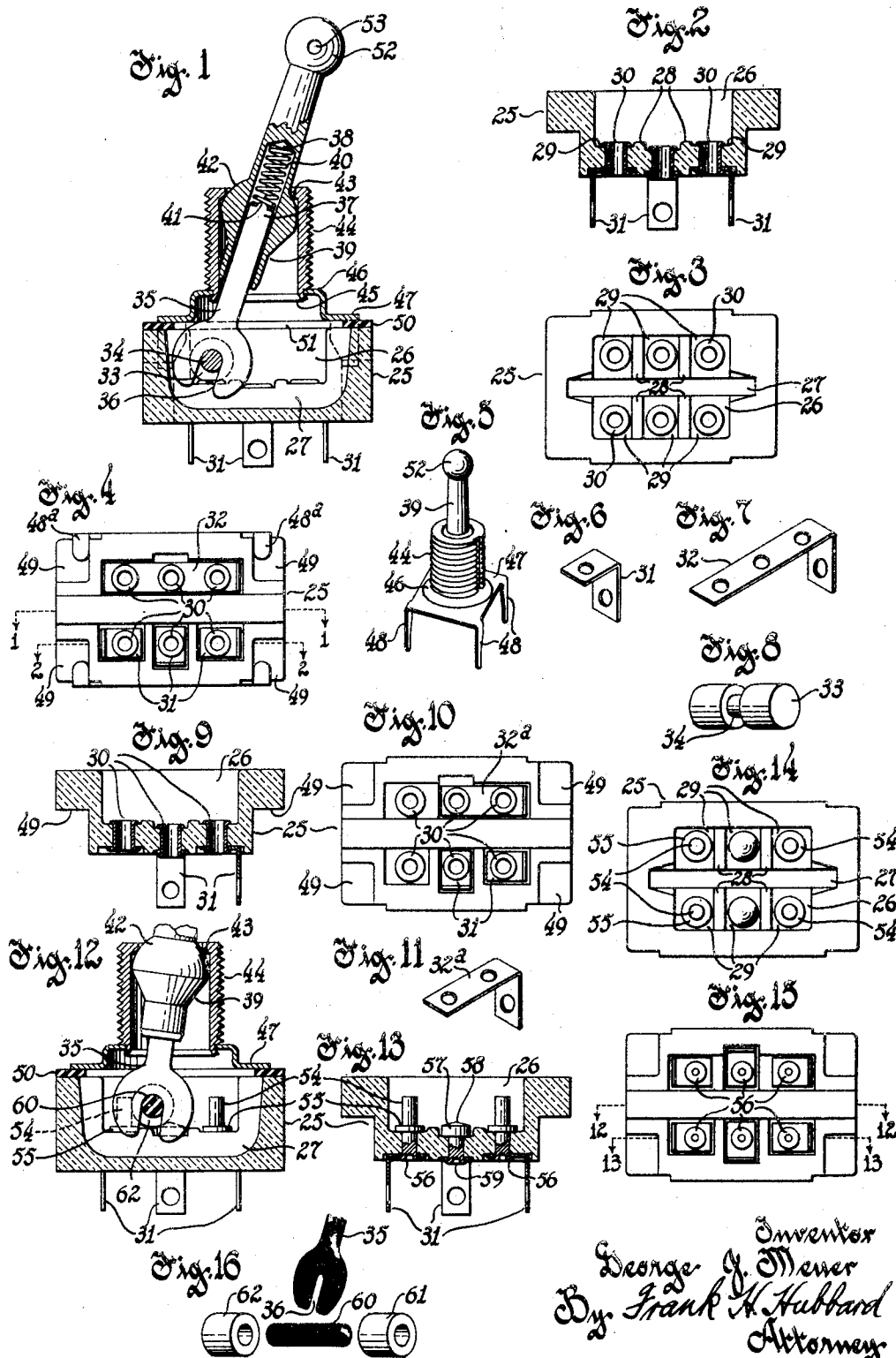
G. J. MEUER

1,812,410

ELECTRIC SWITCH

Filed April 11, 1930

2 Sheets-Sheet 1



Inventor
George J. Meuer
By Frank H. Hubbard
Attorney

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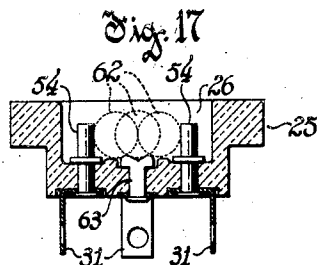
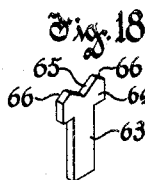
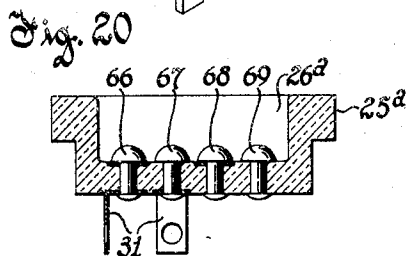
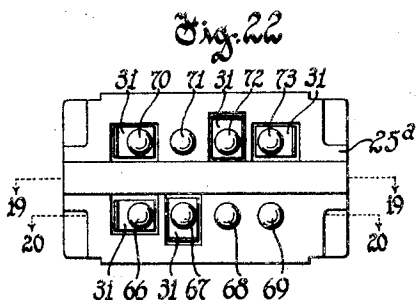
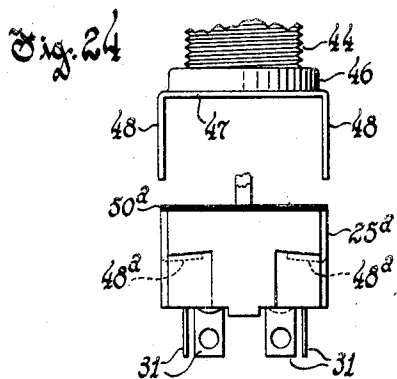
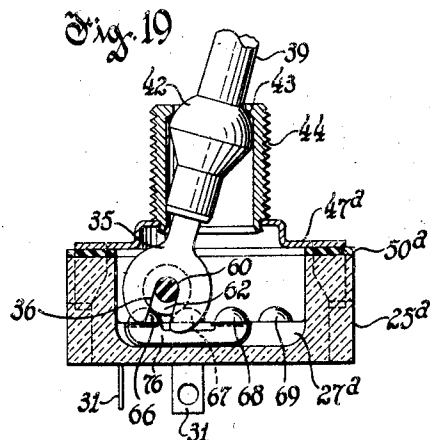
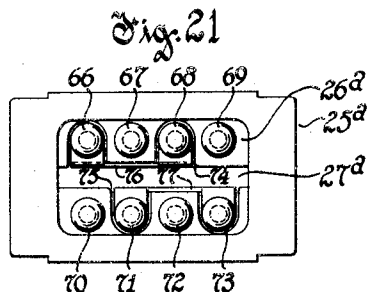
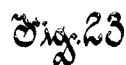
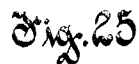
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2 Sheets-Sheet 2



Inventor
George G. Meuer
By Frank H. Hubbard
Attorney

UNITED STATES PATENT OFFICE

GEORGE J. MEUER, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO CUTLER-HAMMER, INC.,
OF MILWAUKEE, WISCONSIN, A CORPORATION OF DELAWARE

ELECTRIC SWITCH

Application filed April 11, 1930. Serial No. 443,335.

This invention relates to improvements in electric switches.

An object of the invention is to provide a switch which is extremely simple in construction and reliable in operation.

Another object is to facilitate assembly of the switch parts.

Another object is to provide a switch the main parts of which may be utilized as standard in the production of switches having various different electrical characteristics.

Another and more specific object is to provide a switch of the so-called toggle type adapted for one hole mounting wherein the stationary and movable contact elements are of improved and simplified construction.

Another object is to provide a novel form of pivotal support for the operating lever of a switch of the aforementioned character.

Another object is to provide a novel form of insulating and supporting base for the switch contacts.

Other objects and advantages of the invention will hereinafter appear.

The accompanying drawings illustrate certain embodiments of the invention which will now be described, it being understood that the invention is susceptible of embodiment in other forms without departing from the scope of the appended claims.

In the drawings, Figure 1 is an enlarged vertical sectional view, on the line 1—1 of Fig. 4, showing a multiple circuit controlling switch constructed in accordance with my invention.

Fig. 2 is a similar view, on the line 2—2 of Fig. 4.

