

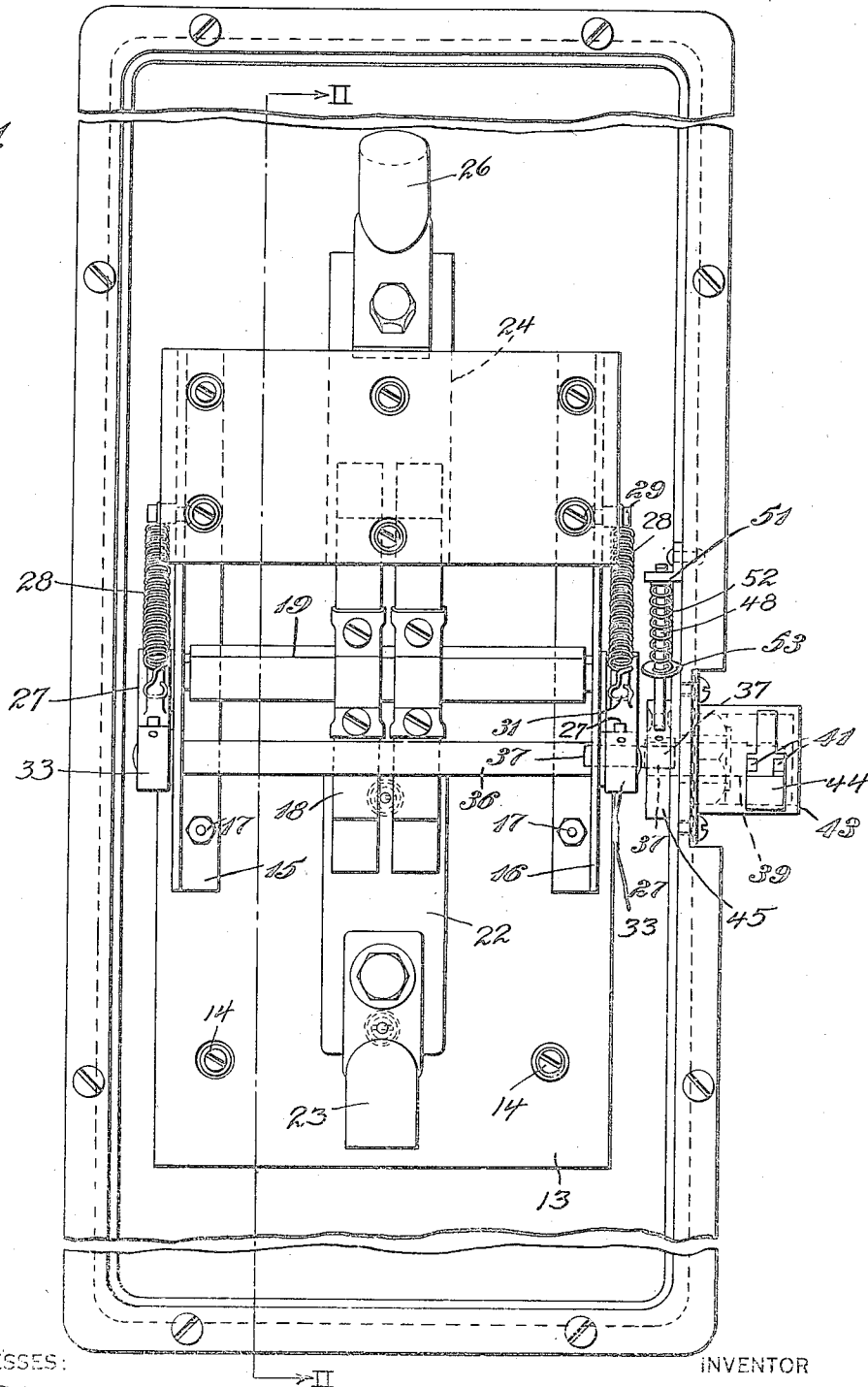
Jan. 2, 1923.

1,440,467

O. S. JENNINGS.  
SAFETY SWITCH BOX.  
FILED Nov. 20, 1920.

2 SHEETS-SHEET 1

Fig. 1.



