Aug. 11, 1970 C. A. BARNEY 3,524,028

ELECTRIC SWITCH WITH IMPROVED CONTACT TERMINAL CONNECTION MEANS AND MOVABLE CONDUCTIVE PLUG CONTACT

Filed June 12, 1969

FIG. 1

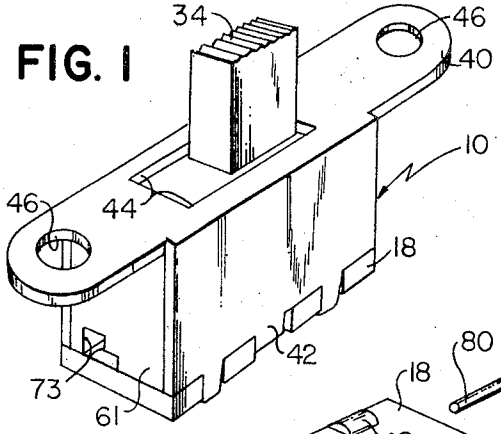
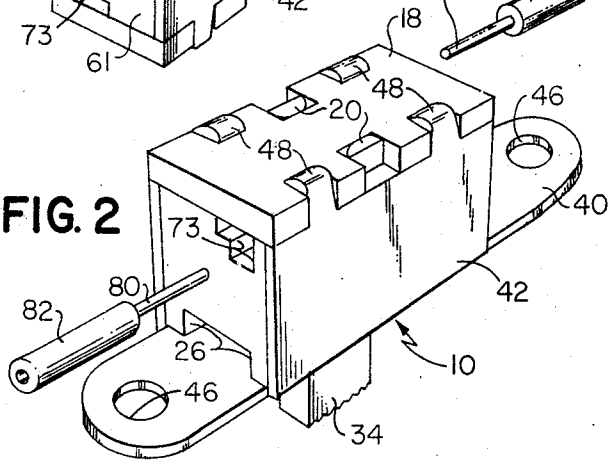


FIG. 2



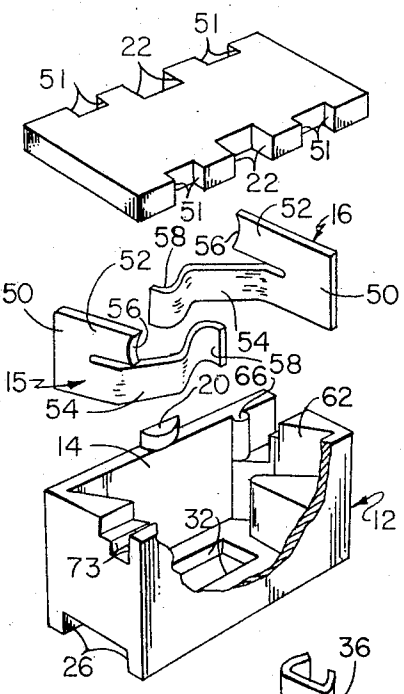
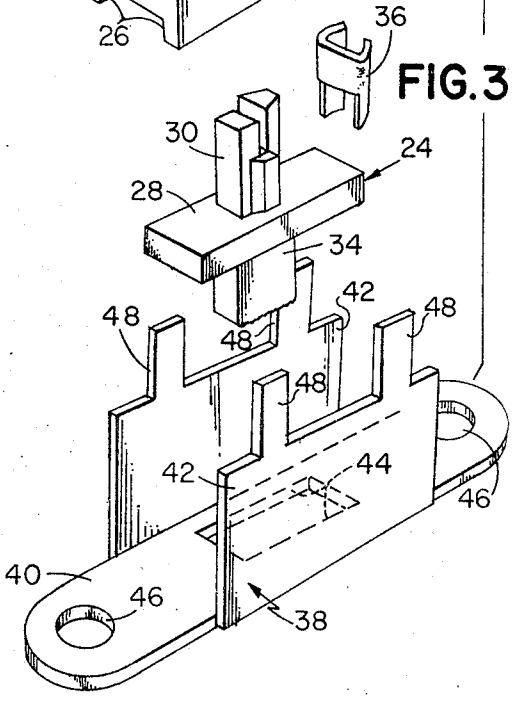


