

June 20, 1939.

R. N. ROWE

2,163,230

FRONT OPERATED SWITCH

Filed Jan. 20, 1938

2 Sheets-Sheet 1

Fig. 1.

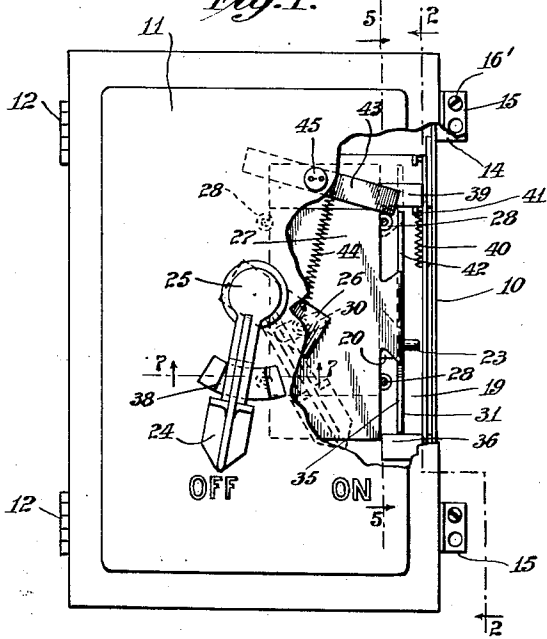


Fig. 2.

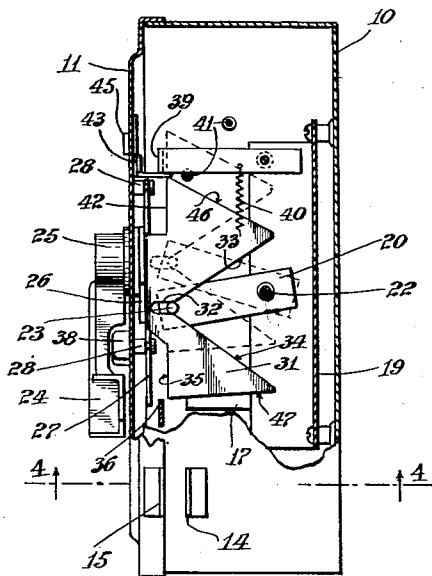
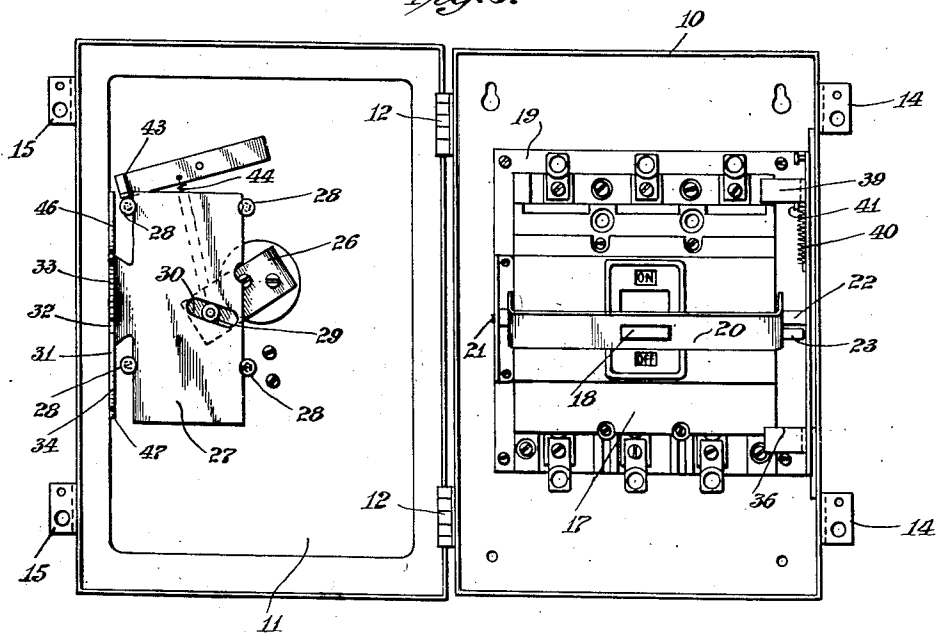


Fig. 3.



