Dec. 8, 1931. H. J. HAMMERLY 1,835,981

INCLOSED SWITCH

Filed May 5, 1928 2 Sheets-Sheet 1

Fig. 1.

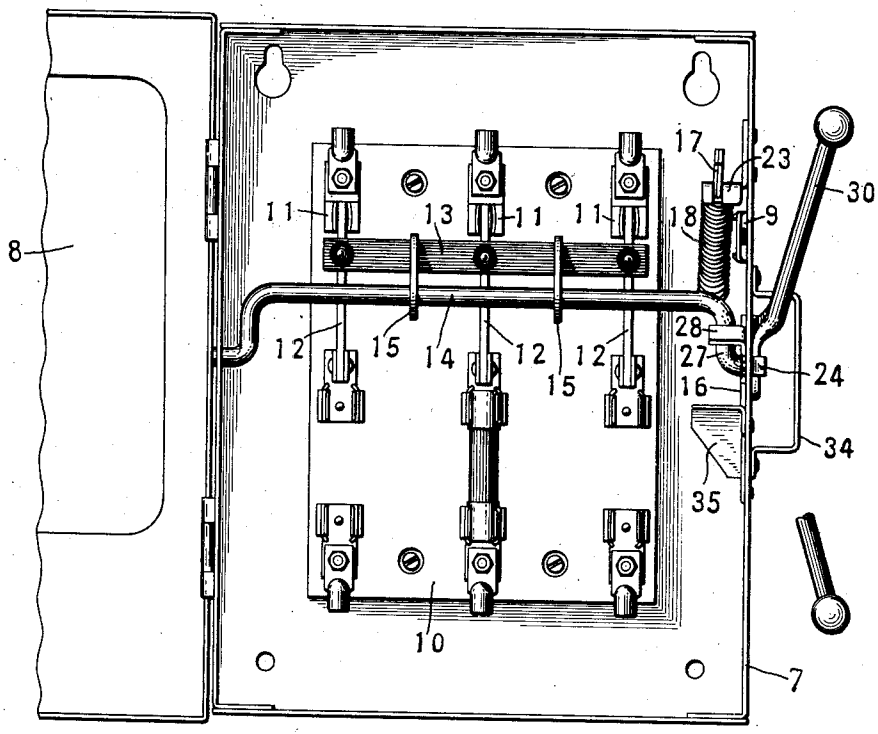


Fig. 2.

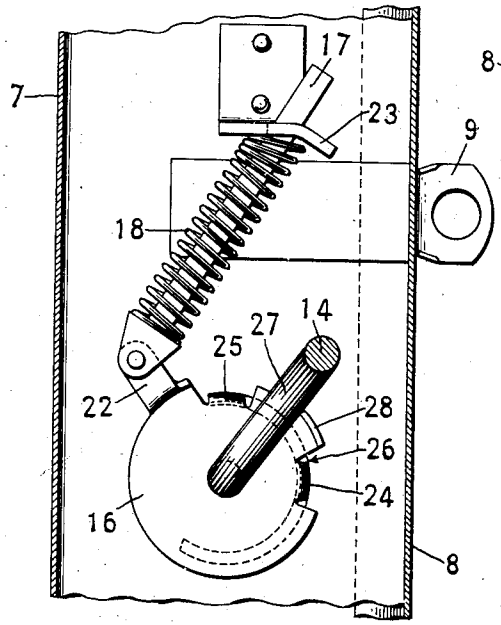
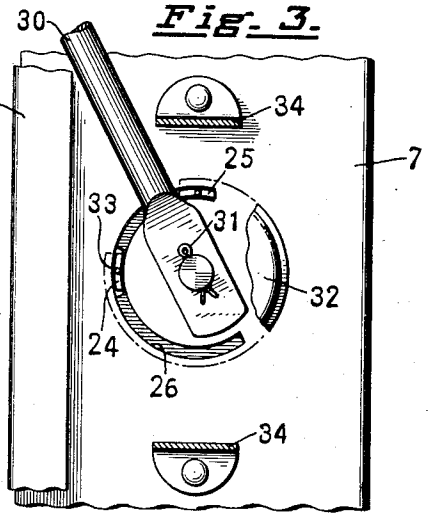


Fig. 3.



INVENTOR,
Herman J. Hammerly,
BY
ATTORNEY.

Dec. 8, 1931. H. J. HAMMERLY 1,835,981

INCLOSED SWITCH

Filed May 5, 1928 2 Sheets-Sheet 2

Fig. 6.

