Feb. 13, 1940. H. A. SMITH 2,190,342

DOUBLE BREAK ELECTRIC SWITCH

Filed May 12, 1937

Fig. 1.

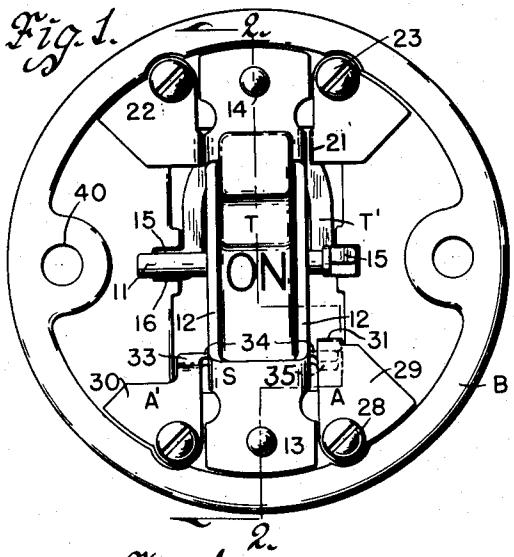


Fig. 2.

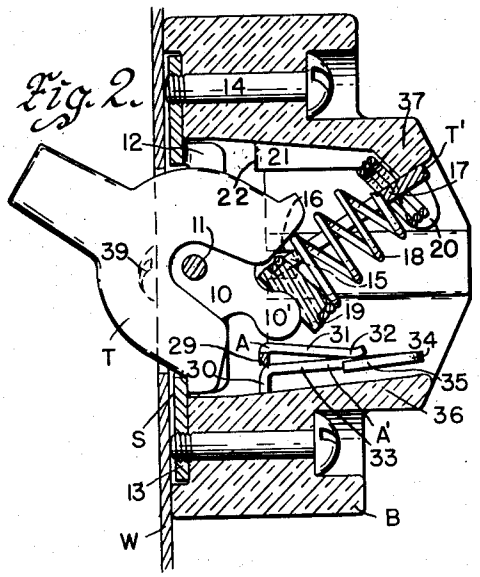


Fig. 4.

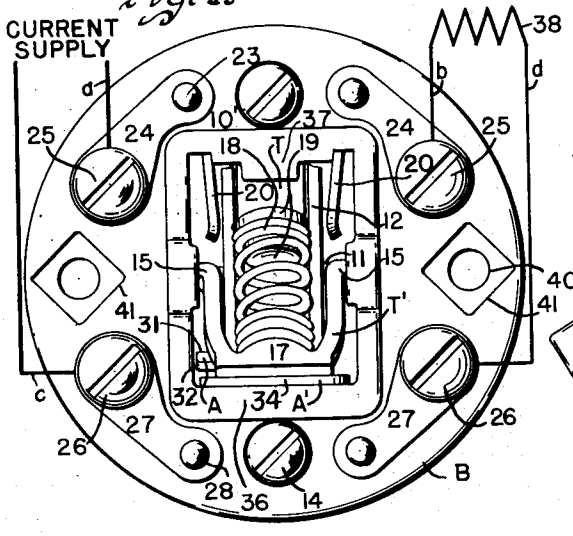


Fig. 3.

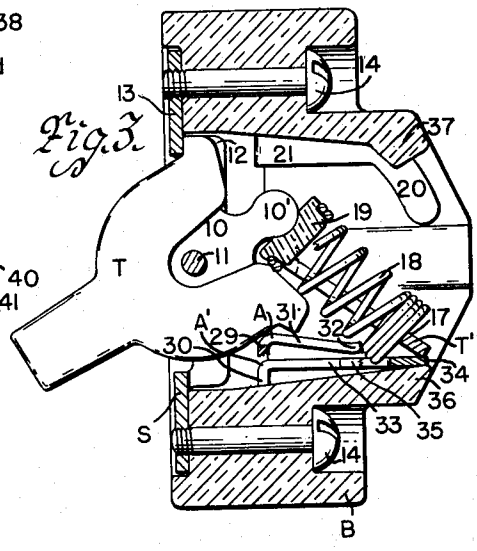
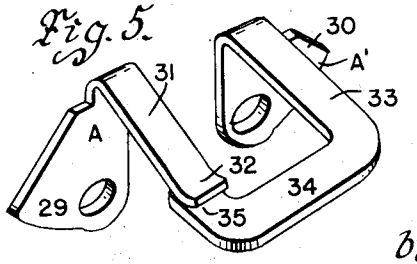


Fig. 5.



