May 26, 1925. 1,539,104

J. A. AMOS

SWITCH

Filed April 29, 1922 2 Sheets-Sheet 1

Fig.1.

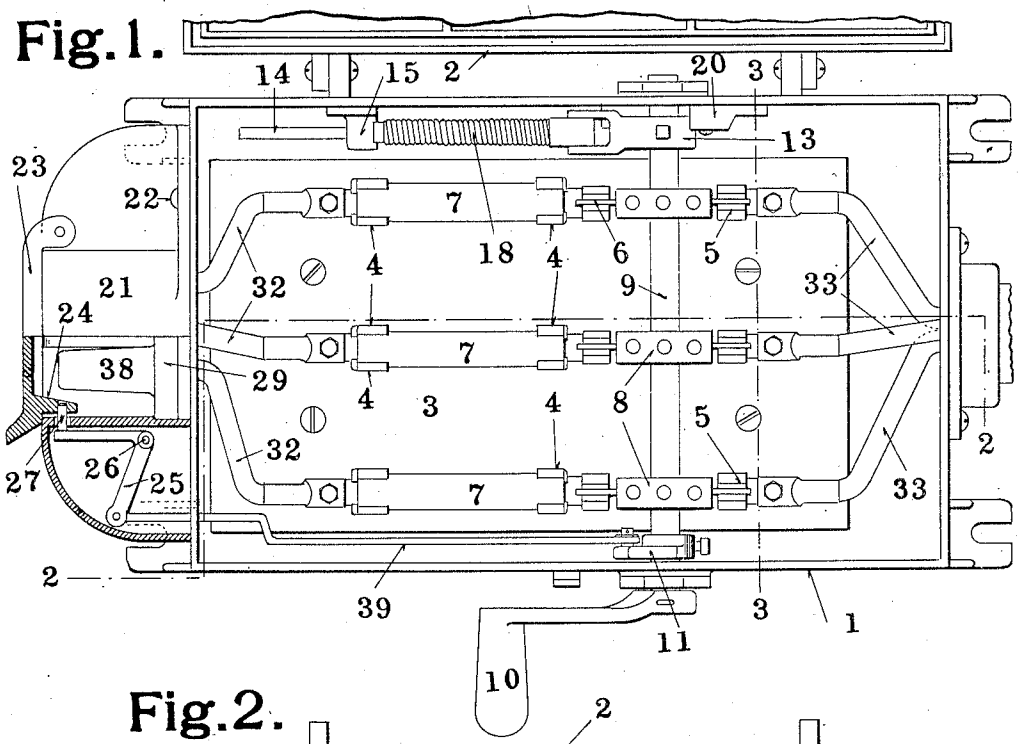


Fig.2.

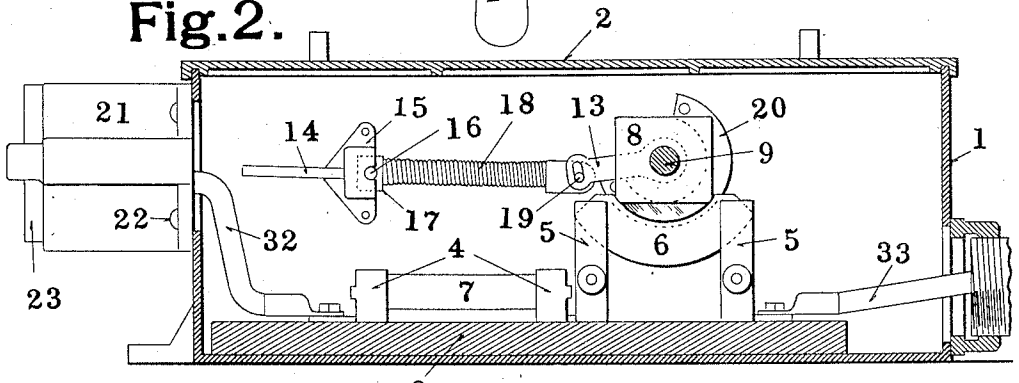


Fig.7.