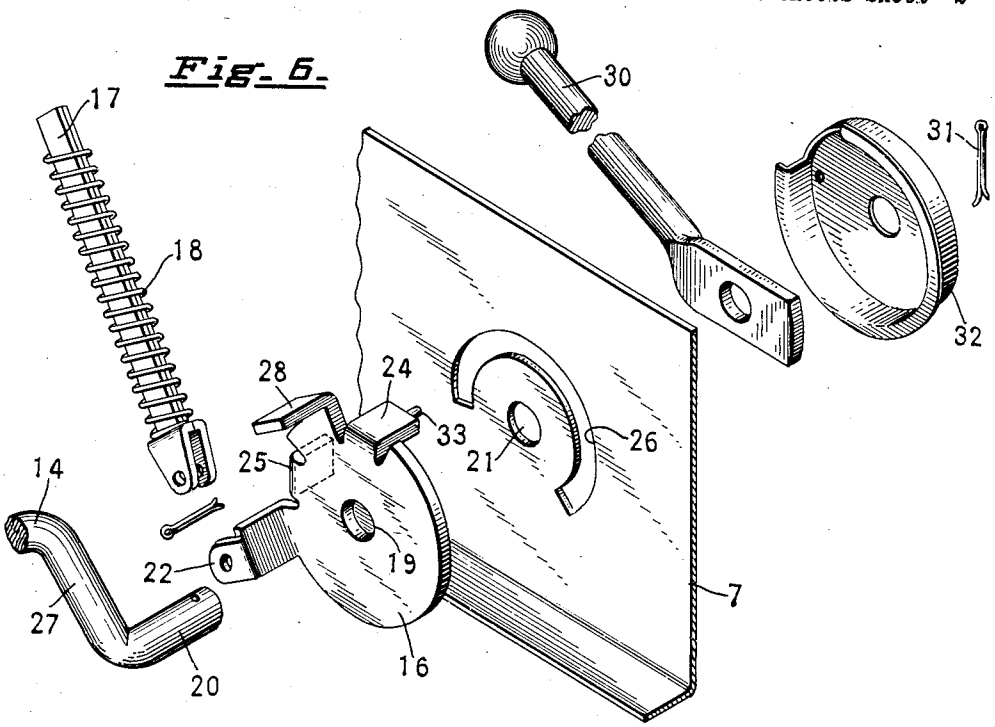


Fig. 4.

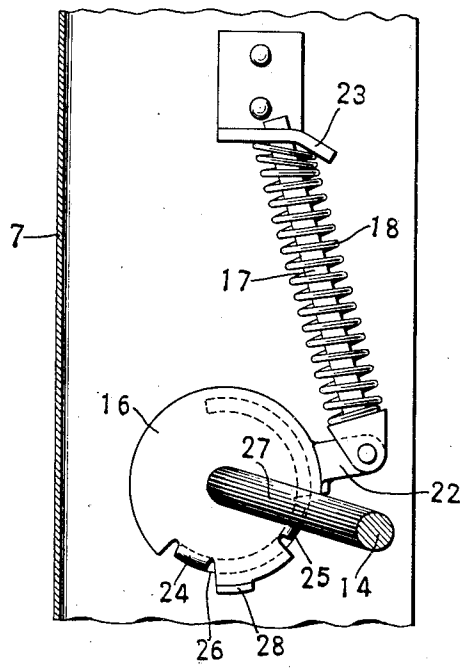
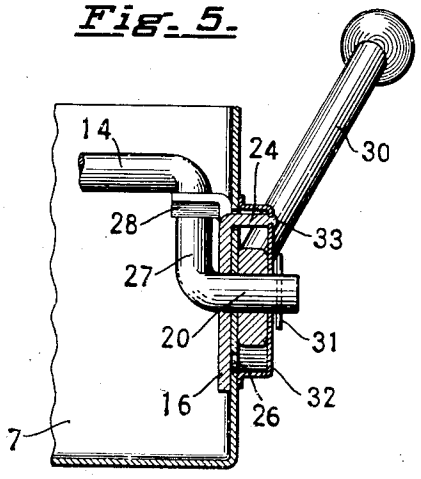


Fig. 5.



INVENTOR,
Herman J. Hammerly,
BY
ATTORNEY

Patented Dec. 8, 1931 1,835,981

UNITED STATES PATENT OFFICE

HERMAN J. HAMMERLY, OF WALLINGFORD, CONNECTICUT, ASSIGNOR TO THE TRUMBULL ELECTRIC MANUFACTURING COMPANY, OF PLAINVILLE, CONNECTICUT, A CORPORATION OF CONNECTICUT

INCLOSED SWITCH

Application filed May 5, 1928. Serial No. 275,320.