FIG. 3



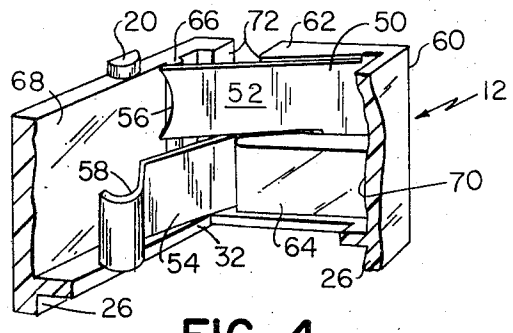


FIG. 4

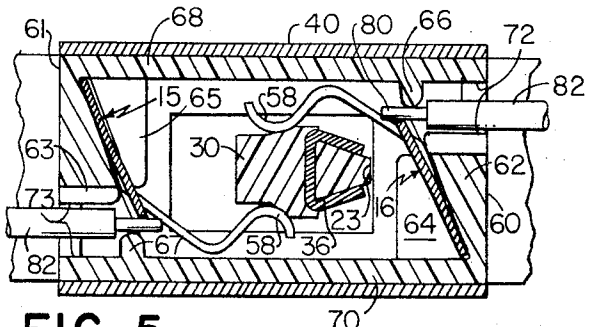


FIG. 5

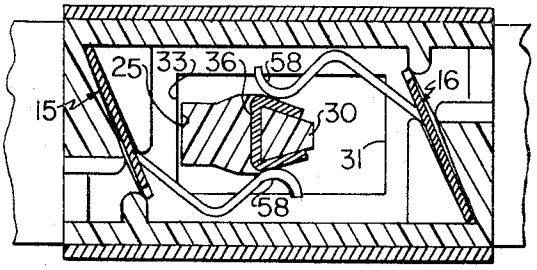


FIG. 6

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ELECTRIC SWITCH WITH IMPROVED CONTACT TERMINAL CONNECTION MEANS AND MOVABLE CONDUCTIVE PLUG CONTACT

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U.S. Cl. 200—16 10 Claims

ABSTRACT OF THE DISCLOSURE

A switch comprising a housing having an internal cavity, a slide mounted on the housing and having an insulating plug extending into the cavity, and a resilient conductive element including a base portion, a wire connection portion and a contact portion mounted in the cavity, the wire connection portion being adapted for engaging a wire introduced into the housing and the contact portion being adapted for engaging the plug in a first position and electrically contacting a second conductive element when the plug is in a second position.

This invention relates to switches.

It is a principal object of the present invention to provide a reciprocating or slide switch having no exposed live parts and a greatly simplified construction in which only two metal parts are required both for wire connection and switch operation. Other objects include providing a switch of the type mentioned in which the total number of parts is reduced to a minimum, and each part is of easily and inexpensively manufactured configuration.

The invention features a switch comprising a housing having an internal cavity, a slide mounted on the housing and having an insulating plug extending into the cavity, and a resilient conductive element including a base portion, a wire connection portion and a contact portion mounted in the cavity, the wire connection portion being adapted for engaging a wire introduced into the housing and the contact portion being adapted for engaging the plug in a first position and electrically contacting a second conductive element when the plug is in a second position. In preferred embodiments in which there are two identical resilient elements, each including a wire connection portion and a contact portion connected to a transverse edge of a base portion, there is featured a conductive wiper on the plug for engaging the elements when the plug is in the second position and internal slots in the housing for supporting the base portions of the two elements.

