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LOW VOLTAGE A.C. CURRENT SWITCH

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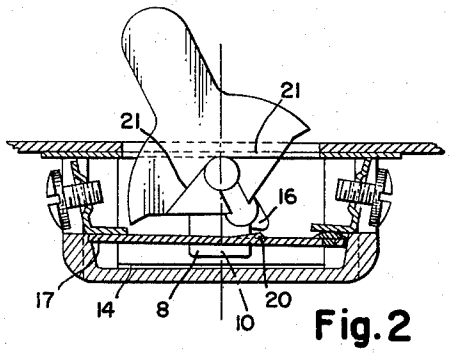


Fig.2

Fig.1

Fig.4

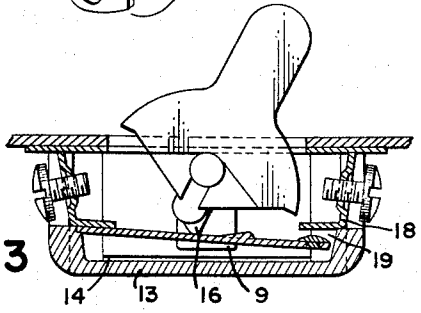


Fig.3

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LOW VOLTAGE A.C. CURRENT SWITCH

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This invention relates to manually operable electric switches and particularly to such switches adapted for household and other uses in which a relatively low A.C. current is sought to be interrupted.

There are many types of manually operable switches in use today. Generally, however, these switches suffer from one or more of the following disadvantages:

(1) They are relatively expensive
(2) They are relatively bulky
(3) They are subject to rapid deterioration or malfunctioning of the parts.

It is a principal object of this invention therefore to provide a switch of the class described which will be of small proportions and formed from a minimum of parts and thus of relatively low cost.

It is another important object of the invention to provide such a switch as will be robust and reliable in operation.

It is yet another important object of the invention to provide such a switch in which no specific separate component is required for the purpose of providing definition of handle movement between the on and off positions.

These and other advantageous objects will become apparent through a consideration of the following detailed description taken in conjunction with the attached drawings in which

Figure 1 is an exploded perspective view of the switch which forms the subject matter of this invention;

Figure 2 is a vertical cross-section taken across the switch in the closed position;

Figure 3 is a view similar to Figure 2 showing the switch in the open position;

Figure 4 is a schematic plan view showing a portion of the switch of Figure 1 in detail.

As may best be seen by reference to Figure 1, the switch which forms the subject matter of this invention comprises a base 1 having slots 2 therein adapted to receive a fixed contact terminal 3 at one end of the base 1, and a contact terminal 4 at the other end. Electrical contact is made from terminal 4 to terminal 3 by means of the resilient cantilever strip 17 and its contact portion 17A which is adapted to butt against the contact portion 18 of the fixed contact member 3.

The resilient strip is provided with a ramp 20 and the strip is so connected to the contact member 4 as to normally cause engagement between the contact 17A and the contact 18 so as to effect current transmission between the terminals.

The switch is further provided with an operating handle 5 having pivots 21 adapted to be retained in pivotable relationship in rounded notches 30 on opposite sides of the base member 1.

The operating handle is retained in position in the base by an insulator 6 and a mounting yoke 7 all as hereinafter described in detail.

Two inwardly extending troughs 8 and 9 are provided on opposite sides of the base member 1 as may best be seen by reference to Figure 4. The lower portion of

the operating switch 5 is provided with a camming means 11 adapted to operate within the troughs in a manner hereinafter described in detail. This means being elongated under wall engaging portions. The troughs 8 and 9 are separated by an intermediate throat 10 and an inwardly inclined surface 15 therebetween.

The sides 12 of the base member 1 on which these troughs are provided are preferably detached from the floor 13 of the base 1 by means of narrow apertures 14 formed at the junction of the sides 12 and the floor 13 of the base so that the sides are relatively flexible transversely within the limits of the elasticity of the material from which the base is formed.

The lower portion of the handle is provided with a cam 16 adapted upon rotation of the switch from the on to the off position to engage the ramp 20 of the cantilever contact 17 to force the cantilever out of contact making engagement between contact members 17A and 18.

The action of the switch is as follows:

The operating handle is held either in the full open position or full closed position by pressure from the sides 12 of the base 1 applying a load through either troughs 8 or 9 as the case may be in the sides of the base, through the means 11 on the handle 5.

Movement of the operating handle 5 away from either position of rest causes wall engaging projections of the means 11 to move out of either the depression 8 or 9 and traverse the inclined slope 15 of the wall recess formations 8, 15, 15, 9. As the means 11 is non-compressible, the walls 12 yield until they reach maximum extension when the webs reach the constriction throat or peaks 10 during which movement over inclined surface 15, a resistance to travel is transmitted through the means 11 opposing the operating force applied to the handle 5. Removal of the operating force from the handle at any point, results in the pressure from the flexible walls 12 forcing the rounded outer surface of the wall engaging cam formations 11 down the inclines 15 on whichever side of the constriction throat 10 the means may be located, thus causing the operating handle to seek either a position at fully open or fully closed position.

While the wall engaging cam formation 11 is thus actuating with respect to the recess formations and the throat 10, the cam 16 at the lower portion of the handle 5 engages or disengages the ramp 20 co-operatively to open or close the contact 17 away from or into the fixed contact 18 selectively to make or break circuit at the point 19.

A positive stop for the operating handle at either position of rest may be obtained through the use of two abutment edges 21 of the pads 24 formed on each side of the operating handle 5 engaging with the underside of the insulator 22 supported on its upper side by the yoke 7. The width of the slots 22 and 23 in the insulator and yoke respectively is less than the width of the handle across the pads 24 thereon.

