Nov. 22, 1932. H. W. BATCHELLER 1,888,444

TOGGLE SWITCH

Filed Sept. 11, 1931

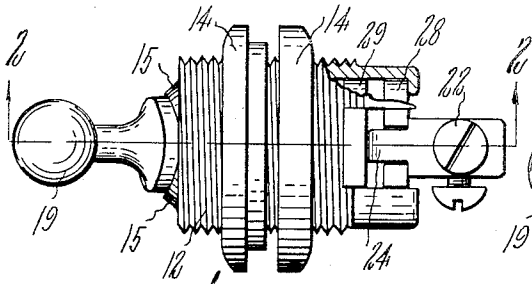


Fig. 1.

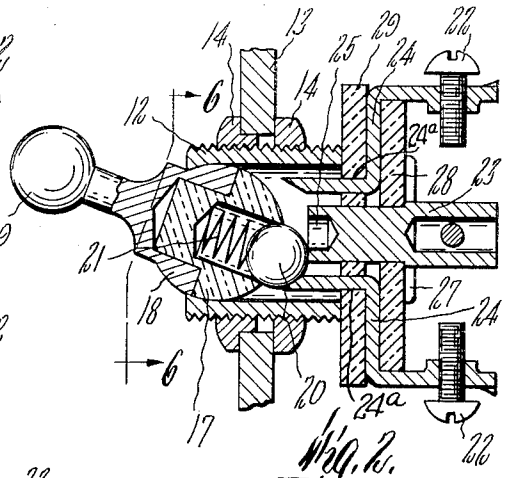


Fig. 2.

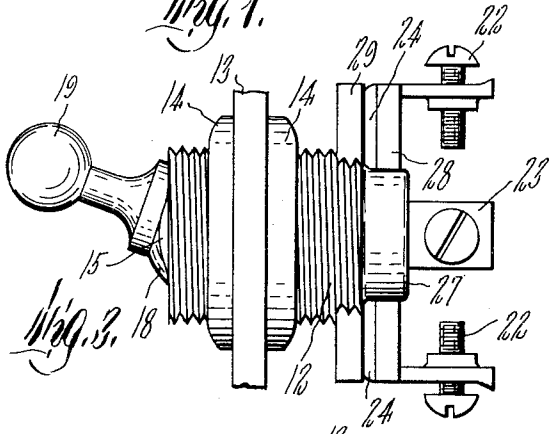


Fig. 3.

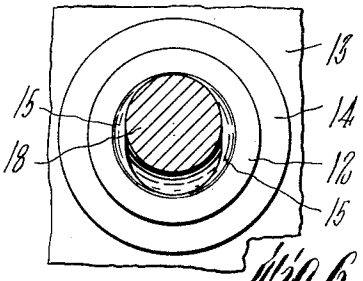


Fig. 6.

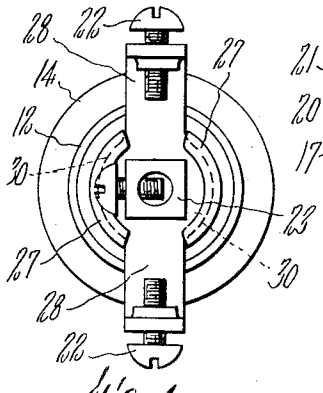


Fig. 4.

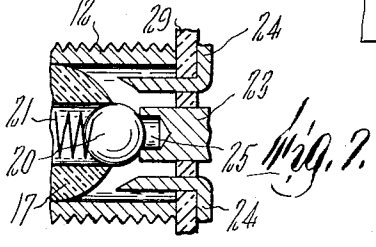


Fig. 7.

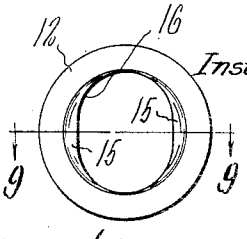


Fig. 8.

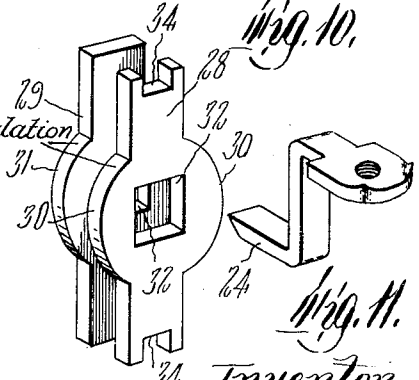


Fig. 10.

Fig. 11.

