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G. J. MEUER

1,918,282

ELECTRIC SWITCH

Filed May 1, 1929

Fig. 1

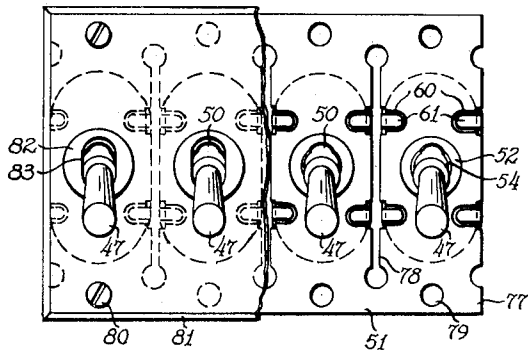


Fig. 2

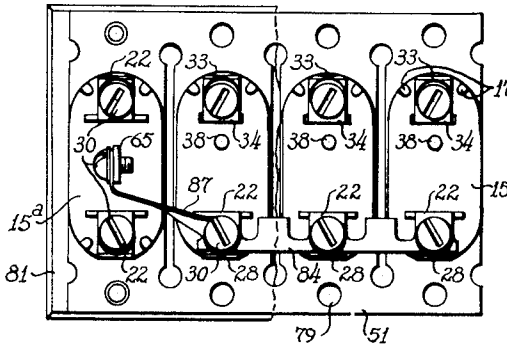


Fig. 3

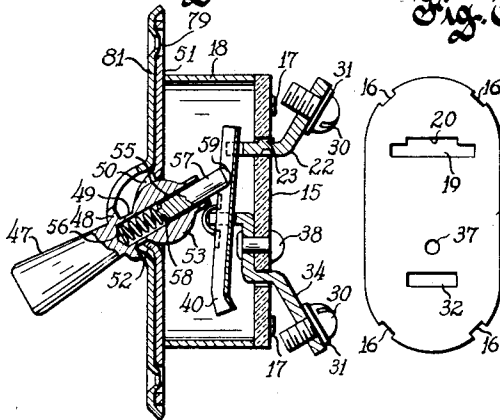


Fig. 3a

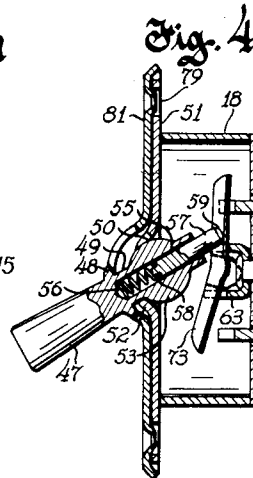


Fig. 4a

Fig. 5

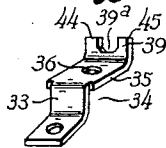


Fig. 6

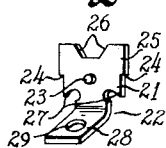


Fig. 6a

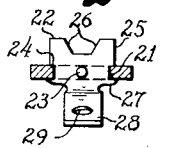


Fig. 7

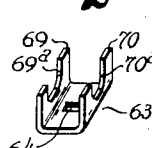


Fig. 8

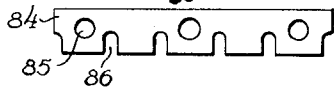


Fig. 9

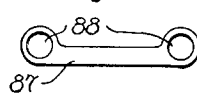


Fig. 9a

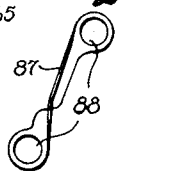


Fig. 10

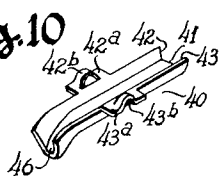
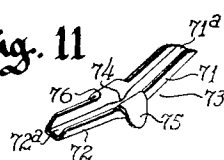


Fig. 11



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ELECTRIC SWITCH

Application filed May 1, 1929. Serial No. 359,489.

This invention relates to improvements in electric switches, and more particularly to high capacity switches of the so-called toggle type.

5 An object of the invention is to improve the details of construction and assembly of the switch parts whereby reliability in operation and long life of the switches are insured.

Another object is to provide novel switch mechanisms with improved means to facilitate gang assembly thereof.

10 Another object is to provide switch units of like dimensions which are capable of gang assembly to provide novel circuit controlling combinations, while minimizing the number of wiring operations required during installation.