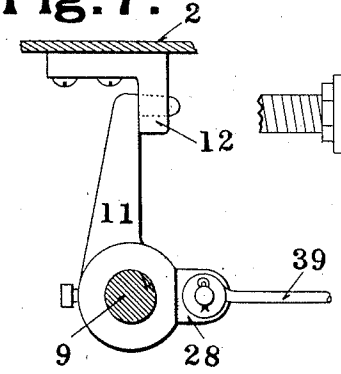


Fig.8.

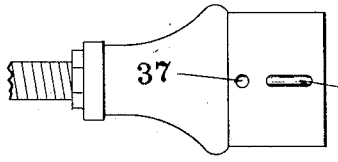
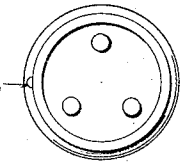


Fig.9.



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May 26, 1925. 1,539,104

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Filed April 29, 1922 2 Sheets-Sheet 2

Fig.3.

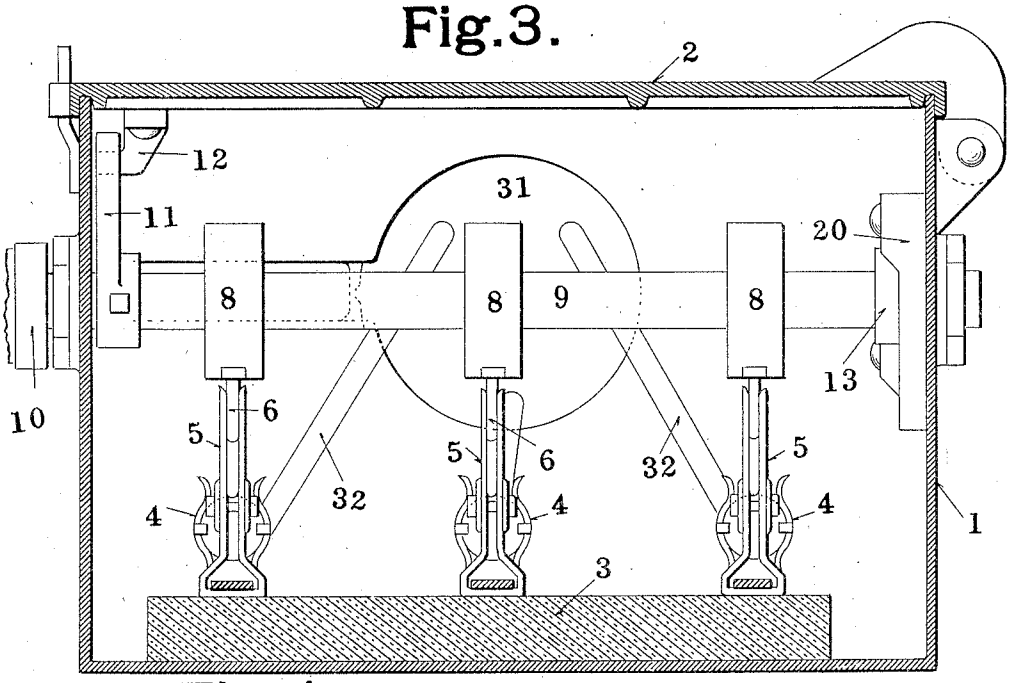
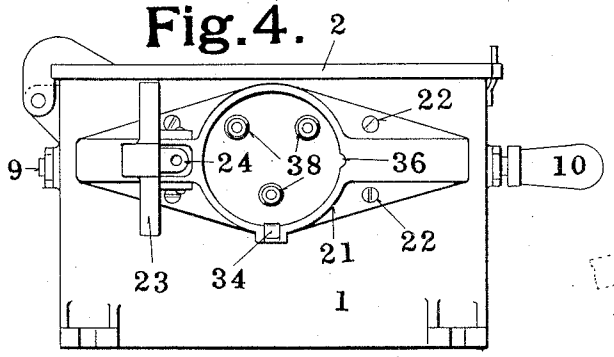


Fig.4.