WITNESSES:

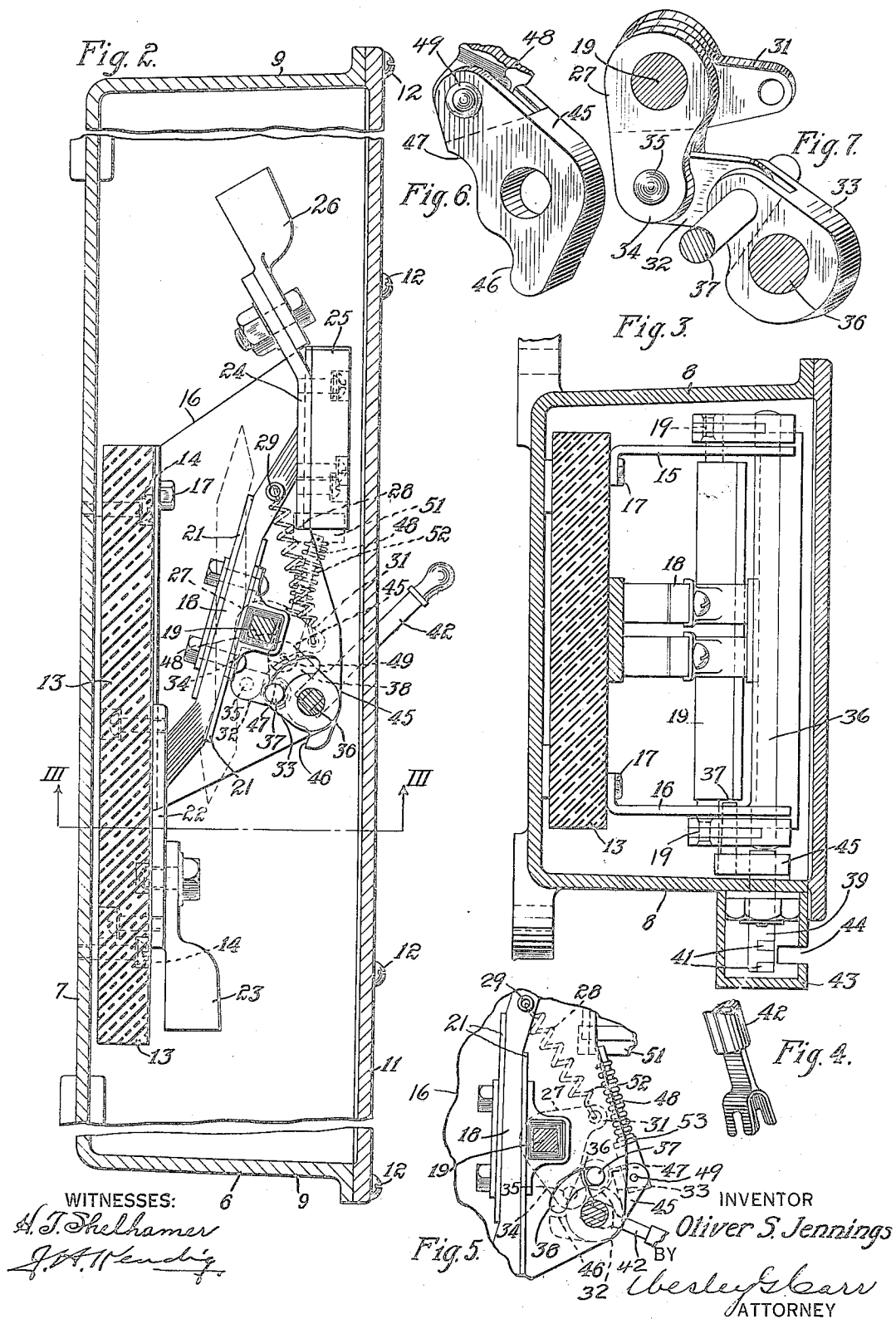
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1,440,467

2 SHEETS-SHEET 2



Patented Jan. 2, 1923.

1,440,467

# UNITED STATES PATENT OFFICE.

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## SAFETY SWITCH BOX.

Application filed November 20, 1920. Serial No. 425,525.

*To all whom it may concern:*

Be it known that I, OLIVER S. JENNINGS, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Safety Switch Boxes, of which the following is a specification.

My invention relates to switch mechanism and particularly to switch mechanism of the brush type wherein a switch brush is pivotally mounted within a housing and engages contact members disposed adjacent to the switch base and to the front of the housing.

The outer contact members of switches of this type are usually mounted upon the cover. While this construction has many advantages, one of them being that the switch may be inspected without difficulty when the cover is open, it is not possible, when the cover is closed, to determine whether the switch is in proper engagement with the contact members on the cover.

An object of my invention is to provide a switch mechanism of the general type above referred to wherein the outer contact member is supported upon a base member which supports the switch, instead of on the cover.

By mounting the switch and contact members upon the detachable base, the switch mechanism constitutes a unit which may be removed bodily from the housing for the purpose of inspection and repair.