Another object is to minimize the number of parts required in constructing the switch mechanism.

Other objects and advantages of the invention will hereinafter appear.

The accompanying drawing illustrates certain embodiments of the invention which will now be described, it being understood that the devices illustrated are susceptible of modification without departing from the scope of the appended claims.

In the drawing, Figure 1 is a top plan view of an assembled gang of switches constructed in accordance with my invention,—a portion of the face plate being broken away.

Fig. 2 is a bottom plan view of the gang of switches shown in Fig. 1.

35 Fig. 3 is a longitudinal sectional view of a single pole switch constructed in accordance with my invention.

Fig. 3^a is a plan view of the insulating plate shown in Fig. 3.

40 Fig. 4 is a similar view of a three-point or multiple circuit controlling switch constructed in accordance with my invention.

Fig. 4^a is a plan view of the insulating plate shown in Fig. 4.

45 Fig. 5 is a perspective view of one of the elements shown in Fig. 3.

Fig. 6 is a similar view of an element common to the devices of Figs. 3 and 4.

50 Fig. 6^a is a view, partly in elevation and partly in section, showing the manner of

attaching the element of Fig. 6 to the insulating base or plate.

Fig. 7 is a perspective view of the center contact and terminal elements shown in Fig. 4, prior to assembling thereof with respect to the base.

Fig. 8 is a plan view of a conductive strip adapted to provide a common electrical connection between three switches assembled in gang relation.

Fig. 9 shows a conductive strip which may be employed to connect one of the terminals of a single pole switch and the center terminal of a three-point switch.

Fig. 9^a shows the preferred manner in which said strip is twisted prior to attachment thereof as shown in Fig. 2.

Fig. 10 is a perspective view of the bridging contactor shown in Fig. 3, and

Fig. 11 is a similar view of the bridging contactor shown in Fig. 4.

Referring first to Figs. 3 and 3^a of the drawing, the numeral 15 designates a relatively thin punched plate or base of suitable insulating material, such as bakelite; said plate preferably being of substantially elliptical contour as shown. The periphery of said plate is provided with a plurality of notches 16 to receive lugs 17 which are integral with a metallic enclosing and spacing member 18,—the lugs 17 being bent over the lower face of plate 15 to secure the latter to said member 18. The member 18 may be formed in a well known manner from a single strip of metal having its abutting ends connected by a dove-tail connection or interlock (not shown).

Disk 15 is provided adjacent one end thereof with an elongated substantially rectangular perforation 19, one wall of which is offset slightly, as indicated at 20, to provide a portion of increased width. Perforation 19 is adapted to receive with a snug fit the reduced portion 21 of a one-piece contact and terminal member 22 (best illustrated in Fig. 6). Said reduced portion 21 is provided with an integral boss or projection 23 to engage the wall portion 20 whereby the member 22 must be driven into said perforation until the shoulders 24

formed by said reduced portion are in engagement with the upper face of plate 15. The portion 25 above the shoulders 24 thus forms one of the stationary contacts of the switch,—and as shown the upper edge of contact 22 is provided with a notch having upwardly diverging sides 26 to receive the movable contactor, as hereinafter described.

As shown in Figs. 6 and 6* the reduced portion 21 is notched or undercut to provide integral lugs 27 which may be upset or riveted against the lower face of the plate 15 to rigidly secure member 22 thereto. The terminal portion 28 is preferably bent at an angle, as illustrated, and the same is provided with a tapped opening 29 to receive the usual binding screw 30 after the aforementioned parts have been assembled. A suitable form of spring washer 31 is preferably interposed between the screw head and the terminal member.

Disk 15 is provided adjacent to its other end with a relatively shorter rectangular perforation 32 which is adapted to receive the reduced or terminal portion 33 of a second combined contact and terminal member 34, best shown in Fig. 5. A portion 35 of member 34 is adapted to lie flatwise against the upper surface of plate 15, said portion being provided with a perforation 36 adapted to register with a perforation 37 in plate 15, and through which perforations a rivet 38 extends to secure said member to plate 15. Integral with portion 35 and extending upwardly at substantially right angles thereto is the contact portion 39, the upper edge of which is notched, as indicated at 39*, to provide clearance for an oscillatable bridging contactor 40.