Fig. 3 is a top plan view of the insulating base of the switch shown in Figs. 1 and 2.

Fig. 4 is a bottom plan view of the switch illustrated in the preceding figures.

Fig. 5 is a perspective view of the metallic cover member, bushing and operating lever of the switch.

Fig. 6 is a perspective view of one of the wiring terminal elements of the switch.

Fig. 7 is a similar view of a wiring terminal member common to a plurality of the switch contacts.

Fig. 8 is a perspective view of the roller contactor illustrated in Fig. 1.

Fig. 9 is a view similar to Fig. 1, but illustrating a modified form of switch wherein an "off" position for the roller contactor is provided.

Fig. 10 is a bottom plan view of the modified form of switch illustrated in Fig. 9.

Fig. 11 is a perspective view of the common wiring terminal member illustrated in Fig. 10.

Fig. 12 is a vertical sectional view, on the line 12—12 of Fig. 15, showing a two-position switch having a modified form of stationary contacts and a modified form of bridging contactor.

Fig. 13 is vertical sectional view, on the line 13—13 of Fig. 15.

Fig. 14 is a top plan view of the insulating base and contacts shown in Figs. 12 and 13.

Fig. 15 is a bottom plan view of the insulating base and terminal members shown in Figs. 12 and 13.

Fig. 16 is a perspective view, in separated relation, of the parts of the roller contactor member shown in Fig. 12, together with a portion of the insulating actuating element therefor.

Fig. 17 is a view similar to Fig. 12, but showing a modified form of middle contact to provide for intermediate or "off" positioning of the roller contactor.

Fig. 18 is a perspective view of the punched sheet metal middle contact of Fig. 17, but prior to attachment thereof to the insulating base.

Fig. 19 is a vertical sectional view, on the line 19—19 of Fig. 22, showing another modified form of switch.

Fig. 20 is a similar view, on the line 20—20 of Fig. 22.

Fig. 21 is a top plan view of the insulating base and contacts shown in Figs. 19 and 20.

Fig. 22 is a bottom plan view of such base and illustrating a preferred arrangement of the wiring terminals.

Fig. 23 is a perspective view of one of the bus members or connectors illustrated in Figs. 19, 20 and 21.

Fig. 24 is a fragmentary end view of the switch illustrated in Figs. 19 to 23, and

Fig. 25 is a sectional view of a modified form of contact element.

In all figures of the drawings, except Fig. 5, the switches and switch parts are illustrated on a scale equal to substantially twice the size thereof preferred in actual practice.

Referring first to the switch illustrated in Figs. 1 to 8, inclusive, the numeral 25 designates a base molded from any suitable insulating material. Base 25 is provided in its upper face with a substantially rectangular recess 26, and extending longitudinally of the base medially thereof and opening to the recess 26 is a relatively narrow but relatively deeper recess or groove 27, said groove extending beyond the opposite end walls of recess 26, as best illustrated in Figs. 1 and 3.

The bottom wall of recess 26 has formed thereon a plurality of ribs or ridges 28 arranged in endwise alined pairs on opposite sides of groove 27, thereby dividing said bottom wall of the recess into a multiplicity of contact pockets 29 of substantially equal dimensions. Each of said pockets is adapted to accommodate the flanged head of an eyelet 30 the shanks of which eyelets penetrate correspondingly shaped perforations or passages in the base and the wiring terminal members 31 or 32 located in suitable shallow recesses on the bottom face of the base, as best illustrated in Figs. 2 and 4. The heads of said eyelets serve as the stationary contacts of the switch and the shanks thereof are spun or riveted over said wiring terminal members to rigidly and permanently secure the latter and said contacts to the base.

As shown in Figs. 1, 2 and 4 the stationary contacts on one side of groove 27 are connected to the individual wiring terminal members 31, which are of identical form and preferably arranged as illustrated. The contacts on the opposite side of said groove may all be secured to the base in permanent electrical connection with the common wiring terminal member 32.

The roller contactor as shown may comprise a cylindrical metal member 33 having an intermediate reduced portion or neck 34 in alinement with the groove 27 in the base. The actuating element for the contactor preferably comprises a punched plate 35 of suitable insulating material, such, for instance as linen-bakelite. The lower end of element 35 is forked or notched, as indicated at 36, to provide for engagement thereof with the reduced portion 34 of the contactor,—said forked end 36 being of sufficient length to project into groove 27 in all positions of said actuating element, whereby the latter is guided in its movements by the side walls of said groove.