INVENTOR
Raymond N. Rowe
BY
[Signature]
ATTORNEY

June 20, 1939.

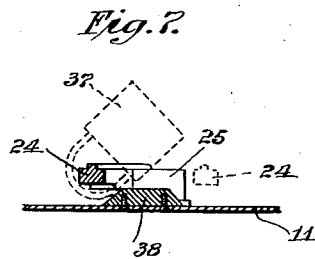
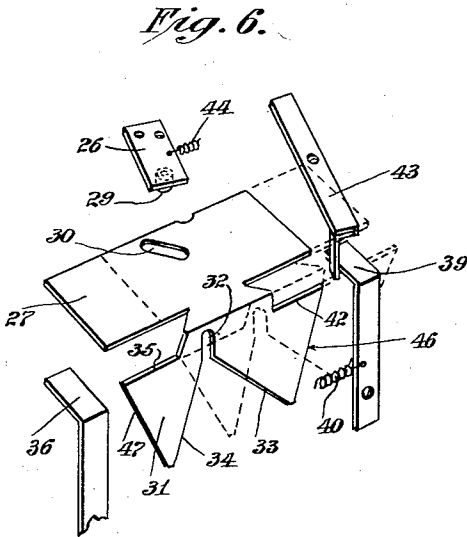
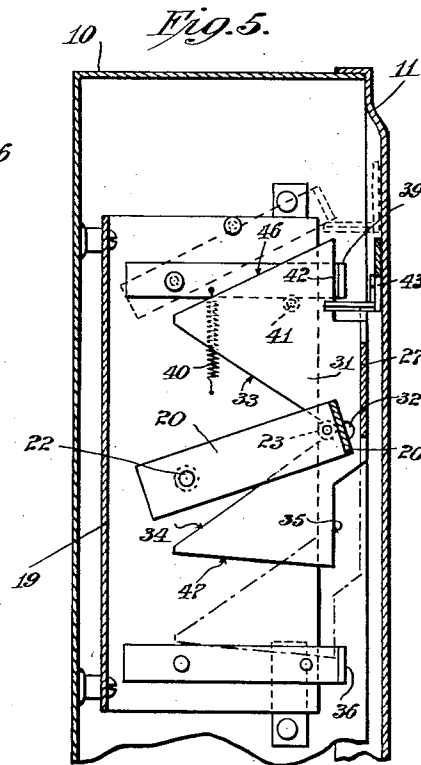
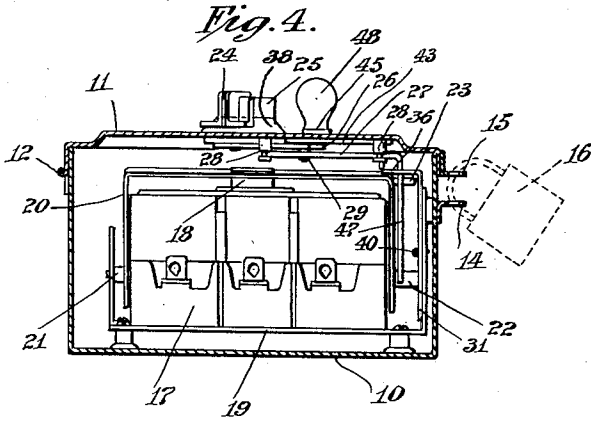
R. N. ROWE

2,163,230

FRONT OPERATED SWITCH

Filed Jan. 20, 1938

2 Sheets-Sheet 2



INVENTOR
Raymond N. Rowe
BY *R. N. Rowe*
ATTORNEY

UNITED STATES PATENT OFFICE

2,163,230

FRONT OPERATED SWITCH

Raymond N. Rowe, Plainville, Conn., assignor to
The Trumbull Electric Manufacturing Com-
pany, Plainville, Conn., a corporation of Con-
necticut

Application January 20, 1938, Serial No. 185,895

15 Claims. (Cl. 200—50)

My invention relates particularly to enclosed or safety switches.