Contactor 40 is preferably of channel shape and comprises a flat bottom wall 41 and upwardly extending slightly divergent walls 42 and 43. At the upper edges of walls 42 and 43 are integral outwardly extending lugs 42* and 43*, said lugs having upstruck arcuate portions 42^b and 43^b which are respectively adapted to engage the pivot portions 44 and 45 of contact 34, on opposite sides of notch 39*. Thus the contactor 40 is adapted to be at all times in pivotal engagement with contact portion 39, and in one extreme position thereof the same is likewise adapted to engage the contact portion 25 for circuit closing, as shown in Fig. 3, whereas in the other extreme (or circuit breaking) position of said contactor the latter is disengaged from contact portion 25 and the downwardly bent end 46 thereof is engaged with the plate 15. Oscillating movement of contactor 40 in each direction is thus definitely limited.

The aforementioned oscillatory movement of contactor 40 is effected by means of an oscillatory actuating lever the handle portion of which is designated by the numeral

47. Handle portion 47 is provided with an annular projection or collar 48 below which is a neck portion 49 which is guided in a slot 50 in the switch supporting plate 51. That portion of plate 51 including slot 50 is bulged outwardly as indicated to provide a bearing socket 52 for the spherical enlargement 53 of the actuating lever. The slot 50 is enlarged intermediate its ends, as indicated at 54 (Fig. 1) to permit passage therethrough of the handle portion 47 and collar 48 whereby the enlargement 53 may be seated against said bearing.

The opposite end of the actuating lever is provided with a relatively deep counterbore 55 within which is seated a coiled compression spring 56, one end of which engages a substantially cylindrical insulating member 57 and tends to expel the latter from said counterbore. One end of member 57 is preferably reduced, as indicated at 58, to insure centering of the spring with respect thereto, and the other end is preferably of tapered or frusto-conical form, as indicated at 59, to properly coact with the movable contactor 40.

As best illustrated in Figs. 3 and 4, the inner face of supporting plate 51 is substantially flat, but as shown in Fig. 1 the outer face thereof is provided with a plurality of slight depressions 60 to provide for flush reception of the attaching lugs 61 which are bent inwardly from the upper edge of member 18 in the final assembly of the parts.

Assuming closed positioning of the switch parts it will be apparent that upon upward movement of handle 47 the end 59 of insulating member 57 will slide downwardly over the bottom surface 41 of the channel-shaped contactor at the same time further increasing the degree of compression of spring 56. When the end 59 has moved across the pivotal center 44, 45 of the contactor the spring reacts to effect quick movement of the contactor to "off" position, wherein the downwardly bent end 46 of the contactor engages the insulating plate. Upon reverse movement of handle 47 the contactor is similarly moved with a quick action to "on" position, as will be obvious.

Certain of the parts employed in constructing the three-point or multiple circuit controlling switch of Fig. 4 are identical with those described in connection with the switch illustrated in Fig. 3, and such parts have been given like reference numerals. However, in this instance two of the one-piece contact and terminal members 22 are employed, said members being merely reversed in relation to each other and arranged at opposite ends of the insulating plate 15*, said plate being provided with duplicate perforations 19 for this purpose.

Midway between the perforations 19 in plate 15* is a relatively smaller rectangular perforation 62, and a U-shaped supporting

contact member 63 which overlies plate 15^a is provided with a perforation 64 adapted to register with perforation 62. A terminal plate 65 is provided with a reduced end portion 66 which extends upwardly through said perforations and is riveted over the bottom portion of member 63, as illustrated in Fig. 4, to secure said parts in position. Member 65 is preferably provided with sharp edges 67 which bite into the lower face of plate 15^a as a result of the riveting operation, and said member is likewise provided with a tapped opening 68 to receive the usual binding screw.

The upwardly extending sides 69 and 70 of U-shaped member 63 are arranged in parallel relation to the contact portions 25 of members 22, and said sides are respectively provided with notches 69^a and 70^a to loosely receive the angularly disposed arms 71 and 72 of a bridging contactor 73 which is channel-shaped in cross section. The substantially flat bottom walls 71^a and 72^a of the contactor arms converge into a concavity 74, whereby upon intermediate positioning of the actuating lever the end 59 of cylindrical insulating member 57 engages said concavity to positively hold the contactor in its intermediate or neutral position in which the arms 71 and 72 seat against the bottom surfaces of notches 69^a and 70^a.

