

Feb. 7, 1956

R. E. DUPRE
ELECTRICAL SWITCHES

2,734,115

Filed May 12, 1953

3 Sheets-Sheet 1

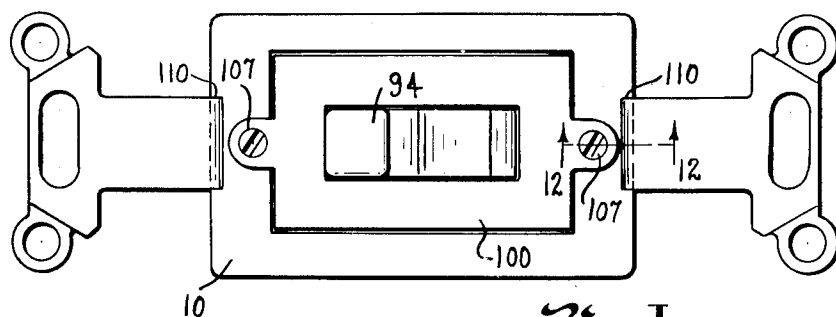


Fig. I

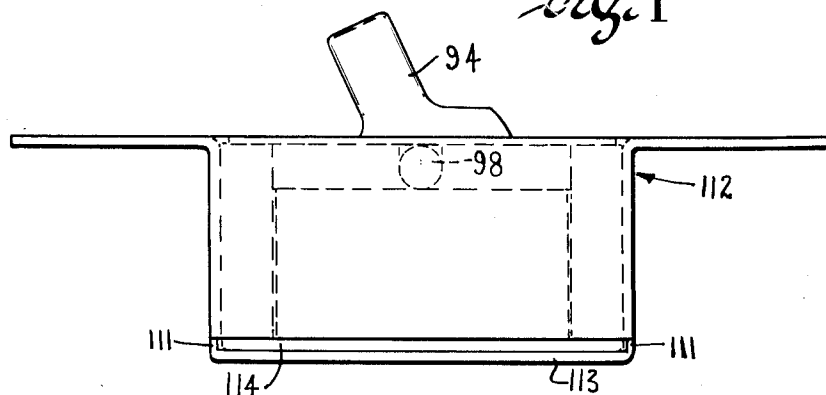


Fig. II

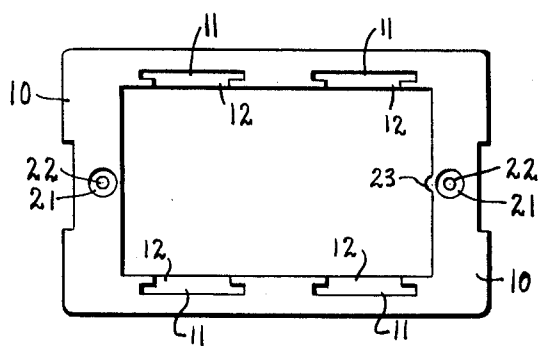


Fig. III

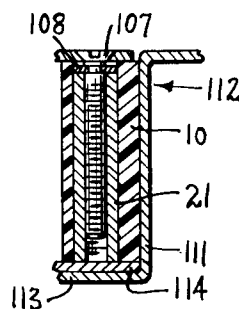


Fig. XII

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3 Sheets-Sheet 2

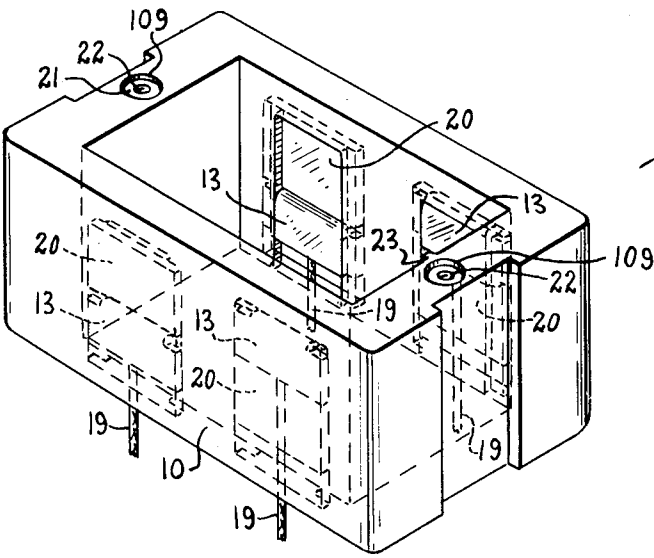


Fig. IV

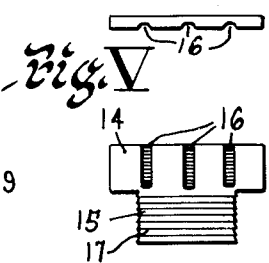


Fig. V

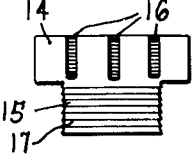


