May 22, 1945. H. E. PEARSON 2,376,503

CIRCUIT BREAKER CONTROL MECHANISM

Original Filed Feb. 27, 1942 2 Sheets-Sheet 1

Fig. 1.

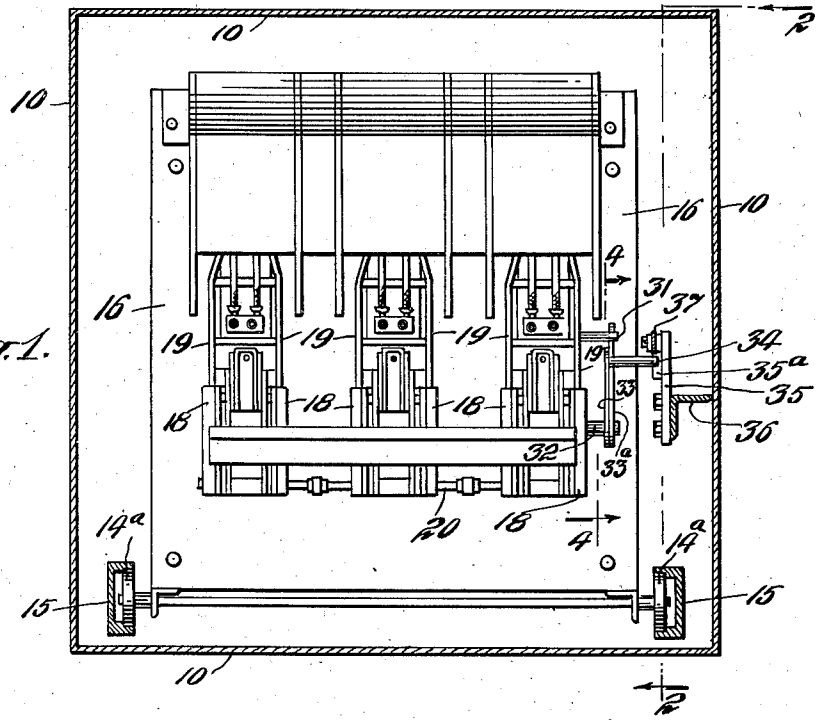


Fig. 4.

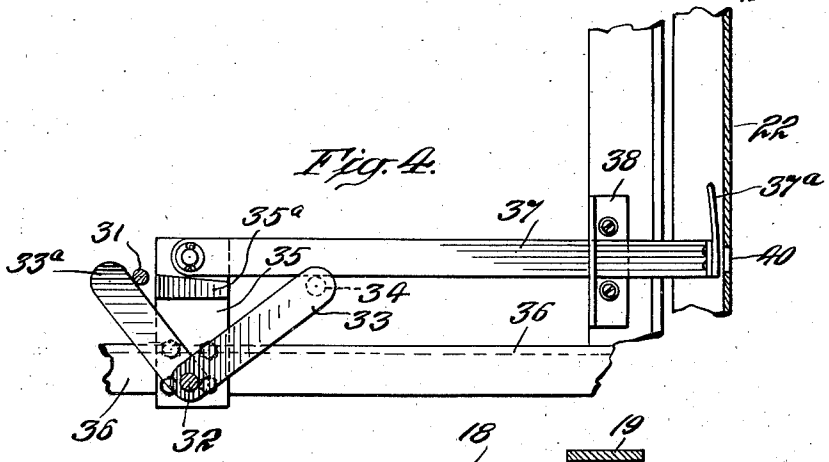
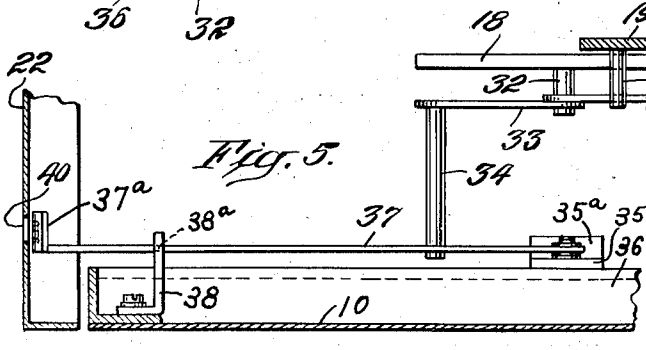


Fig. 5.