Other objects, features, and advantages will appear from the following detailed description of a preferred embodiment of the invention, taken together with the attached drawings in which:

FIGS. 1 and 2 are perspective views of a switch of the present invention;

FIG. 3 is an exploded perspective view partially in section of the switch of FIG. 1;

FIG. 4 is a perspective sectional view of components of the switch of FIG. 1; and,

FIGS. 5 and 6 are sectional views of the switch of FIG. 1.

Referring more particularly to the drawings, there is shown a slide switch **10** comprising a generally rectangular casing **12** of insulating material having a large cavity **14** therein in which are housed a pair of identical, spaced contact and wire connection elements **15** and **16**. The open top (viewed in FIG. 3) of cavity **14** is covered by an insulating cover plate **18**. Plate **18** is located relative to casing **12** by a pair of studs **20** on opposite sides of

casing **12** which extend through corresponding slots **22** at the sides of cover plate **18**.

A slide **24**, also of insulating material, is mounted in an outwardly-facing channel **26** at the bottom of casing **12**. Slide **24** includes a rectangular base **28**, a plug **30** extending upwardly from base **28** through an elongated rectangular opening **32** in the base of casing **12** into cavity **14**, and a finger piece **34** extending downwardly from base **28**. A U-shaped copper wiper **36** is mounted on plug **30** within cavity **14**.

A light-weight steel mounting plate **38**, including a base portion **40** (overlying the bottoms of casing **12** and slide base **28**) and two parallel, spaced side portions **42** (extending upwardly from base portion **40**), holds slide **24** in place within channel **26** and secures cover plate **18** to casing **12**. Base portion **40** includes an elongated rectangular slot or opening **44** through which finger piece **34** extends and a pair of mounting holes **46**. Each side portion **42** includes two retaining fingers **48** which extend upwardly from the top edge of the side portion through corresponding slots **51** in an edge of cover plate **18** and are then bent over the top of the cover plate.

Contact and wire connection elements **15** and **16** are identical. As shown most clearly in FIG. 3, each element is constructed of a single piece of resilient bronze and includes a base portion **50**, a wire connection portion **52** and a contact portion **54**. Wire connection portion **52** is flat and extends outwardly from a transverse edge of base portion **50** coplanar therewith. The transverse edge **56** of wire connection portion **52** most distant from base portion **50** is concave. Contact portion extends outwardly from the same transverse edge of base portion **50** as does wire connection portion **52** and includes an initial segment coplanar with and connected to base portion **50**, an intermediate planar segment forming an acute angle with base portion **50**, and an inwardly convex contact segment **58** forming a larger angle with base portion **50**.

Each element is mounted within cavity **14** adjacent and forming an acute angle with an end wall thereof with its transverse edge **56** engaging one of the side walls of the cavity and its contact segment **50** overlying and spaced slightly from that side wall. Elements **15** and **16** are mounted within cavity **14** in an identical manner and only the mounting of element **16** will be described in detail.

Referring now to FIGS. 3 and 4, a pair of shoulders **62**, **64** cooperate to define a vertical slot, extending angularly into cavity **14** from adjacent the intersection of end wall **60** and side wall **70**, in which base portion **50** of element **16** is placed. Shoulder **62** juts inwardly from end wall **60** and extends upwardly from the bottom of cavity **14** to the lower edge of an opening **72** which extends through the upper portion of end wall **60** adjacent side wall **68**. Shoulder **64**, jutting inwardly from side wall **70**, extends upwardly from the bottom of cavity **14** a distance equal to the width of contact portion **54**. A third shoulder **66** juts inwardly from side wall **68** of cavity **14**, is spaced from end wall **60**, and engages wire connection portion **52** adjacent concave transverse edge **56** thereof.

An opening **73**, similar to opening **72** extends through the upper portion of end wall **61** adjacent side wall **68**. Shoulders **63**, **65** and **67**, similar respectively to shoulders **62**, **64** and **66**, are disposed within cavity **14** adjacent end wall **61**.