Fig. VI

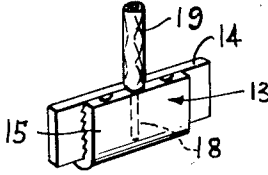


Fig. VII

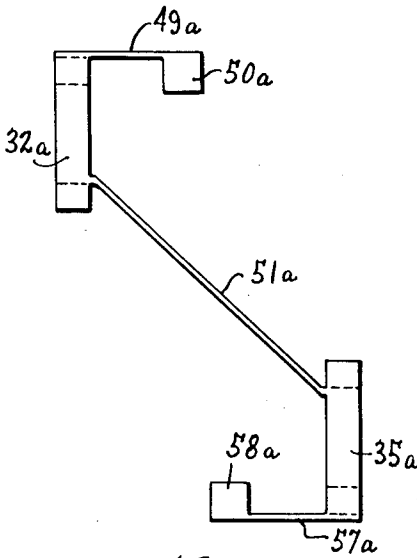


Fig. X

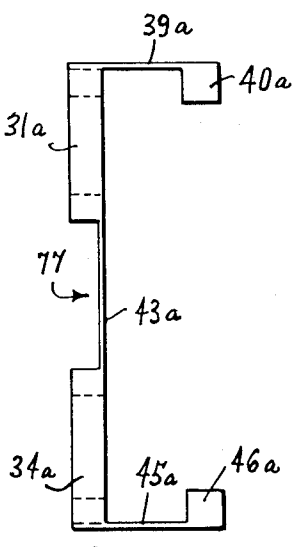


Fig. XI

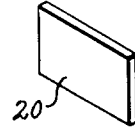


Fig. IX

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3 Sheets-Sheet 3

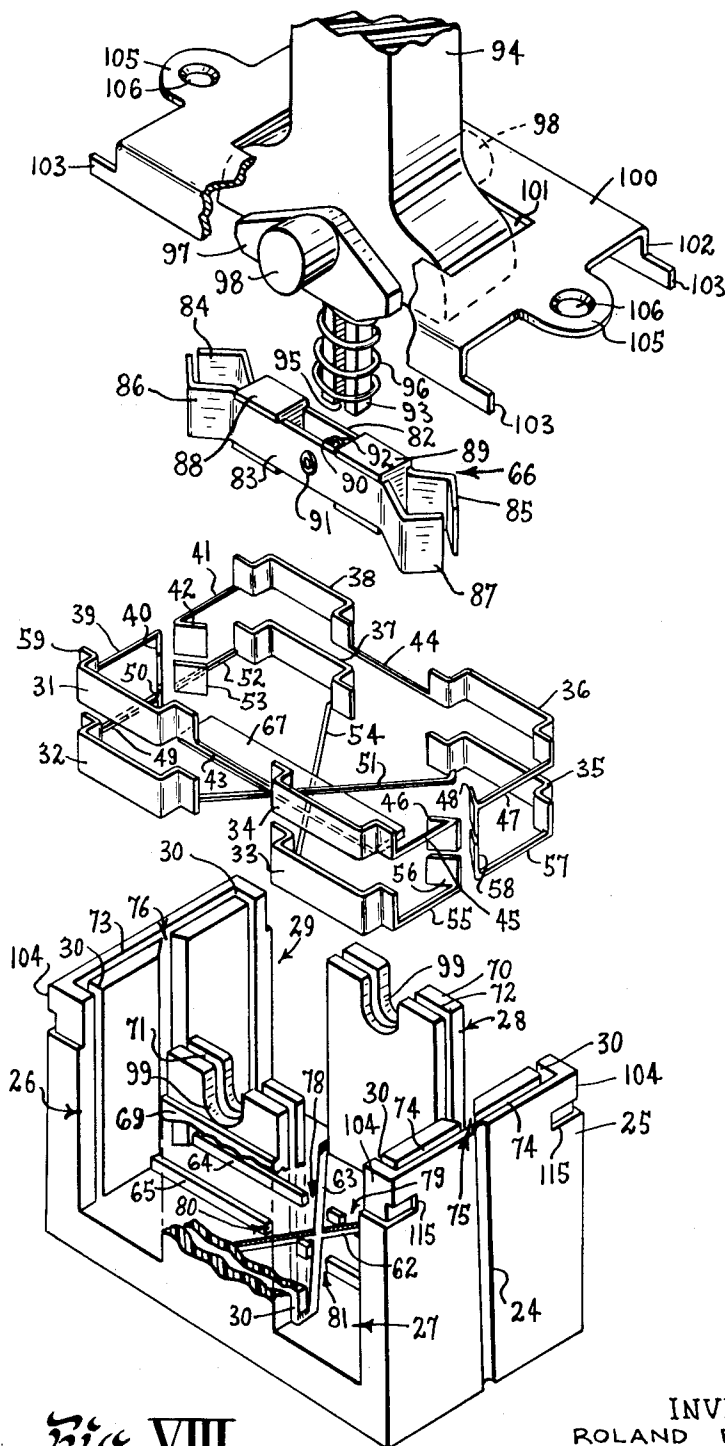


Fig. VIII

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2,734,115

ELECTRICAL SWITCHES

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Application May 12, 1953, Serial No. 354,470