Upon movement of the actuating lever to the position illustrated in Fig. 4 the end 59 of insulating member 57 is moved out of the concavity 74 and across the pivotal center of the contactor provided by the bottom wall of notch 69^a with the result that the energy stored within spring 56 by such relative movement of the parts will effect quick movement of the contactor arm 71 into engagement with the walls of notch 26 in the upper stationary contact 25. Upon reverse movement of the actuating lever the contactor is again moved with a quick action to its intermediate or "off" position, whereas continued reverse movement of the actuating lever will effect quick tilting movement of the contactor arm 72 into engagement with the walls of the notch 26 in the lower stationary contact 25.

In order to prevent longitudinal displacement of the contactor during the aforedescribed movements I preferably provide the same with outwardly and downwardly extending integral lugs 75 and 76 which are retained in place by engagement thereof with the sides 69 and 70 of the intermediate contact member 63 while permitting such tilting movements of the contactor.

As shown in Figs. 1 and 2 the supporting plates 51 each comprises a section of a metallic strip 77 whereby any number of switch units may be readily assembled in gang relation; said sections being partially divided by means of elongated slots or perforations 78, and each section being provided with per-

forations 79 to accommodate the usual fastening screws or bolts 80. Thus in the gang assembly illustrated the strip 77 is cut to include four supporting plate sections and a cover plate 81 having raised portions 82 to accommodate the raised portions of the supporting plate and slots 83 to accommodate the switch handles 47 is provided.

Moreover, as illustrated in Fig. 2 the three terminal members 28 of a corresponding number of the single pole switches are electrically connected to each other by means of a conductive strip 84 (see Fig. 8), said strip having perforations 85 to provide for clamping of the strip by means of the usual binding screws 30, and said strip being provided with notches 86 or other form of weakened portions to facilitate severance of the desired length thereof. The other terminals 33 of said switches provide for connection thereof in the individual circuits to be controlled thereby.

The terminals 28 are further connected by means of a conductive strip 87 with the intermediate terminal 65 of the three-point switch, the opposite ends of said strip having perforations 88 to provide for clamping thereof in position and the intermediate portion thereof being capable of twisting as shown to facilitate attachment to said terminals. In the particular gang of switches illustrated the terminals 28 of the three-point switch may be connected in a manner to provide for selective control of circuits for bright or dim illumination of automobile headlights, and the respective terminals 33 of the other switches may be connected to various other circuits the continuity of which it is desired to selectively control. Various other combinations of switches and modifications in the wiring thereof will readily suggest themselves to those skilled in the art.

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

1. In an electric switch, in combination, a thin punched plate of insulating material, said plate having a plurality of substantially rectangular openings, a plurality of one-piece combined contact and terminal members, the terminal portions of certain of said members being of reduced width to permit passage thereof downwardly through said openings and the contact portions thereof being provided with shoulders to engage the upper surface of said plate, one of said portions of reduced width being undercut at opposite side edges thereof to provide integral lugs which may be upset against the lower surface of said plate to rigidly secure the respective member thereto, and said last mentioned portion also having a boss formed thereon to insure a drive fit thereof within the respective opening.

2. In an electric switch, in combination, a thin punched plate of insulating material,

said plate having a plurality of substantially rectangular openings, a plurality of one-piece combined contact and terminal members, the terminal portions of certain of said members being of reduced width to permit passage thereof downwardly through said openings and the contact portions thereof being provided with shoulders to engage the upper surface of said plate, one of said portions of reduced width being undercut at opposite side edges thereof to provide integral lugs which may be upset against the lower surface of said plate to rigidly secure the respective member thereto, said last mentioned portion also having a boss formed thereon to insure a drive fit thereof within the respective opening, and one of said last mentioned members having a bridging contactor loosely and tiltably supported directly thereby.

3. In an electric switch, in combination, a thin punched plate of insulating material, said plate having a plurality of perforations, a plurality of one-piece combined contact and terminal members, the terminal portions of certain of said members being of reduced width to permit passage thereof through said perforations and the contact portions thereof being provided with shoulders to engage one face of said plate, certain of said portions of reduced width being notched to provide integral lugs which may be upset against the other face of said plate to rigidly secure the respective member thereto, one of the switch contact members having a channel-shaped bridging contactor loosely and tiltably supported thereby, the bottom surface of said contactor being flat with the sides diverging therefrom, and another of said contact members having a notch with upwardly diverging sides to receive said contactor.