Another object of the invention is to provide a switch mechanism, having the above characteristics, wherein the operating mechanism for the switch constitutes a complete unit that is entirely independent of the switch mechanism and permits the removal of the switch mechanism without interference with the operating mechanism.

A further object of the invention is to provide a switch mechanism having all of the advantages of the brush-type switch with the added advantage of the unit construction without complicating the structure and without increasing the manufacturing cost thereof.

A further object of the invention is to provide a switch structure that may be key-actuated, thereby precluding the operation thereof by unauthorized persons.

A further object of the invention is to provide a unit-switch construction with an independently-mounted mechanism that will

impart snap action to the switch mechanism.

These and other objects, that will be apparent throughout the further description of the invention, are attained by means of the switch mechanism hereinafter described and illustrated in the accompanying drawings, wherein:

Figure 1 is a plan view of the switch mechanism mounted within a housing having the cover removed.

Fig. 2 is a longitudinal section of the housing taken on the line II—II of Fig. 1, showing portions of the switch mechanism in section and in side elevation.

Fig. 3 is a transverse section through the housing taken on the line III—III of Fig. 2.

Fig. 4 is a perspective view of a portion of the operating handle.

Fig. 5 is a fragmentary elevation of certain switch-controlling elements, showing their relative positions when the switch is in open position, and

Figs. 6 and 7 are perspective views of details of the switch mechanism.

Referring to the drawings, the apparatus includes a housing having a bottom wall 7 and side and end walls 8 and 9, respectively. The housing is provided with a detachable cover 11 that is preferably secured to the housing by means of screws 12.

The switch mechanism includes an insulating base or panel 13 that is detachably secured to the bottom wall 7 by means of screws 14. Upon opposite sides of the base, a pair of separate supporting standards or plates 15 and 16 are secured by means of bolts 17.

The switch member 18 is pivotally mounted between the supporting plates upon a shaft 19 that is rotatably supported by the supporting plates. The switch is of the brush type and consists of a plurality of metal strips that are clamped between plates 21 which are secured to the switch shaft 19.

A contact plate 22 is mounted upon one end of the base 13 and is conductively attached to the live terminal 23.

Spaced from the opposite end of the panel and adjacent to the front face of the housing, a contact member 24 is mounted upon an insulating panel 25 that is secured to the outer ends of the supporting plates 15 and 16. This contact member is conductively connected to a load terminal 26.

The switch member 18 turns between the

contact members 22 and 24 and is movable from the closed position shown in full lines in Fig. 2 to the open position shown in broken lines in the same figure. The switch is turned through the medium of two bell-crank levers 27 that are secured to opposite ends of the shaft 19. The levers are normally yieldingly held in open position by means of tension springs 28 that are attached at one end to the supporting plates 15 and 16 at 29 and, at the other end, to the arms 31 of the cranks 27.

The switch member 18 is retained in closed position by means of a pair of toggle links 32 and 33, the former being pivoted to the arm 34 of the crank 27 by means of a pin 35 while the latter is pivoted to the auxiliary shaft 36 that is mounted on the supporting plates 15 and 16.

The knee-pivot pin 37 connects the toggle links and operates in an arcuate slot 38 that is disposed in the supporting plate 16 concentric to the axis of the shaft 36. When the toggle links are in the position indicated in Fig. 2, the knee-pivot pin occupies a position on one side of the "dead center" of the toggle and bears against the lower end of the arcuate slot.

The switch will, therefore, remain in closed position until the pin 37 is moved to the other side of the "dead center" of the toggle, at which time the toggle will collapse and permit the switch to move to the open position indicated in broken lines in Fig. 2. At this time, the pivot pin 37 is held against the upper end of the slot 38 which serves to limit the opening movement of the switch.

It will be understood that the switch-controlling and actuating mechanism just described is duplicated on the side of the apparatus adjacent to the plate 15, and, therefore, the switch shaft is actuated by a force exerted at each end of the shaft.

The switch mechanism above described is constructed and assembled as a unit and may be removed bodily from the housing by releasing the base 13 from the bottom of the housing.

The switch is operated by means of an operating shaft 39 that projects through the side of the housing. The outer end of the shaft is provided with notches 41 adapted to receive a handle 42 (Figs. 2, 4 and 5) that is provided with a forked key portion which is so slotted that it fits into the notches 41. The housing 43, that is provided with an opening 44 for the entrance of the handle, serves to protect the outer end of the operating shaft and prevent its manipulation except by means of the proper key handle. The slots 41 are so disposed with relation to the switch and the opening 44 that the key cannot be moved while the switch is in closed position.