8 Claims. (Cl. 200—168)

This invention relates to improvements in electrical circuit switches and has particular reference to the provision of novel and inexpensive constructions of switches whereby only the portions thereof most susceptible to wear and requiring replacement may be readily interchanged or replaced.

One of the principal objects of the invention is to provide a circuit switch of the above character whereby only the portions thereof most susceptible to wear can readily be interchanged or replaced with ease and simplicity and without having to disturb the connections of said switch with the main line circuit.

Another object is to provide an outer housing having contact plates for relatively permanent connection with a main line circuit and an inner housing embodying a plurality of switch blades having portions thereof adapted to automatically electrically engage the contact plates when said inner housing is positioned in said outer housing, said inner housing embodying an adjustable contact member which when in one position of adjustment will close a circuit through certain of said switch blades and when in another position of adjustment will close a circuit through other of said switch blades, said inner housing having means for securing it in said outer housing, said means being such as to enable the inner housing to be adjusted outwardly of said outer housing an amount sufficient to disengage the portions of said switch blades from their respective contact plates prior to the complete removal of said inner housing from said outer housing whereby the inner housing and the portions of the switch blades therein may be interchanged without having to disconnect the main contact plates from the main line circuit and with no danger of receiving an electrical shock.

Another object is to provide a novel switch lever construction which is simple and durable in construction, positive in function and silent in operation.

Another object is to provide a switch of the above character which may be readily converted to a single pole, three-way or four-way switch as desired and with a minimum change of parts.

Another object is to provide a novel method of making circuit blade elements for a switch of the character described and of supporting said circuit blade elements in proper position of use whereby they may be readily interchanged or replaced by other circuit blade elements when desired.

Other objects and advantages of the invention will become apparent from the following description taken in connection with the accompanying drawings and it will be apparent that many changes may be made in the details of construction, arrangement of parts and method shown and described without departing from the spirit of the invention as expressed in the accompanying claims. I, therefore, do not wish to be limited to the exact details of construction, arrangement of parts and method shown and described as the preferred form only has been given by way of illustration.

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Referring to the drawings:

Fig. I is a plan view of the device embodying the invention;

Fig. II is a side elevational view of said device;

Fig. III is a bottom plan view of the outer housing of the device;

Fig. IV is a perspective view of the outer housing showing the circuit contact members and circuit terminals associated therewith;

Fig. V is a top plan view of a contact plate;

Fig. VI is a face view of said contact plate;

Fig. VII is a perspective view showing how the contact plate is secured to a circuit terminal;

Fig. VIII is an exploded diagrammatic perspective view of the inner housing having a portion of its side wall broken away and showing its correlated parts;

Fig. IX is a perspective view of an insulation or filler member utilized with the device embodying the invention;

Fig. X is a plan view of a blade circuit element formed in accordance with the invention;

Fig. XI is a plan view of another circuit element formed in accordance with the invention; and

Fig. XII is an enlarged fragmentary sectional view taken as on line XII—XII of Fig. I.

In following the teachings of the invention, and for ease of description, a four-way switch is shown in the drawings and will be described in detail hereinafter.

The switch construction comprises an outer housing 10 preferably formed of Bakelite, plastic, or other suitable material having a plurality of T-shape slots 11 formed in opposite side walls thereof, the slots 11 each having an open side area 12 communicating with the interior of the housing. Inwardly of said slots 11 there is positioned contact members 13 comprising a pair of pre-shaped portions 14 and 15 adapted to be folded in superimposed relation with each other, as shown in Fig. VII. The said portion 14 is provided with a plurality of shallow channels 16 each having a corrugated or roughened inner surface. The portion 14 is of a size and shape to fit within the slots 11 with the portion 15 being of a size and shape to lie within the open areas 12. The portion 15 is also provided with a corrugated or roughened surface 17 and when folded, as shown in Fig. VII, is adapted to clamp the bared end 18 of a main line circuit wire 19 therebetween. The free edge of the portion 15 is resilient whereby it will be slightly free to move toward the portion 14 when pressure is exerted thereon.

