

Jan. 30, 1945.

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2,368,083

OPERATING MECHANISM FOR TOGGLE TYPE SWITCHES AND CIRCUIT BREAKERS

Filed July 14, 1943

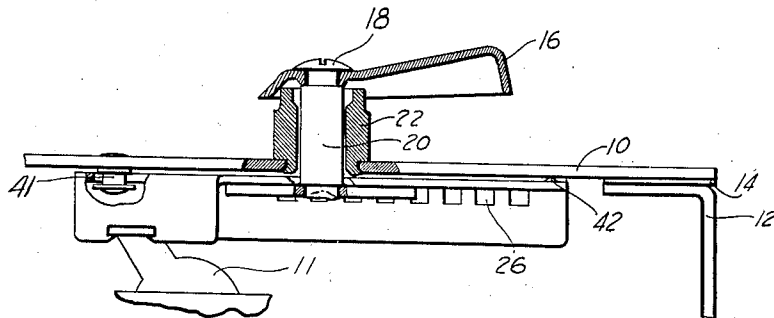


FIG. 1

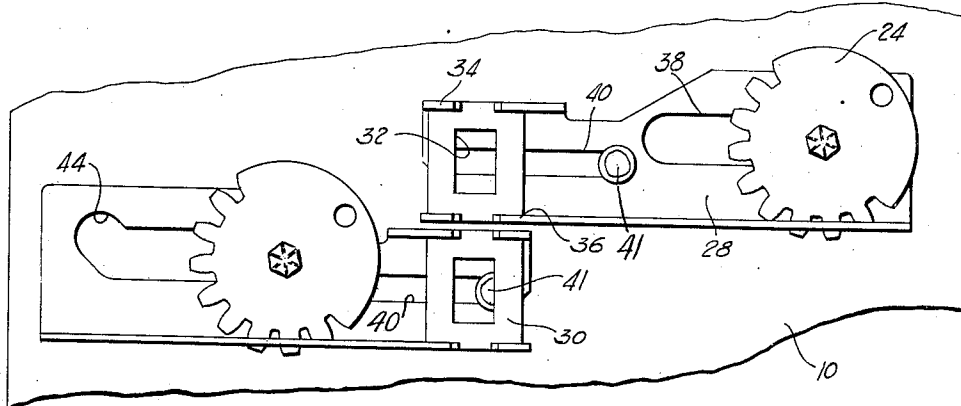


FIG. 2

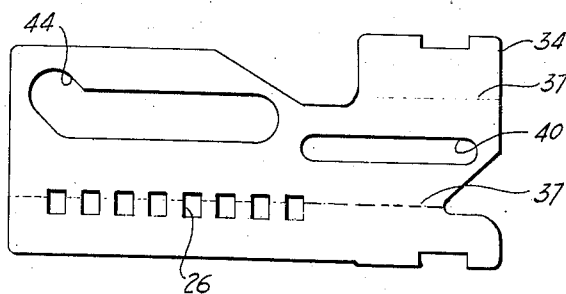


FIG. 3

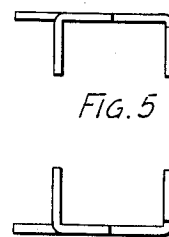


FIG. 4

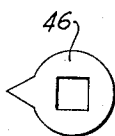


FIG. 6

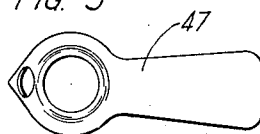


FIG. 7

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2,368,083

OPERATING MECHANISM FOR TOGGLE
TYPE SWITCHES AND CIRCUIT BREAK-
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Application July 14, 1943, Serial No. 494,896

5 Claims. (Cl. 200—18)

This invention relates to operating mechanism for toggle type switches and circuit breakers.

Where dust or vapor are prevalent it is desirable to prevent either from entering the interior of the enclosure of switches and circuit breakers. This invention provides a dust or vapor tight enclosure which can house switches or circuit breakers of the toggle operating type spaced closely together and placed in either a single or a double row.

The enclosure or box of the invention may be made dust or vapor proof and the cover may be sufficiently gasketed to prevent dust or vapor entering between the cover and sides of the enclosing box.