This invention relates to the class of externally operated inclosed switches having automatic means for causing the switch to operate with a quick-make and quick-break movement by the normal manual movement of the external operating handle.

The particular object of my invention is to provide a very simple, cheap and efficient means for causing a quick-make and quick-break movement of the movable contacts of a switch of this class.

Another object is to provide such a construction which can be made with a minimum number of parts of such a simple nature that they may be stamped and formed with tools of the simplest and cheapest nature.

Another object is to provide a quick-make and quick-break mechanism that, after its movement has once started, will complete its full operating movement independently of the operator.

Another object is to provide a switch operating mechanism which may be readily assembled or dis-assembled without the use of special tools or fixtures.

Another object is to provide a switch construction in which the operating crank is inserted into bearing holes in the sides of the box and one end of the crank is utilized as a bearing for the free movement element as well as the sole means for securing the element in operable position.

Another object is to provide a construction in which the box member is slotted to permit the lugs of the free movement element to project from the inside of the box to the outside and to provide a disc-like free movement which covers the slots and, further, to utilize the slots in the box as a stop means for the free movement elements in both directions of its operating movements.

Fig. 1 is a front view of an inclosed switch embodying my invention, the cover being shown open and partly broken away.

Fig. 2 is a sectional view and side elevation showing the parts of the quick-break mechanism which are inside of the box, the parts being shown in the closed circuit position.

Fig. 3 is a side view from the outside showing the handle and its connection with the actuating mechanism parts being broken away.

Fig. 4 is a view similar to Fig. 2 but showing the parts in the open circuit position.

Fig. 5 is a transverse sectional view showing the connection between the handle and operating crank.

Fig. 6 is an exploded perspective view showing the principal parts involving my invention.

The box 7 may be of any suitable construction and have a cover 8 secured in any suitable manner. Usually a spring latch 9 is provided for structures of this character to hold the cover closed.

The switch mechanism per se may be of any suitable character. In the form shown the insulating base 10 is secured in the bottom of the box and provided with the usual circuit terminals and stationary and movable switch contacts such as the usual stationary jaws 11 and hinged blades 12. Usually there are two or more of these blades connected by a cross bar 13 for simultaneously operating them.

The operating crank 14 has its ends supported in opposite sides of the box in any suitable manner and its central portion connected to the arms 15 which in turn are connected to the cross bar 13.

In switch constructions which include what is commonly known as a "wire handle" or crank, it has been the usual practice to wiggle the handle through one of the bearing holes in the side of the box and then spring or force the other end until it snaps into the other bearing hole: This, of course, required that the handle be made long enough so that considerable force was necessary to get it into its bearings so that when, in position, it would bear against the sides of the box and prevent much, if any, loose endwise movement of the handle.

In my construction, I have so made the crank member that it can be slipped into its bearings without any forcing whatever and then draw the end 24 of the crank out until it bears against the disc 16 which, in turn, bears against the inside wall of the box and

the cotter pin 31 securely holds the members in position.

The quick-break mechanism consists of the disc 16, the rod 17 and the spring 18. The disc 16 has a central perforation 19 through which the end 20 of the crank 14 extends into the perforation 21 in the side of the box. The rod 18 is pivoted to the arm 22 in any suitable manner and its opposite end is guided in the forked abutment bracket 23 which is secured to the side of the box.

The disc 16 is provided with lugs 24 and 25 which extend through the slot 26 in the side of the box.

The arm 27 of the operating crank lies between the arm 22 and the lug 28 of the disc 16. When the parts are in the closed circuit position the spring 18 tends to rotate the disc 16 in an anti-clockwise direction as viewed in Fig. 2 so that the lug 28 presses against the arm 27 of the crank and holds the parts of the switch in the closed circuit position.

The handle 30 is mounted on the outer end 20 of the crank and is held in place by any suitable means such as the pin 31. The handle lies between the lugs 24 and 25 of the disc 16. A guard 32 may enclose the end of the handle and be held in place in any suitable manner as for instance by providing the guard with holes to fit over the tips 33 of the lugs in which positions it will be secured by the pin 31. Or the tips 33 may be riveted over to permanently attach the parts.

The disc 16 substantially covers the slot 26. A bracket 34 may be provided outside the handle if desired.

To open the circuit the handle 30 is drawn downward from the position shown in Fig. 1. The pressure of the handle against the lug 24 rotates the disc 16 on the shaft 20 until the spring of the quick-break mechanism passes the center line of its movement and exerts its pressure to open the circuit by rotating the disc 16 clockwise to the position shown in Fig. 4. The lug 24 serves as a stop against the front end of the slot 26. An additional stop 35 may be provided to limit the movement of the crank 14 and the handle 30 in this opening movement.