A contact plate 13 is positioned in each of the slots 11 with the portion 15 thereof extending outwardly of the respective open area 12. With a switch construction, such as shown in Fig. VIII and which is a four-way switch, a contact plate 13 is positioned in the outer housing adjacent the lower end of each of the opposed slots to form a pair of low positioned contact plates, as illustrated in Fig. IV. The other opposed slots 11 each have contact plates 13 positioned therein adjacent the tops of said slots to provide a pair of upper contact plates 13. It is to be understood that each contact plate is connected with a main circuit line. The spaces in said slots 11 unoccupied by the contact plates 13 are provided with a filler 20 of Bakelite, plastic or other suitable material such as shown in Fig. IX. In the case of the upper contact plates, the contacts 13 are first placed inwardly of the slots 11 prior to the insertion of the filler 20 in said slots while in the case of the lower contact members the fillers of insulation material are inserted in the slots 11 prior to the insertion of the contact plates 13. The fillers 20 are so dimensioned as to retain said contact plates in desired positions in said slots, see Fig. IV.

It is particularly pointed out that the contact plates 13, that is, the portions 14 and 15 thereof, when folded

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to clamp the bared end 18 of the circuit wire therein, as shown in Fig. VII, are so dimensioned as to have a relatively intimate fit in the respective slots 11 with the portions 15 thereof extending slightly outwardly of the open areas 12.

The inner housing 25 is dimensioned and shaped to fit within the outer housing 10. The side walls of the inner housing, as shown in Fig. VIII, are provided with spaced cut-out areas 26, 27, 28 and 29. Each of the wall sections, intermediate said cut-out areas, is channeled, as illustrated at 30, throughout the length thereof and substantially to the depth of said cut-out areas to receive the supporting plates 32, 33, 35 and 37 and the associated parts of the lower contact blade circuit elements of the device. The supporting plate 32 is connected by a lead 49 to a contact blade 50. It is further connected by a lead 51 to the supporting plate 35 which, in turn, is connected through the lead 57 to a contact blade 58. The housing 25 is provided, in its respective end walls, with slots 73 and 74 communicating with the respective channeled portions 30 of the cut-out areas 26, 28, 27 and 29 to receive the respective leads 49 and 57 of one circuit element and to receive the leads 52 and 55 of another circuit element. The leads 52 and 55 are respectively connected to the contact blades 53 and 56 and the supporting plates 33 and 37. The said supporting plates 33 and 37 are, in turn, connected by the lead 54. The bottom of the housing 25 is provided with grooves 62 and 63 for receiving the respective leads 51 and 54 therein.

It is pointed out that the above described blade circuit elements constitute the lower circuit units of the device, one unit having a substantially reversed Z shape and the other a substantially Z shape. The first unit embodies, for example, a blanked out structure as shown in Fig. X comprising contact blades 50^a and 58^a adjacent the outer free ends of the leads 49^a and 57^a which constitute the upper and lower branches of the reversed Z, supporting plate portions 32^a and 35^a on the opposed ends of said branches and an angularly disposed lead 51^a connecting said supporting plate portions and which constitute the angled central portion of the Z. The cooperative elements of the unit are blanked from sheet beryllium copper or other conductive material. The various portions of the first unit are thence bent to the configuration illustrated in Fig. VIII. This is accomplished by bending the portions 32^a, 35^a, 50^a and 58^a in a sidewise and upward direction and simultaneously to the shape desired of the respective portions 32, 35, 50 and 58. The second Z-shaped unit is formed by merely turning the blanked out unit over and bending the portions thereof as set forth above whereby the supporting plates 32^a—35^a will then become the supporting plates 33—37, the angularly disposed connecting lead 51 will then become 54, the respective leads 49^a—57^a will become leads 52—55, and the contact blades 50^a—58^a will become contact blades 53—56.

The intermediate inner portions of the end walls are each provided with vertically slotted areas 75 and 76 having their side edges tapering inwardly to communicate with the respective slots 73 and 74, as shown in Fig. VIII. The respective vertically slotted areas 75 and 76 are adapted to receive the respective contact blades 50—53 and 56—58 when the respective supporting plates 32, 33, 35 and 37 are positioned within the respective cut-out areas 26, 27, 28 and 29. The leads 49, 52, 55 and 57 assume a position inwardly of the slots 73 and 74 in the end walls and the contact blades 50—53 and 56—58 will assume a position in overlying relation with the inwardly beveled edge walls of the intermediate vertically slotted areas 75 and 76.

Suitable spacers, such as shown in Fig. XI, may be placed inwardly of the slotted portions 30 of the respective open areas 26, 27, 28 and 29 above the respective

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supporting plates 32, 33, 35 and 37 when positioned therein.