It is an object of this invention to provide an improved dust tight enclosure with operating handles and mechanism for operating toggle type switches and circuit breakers.

Further objects and advantages will appear from the accompanying drawing and the following specification.

In the drawing, Fig. 1 is a longitudinal sectional view of the operating handle of the mechanism and a side view of portions of the mechanism.

Fig. 2 is a plan view of the back of the front cover of the enclosure with the operating mechanism attached thereto.

Fig. 3 is a plan view of a blank which is later bent to form a rack of the operating mechanism.

Fig. 4 is an end view of one of the blanks shown in Fig. 3 bent to form a right rack.

Fig. 5 is an end view of a left rack.

Fig. 6 is a plan view of a plate which may be substituted for the permanently attached handle.

Fig. 7 is a plan view of a removable handle for use with the plate of Fig. 6.

Referring now to the drawing, numeral 10 indicates the cover of the dust tight enclosure which may be secured to side 12 of the enclosure and sealed with gaskets 14. Numeral 11 indicates the handle of a circuit breaker or switch which the mechanism is designed to operate. 16 is the handle of the operating mechanism which may be formed in the shape shown, or which may be substituted for in various other forms to provide operating means for mechanism to be described. The handle 16 is secured by means of a screw 18 to a short shaft 20 which passes through a bushing 22. Bushing 22 may be secured to the cover front plate 10 in any suitable manner and in the device shown it is crimped against the cover. The fit between shaft 20 and the journal or bushing 22 should be tight enough

to prevent the passage of dust or vapor there-through. An operating pinion 24 is secured to the end of the shaft 20 in any suitable manner as by crimping, as shown. The pinion 24 engages a rack or piece 26 in the rack blank 28, which will be more fully described later. A member 30 provided with a rectangular opening 32 therein suitable for operating a handle of a circuit breaker or switch extends transversely between flanges 34 and 36 of the rack blank 28. This member 30 is the only piece which need be changed should it be desired to fit the mechanism to various circuit breaker handles. Thus all the other parts may remain standard while only this member need be changed to fit the mechanism to operate any one of the many available circuit breakers.

A large slot 38 and a smaller slot 40 are provided in the rack blank. The large slot allows the rack blank to slide back and forth along the shaft 20. A guide pin 41 secured to the cover and extending through the small slot 40 prevents rotation of the rack blank but allows translational movement thereof when the pinion is operated by the handle 16.

One of the important features of the invention is a provision of a rack blank 28 which may be used for either right or left side of a double row of circuit breaker operating mechanisms, such as is shown in Fig. 2. Thus the blank shown in Fig. 3 may be bent one way on the fold lines 37 as shown in Fig. 4, or the other way as shown in Fig. 5, to form a left or right rack for cooperation with the operating pinion of the mechanism. This means that one punching is all that is necessary as far as rack blanks are concerned, for complete operating mechanisms for a double row of operating handles for the circuit breakers. As the circuit breakers are relatively narrow, it can be seen that the operating mechanism was designed to provide for close positioning of the circuit breakers. This is accomplished by providing a mechanism which can be made small where the transverse member 30 is secured and yet large enough for the pinion 24. The mechanism provided by this invention also makes it possible to use stamped parts for the rack, pinion and handle, which considerably reduces the cost of manufacture as well as expedites the same. A small bump 42 may be pressed from the blank to form a bearing surface for the rack against the cover 10. This makes for easy operation of the mechanism.

An offset 44 is provided from the large slot

38 and makes possible easy assembly of the mechanism. Thus pinion 24 is secured to the shaft 20 before assembly and the rack 28 is then placed in position on the cover with the pin 41 through the small slot 40 and the offset 44 registering with the opening in journal 22. The shaft 20 may then be inserted through the opening without interference from the flange 36 of the rack blank. The pinion and rack may then be engaged by moving the rack so that the main portion of the slide 38 engages the shaft 20 and retains the pinion in operating position.

Instead of the handle 16 a plate 46 may be secured by screw 18 to shaft 20. Then the removable handle 47 shown in Fig. 7 may be used and the operating mechanism becomes a locked or key operated type. The handle 47 may be carried by an authorized person and the lighting or power circuits may thus be controlled.