The assembly is, of course, completed by the superimposition of the insulator 6 on to the assembly and the yoke 7 thereupon, the tabs 24 on the yoke being closed under projections 25 formed in the outer and upper corners of the base 1.

The essence of the invention lies in the achievement of a positive means urging the handle 5 into either the off or on position, without the necessity of providing an additional spring or similar part for this purpose.

This is, of course, effected by means of the cooperation between the wall engaging cam formation 11 with the recess formations provided in the form of troughs with a throat therebetween in the expansible sides of the switch base member itself.

The invention has been described with reference to preferred embodiments. It is to be understood, however, that the invention is not to be construed as limited to such embodiments. Such embodiments of the invention as come within the scope and purview of the appended claims are to be considered as part of this invention.

What I claim as my invention is:

1. In an electric switch, a pair of contacts, a pivot operating handle, spaced resiliently separable walls between which the portion of said handle below the pivot thereof is mounted to move between an on-position effecting closing of said contacts and an off-position effecting opening of said contacts, said walls presenting a constriction normally blocking movement of said handle between said on and off positions, and means on the portion of said handle below the pivot thereof to separate said walls for handle movement through said constriction on the application of operating pressure on said handle.

2. In an electric switch as claimed in claim 1, recess formations formed in said spaced walls on opposite sides of said constriction to receive and locate said handle in said on and off positions.

3. In an electric switch as claimed in claim 2, cooperative stop means carried by said wall and said handle to block movement of said handle out of said recess formations in any direction except through said constriction.

4. An electric switch comprising a casing presenting spaced resiliently separable walls, a pair of contacts, a pivot handle supported to move between said walls between an on-position effecting closing of said contacts and an off-position effecting opening of said contacts, the portion of said handle below the pivot thereof having a wall engaging cam formation at least on one side thereof and said walls being formed to present recess formations to receive and locate said handle cam formation with said handle in said on and off positions and to present a constriction normally blocking said handle cam from movement between said recess formations, said handle cam formation being adapted on application of operating pressure on said handle to separate said walls opening said constriction for passage of said handle cam formation from one recess formation to the other recess formation.

5. A switch as claimed in claim 4 in which said switch handle is provided with a pair of said cam formations on opposite sides thereof to engage both of said walls, and said walls being formed to prevent said recess formations at both sides of said handle.

6. A switch as claimed in claim 5 in which said cam formations are elongated projections having rounded outer edges and said wall recess formations are in the form of troughs to receive said cam formations.

7. A switch as claimed in claim 6 in which a cover member is secured to said walls, said cover member having an opening through which said handle extends, and cooperative stop surfaces provided on said handle and cover to block handle movement in directions other than between said recess formations and through said constriction.

8. A switch as claimed in claim 6 in which one of said contacts is stationary and the other of said contacts is carried on a cantilever spring arm normally urging said other contact into engagement with said stationary contact and said handle is provided with a cam adapted to actuate said cantilever arm to disengage said contacts as said handle is moved from said on to said off position.

9. A switch as claimed in claim 4 in which one of said contacts is stationary and the other of said contacts is movable, said movable contact being carried on a cantilever spring arm normally urging said movable contact into engagement with said stationary contact, and said handle and cantilever arm are provided with cooperative cam formations whereby movement of said handle from said on to said off position is adapted to actuate said cantilever arm to disengage said contacts.

10. A switch as claimed in claim 9 in which said contacts are provided with supporting plate members slidably and removably mounted between said spaced walls.

11. An electric switch comprising a casing presenting a pair of spaced walls supported at their ends and being resiliently separable intermediately of their ends, said walls having rounded notches **30** in their upper edges intermediately of their ends and presenting intermediately of their ends inwardly projecting formations defining a wall constriction and on opposite sides of said constriction trough-like recess formations, a handle having on opposite sides thereof pivot projections **21** received in said rounded wall notches to pivotally support said handle from and between said walls, said handle having cam formations **11** on opposite sides thereof for cooperation with said wall trough formations to resiliently locate said handle in an on-position with said handle swung to bring said handle cam formations into the trough formation at one side of said constriction and in an off-position with said handle swung to bring said handle cam formations into the trough formation at the other side of said constriction, said constriction normally blocking said handle cams from movement from one trough formation to the other, and said handle cams being adapted on application of operating pressure on said handle to cam open said restriction allowing movement of said handle between said on and off positions, means blocking handle movement in directions other than between said on and off positions, and contacts arranged to close when said handle is moved to said on-position and to open when said handle is moved to said off-position.

12. A device as claimed in claim 11 in which one of said contacts is stationary and the other of said contacts is movable and is spring urged into contact with said stationary contact and said handle is provided with cam means to operate said movable contact away from said stationary contact on movement of said handle to said open position.

13. A device as claimed in claim 12 in which said contacts are carried from mounting base plates slidably and removably supported between said spaced walls and the means blocking handle movement in directions other than between said on and off positions comprises a cover member through which said handle operates, said cover member being secured to said walls and blocking removal of said contacts therefrom.

14. An electric switch as claimed in claim 4 wherein said switch casing is formed of relatively rigid material and the side walls of the casing are detached from the base for at least a portion of their distance to increase the resiliency of the side walls upon separation thereof.

15. An electric switch as claimed in claim 11 wherein said spaced side walls are detached from the bottom of the casing over at least a portion of their distance to increase the resiliency of the side walls upon separation thereof.

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