Another set of circuit elements 77, such as shown in Fig. XI, are blanked from sheet beryllium copper or other conductive material and comprise portions 31^a and 34^a connected by a lead 43^a and by leads 39^a and 45^a to contact blade portions 40^a and 46^a. The said portions 31^a and 34^a are bent in a sidewise and upward direction and simultaneously to the shapes illustrated in Fig. VIII to form the supporting portions 31—34 each having an outwardly angled intermediate portion and opposed aligned tongue portions. The portions 40^a—46^a are bent downwardly to form the blade portions 40—46. The leads 39^a, 43^a and 45^a form the respective leads 39, 43 and 45. This circuit element is placed inwardly of the respective open areas 26 and 27 with the lead 43 fitted in the slot 71 intermediate said open areas and the respective leads 39 and 45 fitting within the slotted ends 73 and 74. The contact blades 40 and 46 which are bent downwardly, as illustrated in Fig. VIII, are adapted to fit within the respective vertically slotted areas 75 and 76 in overlying relation with the adjacent angled edge surfaces of said slotted areas. A similar circuit element is formed with the exception that the portions 31^a and 34^a and the contact blades 40^a and 46^a are bent in the opposite direction. The element is then reversed to form the respective supporting plates 36 and 38 connecting lead 44 and leads 41 and 47 which are connected to the contact blades 42 and 48. This section is placed inwardly of the respective open areas 28 and 29 with the lead 44 lying in the slot 72 intermediate said areas, with the leads 41 and 47 lying within the adjacent slots 73 and 74 and with the contact blades 42 and 48 lying within the respective vertical slots 75 and 76 and in overlying relation with the adjacent angled edge surfaces thereof.

Suitable spacer members of insulation material may be placed intermediate the various end leads 49—52 and 39—41 to hold them in proper spaced relation with each other and between the respective leads 55—57 and 45—47 to hold them in proper spaced relation with each other. If desired, filler members of insulation material may be placed above the various supporting plates 31, 34, 36 and 38 and the respective connecting leads to anchor them in proper position in the inner housing 25. It is to be understood that the filler members are so dimensioned that the upper edges thereof will be substantially flush with the respective upper edges of said inner housing 25.

The leads 51 and 54 have an insulation strip or plate 67 positioned therebetween so as to insulate one of said leads from the other at the location where they cross each other. The insulation strip 67 is dimensioned to fit within spaced upwardly extending substantially parallel rib portions 64 and 65 formed on the inner bottom surface of the inner housing and which extend transversely of said housing to communicate with the respective vertically slotted areas 75 and 76. A plate of insulation material similar to the plate 67 is positioned in between said ribs 64 and 65 in overlying relation with the leads 51 and 54 to form a guideway for receiving an adjustable blade contacting member 66. The respective upstanding ribs 64 and 65, as shown at 78, 79, 80 and 81 are cut away to provide clearance for the respective leads 51 and 54.

The adjustable blade contacting member 66, as shown in Fig. VIII, comprises a pair of relatively flat strips of beryllium copper or other conducting material 82 and 83 having their respective ends 84—85 and 86—87 provided with a V-shaped bend adapted to engage the respective contact blades 40—50 and 42—53 at one end of the housing when adjusted in the direction thereof and the ends 85—87 are adapted to engage the respective contact blades 46—56 and 48—58 when adjusted in the direction thereof. The said portions 82 and 83 are spaced relative to each other by suitable strips 88 and 89 of insulation material and are held in assembled relation

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with each other by a pin 90 fitting within bushings of insulation material 91 and 92 frictionally placed in suitable openings centrally of the portions 82 and 83. The inner ends of the strips 88 and 89 of insulation material are spaced relative to each other to receive the depending portion 93 of a switch lever 94. The depending portion 93 is provided with a slot 95 adapted to straddle the pin 90 when the depending portion 93 is placed in the spaced area between the strips of insulation material 88 and 89. A coil spring 96 is placed on said depending portion 93 prior to placing said depending portion in assembled relation with the pin 90. The said switch lever 94 is provided on the opposed sides thereof with outwardly extending portions 97 each having an integrally related pin portion 98 thereon. The said pin portions 98 are adapted to fit within suitable curved notches 99 formed in the upper side walls of the inner housing 25.