One object is to provide a construction in which the box or receptacle may be locked or sealed with the circuit either open or closed or alternatively in which the actuating handle may be locked either in the "off" or "on" position or in which the cover may be released while the circuit is closed.

Another object is to provide a structure in which the switch contact mechanism is entirely disconnected from the exterior actuating handle when the cover is opened.

Another object is to provide a structure in which the switch may be operated independently of the outer handle when the cover is open.

Another object is to provide a structure by which the handle will be automatically returned to its proper relative position upon closing the cover whether the circuit is open or closed.

Another object is to provide a box and actuating mechanism which can receive a complete circuit breaker or switch.

Fig. 1 is a front view of a switch involving one form of my invention, part of the cover being broken away and the parts being shown in the open circuit or "off" position.

Fig. 2 is a side view and partial section on the plane of the line 2—2 of Fig. 1, parts of the actuating mechanism being shown in dotted lines in the closed circuit or "on" position.

Fig. 3 is a front view of the construction showing the box cover opened.

Fig. 4 is a transverse sectional view on the plane of the line 4—4 of Fig. 2 looking upwardly and showing in dotted lines a padlock for holding the cover closed.

Fig. 5 is a longitudinal sectional view on the plane of the line 5—5 of Fig. 1 showing the parts in full lines in the closed circuit or "on" position and showing the interlocking latch in dotted lines in the upper part of the figure in the position which it occupies when retracted to permit opening of the cover while the circuit is closed and showing in dotted lines in the bottom of the figure the position of the actuating slide when the actuating handle is locked in the "off" position.

Fig. 6 is a perspective view of the interlocking parts and the release device.

Fig. 7 is a transverse section on the plane of the line 7—7 of Fig. 1 showing the actuating handle padlocked or sealed in the "off" position in which position the cover is locked closed and cannot be opened.

The box 10 has a cover 11 hinged at 12. The cover may be locked or sealed in a closed position by the padlock or sealing device applied to the lugs 14 and 15. A pair of these lugs is provided at the top and bottom for added security. The padlock 16 is shown in Fig. 4 and a screw 16' in Fig. 1 for holding the cover closed and yet permitting the switch to be operated.

The switch unit or circuit breaker 17 may be of any suitable form or construction and provided with a handle or lever 18 for direct operation of the switch. In constructions of this character the switch unit per se is complete and self contained and may be mounted upon a platform or sub-base 19.

In the form shown a yoke 20 constitutes an auxiliary interior actuator pivoted at 21 and 22 and engages the outer end of the handle or switch lever 18. This yoke has a projecting stud 23 by means of which it is actuated through the medium of the actuating mechanism carried by the cover. This actuating mechanism includes the handle 24 having a hub at 25 near the center of the cover. On the inside of the cover is an arm 26 which is secured to the inner end of the hub 25 of the handle 24. A plate 27 is carried by the cover, guided between studs or rollers 28, 28. This plate is connected to the arm 26 by means of a roller and slot carried by the parts. In this case the roller 29 is carried by the arm 26 and the slot 30 is formed in the plate 27.

The plate 27 has a flange 31 with a notch 32 for engaging the stud 23. When the cover is closed the switch is actuated by swinging the exterior handle 24 from left to right or vice versa. This swinging movement rotates the hub of the handle and through the instrumentality of the roller 29 and slot 30 moves the plate 27 with its flange 31 up and down so as to move the yoke 20 and throw the switch "on" or "off" as the case may be.

It will be understood that the switch mechanism may be of any suitable type including the quick make and break type of circuit breaker involving the use of quick make and break mechanism (not shown). It is customary in such mechanisms for the handle 18 to have a certain lost motion spring connection with the movable switch members so that the handle may be moved to a limited extent without actuating the switch mechanism.

The flange 31 of the plate 27 preferably has inclined walls 33 and 34 leading to the notch 32 so that when the cover is being closed the external handle 24 and the yoke 20 will be brought in-

to their appropriate relative positions. For instance if the switch mechanism and yoke 20 are in the "off" position and the cover is closed while the handle 24 is held in the "on" position, the switch will be thrown to the "on" position. If on the other hand the switch mechanism and the yoke 20 are in the "on" position and the cover is closed while the handle is held in the "off" position, the switch yoke will be automatically thrown to the "off" position.