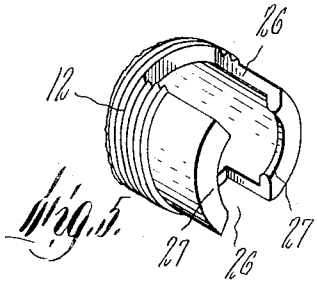


Fig. 5.

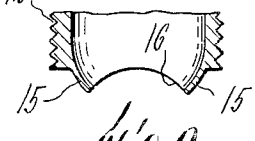


Fig. 9.

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Attys.

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UNITED STATES PATENT OFFICE

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TOGGLE SWITCH

Application filed September 11, 1931. Serial No. 562,231.

This invention relates to an electric switch which includes a casing adapted to be fixed to a support, a plurality of gap-separated terminals in the casing insulated from each other and from the casing and adapted to be engaged with circuit wires, and a hand piece pivotally connected with the casing and provided with a bridging conductor which is insulated from the casing and movable by the hand piece to bridge the gap between two terminals when the switch is in an "on" position, and contact with only one terminal when the switch is in an "off" position.

The object of the invention is to provide a switch of simple and durable construction, the parts of which are adapted to be conveniently and securely assembled.

Of the accompanying drawing forming a part of this specification,—

Figure 1 is a top plan view of a switch embodying the invention.

Figure 2 is a section on line 2—2 of Figure 1, showing the "on" position of the switch.

Figure 3 is a side view.

Figure 4 is an end view looking toward the inner end of the casing.

Figure 5 is a fragmentary perspective view, showing only the inner end portion of the casing.

Figure 6 is a section on line 6—6 of Figure 2.

Figure 7 is a fragmentary view similar to a portion of Figure 2, showing the "off" position of the switch.

Figure 8 is an end view of the casing only, looking toward the outer end.

Figure 9 is a fragmentary section on line 9—9 of Figure 8.

Figure 10 shows in perspective the two insulating members hereinafter described.

Figure 11 shows in perspective one of the terminals.

The same reference characters indicate the same parts in all of the figures.

In the drawing, 12 designates a tubular casing having means for attachment to a support 13, for example, clamping nuts 14 engaged with an external screw thread on the casing and turned up against opposite sides of the support.

The outer end of the casing is provided with internally concave ears 15, forming members of a ball seat in which is formed an oblong guiding slot 16 (Figures 8 and 9). The hand piece of the switch includes a ball portion adapted to turn on the ball seat, and a handle portion extending through the slot 16 and guided in a predetermined path thereby.

The ball portion preferably includes a semi-spherical section 17 of insulating material, such as bakelite, and an approximately semi-spherical metal portion 18, having a socket receiving a shank on the section 17. The portion 18 is the base of a metal handle portion 19.

20 designates a spherical bridging conductor which is preferably a ball of conducting metal of smaller diameter than the insulating section 17, and pressed outwardly by a spring 21 in a radial guiding recess in said section, the said conductor being insulated from the metal portion of the hand piece, and adapted to rotate in said recess for a purpose hereinafter stated.

The gap-separated terminals are provided with circuit wire-engaging means, such as binding screws 22. Such terminals include an inner terminal 23, and an outer terminal 24, the form and arrangement of said terminals being such that they contact simultaneously with the conductor 20 when the hand piece is in the position shown by Figure 2. When the hand piece is in the position shown by Figure 7, only the inner terminal 23 contacts with the conductor, said terminal being provided with a recess, the wall of which constitutes a detent 25 formed to engage a portion of the spherical conductor as shown by Figure 7, and releasably confine the conductor when the switch is in its "off" adjustment. The arrangement is such that when the hand piece is moving to and from the "off" position shown by Figure 7 the spherical conductor 20 rolls in contact with the detent 25, and presents different portions of its periphery thereto, to minimize the corrosion which would be caused by repeated contacts of the same portion of the conductor with the detent.

I provide insulating means for said terminals fixed to the inner end portion of the casing and to said terminals, said means insulating the terminals from each other and from the casing. The casing is preferably prepared to confine said insulating means by forming slots 26 in opposite sides of the inner end portion of the casing, as best shown by Figure 5, and inwardly projecting arcuate stop ears 27 between said slots, said stop ears being formed by inwardly bending or crimping the end portions of the casing between the slots 26 after the insulating members next described are inserted in the slots.