The pin portions 98 of the switch lever 94 are held within said curved notches 99 by a metal plate or cap 100 which has a central slot 101 therein through which the lever 94 extends and which has depending side portions 102 each having on the opposed ends thereof bendable projections 103 adapted to be bent so as to be within notches 115 formed in the ends of the inner housing 25. The depending side portions 102 are angled slightly inwardly with respect to each other and adapted to frictionally engage the inwardly angled recessed opposed sides 104 of the housing 25. The plate or cap 100 is provided on its opposed ends with tongues 105 each having a connection opening 106 therein for receiving connection screws 107 by means of which the inner housing 25 is secured internally of the outer housing 10, see Fig. 1. Each of the end walls of the housing 10 is provided with a vertically disposed metal bushing 21 extending throughout the height thereof and having a threaded bore 22 adapted to receive the screws 107. The housing 25 is dimensioned to have a loose sliding fit internally of the housing 10 and when positioned therein the various supporting plates 31—32, 33—34, 35—36 and 37—38 are adapted to frictionally and electrically engage with the contact elements 13 placed inwardly of the respective open areas 26, 27, 28 and 29. In this instance, however, only the lower supporting plates 32 and 37 will engage the respective portions 15 of the lower contact elements 13 positioned within the slotted and open areas 11 and 12 and which are, in turn, connected with the circuit terminals 19, and only the supporting plates 34 and 36 will engage the portions 15 of the upper contact members 13 in the respective slotted and cut-out areas 11 and 12 in the opposed end of the housing and which are, in turn, connected with the electrical leads 19. The inner housing is held in the outer housing by tightening the screws 107. The screws 107 beneath the perforated tongues 105 are provided with washers 108 in mechanically locked relation therewith. The opposed upper edges of the housing 10 are cut away, as shown at 109, to provide clearance for the washers 108. The washers 108 are so interlocked with the screws 107 as to permit said screws to be turned and yet retain their initially related position on said screws beneath the tongues 105. This is for the purpose of causing the inner housing 25 to move in a direction outwardly of the outer housing 10 when the respective screws 107 are backed out and the said screws 107 are of a length sufficient to permit the respective supporting plates which were in initial contact with the portions 15 of the contact members 13 out of engagement with said respective contact members whereby the inner housing may then be lifted out of the outer housing without danger of having the individual performing this operation receiving an electrical shock. In this manner the inner housing and associated parts thereof, namely, the circuit contact blades and associated parts thereof, may be interchanged as desired without having to replace the other parts of the device. This enables the contact blades, which are the parts most susceptible to wear to

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be quickly and easily interchanged or replaced when desired. The outer housing 10 is provided inwardly thereof with a vertically disposed key 23 adapted to fit within a vertically disposed groove 24 formed in the inner housing whereby the said inner housing may be polarized with the outer housing.

The outer housing, as shown in Figs. I and II, is provided with slots 110 adapted to receive the side portions 111 of a supporting bracket 112. The supporting bracket is provided with a spanning member 113 which is adapted to overlie a plate of insulation material 114 fitting over the lower end of the outer housing 10. The side portions 111 may be secured to the housing by rivets, screws, or other suitable means. The bracket 112 is of the conventional type.

It is to be understood that by proper selection and positioning of the contact members 13 in the outer housing 10 and by proper arrangement of blade circuits the characteristics of the resultant switch may be changed. For example, if it is desired to form a three-way switch a circuit element such as 77 would be placed in one side of the inner housing 25, that is, the support plates 31—34 would be placed in the respective open areas 26—27 with the leads 39—45 and lead 43 lying within the respective slots 73—74 and 71. However, the other section of the circuit would be like 77 with the central lead 43^a omitted. These circuit elements would be placed in the other side of the inner housing 25 with the support plate 38 lying in the open area 29, the lead 41 lying in the slot 73 and the blade 42 lying in the vertical slot 76. The support plate 36, which is now separate from the support plate 38, lies within the open area 28 and the lead 47 lies within the slot 74 and the contact blade 48 lies within the vertical slot 75. The contact blades 40—42 of said circuit elements will assume an overlying relation with the inwardly beveled edge surfaces of the vertical slot 76 and the blades 46—48 will assume an overlying relation with the beveled edges of the slot 75. In this instance only the above circuit elements are used. The above circuit elements will now be at the bottom of the open areas 26—27 and 28—29. Contact members 13 are now placed only in the slotted and open areas 11—12 of the outer housing 10 so as to engage only the respective supporting plates 31, 36 and 38, that is, only three main circuit connections 19 are required.

The adjustable contact 66 is now formed without the insulation bushings 91—92 whereby the pin 90 which is of metal will close an electrical circuit through both sections 82—83.

For a single pole switch only two halves of the circuit element 77 would be used, that is, two elements each embodying only the portions 31^a, 39^a and 40^a. These two half circuits now embody only the supporting plate 31, lead 39 and contact blade 40 on one side of the inner housing 25 and the supporting plate 38, lead 41 and contact blade 42 on the other side of the housing.

Only two contact members 13 and two main circuit connections 19 are used, these being placed in the outer housing 10 to engage with the respective supporting plates 31—38. The adjustable contact 66 is the same as that described for the three-way switch. It is to be understood, of course, that suitable fillers or spacers 20 will be used to fill the empty areas and the unoccupied portions of the open areas and slots as previously described.

It is to be understood, of course, that the blade circuit portions would be formed by blanking in a manner similar to the circuit portions illustrated in Figs. X and XI and to have the proper characteristics desired.

From the foregoing description it will be seen that simple, efficient and economical means and method have been provided for accomplishing all of the objects and advantages of the invention.