The upper end 37 of element 36 telescopes

into a relatively deep cylindrical counterbore 38 in the lower end of an operating lever 39, which is preferably of metal. Interposed between the end of said counterbore and the upper end 37 of element 35 is a coiled compression spring 40 which normally tends to eject said element from the counterbore. As shown, said upper end 37 of the element is provided with a small projection or knob 41 to insure centering of the spring with respect thereto. Lever 39 is provided at an intermediate point in its length with a substantially hemispherical enlargement 42 which is adapted to bear against the inwardly extending annular flange 43 at the upper end of an externally threaded hollow metal bushing 44.

The lower reduced end 45 of said bushing is adapted to project through a correspondingly shaped opening in a hollow boss 46 formed integrally with the metal cover member 47 of the switch, said reduced end 45 being upset against or spun over the inner surface of said boss to secure said parts against relative rotary or longitudinal movement.

Cover member 47 is provided at the four corners thereof with integral downwardly extending lugs 48 which are adapted to embrace the sides of base 25 and the ends 48^a of which are bent inwardly and slightly upwardly over the angular shoulders 49 provided on the base (see Figs. 4 and 24). An insulating plate 50 is preferably interposed between the cover member 47 and the top surface of base 25, said plate being provided with a slot 51 to provide clearance for actuating element 35, while serving as additional means to guide the latter.

Lever 39 is provided with the usual knob or handle enlargement 52 which extends outwardly a suitable distance from the bushing,—and said knob as shown in Fig. 1 may be provided with a drilled opening 53 for reception of a special form of operating link or rod (not shown).

With the parts assembled in the manner illustrated in Fig. 1, it will be noted that spring 40 acts not only to retain the enlargement 42 of lever 39 against the bearing flange 43, but also acts through the medium of actuating element 35 to retain the contactor 33 in any one of its three operative positions. Moreover, since the forked end 36 of actuating element 35 is guided by the side walls of groove 27, it follows from the telescopic connection between said element and lever 39 that the latter is likewise limited to oscillation in a single plane. The necessity for employment of the usual pivot pin for the operating lever is thus obviated while a more rugged and more durable bearing is provided for the latter.

Assuming connection of a common circuit wire to the common terminal 32 in the switch illustrated in Figs. 1 to 8, and further as-

suming connection of branch circuit wires to each of the individual terminals 31, obviously one of three circuits will be completed in each of the three operative positions of the roller contactor 33. The arrangement illustrated likewise provides for movement of the contactor into and out of bridging engagement with the respective pairs of contacts with a quick action. Also as will be noted, each circuit is made or broken at two points in each instance, thus reducing the amount of arcing incident to operation of the switch when in use.

The modified form of switch illustrated in Figs. 9, 10 and 11 is in most respects identical with that shown in Figs. 1 to 8, except that a common wiring terminal 32^a is provided which underlies and is attached to only two of the stationary contacts 30 on one side of the aforementioned groove 27, and only two of the contacts on the opposite side of said groove are provided with individual wiring terminal members. Thus, as illustrated in Figs. 9 and 10 the pair of contacts 30 at the left-hand end of base 25 will at all times be dead, so that when the contactor 33 is moved into bridging relation thereto the switch will be in "off" position. Obviously if desired the switch illustrated in Figs. 1 to 8 may similarly be provided with an "off" position by merely omitting the circuit connection with respect to any one of the individual wiring terminal members 31.

The switch illustrated in Figs. 12 to 16 is provided with six stationary contacts of modified form, and each of said contacts has rigidly secured thereto and to the base 25 an individual wiring terminal member 31. The four end contacts 54 are of identical form and preferably comprise machined pieces having an upper end to act as a combined contact and stop or abutment for the bridging contactor, an intermediate flange or enlargement 55 which is adapted to seat within its respective pocket 29, and a shank adapted to penetrate the registering openings in the base 25 and wiring terminal member 31, said shank having a hollow end 56 which is upset or spun over its respective terminal member to secure said parts to the base.