The inner end of the operating shaft 39 is provided with a pawl lever 45 (Figs. 1, 5 and 6) having contact faces 46 and 47 that are adapted to overlap the projecting end of the pin 37 carried by the toggle links and engage the opposite sides thereof.

A spring shaft 48 is pivoted to the arm of the lever 45 by means of a pin 49, and the free end thereof is slidably mounted in a guide bracket 51 that is secured to the side of the housing. A compression spring 52 surrounds the shaft and is disposed between the shoulder 53 and the guide bracket 51. The springs serve to yieldingly retain the operating shaft 29 in either open or closed position and to move it to open or to closed position with a snap action when the pivot pin 49 passes the center line connecting the axis of the shaft 39 and the opening in the guide bracket 51 through which the shaft 48 projects.

Assuming the switch to be in the closed position shown in Fig. 2, the operation is as follows: The key portion of the handle 42 is inserted through the opening 44 in the housing 43 into engagement with the notched portion of the operating shaft 39. The handle is then turned downward and will move the knee-pivot 37 upward from "made" position when the contact face 46 of the lever 45 engages the projecting end of the pin.

When the pin 37 is moved upward past the "dead center" of the toggle, the toggle will collapse to "broken" position in response to the action of the spring 28, which will turn the switch to open position with a snap action. The space between the contact faces 46 and 47 of the lever 45 permits of this action.

To close the switch, the handle is moved upward, thereby moving the contact face 47 into engagement with the pin 37. When the pin 37 is moved past the "dead center" of the toggle, the latter will hold the switch in closed position against the tension of the spring 28. The spring 52 serves, at this time, to retain the operating shaft in closed position.

It will be apparent from the foregoing that there is a lost-motion connection between the switch-operation mechanism and the switch unit, and that the switch unit may be removed bodily from the housing without interference with the switch mechanism.

While I have described and illustrated but one embodiment of my invention, it will be apparent to those skilled in the art that various changes, modifications, substitutions, additions and omissions may be made in the apparatus illustrated without departing from the spirit and scope of the invention, as set forth in the appended claims.

I claim as my invention:

1. In switch mechanism enclosed within a covered housing, the combination with a

movable switch member supported upon a detachable base and operating between separate contact members secured to the base, of an operating means mounted on a fixed wall of the housing and detachably engaging the switch member for permitting removal of the switch member independently of the operating means.

2. In switch mechanism enclosed within a covered housing, the combination with a movable switch member supported upon a detachable base and operating between separate contact members secured to the base, of an operating means mounted on a fixed wall of the housing for imparting a snap-action opening and closing movement to the switch member and detachably engaging the switch member for permitting removal of the switch member independently of the operating means.

3. Switch mechanism comprising a housing, a detachable base member within the housing, a pair of support members mounted on the base member, an outwardly facing contact member mounted on the base member, an inwardly facing contact member mounted on the support member, a switch member pivotally mounted on the support member and movable into contact with the contact members, and means mounted on the housing independently of the switch member, detachably engaging the switch member for imparting opening and closing movement to the switch member.

4. Switch mechanism comprising a housing, a base member, terminal members mounted thereon, a switch member mounted on the base member for connecting the terminal members and movable to open and closed positions, yielding means for normally moving the switch member to open position, toggle links for retaining the switch member in closed position when the links are in made position, and means mounted on a fixed wall of the housing for actuating the toggle links and detachably connected thereto whereby

the switch member may be removed from the housing independently of the said actuating means.

5. Switch mechanism comprising a housing, a base member, terminal members mounted thereon, a switch member mounted on the base member for connecting the terminal members and movable to open and closed positions, yielding means for normally moving the switch member to open position, releasable means for retaining the switch member in closed position, and means mounted on a fixed wall of the housing for tripping the releasable means and detachably connected thereto whereby the switch member may be removed from the housing independently of the said actuating means.

6. Switch mechanism comprising a housing, a switch-operating means rotatably mounted on the housing and movable to open and to closed positions, yielding means for yieldably retaining the actuating means in either open or closed position, a switch member within the housing movable to open and to closed positions, yielding means for normally moving the switch member to open position, and a releasable means for retaining the switch member in closed position having a portion detachably connected to the said switch-actuating means and adapted to be actuated thereby.

7. Switch mechanism comprising a housing, a movable switch member within the housing, an operating shaft for the switch projecting exteriorly of the housing and having a key-receiving portion, an auxiliary housing for enclosing the key-receiving portion provided with a key slot for permitting limited angular movement of the key about the axis of the shaft and adapted to engage the key and prevent removal thereof when the shaft is in a predetermined position.

In testimony whereof, I have hereunto subscribed my name this fourth day of Nov. 1920.

OLIVER S. JENNINGS.