As shown, each of openings **72**, **73** includes a full depth wire insertion portion (whose lower edge is slightly above the lower edge of wire connection portion **52**) and a partial depth wire release portion (about one-half as deep as the wire insertion portion and through which a release probe may be introduced into cavity **14** for bending wire connection portion **52** to release a wire engaged thereby).

In operation, the stripped ends **80** of insulated wires

82 are inserted into switch 10 through the wire connection portions of openings 72 and 73. As shown in FIG. 5, each end 80 is inserted between the shoulder 66 adjacent the opening and the transverse edge 56 of the wire connection portion 52 engaging the shoulder. As previously mentioned, such wire connection portion 52 is inclined relative to the end wall of base 12 so that it will flex inwardly as the wire is inserted and be drawn tightly against the stripped end 80 if the wire is drawn in the other direction.

With wires 82 inserted in place, as shown in FIG. 5, all live switch components are within the bounds of base 12.

Reference is now made to FIGS. 5 and 6 wherein switch 10 is shown, respectively, in its "off" and "on" positions. As there illustrated, slide 24 is movable longitudinally relative to base 12 between the "off" position, shown in FIG. 5 wherein contact portions 58 of elements 15, 16 engage electrically insulating portions of plug 30, and the "on" position, shown in FIG. 6, wherein contact portions 58 engage (and are electrically connected by) wiper 36. The longitudinal movement of slide 24 is limited by the length of opening 32 in the base of casing 12. In the "off" position, an end 23 of plug 30 is flush against one transverse edge 31 of opening 32; in the "on" position the other end 25 of plug 30 is flush against the other transverse edge 33 of opening 32. The portion of plug 30 intermediate wiper 36 and the plug portion engaged by contact portions 58 when the switch is "off" is of increased thickness to insure positive switching action.

Other embodiments within the scope of the following claims will occur to those skilled in the art.

What is claimed is:

1. A slide switch comprising:

a housing having a cavity therein, said housing defining a wire connection opening extending through a wall thereof;

a slide mounted on said housing for movement relative thereto and including an insulating plug extending into said cavity;

a resilient conductive element mounted within said cavity;

said element including a base section secured in position within said housing and wire connection and contact sections extending outwardly from an edge of said base section for flexure relative thereto,

said wire connection section overlying said opening and having a free edge adjacent an interior wall of said housing whereby a wire may be introduced into said cavity through said opening and inserted intermediate and engaged by said free edge and said interior wall, and

a portion of said contact section being disposed on one side of said plug; and

a second conductive element disposed on the other side of said plug,

said plug being movable between and relative to said portion and said second element between a first position wherein said portion and said second element are electrically insulated from each other and said portion engages said plug and a second position wherein said portion and said second element are electrically connected.

2. The switch of claim 1 wherein said base section, said wire connection section and portions of said contact section are planar.

3. The switch of claim 2 wherein said base section and said wire connection section are coplanar.

4. The switch of claim 1 wherein said second conductive element is substantially identical to said resilient conductive element.

5. The switch of claim 4 including a conductive wiper mounted on said plug in position for engaging said elements when said plug is in said second position.

6. The switch of claim 1 wherein said housing defines a wire connection opening extending through each of a pair of opposite walls thereof, an edge of each of said openings is aligned with an interior wall of said cavity, and including a pair of substantially identical resilient conductive elements, each of said elements including a wire connection section overlying one of said openings and having a free edge adjacent the inner wall of said cavity aligned with said one opening.

7. The switch of claim 6 wherein the base section of each of said elements is supported in a slot defined by portions of said housing.

8. The switch of claim 7 wherein the depth of said slots is substantially equal to the width of said contact sections.

9. The switch of claim 6 including a conductive wiper mounted on said plug in position for engaging the contact sections of said elements when said plug is in said second position.

10. The switch of claim 6 wherein said base section and said wire connection section are coplanar and portions of said contact section are planar.

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