The middle contacts 57 on opposite sides of groove 27 similarly comprise machined pieces each having a substantially cone-shaped upper end or contact head 58 seated within its respective pocket in base 25, the hollow ends 59 of the shanks of said middle contacts being similarly upset as shown to secure the same and their respective terminal members 31 to the base.

In this switch the bridging contactor is likewise of modified form, and as shown the same comprises a cylindrical rod 60 of insulating material upon which are loosely or rotatably mounted a pair of metal cylinders or rollers 61 and 62,—said rollers being held

against endwise displacement from rod 60 by the opposite side walls of recess 26, and said rollers being held in spaced relation to each other by the interposition of the forked end 36 of actuating element 35. The switch may be wired in several different ways, as desired. Thus assuming connection of each of the middle contact terminal members with common circuit wires, respectively, and with the terminals of the end contacts on each side of groove 27 connected with branch circuit wires, obviously in each of the two positions of the bridging contactor two different circuits will be completed; or if desired the circuit wires may be so arranged as to provide for completion of a single circuit in each of the two positions of the bridging contactor,—each circuit to be made or broken at two points upon each operation of the switch.

As will be apparent, the stationary contacts 54 and 57 are so formed as to prevent engagement of the roller contactors 61 and 62 with the bottom wall of recess 26 or with the ribs 28 formed on the latter. The cone-shaped heads 58 of the middle contacts cooperate with contactors 61 and 62 to provide for rapid movement of the latter jointly to each circuit-making position.

In Figs. 17 and 18 I have shown a switch similar to that just described, but having a modified form of middle contact on each side of the groove 27. Such middle contacts as shown may each comprise a sheet metal punching 63 the upper or head portion 64 of which is provided with a V-shaped or similar notch 65 which intercepts the upwardly converging edges 66 of the latter. The notches 65 are adapted to receive and retain the roller contactors 61, 62 in an intermediate or "off" position; said contactors being jointly movable in either direction to opposite edges of the middle contacts whereby the latter are electrically connected with the end contacts selectively, as illustrated in dotted lines in Fig. 17.

Figs. 19 to 24 illustrate a still further modified form of switch embodying my invention. In this switch a slightly longer molded insulating base 25^a is employed, said base having a correspondingly longer recess 26^a and a medial groove 27^a, which as shown need not extend into the end walls of said recess. The bottom wall of recess 26^a is provided with eight stationary contacts 66 to 73, inclusive, comprising two groups of four contacts each arranged in laterally aligned pairs on opposite sides of groove 27^a. Each of said contacts may consist of a round-headed rivet, as shown, and the contacts 66, 67, 70, 72 and 73 may be upset or riveted over the individual wiring terminal members 31,—which are preferably arranged in the manner illustrated. The other contacts 68, 69 and 71 are merely upset against the lower face of the insulating base 25^a, although if desired a

metal washer or similar element may be interposed between the base and the upset ends of said contacts to facilitate the riveting operation.

5 The bottom wall of recess 26^a is slightly offset downwardly beneath the heads 66, 68 and 71, 73 of the rivet contacts, and the opposed walls of groove 27^a are likewise inwardly offset in the manner shown at 74 and 75. Adapted to seat within said offsets are a pair of metal stampings 76 and 77,—one of which is shown in detail in Fig. 23. Said stampings 76, 77 act as bus members or conductors to permanently electrically connect the contacts 66, 68 and 71, 73 respectively, so that only one wiring terminal is required for each of said pairs of contacts.

The bridging contactor is of the insulated double-roller type illustrated in Fig. 16, and assuming completion of the circuit connections for the respective wiring terminals 31, the following independent circuits will be completed in that position of the switch illustrated in Fig. 19; namely, from terminal 31 through contact 66, bridging contact roller or cylinder 62, through contact 67 to wiring terminal 31 on one side of groove 27^a, and on the other side of said groove a circuit will be completed from terminal 31 through contact 70, bridging contact roller 61 (see Fig. 16), through contact 71 to and through bus member 77 to contact 73 and its wiring terminal member 31.

Upon movement of the roller contactor toward the right to its next position a circuit will be completed on one side of groove 27^a which may be traced from terminal 31 through contact 67, bridging contact roller 62 through contact 68 to and through bus member 76 and through contact 66 to the wiring terminal 31 of the latter,—thus repeating the aforescribed electrical connection between the terminals of contacts 66 and 67. On the opposite side of groove 27^a a circuit may be traced from terminal 31 through contact 73, bus member 77 to and through contact 71 bridging contact roller 61 to and through contact 72 and the terminal 31 of the latter.