If the cover is closed without holding the handle, the handle will be automatically moved to its proper position corresponding to the position of the switch.

The flange 31 is also provided with a shoulder or projection 35 adapted to interlock with the stationary stop 36 carried by the inside of the box. This interlock occurs only when the handle 24 is moved to the position shown in Fig. 7 which is somewhat to the left of the normal "off" or open circuit position. The handle may be padlocked or sealed in this extreme "off" position by means of a padlock 37 or other suitable device as shown in Fig. 7.

The cover is provided with a projection 33 which extends outwardly a distance which leaves only slight clearance for the swinging of the handle 24 so that when the padlock or sealing device 37 embraces the handle it prevents the handle from swinging across the projection 33 thus locking the handle in the position shown in full lines in Fig. 7 or in the position shown in dotted lines at the right.

When the handle is in this full line position it is impossible to open the box because of the interlocking of the shoulder 35 with the stop 36. In the upper part of the box is another latch 39 which is hinged to the wall of the box and biased by a spring 40 against the stop 41. The flange 31 of the plate 27 has a shoulder 42 adapted to slide underneath the stop 39 when the handle 24 is moved to the "on" position as shown in dotted lines in Figs. 1 and 2 and in full lines in Fig. 5. The handle 24 may be locked in this position in a manner similar to that shown in Fig. 7.

The latch 39, however, may be readily retracted by means of a retracting arm 43 which is hinged to the cover and biased by spring 44 into a position just beneath the stop 39. This arm may be actuated in any suitable manner from outside the box for instance by means of an externally extending hub 45 which is rigidly connected with the arm 43 and which can be rotated with the retracting arm by means of a key 48 so as to unlock or release the cover when the circuit is "on" and thus permit inspection of the switch and the entire interior of the box without interrupting the service.

The flange 31 is preferably provided with an inclined surface 46 for engaging the lower side of the stop 39 so that if it is attempted to close the cover while the handle 24 and connected parts are in the "on" position the latch will be automatically moved out of the way without damaging the mechanism. The flange 31 is also preferably provided with another incline 47 for engaging the stop 36 so that if it is attempted to close the cover with the handle 24 and attached parts in the extreme "off" position the plate 27 will be automatically raised without damaging the mechanism.

I claim:

1. An enclosed switch including a box having a cover hinged thereto, a circuit breaker mounted in the box, an actuating handle carried by the

cover, a slide carried by the cover and operatively connected with the handle and means for connecting the handle with the circuit breaker by the closing movement of the cover and automatically causing the circuit breaker and the handle to be respectively moved to their correct corresponding positions regardless of their previous relative positions.

2. An enclosed switch including a box having a cover hinged thereto, a circuit breaker mounted in the box, an actuating handle carried by the cover, a slide carried by the cover and operatively connected with the handle and means for automatically moving the handle and the circuit breaker to their correct relative operating relations by the closing movement of the cover and means actuated by said handle for interlocking between the cover and the box when the handle is moved to close the circuit.

3. An enclosed switch including a box having a cover hinged thereto, a circuit breaker mounted in the box, an actuating handle carried by the cover, a slide carried by the cover and operatively connected with the handle and means for automatically connecting the handle with the circuit breaker by the closing movement of the cover and means actuated by said handle for interlocking between the cover and the box to hold the cover closed when the handle is moved beyond the normal "off" position.

4. An enclosed switch including a box having a cover hinged thereto, a circuit breaker mounted in the box, an actuating handle carried by the cover, a slide carried by the cover and operatively connected with the handle and means for automatically connecting the handle with the circuit breaker by the closing movement of the cover and stops carried by the box automatically interlocked with said slide when the handle is moved to the "on" or "off" position.

5. An enclosed switch including a box, a cover hinged thereto, circuit making and breaking mechanism mounted in the box and having an actuating lever and a projecting stud, an actuating slide carried by the cover and having a flange with a notch to fit said stud when the cover is closed, said flange having inclined edges leading to said notch and adapted to automatically move said slide to the "on" or "off" position corresponding to the position of the circuit making and breaking mechanism when the cover is closed regardless of the former position of the slide.