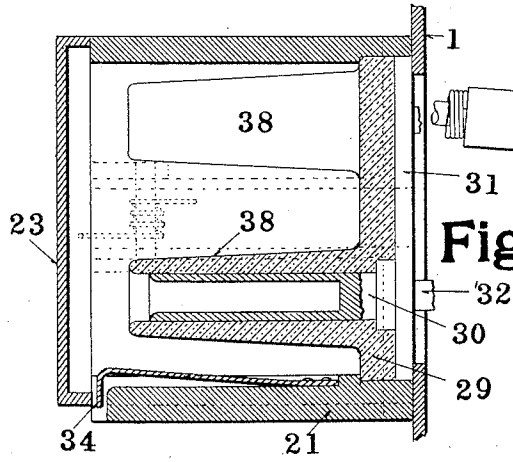
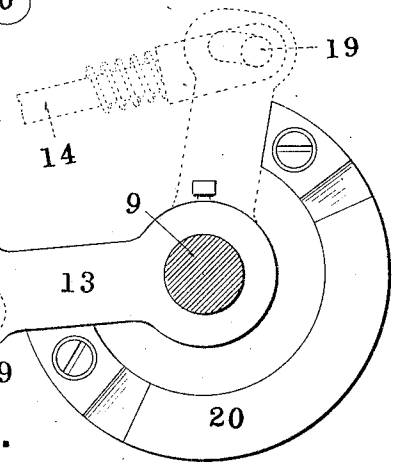


Fig.5.

Fig.6.



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UNITED STATES PATENT OFFICE.

JOHN A. AMOS, OF ST. LOUIS, MISSOURI, ASSIGNOR TO OLIVER ELECTRIC AND MANUFACTURING COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

SWITCH.

Application filed April 29, 1922. Serial No. 557,448.

To all whom it may concern:

Be it known that I, JOHN A. AMOS, a citizen of the United States of America, residing at the city of St. Louis, State of Missouri, United States of America, have invented a certain new and useful Switch, of which the following is such a full, clear, and exact description as will enable anyone skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to an electric switch and associated plug receptacle as hereinafter fully described. One of the objects of the invention is to provide means whereby access cannot be had to the switch parts or conductors and the connecting plug cannot be inserted or removed from the receptacle while the switch is in closed circuit position thus eliminating danger to even the most careless and inexperienced workmen. Other objects and advantages of my invention relating to structural features designed to produce a safe, durable and efficient switch will appear from the following description.

In the accompanying drawings, Figure 1 is a top view partly in plan and partly in section of a switch embodying my invention, the switch housing cover being open; Figure 2 is a vertical longitudinal section along the line 2—2 of Figure 1; Figure 3 is a vertical transverse section along the line 3—3 of Figure 1; Figure 4 is an end view with the receptacle cover in open position; Figure 5 is a sectional view of the receptacle and its cover; Figure 6 is a view showing a portion of the switch toggle elements and stop plate therefor; Figure 7 is a fragmentary view showing the cover lock and associated parts; Figure 8 is a side elevation and Figure 9 is an end view of the plug adapted to cooperate with the receptacle on the switch housing.

1 represents a metal switch housing of box shape having a hinged cover 2. To the bottom of the housing is attached an insulating block 3 upon which is mounted fuse clips 4 and stationary switch contacts 5. These contacts are each in the form of parallel spring fingers between which the movable contacts 6 of the switch slide in "wiping" contact in the opening and closing operation. 7 indicates the fuses held in the fuse clips 4. The conducting wires connecting the fuse clips with the receptacle are indicated by the numeral 32 and the line conductors connected to the stationary switch contacts 5 by the numeral 33.

The movable switch contacts 6 are of segmental shape and are attached to insulating blocks 8, which blocks are in turn attached to the switch shaft 9 journaled in suitable bearings in the housing walls and operated by means of the handle 10 outside the housing.

A cover locking member 11 is attached to the shaft and has a right angle extension at its free end which in the closed position of the cover and the closed position of the switch passes over the horizontal extension of the bracket 12 attached to the cover and prevents the cover being opened.

A toggle member 13 is also attached to the switch shaft 9 and cooperates with a second toggle member 14, the rear end of which is supported by the bracket 15 attached to the wall of the switch housing and is capable of pivotal and longitudinal movement with respect thereto. In the form shown this pivotal movement is on a pivot 16 carried by block 17 through which toggle member 14 slides, said pivot being seated in suitable recesses in the bracket 15 as shown. A compression spring 18 surrounds the toggle rod 14 and bears on the block 17 at one end and at the other end on an enlarged head of the member 14. The forward end of the toggle member 14 carries a pivot pin 19 projecting from its sides which pin cooperates with transverse slots in the forked end of the toggle member 13, these slots being so arranged that they extend substantially at right angles to a line between the center of the switch shaft and the pivot 16 when the toggle member 13 is at a point intermediate the limits of its travel and in the particular form shown extends directly toward the pivot 16.