Having described my invention I claim:

1. A device of the character described comprising an outer housing having solid continuous side walls with

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inwardly disposed recesses communicating with slots extending inwardly of said side walls through an end edge surface thereof, said slots being disposed in a plane parallel with said side walls within the limit of the thickness of said side walls and said recesses having areas of a width less than the width of the slots and an inner housing having recesses in the side walls thereof with slots in the side edges of said recesses, said inner housing being shaped to slidably fit within said outer housing, each of said housings having contact members formed with edge portions slidably mounted in the slots in the walls thereof and each having a relatively flat intermediate portion lying in said recesses and extending outwardly thereof an amount sufficient to assume a frictional and an electrical engagement with each other when said inner housing is placed in said outer housing and means for securing said inner housing in said outer housing, the contact members of said outer housing being adapted to have electrical connection with the leads of a main line circuit, and the contact members of said inner housing being adapted to have electrical connection with switch mechanism supported in said inner housing, whereby the switch mechanism will be energized by engagement of said contact members of the outer housing with the contact members of the inner housing and will permit said switch mechanism to be deenergized by movement of the inner housing outwardly of the outer housing without disconnection of the contact members of said outer housing from the leads of the main line circuit, said contact members in the recesses of said outer housing and the exposed portions of the leads connected thereto being located within and shielded by the solid continuous walls of said outer housing and from electrical contact with means externally of said solid walls.

2. A device of the character described comprising an outer housing having solid continuous walls with slots extending inwardly thereof from one end edge of said housing, said slots being disposed in a plane parallel with said side walls within the limit of the thickness of said side walls, the inner walls of said slots each having a recess communicating with the interior of the housing and being of a width less than the width of the slots, and an inner housing having recesses in the side walls thereof located to communicate with the recesses in the outer housing and having slots in the opposed sides thereof, said inner housing being shaped to slidably fit within said outer housing, each of said housings having contact members formed with edge portions slidably mounted in the slots and each having a relatively flat intermediate portion lying in said recesses and extending outwardly thereof an amount sufficient to assume a frictional and an electrical engagement with each other when said inner housing is placed in said outer housing and means for securing said inner housing in said outer housing, the contact members of said outer housing being adapted to have electrical connection with the leads of a main line circuit, and the contact members of said inner housing being adapted to have electrical connection with switch mechanism supported in said inner housing, whereby the switch mechanism will be energized by engagement of said contact members of the outer housing with the contact members of the inner housing and will be deenergized by movement of the inner housing outwardly of the outer housing without disconnection of the contact members of said outer housing from the leads of the main line circuit, said contact members in the recesses of said outer housing and the exposed portions of the leads connected thereto being located within and shielded by the solid continuous walls of said outer housing and from electrical contact with means externally of said solid walls.

3. A device of the character described comprising an outer housing having side walls with internally disposed recesses therein each communicating with a slot extending inwardly of an edge surface of said side wall in sub-

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stantially parallel relation therewith and of a width greater than the width of said respective recesses and an inner housing shaped to slidably fit within said outer housing, and having recesses in the side walls thereof aligned with the recesses in said outer housing and having slotted edges on the opposed sides of said recesses, said outer housing having contact members formed with edge portions slidably mounted in the slots and relatively flat intermediate portions lying in the recesses thereof, and extending slightly outwardly of said recesses, leads connecting said contact members with a main line circuit, the said contact members and the exposed portions of said leads being shielded by the side walls of said outer housing and from possible accidental electrical contact with conductive means externally of the outer housing, said inner housing having contact members formed with edge portions slidably mounted in the slots of the side walls thereof and each having a relatively flat intermediate portion lying in said respective recesses and extending outwardly thereof an amount sufficient to frictionally engage the relatively flat side surfaces of the intermediate portions of the contact members in said outer housing when said inner housing is slidably fitted in said outer housing, said contact members of said inner housing having an electrical connection with switch mechanism supported in said inner housing and said frictional contact of the contact members of the inner housing with the contact members in the recesses internally of the side walls of the outer housing being such that the inner housing may be moved outwardly of said outer housing and the contact members out of frictional engagement with each other without disconnection of the contact members of said outer housing from the leads of the main line circuit.