6. An enclosed switch including a box, a cover hinged thereto, circuit making and breaking mechanism mounted in the box and having an actuating lever and a projecting stud, an actuating slide carried by the cover and having a flange with a notch to fit said stud when the cover is closed, said flange having inclined edges leading to said notch and engaging said stud to move said slide to the "on" or "off" position to correspond to the indicating position of the handle, and a stop carried by the box, said slide having a shoulder for interlocking with said stop when the actuating slide is moved to close the circuit.

7. An enclosed switch including a box, a cover hinged thereto, circuit making and breaking mechanism mounted in the box and having an actuating lever and a projecting stud, an actuating slide carried by the cover and having a flange with a notch to fit said stud when the cover is closed, said flange having inclined edges leading to said notch, a stop carried by the

box, said slide having a shoulder for interlocking with said stop when the actuating slide is moved to close the circuit and a lever carried by the cover for retracting said stop.

5 8. An enclosed switch including a box having a cover, a circuit breaker mounted in the box, an actuating handle carried on the outside of the cover and common means for automatically connecting and relatively positioning the handle
10 with respect to the circuit breaker when the cover is closed and for interlocking the cover and box when the handle is moved to close the circuit.

9. An enclosed switch including a box, a cover therefor, a handle on the cover, a stop on the
15 wall of the box, a circuit breaker mounted in the box and having a projection and common means for automatically connecting the handle with the circuit breaker when the cover is closed and for interlocking the cover and box when the handle is moved to close the circuit, said
20 means including a slidable plate connected to the handle and having a notch adapted to engage the projection on the circuit breaker and having a shoulder adapted to engage the stop
25 to interlock the cover and box when the handle is moved to close the circuit.

10. A switch as defined in claim 9 characterized by a device for independently moving the stop away from the shoulder to permit opening
30 of the cover.

11. An enclosed switch including a box having a cover, a circuit breaker mounted in the box, an actuating handle carried on the outside of the cover and common means for automatically connecting the handle with the circuit
35 breaker when the cover is closed and for interlocking the cover and box when the handle is moved to either open or close the circuit, said means including a slidable plate fast to the handle, a projection on the circuit breaker adapted
40 to be engaged by said plate, and a shoulder on said plate adapted to engage a projection on the wall of the box on either side of the projection on the circuit breaker.

12. A switch as defined in claim 11 in which
45

one of the projections may be moved away from the shoulder.

13. An enclosed switch including a box having a cover, a circuit breaker including a projection in the box, an actuating handle carried
5 on the outside of the cover, a plate slidably mounted on the inside of the cover and connected to said handle, spaced posts mounted on a wall of the box, said plate having a notch adapted to interlock with the projection and spaced
10 shoulders formed on the plate adapted to engage the posts upon movement of the plate.

14. An enclosed switch including a box, a cover, a circuit breaker including an actuating member in the box, a handle on the outside of the cover, spaced posts on the inner wall of the box, a
15 plate freely slidable on the inside of the cover and having a slot, a roller connected to the handle on the inside of the cover and coacting with the slot to slide the plate, members on the cover for guiding the movement of the plate and a
20 flange on the plate having a slotted portion with a notch for interlocking with the circuit breaker actuating member and with slanting edges adapted to engage the posts for automatic up and
25 down movement of the plate upon inward movement of the cover.

15. A safety switch having a box with a cover hinged to it, a circuit breaker mounted in the box and having operating means by which the
30 circuit may be opened or closed independently of the cover when the cover is open, an operating handle carried by the cover at the outside thereof and freely movable to "off" and "on" positions when the cover is open, and means
35 carried by the cover and operatively connected to the handle and engaging the operating means for the circuit breaker when the cover is closed to move the handle to a position corresponding to the "on" or "off" position of the circuit breaker
40 if the handle is left free to move and to forcibly throw the circuit breaker to the "on" or "off" position of the handle if the handle is held from movement relative to the cover.

RAYMOND N. ROWE.