In Figure 2 and in full lines of Figure 6 the toggle is in the position it occupies when the switch is closed and the dotted lines in Figure 6 show the toggle position when the switch is open. The ends of stop plate 20 attached to the switch housing

form stops for the toggle member 13. It will be noted from the figures referred to that when the toggle is in closed position the pivot pins 19 are in the bottoms of the slots and when the switch is in open position are in the tops of the slots. This shift from top to bottom of the slots takes place automatically upon passage of the pins 19 over the line between the center of the shaft 9 and the pivot 16 and thus the toggle angle is greater in the closed position of the switch than it would be with the same extent of motion of the switch shaft if the slots were not employed. The construction just described has the advantage of increasing the toggle resistance to initial opening movement of the switch and likewise increasing the toggle angle suddenly and immediately after release to produce quicker separation of the contacts.

The receptacle housing 21 is attached to the switch housing mechanically and electrically by means of the screws 22. It is provided with a hinged cover 23 for the open end of the receptacle which cover has an inwardly projecting perforated boss 24. The lever 25 pivoted at 26 is provided at one end with an extension 27 adapted to enter the perforation in the boss 24 of the receptacle cover. The other end of the lever 25 is connected by means of a rod 39 with a short lever 28 attached to the switch shaft 9 and which in the form shown is integral with the locking member 11. The position of the short lever 28 is such with respect to the handle 10 that when the switch is in closed position, the locking extension 27 engages with the receptacle cover and prevents its being opened. Said extension 27 is likewise adapted to engage with the opening 37 in the plug shown in Fig. 8 whereby the plug cannot be removed or inserted when the switch is in closed position.

The interior circular portion of the receptacle housing is of enlarged diameter at the bottom to receive the insulating base 29 in which the metal contact sockets 30 of the receptacle are held. These contact sockets have an integral collar as shown which bears upon an insulating member 31 which member bears upon the switch housing. The construction just described makes a secure mounting of the conducting and insulating parts of the receptacle without the use of any securing members in addition to the screws 22 which hold the receptacle on the switch housing.

The inner wall of the receptacle 21 carries a resilient contacting member 34 as shown in Figures 4 and 5. This contact member is in electrical connection with the walls of the receptacle which walls are grounded together with the switch housing and the member projects into the path of the lug cooperating with the receptacle and comes into contact with the plug wall before the electrical terminals of the plug contact with the terminals of the receptacle, the purpose of the member 34 being to produce a good wiping ground contact with the plug and thus make certain the proper grounding of the plug casing through the ground connection of the receptacle and switch housings.

I prefer to provide the plug with a spline 35 engaging a groove 36 in the receptacle wall whereby the plug cannot be inserted in the receptacle in a manner to make more than a single predetermined circuit connection but as further security against producing a wrong connection in case for example when the spline 35 has been broken off or a plug is used which has no such member, I place the receptacle contacting terminals 38 in non-symmetrical relation as shown in Figure 4 where the upper terminals are each unequal distances from the other two terminals.

The extent of motion of the rotatable switch member is preferably such that the portions of the conducting blade 6 which contact with the right hand contacts in closed position of the switch are brought into frictional engagement with left hand contacts when the switch is open and thus clean condition of contacting portions of the blade is assured. The travel of the blade transversely in the direction of the length of the contact fingers also causes lint or any combustible material on the contacts to fall at the sides of the contacts instead of collecting between the fingers at the bottom as in ordinary knife blade switches.

Having fully described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

The combination of an electric switch, a plug receptacle connected therewith and provided with a cover, a switch operating member, a pivoted lever on the receptacle housing, one end of said lever constituting a locking member for the receptacle cover and the other end being connected to the switch operating member.

In testimony whereof, I have hereunto set my hand and affixed my seal.

JOHN A. AMOS. [L. S.]