50 Upon movement of the roller contactor another step to the right the contacts 68 and 69 will be bridged by contact roller 62 but no circuit will be completed on that side of groove 27^a due to the fact that contact 69 is not provided with a wiring terminal or other form of circuit connection. However, upon the other side of groove 27^a a circuit will be completed, which circuit may be traced from terminal 31 through contact 72, by bridging contact roller 61 to contact 73 and the wiring terminal 31 of the latter.

More particularly, it will be noted that in the first-mentioned position of the switch illustrated in Figs. 19 to 24 the terminals of contacts 66 and 67 are electrically connected

on one side of groove 27^a and the terminals of contacts 70 and 73 are electrically connected on the opposite side of said groove. In the next position of the switch the terminals of contacts 66 and 67 are again electrically connected on one side of the groove and the terminals of contacts 72 and 73 are electrically connected on the other side of said groove; whereas in the next and final position of the switch the terminals of contacts 72 and 73 only are electrically connected. It will thus be seen that I have provided a very simple switching mechanism for producing rather complicated electrical circuit commutations or variations. Obviously if desired the arrangement of terminals and/or bus members like or similar to those illustrated may be varied to provide the particular electrical or circuit commutating characteristics desired.

As shown in Fig. 19 the metal cover member 47^a and the insulating plate 50^a may be of slightly larger dimensions than the corresponding parts of the other switches illustrated herein to accommodate the relatively larger size of the base 25^a.

I have illustrated in Fig. 25 a form of tubular rivet 78, which may if desired be substituted for the eyelet contacts shown in Figs. 1 to 10—such rivet contacts having the advantage of providing a greater contact surface to be engaged by the roller contactor.

What I claim as new and desire to secure by the Letters Patent is:

1. In an electric switch, in combination, a molded insulating base having a substantially rectangular recess in the upper face thereof, contacts secured within said recess on opposite sides of the longitudinal center line of said base, said base being further provided with a relatively narrow but relatively deeper recess coincident with said center line thereof, a roller contactor movable longitudinally of said base into and out of bridging relation to said base contacts, and an actuating element engaging said contactor and extending into said relatively narrow recess to be guided by the side walls of the latter.

2. In an electric switch, in combination, a molded insulating base having a substantially rectangular recess in the upper face thereof, contacts secured within said recess on opposite sides of the longitudinal center line of said base, said base being further provided with a relatively narrow but relatively deeper recess coincident with said center line thereof, a roller contactor movable longitudinally of said base into and out of bridging relation to said base contacts, an actuating element engaging said contactor and extending into said relatively narrow recess to be guided by the side walls of the latter, and a universally pivoted lever having telescopic engagement with said actuating element and limited by the

latter to oscillating movement in a single plane.

3. In an electric switch, in combination, a molded insulating base having a substantially rectangular recess in the upper face thereof, contacts secured within said recess on opposite sides of the longitudinal center line of said base, said base being further provided with a relatively narrow but relatively deeper recess coincident with said center line thereof, a roller contactor movable longitudinally of said base into and out of bridging relation to said base contacts, an actuating element engaging said contactor and extending into said relatively narrow recess to be guided by the side walls of the latter, a universally pivoted lever having telescopic engagement with said actuating element and limited by the latter to oscillating movement in a single plane, and a compression spring interposed between said lever and said actuating element to retain the latter within said last mentioned recess.

4. In an electric switch, in combination, a molded insulating base having a substantially rectangular recess in the upper face thereof, contacts secured within said recess on opposite sides of the longitudinal center line of said base, said base being further provided with a relatively narrow but relatively deeper recess coincident with said center line thereof, a roller contactor movable longitudinally of said base into and out of bridging relation to said base contacts, an actuating element engaging said contactor and extending into said relatively narrow recess to be guided by the side walls of the latter, a universally pivoted lever having telescopic engagement with said actuating element and limited by the latter to oscillating movement in a single plane, a compression spring interposed between said lever and said actuating element to retain the latter within said last mentioned recess, and means associated with said contacts and located in the path of said contactor to restrain the latter against movement in either direction pending storage of a given amount of energy in said spring.