To close the circuit the handle 30 is thrown upwardly and engages the lug 25 of the disc 16 and rotates the disc until the quick-break mechanism throws the switch blades into the closed circuit position reversely as above described.

In addition to being very cheap and substantial, this construction may be very readily assembled or dis-assembled.

The operation of assembling is as follows: spring arms 17 are connected to the arms 22 of the disc member 16 by means of the cotter pin as indicated by the drawings. The end 20 of crank shaft 14 is then inserted through hole 19 of the disc 16 and the bearing opening 21 in the side of the box after which, the other end of the crank is inserted into its bearing opening in the opposite side of the box, the lugs 24 and 25 of the disc 16 being, of course, positioned in the arcuate slot 26 and projecting through the side of the box: Then, in order, the handle 30 is positioned upon the projecting end 20 of the crank shaft 14 and between lugs 24 and 25. The guard member 32 is also positioned on the crank shaft with the small holes engaged by the projections 33 on lugs 24 and 25 and, as the final operation the cotter pin is inserted in the hole in the end 20 of the crank shaft. Thus it will be seen that all of these parts are secured in operable relation and assemblage by the cotter pin 31.

It is sometimes necessary or desirable to dis-assemble the construction, and, with this construction, it is only necessary to remove the cotter pin 31 and reverse the order of assemblage. This feature is especially valuable in cases where it is desirable to ship the handles detached from the switch in order that the switches may be more compactly packaged for shipment. In such cases it will only be necessary to pack the handle 30, guard 32 and pin 30 in a wrapper or envelope which may be shipped inside of the switch box. This arrangement not only reduces the size of the carton but reduces the factory cost by the omission of this part of the assembling.

Obviously, the guard 32 may be omitted entirely without affecting the co-acting relation of the remaining parts.

This quick-make and quick-break construction is very sturdy and efficient in active service and yet so comparatively simple and cheap that it may be applied to what are commercially known as 'Type C" inclosed switches which are the cheapest type of standard switches and, in which class it has been difficult to provide a quick-make and break means because of the commercial objection to the necessary additional cost. My invention is shown and described herein as applied to an inclosed switch of the knife blade type but, obviously my quick-make and quick-break means may be applied to any type of switch having an element equivalent to the operating crank as shown herein.

I claim:

1. A quick-make and quick-break switch construction including a box having crank shaft bearings in its opposite side walls and a slot concentric with one of said bearings, a switch within the box, a crank shaft within the box having its ends supported in said bearings and having operable connection with said switch, a pivotally mounted external operating handle, a pivotally mounted intermediate member, a spring inside of said box for moving said intermediate member independently of the operating handle, the

said intermediate member comprising a sheet metal plate having a pair of spaced lugs projecting from each side of the plate in opposite directions, two of said lugs having a lost-motion engagement with a portion of said crank shaft and the other two of said lugs projecting through the slot in the side of the box and having a lost-motion engagement with said operating handle.

2. A quick-make and quick-break switch construction including a box having side and end walls, one of the side walls having a crank shaft bearing and a slot concentric therewith, a switch within the box, a crank shaft within the box having one end supported in said bearing and having operable connection with said switch, a pivotally mounted operating handle outside of said box, a pivotally mounted intermediate member within the box and a throwing spring for said intermediate member inside of said box, the said intermediate member comprising a pivotally mounted plate having a pair of spaced lugs projecting in one direction and having a lost-motion engagement with a portion of said crank shaft, said intermediate member having a pair of spaced lugs projecting in the opposite direction from the other lugs through the slot in the side wall of the box and having a lost-motion engagement with said operating handle and a cover member for housing the ends of the lugs of the intermediate member which project through the side of the box.

3. A quick-make and quick-break switch construction including a box having a crank shaft bearing in at least one of its side walls and a slot in said side wall concentric with said bearing, a switch within said box, a crank shaft mounted in said bearing and having operable connection with said switch, an operating handle outside of said box and pivotally mounted on one end of said crank shaft, an intermediate member pivotally mounted on said crank shaft inside of said box and a throwing spring for said intermediate member, said intermediate member comprising a metal plate having a pair of spaced lugs projecting from each side of the plate in opposite directions, one pair of said lugs having a lost-motion engagement with a portion of said crank shaft and the other pair of said lugs having a lost-motion engagement with said operating handle.

HERMAN J. HAMMERLY.