While I have shown and illustrated one embodiment of my invention, it is to be understood that this is for purposes of illustration only and that the scope of the invention is not to be limited thereby but is to be defined by the appended claims.

I claim:

1. An operating mechanism for a group of toggle type circuit breakers, comprising a cover plate adapted to be secured to an enclosure for said circuit breakers, a bushing secured to said cover plate, an opening through the cover registering with the bushing, a shaft passing through said bushing and equipped with an operating means on the outer end thereof, a pinion secured to the inner end of said shaft, a rack plate positioned between said cover and said pinion and provided with a flange with teeth therein engaging said pinion, said rack plate provided with another flange opposite the first named flange, a transverse member secured between said flanges and provided with an opening therein adapted to engage the toggle lever of a circuit breaker, a slot in said rack blank for slidably engaging the shaft, and a second slot slidably engaging a pin secured to the cover to prevent rotation of the rack blank and yet allow longitudinal movement thereof.

2. An operating mechanism for a toggle type circuit breaker comprising a cover adapted to be secured to an enclosure, a bushing secured to the cover and extending from the top side of said cover, an opening in said cover registering with said bushing, a shaft extending through said bushing and opening in the cover, said shaft provided with an operating means on the end on the top side of the cover, a pinion secured to the end of the shaft extending from the underside of the cover, a rack plate positioned between the pinion and the cover plate, said rack plate provided with a depending flange having teeth therein adapted to engage the pinion, a longitudinal slot in said rack plate, said shaft extending through said slot, said slot having a straight and an offset portion, the straight portion serving to hold the pinion in engagement with the teeth, the offset portion allowing insertion of the pinion and shaft into position from the underside of the cover without interference from the flange of the rack plate and a member

on said rack plate adapted to engage the operating means of a circuit breaker.

3. An operating mechanism for a toggle type circuit breaker comprising a cover adapted to be secured to an enclosure, a bushing secured to the cover and extending from the top side thereof, an opening in said cover registering with the bushing, a shaft extending through said bushing and opening in the cover, said shaft provided with an operating means on the end on the top side of the cover, a pinion secured to the end of the shaft extending from the underside of the cover, a rack plate positioned between the pinion and the cover plate, said rack plate provided with a depending flange having teeth therein adapted to engage the pinion, a longitudinal slot in said rack plate, said shaft extending through said slot, said slot having a straight and an offset portion, the straight portion serving to hold the pinion in engagement with the teeth, the offset portion allowing insertion of the pinion and shaft into position from the underside of the cover, without interference from the flange of the rack plate, a second longitudinal slot in said rack plate, a pin extending through said second named slot and secured to the cover, said second named slot and pin limiting movement of the rack plate to prevent movement of the offset portion of the slot over the shaft and a member on said rack plate adapted to engage the operating means of a circuit breaker.

4. An assembly for operating a group of toggle type circuit breakers comprising a cover plate, a plurality of individual operating mechanisms secured to said cover plate in staggered relationship, each operating mechanism comprising, a bushing registering with an opening in the cover plate, a shaft passing through said bushing and said opening, operating means secured to the end of the shaft on the front of the cover plate, a pinion secured to the end of the shaft beneath the cover plate, a rack plate positioned beneath the cover plate, said rack plate provided with a flange engaging said pinion, means at one end of said rack plate adapted to engage the operating handle of a circuit breaker, said individual operating mechanisms being so staggered that said means are aligned in a single row between opposing rows of pinions.

5. An assembly for operating a group of toggle type circuit breakers comprising a cover plate, two rows of bushings on the outside of said cover plate registering with openings through the cover plate, a shaft extending through each of said bushings, an operating handle secured to the end of each of said shafts on the outside of the cover plate, a pinion secured to the end of each shaft on the inside of the cover plate, a rack plate for each of said pinions each of said rack plates provided with a toothed flange engaging its pinion, each rack plate provided with means at one end thereof adapted to engage an operating handle of a circuit breaker, all of said means being placed adjacent each other, each of said rack plates having a longitudinal slot arranged to allow the respective shafts to pass therethrough.

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