5. In an electric switch, in combination, a molded insulating base having a substantially rectangular recess in the upper face thereof, said base having a medial groove extending longitudinally thereof and opening to said recess, contacts rigidly secured within said recess on opposite sides of said groove said contacts having wiring terminals projecting downwardly from the bottom face of said base, a roller contactor movable longitudinally of said base into and out of bridging relation to said contacts, said contactor having a portion of reduced diameter in alignment with said groove, and a reciprocable and oscillatable actuating element for said contactor, said element straddling the reduced

portion of said contactor and extending into said groove to be guided by the side walls of the latter.

6. In an electric switch, in combination, a molded insulating base having a substantially rectangular recess in the upper face thereof, said base having a medial groove extending longitudinally thereof and opening to said recess, contacts rigidly secured within said recess on opposite sides of said groove, said contacts having wiring terminals projecting downwardly from the bottom face of said base, a roller contactor movable longitudinally of said base into and out of bridging relation to said contacts, said contactor having a portion of reduced diameter in alignment with said groove, and a reciprocable and oscillatable actuating element for said contactor, said element straddling the reduced portion of said contactor and extending into said groove to be guided by the side walls of the latter, certain of said contacts having projecting portions engageable by said contactor to limit movements of the latter from each extreme position to the other.

7. In an electric switch, a molded insulating base having a substantially rectangular recess in the upper face thereof, said base having a groove extending longitudinally thereof and opening to said recess, a plurality of laterally extending ribs or ridges formed on the bottom wall of said recess and arranged in endwise alignment on opposite sides of said groove whereby said recess is provided with a multiplicity of contact pockets of substantially equal dimensions, and contact members rigidly secured to said base within the respective pockets.

8. In an electric switch, a molded insulating base having a substantially rectangular recess in the upper face thereof, said base having a groove extending longitudinally thereof and opening to said recess, a plurality of laterally extending ribs or ridges formed on the bottom wall of said recess and arranged in endwise alignment on the opposite sides of said groove whereby said recess is provided with a multiplicity of contact pocket of substantially equal dimensions, and contact members rigidly secured to said base within the respective pockets, one laterally aligned pair of said contact pockets being located in a plane downwardly offset from the plane of other of said pockets.

9. In an electric switch, a molded insulating base having a substantially rectangular recess in the upper face thereof, said base having a groove extending longitudinally thereof and opening to said recess, a plurality of laterally extending ribs or ridges formed on the bottom wall of said recess and arranged in endwise alignment on opposite sides of said groove whereby said recess is provided with a multiplicity of contact pockets of substantially equal dimensions, one

laterally alined pair of said contact pockets being located in a plane downwardly offset from the plane of other of said pockets, and wiring terminal members rigidly secured to said contact members and projecting downwardly from the bottom face of said base.

10. In an electric switch, a molded insulating base having a substantially rectangular recess in the upper face thereof, said base having a groove extending longitudinally thereof and opening to said recess, a plurality of laterally extending ribs or ridges formed on the bottom wall of said recess and arranged in endwise alinement on opposite sides of said groove whereby said recess is provided with a multiplicity of contact pockets of substantially equal dimensions, one laterally alined pair of said contact pockets being located in a plane downwardly offset from the plane of other of said pockets, and wiring terminal members rigidly secured to said contact members and projecting downwardly from the bottom face of said base, certain of said terminal members being common to a plurality of said contact members.

11. In an electric switch, in combination, an insulating base, a plurality of groups of contacts arranged longitudinally of said base, the contacts of the respective groups being in lateral alinement, a roller contactor movable longitudinally of said base to any one of a plurality of positions selectively and adapted in each of said positions to bridge a plurality of pairs of said contacts, said contactor comprising a rod or shaft of insulating material, a plurality of metal cylinders or rings carried by said rod in spaced relation to each other, and an actuating member of insulating material, said member having a portion straddling said rod for positively driving the latter in either direction longitudinally of said base.