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DOUBLE BREAK ELECTRIC SWITCH

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3 Claims. (Cl. 200—67)

An object of my invention is to provide an electric switch of very simple construction, adapted for connection in an electric circuit so that it breaks both sides of the circuit when in "off" position.

Still a further object is to provide a switch structure in which a toggle or snap acting lever bridges one pair of terminals in one side of the electric circuit when the switch is in its "on" position, and which separates another pair of terminals in the other side of the electric circuit when the switch is in the "off" position, whereby a single toggle lever is effectively operable to break both sides of the circuit with very little change in the switch from standard construction.

A further object is to provide a switch in which a pair of spring contacts are so formed and mounted that they normally engage each other resiliently and are separable by an operating member of the switch which engages one of them to move it away from the other one.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my double break electric switch, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawing, in which:

Figure 1 is a front elevation of a double break switch embodying my invention and showing it in the "on" position.

Figure 2 is a sectional view on the line 2—2 of Figure 1.

Figure 3 is a similar sectional view showing the switch in "off" position.

Figure 4 is a rear elevation of the switch showing it in "off" position and showing it diagrammatically connected in both sides of an electric circuit; and

Figure 5 is a perspective view of the terminals which I specifically provide for breaking the second side of the electric circuit.

On the accompanying drawing I have used the reference character B to indicate generally a base, and T a toggle lever. The base B is usually made of porcelain or the like. The toggle T is ordinarily made of insulating material having an insert 10 of relatively thick sheet metal.

The toggle lever T is pivoted on a pin 11 extending through the insert 10 and supported by a pair of flanges 12 of a supporting bar S. The bar S also has flanges 13 at its ends arranged in planes at right angles to the flanges 12 which are connected to the base B as by screws 14.

A toggle member T' is provided in association with the toggle lever T for operation thereby as the toggle lever T is swung about the pivot pin 11. The toggle lever T' is of U-shape having its arms terminating in pintle portions 15 extending away from each other and located in notches 16 of the base B.

Interposed between a central projection 17 adjacent the outer end of the toggle lever T' and a circular disk portion 10' of the insert 10 is a toggle spring 18 and a spring insert 19 of porcelain or like insulating material.

In operation the toggle lever T' is swung from the position shown in Figure 2 to the position shown in Figure 3 by swinging the lever T downwardly, and reversely by swinging the lever T upwardly, the toggle lever T' is returned to the position of Figure 2.

In the position of Figure 2, the toggle lever T' serves as a bridge connection between a pair of terminals 20. These are curved as shown in Figure 4, so that when the outer end of the toggle lever T' swings toward them, it wedges between them.

The terminals 20 have arms 21 extending toward the front of the base B and terminating in plate-like portions 22 which are mounted on the base B by screws 23. The screws 23 extend through the base B and into terminal lugs 24, which are provided with terminal screws 25 for connection in one side of the electric circuit.

For the other side of the electric circuit I provide terminal screws 26, terminal lugs 27 and screws 28. The screws 28 retain a pair of terminal members A and A' in position on the base B. The terminal members A and A' each have attaching foot portions 29 and 30 somewhat similar to the plate-like portions 22 of the terminals 20, and arms of peculiar shape. The arm of the terminal member A is illustrated at 31. It terminates in a contact portion 32.

The arm of the terminal member A' consists of three parts 33, 34 and 35. This arm is U-shaped as shown in Figure 5, and the portion 35 thereof is adapted to normally contact with the portion 32 of the arm 31, as shown in Figures 2 and 5. The arms, of course, are so shaped that when they are mounted in position, the portions 32 and 35 engage each other under tension. When the toggle lever T' is in the position shown in Figure 3, however, it engages the portion 34 of the arm of the terminal member A', thus caus-

ing it to swing to a stopped position against a flange 36 of the base B.

This operation results in the outer end of the toggle lever T' ceasing to bridge the terminals 20 and to open the circuit across the terminal members A and A'. When the switch is returned to "on" position, as in Figure 2, the terminal members A and A' re-engage each other for establishing a circuit, and the toggle lever T' bridges the terminals 20, the lever being stopped in such position by a flange 37 of the base B.