Said insulating means includes an outer member 28 and an inner member 29 of any suitable insulating material. Said members, as best shown by Figure 10, have narrow end portions extending through the casing slots 26, and intermediate enlarged portions within the casing 12 having orifices 32 in which the terminal 23 is tightly fitted. Said orifices are preferably square and the inner terminal is preferably square in cross section. The enlarged portions of the members preferably have arcuate edges 30 and 31. In assembling the parts, the inner member 29 is abutted against the inner ends of the slots 26, a portion of the angular outer terminal 24 is interposed between the members 28 and 29, and the stop ears 27 are formed on the inner end of the casing, so that said ears and the casing slots 26 confine the insulating members, the angular outer terminal, and the inner terminal in position to cooperate as described with the bridging conductor 20.

The inner end portion of the angular terminal projects through a slot 24*a* (Figure 2) in the inner insulating member, and the outer portion of said terminal is inserted in a recess 34 (Figure 10) in the outer insulating member.

The switch may include two outer terminals 24, located at opposite sides of the inner terminal 25, as shown by Figure 2, so that the switch may control two circuits.

I claim:

1. A toggle switch comprising a tubular casing having means for attachment to a support and provided at its outer end with an internal ball seat and an oblong guiding slot in said seat; a hand piece including a ball portion adapted to turn on said seat, and a handle portion movable in a predetermined path in the guiding slot; a bridging conductor carried by said ball portion and pressed outwardly by a spring in a radial guiding recess therein, gap separated terminals provided with circuit wire-engaging means and including an inner and an outer terminal, said terminals being formed and arranged to contact simultaneously with the bridging conductor when the hand piece is in a given position, only the inner terminal contacting with the conductor when the hand piece is in another position; and insulating confining means for said terminals, fixed to the inner end portion of the casing and to said terminals, and insulating the terminals from each other and from the casing.

2. A toggle switch comprising a tubular casing having means for attachment to a support, and provided at its outer end with an internal ball seat and an oblong guiding slot in said seat, and at its inner end with slots in its opposite sides, and inwardly projecting stop ears between said slots; a hand piece including a ball portion adapted to turn on said seat and provided with a radial guiding recess, and a handle portion extending through and movable in a predetermined path in the guiding slot; a bridging conductor carried by the ball and pressed outwardly in said guiding recess by a spring, insulating members confined in the casing slots by said stop ears, and including an outer member and an inner member, gap separated terminals fixed to the insulating members and confined in the casing thereby, said terminals having circuit wire-engaging means, and including an inner terminal extending through the insulating members, and an angular outer terminal having a portion clamped between said members, the arrangement being such that when the hand piece is in a given position, the terminals contact simultaneously with the bridging conductor, and when the hand piece is in another position, only the inner terminal contacts with the conductor.

3. A toggle switch as specified by claim 2, the said insulating members having narrow end portions extending through the casing slots, and intermediate enlarged portions within the casing having orifices engaged with the inner terminal, the casing stop ears and the casing slots confining the insulating members, the angular outer terminal, and the inner terminal, in position to cooperate as described with the bridging conductor.

4. A toggle switch as specified by claim 2, the said insulating members having narrow end portions extending through the casing slots, and intermediate enlarged portions within the casing having orifices engaged with the inner terminal, the casing stop ears and the casing slots confining the insulating members, the angular outer terminal, and the inner terminal, in position to cooperate as described with the bridging conductor, the inner insulating member having a slot in its intermediate enlarged portion receiving and confining a portion of the angular outer terminal, the outer insulating member having a recess in its outer end receiving and confining another portion of the angular inner terminal.

5. A toggle switch comprising a casing having means for attachment to a support, gap separated terminals provided with circuit wire engaging means and including an

inner and an outer terminal, insulating confining means for said terminals fixed to the casing, an oscillatory hand piece fulcrumed in the casing and including an inner portion within the casing and a handle portion outside the casing, said portions being at opposite sides of the center of oscillation of the hand piece, means being provided for causing movement of the hand piece in a predetermined path, a bridging conductor carried by said inner portion and pressed outwardly by a spring in a radial guiding recess therein, said terminals being arranged to contact simultaneously with the bridging conductor when the hand piece is in a given position, only the inner terminal contacting with the conductor when the hand piece is in another position, the bridging conductor being spherical and pressed outwardly by said spring, the inner terminal having a detent formed to engage the bridging conductor, the arrangement being such that when the hand piece is moving to and from its "off" position the spherical conductor rolls in contact with the detent of the inner terminal and presents different portions of its periphery thereto and to the outer terminal to minimize corrosion which would be caused by repeated contacts of the same portion of the conductor with said terminals.

In testimony whereof I have affixed my signature.

HUGH W. BATCHELLER.