4. A device of the character described comprising an outer housing having contact plates supported by the side walls thereof with portions of said plates exposed inwardly of the housing, one set of contact plates being located adjacent the lower end of said housing and another set being located adjacent the upper end of said housing, said contact plates being adapted to have the leads of an electrical circuit attached thereto, an inner housing having open areas in the opposed side walls thereof adapted to communicate with the contact plates in the outer housing, a first set of supporting plates secured in said open areas, one pair of said plates having a portion thereof engaging the contact plates adjacent the lower end of the outer housing when said inner housing is located therein, contact blades supported in horizontally spaced relation with each other at each end of the inner housing, electrical leads connecting each of said contact blades with a respective adjacent supporting plate in each of the respective side walls of the inner housing, electrical cross leads connecting one of each of the respective supporting plates adjacent one end of the opposed side walls of the inner housing to the oppositely disposed respective supporting plates in said side walls and adjacent the opposed end of said inner housing, an electrical lead connecting each of the respective supporting plates in said opposed side walls of the inner housing, a second set of supporting plates positioned in the respective open areas in the inner housing, means for insulating said second set of supporting plates from said first set of supporting plates, one pair of said second plates having a portion thereof in engagement with the respective set of contact plates adjacent the upper end of said outer housing, a second pair of horizontally spaced contact blades adjacent the opposed end of said inner housing, means for insulating said second set of spaced contact blades from the first-mentioned spaced contact blades, electrical leads connecting each of said contact blades with a respective adjacent supporting plate of said second set in said open areas of the inner housing, electrical leads connecting the respective supporting plates of said second set on each of the opposed sides of the inner housing, a movable contact member slidably supported in said inner housing, said movable

contact member comprising two electrical conductive members insulated from each other and each having their respective end portions shaped to simultaneously and separately engage a respective pair of the upper and lower horizontally spaced blade portions adjacent the opposed ends of the housing to close an electrical circuit through said respective upper and lower blade portions when said movable contact member is moved in the direction of engagement with said contact blades, and a switch lever operably connected with said movable contact member and embodying means for retaining the ends of said spaced electrical conductive members of said movable contact member in adjusted engagement with the contact blades adjacent one end or the other of said inner housing.

5. A device of the character described comprising an outer housing having side walls with continuous uninterrupted outer surfaces, said side walls having slots extending inwardly thereof from one end of the housing, the inner walls of said slots each having a cut-out area communicating with the interior of the housing, and an inner housing having recesses in the side walls thereof located to communicate with the recesses in the inner side walls of the outer housing, said side walls of said inner housing further having slotted areas intermediate the recesses and communicating therewith, slots in each of the end walls of said inner housing communicating with a vertically disposed long and narrow recess in the inner intermediate portion of said end walls, spaced switch blades in said long and narrow recesses, said inner housing being shaped to slidably fit within said outer housing, each of said housings having contact members mounted in the recesses in the side walls thereof adapted to assume a frictional and an electrical engagement with each other when said inner housing is placed in said outer housing and means for securing said inner housing in said outer housing, the contact members of said outer housing being adapted to have electrical connection with the leads of a main line circuit, and the contact members of said inner housing and the switch blades supported in said vertically disposed long and narrow recesses in the inner intermediate portion of the end walls of said inner housing being adapted to have electrical connection with each other through electrical leads lying within said slots in the side and end walls of said inner housing, whereby the switch blades will be energized by engagement of said contact members of the outer housing with the contact members of the inner housing outwardly of the outer housing without disconnection of the contact members of said outer housing from the leads of the main line circuit.

6. Blade circuit elements for an electrical switch of the character described comprising substantially reversed Z-shape members of conductive material having the upper and lower portions thereof, which constitute the upper

and lower branches of the Z, each formed with an integral enlarged end joined with long and narrow sections which are integrally connected with substantially right angularly disposed enlarged rectangular portions, each of said rectangular portions being integrally joined with a long and narrow angularly disposed intermediate portion which constitutes the intermediate portion of the Z.

7. A blade circuit element of conductive material having a substantially C-shape embodying upper and lower portions having enlarged ends joined by reduced substantially parallel integral portions to right angularly disposed enlarged rectangular portions which are, in turn, integrally joined with a reduced intermediate long and narrow portion.

8. A device of the character described comprising an outer housing having side walls with continuous uninterrupted outer surfaces and internally disposed recesses communicating with slots extending inwardly of an end edge thereof, said slots being disposed in a plane parallel with said side walls within the limit of the thickness of said side walls and said recesses having areas of a width less than the width of the slots, and an inner housing shaped to slidably fit within said outer housing, and having recesses in the side walls thereof with slots in the opposed sides of said recesses and aligned with the recesses in said outer housing, said outer housing having relatively flat contact members mounted in the internal recesses thereof and having side portions slidably fitted in the slots communicating with said recesses, leads connecting said contact members with a main line circuit, the said contact members and the exposed portions of said leads being shielded by the side walls of said outer housing and from possible accidental electrical contact with conductive means externally of the outer housing, said inner housing having contact members mounted in the recesses of the side walls thereof and having side portions slidably fitted in the opposed slotted sides of said recesses, said contact members of said inner housing having an electrical connection with switch mechanism supported in said inner housing and having frictional contact with the contact members in the recesses internally of the side walls of the outer housing whereby the inner housing may be moved outwardly of said outer housing and the contact members out of frictional engagement with each other without disconnection of the contact members of said outer housing from the leads of the main line circuit.

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