By reference to Figure 4 it will be noted that the terminal screws 25 are connected in one side of the circuit indicated by the wires *a* and *b*, while the terminal screws 26 are connected in the other side of the circuit indicated by the wires *c* and *d*. The load is indicated as a heating element 38 such as that found in an electric stove.

Underwriter requirements for an electric stove are that both sides of the circuit of an electric stove shall be broken when the switch is in "off" position.

Obviously the circuit in the wires *a* and *b* is controlled by the terminals 20 in conjunction with the toggle lever T' acting as a bridging member, while the circuit in the wires *c* and *d* is controlled by the arms of the terminal members A and A', which are separated by the toggle lever T' in the "off" position of the switch. The terminals 20 accordingly serve as the circuit breaker terminals, these being operated in snap action fashion due to the toggle construction of the switch.

Immediately after the circuit is broken across the terminals 20, the circuit is opened across the terminals 32 and 35 so that both sides of the line (*b* and *d*) to the load or heating element 38 are opened. This prevents any possibility of current flowing from the wire *c* to the ground or back to the wire *a*, if the wire *d* should be accidentally connected with the ground or wire *a*.

Thus I provide a very inexpensive means to open both sides of the electric circuit and utilize the single toggle lever T' to accomplish such result. My switch is thus characterized from the usual type of single break switches by using the terminal members A and A' associated with each other and with the toggle lever T' to be operated thereby as disclosed.

The base B is adapted for mounting against some portion of the electric stove or other device to which the switch is applied, such as against the back of a wall W shown in Figure 2, suitable bolts 39 being extended through the wall and through perforations 40 in the base B provided for this purpose, the perforations terminating in angular sockets 41 to receive the nuts for the bolts 39.

Some changes may be made in the construction and arrangement of the parts of my device without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modified forms of structure or use of mechanical equivalents, which may be reasonably included within their scope.

I claim as my invention:

1. In a manually actuated toggle switch, a base of insulating material having a cavity therein, a manually actuated toggle member pivoted in said cavity, a pair of resilient terminals for one side of an electric circuit mounted on one side of said cavity separated by a gap, a second pair of resiliently separable terminals mounted on another side of the cavity comprising a pair of elements normally urged resiliently into contact with each other, one of said elements having an extension thereof positioned adjacent a wall of said cavity at the side opposite said gap, and a spring pressed toggle actuated lever having a portion adapted to be moved to a stop position against the cavity wall bridging the gap between said first pair of terminals to close a side of the circuit, said lever portion being adapted to move the extension of said second resilient terminal element to a stop position against the adjacent cavity wall for separating said second pair of terminals and simultaneously establishing the gap between said first pair of terminals.

2. In a manually actuated toggle switch, a base of insulating material having a cavity therein, a manually actuated toggle member pivoted in said cavity, a pair of resilient terminals for one side of an electric circuit mounted on one side of said cavity separated by a gap, a second pair of resiliently separable terminals adapted to assume positions of operation for opening and closing another side of the electric circuit comprising a pair of elements, one of said elements having an extension thereof positioned adjacent a wall of the cavity at a side opposite said gap and overlying said first element in one position of operation and a spring pressed toggle actuated lever adapted to be moved to a stop position bridging the gap between said first pair of terminals to close a side of the circuit, said lever being adapted to be moved to a stop position against one of said second resilient terminal elements for changing the position of operation of the elements of said second terminal with respect to each other and simultaneously establishing the gap between said first pair of terminals.

3. In a manually actuated toggle switch, a base, a manually actuated toggle member of electrically conductive material pivotally mounted thereon for movement in a path from side to side, a pair of resilient terminals for one side of an electric circuit mounted on one side of the base in the path of said member and separated by a gap, a second pair of resiliently separable terminals mounted on another side of the base, comprising a pair of elements normally urged resiliently into contact with each other, one of said elements having a portion thereof positioned opposite the gap in the path of said member, and a spring pressed toggle actuated lever adapted to move said toggle member in one direction to a stop position bridging the gap between said first pair of terminals to close said side of the electric circuit, and in another direction to a stop position against the portion of said second terminal element in the path thereof for simultaneously separating said second pair of terminals and establishing a gap between said first pair of terminals.

HOWARD A. SMITH.