4. In an electric switch, the combination with a flat punched plate of insulating material, said plate having an elongated substantially rectangular perforation, one wall of said perforation being slightly offset intermediate the ends thereof, a single member formed a strip metal having a reduced portion adapted to snugly fit within said perforation and the shoulders formed by said reduced portion being adapted to seat against one face of said insulating plate, said reduced portion being notched beneath the other face of said plate to provide integral lugs which may be upset against the last mentioned face of said plate to rigidly secure said member thereto, and said member having an integral boss or projection to provide a wedge fit against said offset wall of the perforation when said parts are in assembled relation.

5. In an electric switch, the combination with a flat punched plate of insulating material, said plate having an elongated substantially rectangular perforation, one wall of

said perforation being slightly offset intermediate the ends thereof, a single member formed of strip metal having a reduced portion adapted to snugly fit within said perforation and the shoulders formed by said reduced portion being adapted to seat against one face of said insulating plate, said reduced portion being notched beneath the other face of said plate to provide integral lugs which may be upset against the last mentioned face of said plate to rigidly secure said member thereto, said member having an integral boss or projection to provide a wedge fit against said offset wall of the perforation when said parts are in assembled relation, and the portion of said member above said shoulders being provided with a notch having upwardly diverging sides to cooperate with the movable contact of the switch.

6. In an electric switch, in combination, a relatively thin punched plate of insulating material, said plate having a plurality of substantially rectangular perforations arranged in parallel relation, a single member formed of strip metal having a reduced portion adapted to snugly fit within one of said perforations and the shoulders formed by said reduced portion being adapted to seat against one face of said insulating plate, opposite edges of said reduced portion being notched beneath the other face of said plate to provide integral lugs which may be upset against the last mentioned face of said plate to rigidly secure said member thereto, a second member formed of strip metal having a reduced portion to penetrate another of said perforations, the shouldered portion of said last mentioned member lying flat against the upper face of said plate and riveted thereto, and a contact portion extending upwardly at right angles to said shouldered portion and having a tiltable bridging contactor supported thereby.

7. In an electric switch, in combination, a relatively thin punch plate of insulating material, said plate having a plurality of substantially rectangular perforations arranged in parallel relation, a single member formed of strip metal having a reduced portion adapted to snugly fit within one of said perforations and the shoulders formed by said reduced portion being adapted to seat against one face of said insulating plate, opposite edges of said reduced portion being notched beneath the other face of said plate to provide integral lugs which may be upset against the last mentioned face of said plate to rigidly secure said member thereto, a second member formed of strip metal having a reduced portion to penetrate another of said perforations, the shouldered portion of said last mentioned member lying flat against the upper face of said plate and riveted thereto, and a contact portion extending upwardly at right angles to said shouldered portion,

5 said contact portion being notched to accom-
modate a channel-shaped bridging contactor
having outwardly extending arcuate lugs to
pivotaly engage said contact portion on op-
posite sides of the notch.

10 8. In an electric switch, in combination, a
relatively thin punched plate of insulating
material, said plate having a plurality of sub-
stantially rectangular perforations arranged
in parallel relation, a single member formed
of strip metal having a reduced portion
adapted to snugly fit within one of said per-
forations and the shoulders formed by said
15 reduced portion being adapted to seat against
one face of said insulating plate, opposite
edges of said reduced portion being notched
beneath the other face of said plate to pro-
vide integral lugs which may be upset against
20 the last mentioned face of said plate to
rigidly secure said member thereto, a second

member formed of strip metal having a re-
duced portion to penetrate the other of said
perforations, the shouldered portion of said
last mentioned member lying flat against the
upper face of said plate and riveted thereto,
70 and a contact portion extending upwardly at
right angles to said shouldered portion, said
contact portion being notched to accommo-
date a channel-shaped bridging contactor
having outwardly extending arcuate lugs to
75 pivotaly engage said contact portion on op-
posite sides of the notch, pivotal movement
of said contactor in one direction being
limited by engagement thereof with the con-
tact portion of said first mentioned member
80 and pivotal movement in the opposite direc-
tion being limited by engagement of said con-
tactor with said insulating plate.

GEORGE J. MEUER. 85

25	90
30	95
35	100
40	105
45	110
50	115
55	120
60	125
65	130