12. In an electric switch, in combination, an insulating base, a plurality of groups of contacts arranged longitudinally of said base, the contacts of the respective groups being in lateral alinement, a roller contactor movable longitudinally of said base to any one of a plurality of positions selectively and adapted in each of said positions to bridge a plurality of pairs of said contacts, said contactor comprising a rod or shaft of insulating material, a plurality of metal cylinders or rings carried by said rod in spaced relation to each other, an actuating member of insulating material, said member having a portion straddling said rod for positively driving the later in either direction longitudinally of said base, a pivoted lever having telescopic engagement with said actuating member, and a compression spring interposed between said lever and said actuating member to effect movement of said contactor into bridging engagement with said pairs of contacts with a snap action.

13. In an electric switch, in combination, a molded insulating base having a substantially rectangular recess in the upper face thereof, said base having a groove coincident with the longitudinal center line thereof and opening to said recess, a multiplicity of contacts secured to the bottom wall of said recess and arranged on opposite sides of said groove, a roller contactor movable longitudinally of said base within said recess to engage said contacts selectively, said contactor having a reduced portion alined with said groove, a cover member for said base, an externally threaded bushing rigidly secured to said cover member, said bushing having an internal annular flange at its upper end, an operating lever having a hemispherical enlargement bearing against said flange, an insulating actuating member having one end portion straddling the reduced portion of said contactor and projecting into said groove to be guided by the latter, the other end portion of said actuating member having telescopic engagement with said lever, and a compression spring interposed between said lever and said actuating member to retain the lever in bearing engagement with said flange and to retain the actuating member in driving engagement with said contactor.

14. In an electric switch, in combination, a molded insulating base having a substantially rectangular recess in the upper face thereof, said base having a relatively narrow groove extending longitudinally thereof and opening to said recess, a multiplicity of contacts arranged in alinement with each other on opposite sides of said groove, a punched insulating actuating member movable within said groove and guided by the side walls of the latter, an insulating rod engaged by said actuating member to be driven thereby, and a pair of cylindrical metal contactor elements rotatably mounted on said rod at opposite ends of the latter, said elements being jointly movable longitudinally of said base into and out of bridging relation to said contacts.

15. In an electric switch, in combination, a housing comprising a recessed molded insulating base and a cover member therefor, an internally flanged bushing secured to said cover member, an operating lever projecting from said bushing and having an enlargement in bearing engagement with said flange, an insulating actuating element telescopically engaged with said lever at one end, the other end of said element being forked for driving engagement with a substantially cylindrical roller contactor, and a multiplicity of contacts riveted to said base and adapted to be bridged by said contactor upon predetermined movements of said lever.

16. In an electric switch, in combination, a housing comprising a recessed molded insulating base and a cover member therefor, an

internally flanged bushing secured to said cover member, an operating lever projecting from said bushing and having an enlargement in bearing engagement with said flange, an insulating actuating element telescopically engaged with said lever at one end, the other end of said element being forked for driving engagement with a substantially cylindrical roller contactor, a multiplicity of contacts riveted to said base and adapted to be bridged by said contactor upon predetermined movements of said lever, and integral lugs at the four corners of said cover member embracing said base and bendable into interlocking engagement with the latter to retain the aforementioned parts in assembled relation to each other.

17. In an electric switch, in combination, a housing comprising a molded insulating base having a recess and a metallic cover member for said base, an internally flanged metal bushing rigidly secured to said cover member, an operating lever having an enlargement in bearing engagement with said flange, a multiplicity of contacts secured within said recess on opposite sides of the longitudinal center line of said base, a roller contactor adapted for bridging engagement with said contacts selectively, a flat punched insulating actuating element for said contactor, said actuating element having a yieldable telescopic connection with said operating lever, and a punched plate of insulating material interposed between said base and said cover member, said plate having a relatively narrow slot to provide clearance for said actuating element and to limit the latter to movement in a single plane.

18. In an electric switch, in combination, a molded insulating base having a substantially rectangular recess in the upper face thereof, said base having a relatively narrow groove extending longitudinally thereof and opening to the bottom wall of said recess, a multiplicity of contacts secured to the bottom wall of said recess on opposite sides of said groove, a roller contactor movable longitudinally of said base into and out of bridging relation to said contacts, a flat punched insulating actuating element having a forked portion adapted to straddle said contactor and projecting into said groove to be guided by the side walls of the latter, and a flat punched plate of insulating material secured to the upper face of said base, said plate having a slot and edges of which are engageable by said actuating element to further assist in guiding the latter.

In witness whereof, I have hereunto subscribed my name.

GEORGE J. MEUER.