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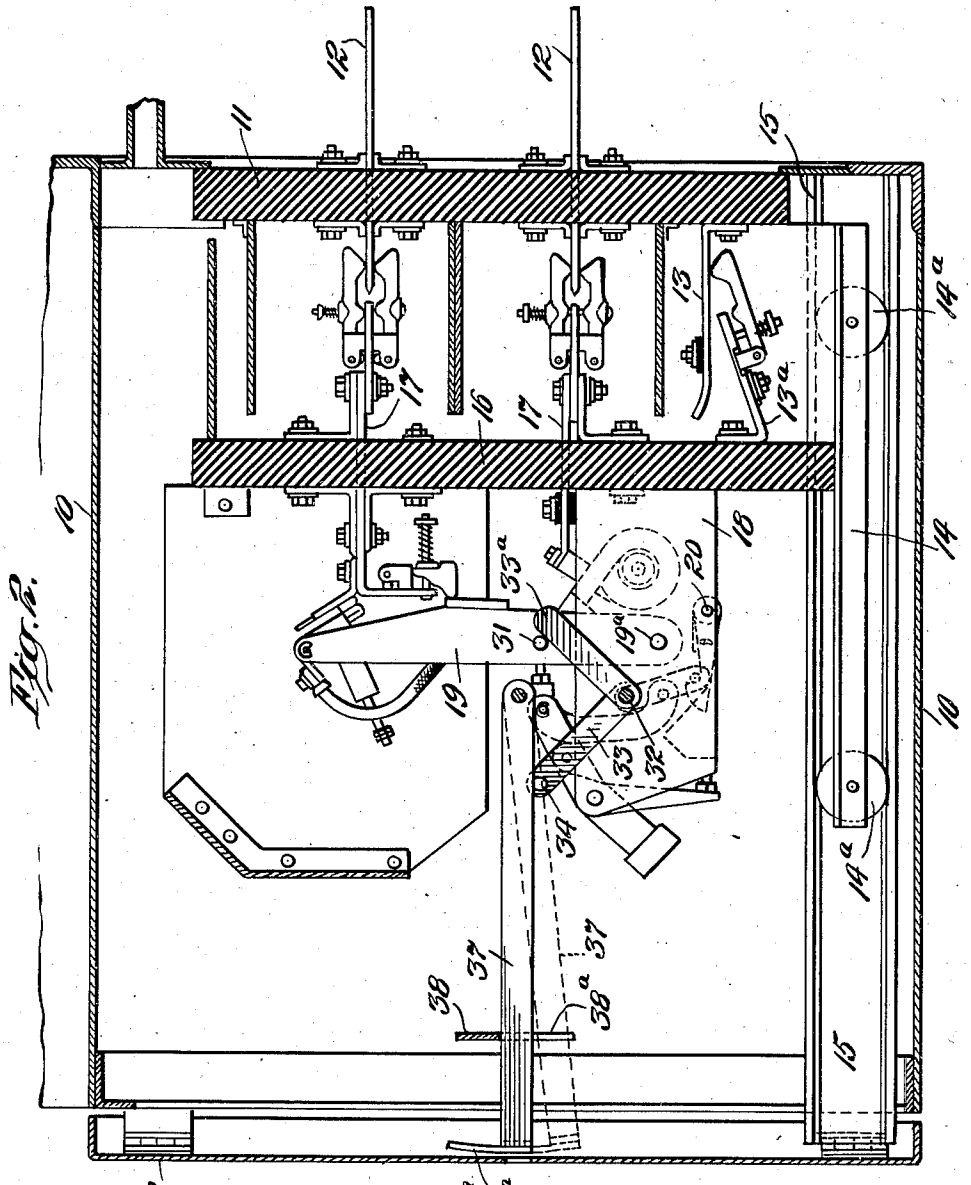


Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE

2,376,503

CIRCUIT BREAKER CONTROL MECHANISM

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Original application February 27, 1942, Serial No. 432,571. Divided and this application May 3, 1943, Serial No. 485,438

3 Claims. (Cl. 200—167)

This invention relates to circuit breakers which are housed in compartments and wherein the front of each compartment is closed by a door or a movable panel. The circuit breaker in each of such compartments is mounted on a movable frame or truck in order that the breaker may be conveniently withdrawn or replaced. The movable unit carries yieldable contacts which engage fixed contacts at the rear of the compartment for connecting the circuit breaker to the buses and carries auxiliary contacts for engaging contacts mounted at the rear of the unit for control purposes. When the breaker unit is moved from its normal operating position outwardly from the compartment, the main circuit breaker contacts are interrupted while the auxiliary control contacts are still maintained. This is known as the test position. Upon further outward movement of the unit, the connections and the auxiliary control circuits are broken and all parts of the unit are disconnected from the fixed contacts of the compartment and this position is known as the disconnected position of the unit.

It is desirable in each of these positions to provide mechanism which will indicate at the front of the compartment whether the breaker is open or closed. These compartments are usually stacked one above the other and side by side and the door at the front is the usual means of access to each compartment.

This application is a division of my pending application Serial No. 432,571, filed February 27, 1942.

One object of this invention is to provide a simple form of mechanism which will indicate whether the breaker is open or closed when the door of the compartment is closed, regardless of the position to which the movable circuit breaker unit has been moved within the compartment. Other objects and advantages will be understood from the following description and accompanying drawings which illustrate one embodiment of the invention.

Fig. 1 is a front elevation, partly in section, showing the breaker in its compartment; Fig. 2 is a side elevation of the breaker within its compartment, partly in section, on the line 2—2 of Fig. 1; Fig. 3 is a front view of the indicator through the door; Fig. 4 is an enlarged side view, partly in section, on the line 4—4 of Fig. 1; Fig. 5 is an enlarged plan view, partly in section of the indicator control mechanism.

The invention is applicable to any type of drawout circuit breaker and although in the drawings an air break circuit breaker of the form disclosed in the J. D. Wood Patent No. 2,129,723 granted September 13, 1938, is indicated, any other form or type of circuit breaker might be used and the present invention applied thereto. The compartment is shown provided with side walls and top and bottom walls 10 preferably made of sheet steel. The rear end of the compartment, as shown in Fig. 2, is provided with an insulating panel 11 which supports the main conductors 12 which lead to the buses. These conductors pass through the panel 11 and are adapted to be engaged by the yieldable main contacts of the circuit breaker. On the front of this panel is mounted a series of conductors 13 which are connected to auxiliary control circuits and which extend forwardly beyond the ends of the conductors 12. The conductors 13 are adapted to be engaged by yieldable contacts carried by the movable unit which contacts are connected to the various control relays of the circuit breaker.

The movable unit is supported on a truck frame 14 provided with wheels 14a which are in turn supported and guided by rails 15 positioned at the bottom of the compartment and at each side thereof. These rails permit the truck and breaker carried thereby to be moved forwardly to the test or to the disconnected position within the compartment from the operative position shown in Fig. 2. The truck supports a vertically extending insulating panel 16 which supports the circuit breaker and its controlling parts. The breaker shown is of the three-pole type, as shown in Fig. 1, and is provided with fixed contacts connected to conductors 17 which pass through the panel rearwardly and carry the yieldable contacts which are adapted to engage the conductors 12 when the breaker is in the operating position. The panel supports the frames 18 which extend forwardly and support the main movable contact arms 19 of the breakers which are pivoted on the cross rod 19a. The various parts of the breaker mechanism need not be particularly described as they are shown the same as disclosed in said patent, it being sufficient to state that upon the automatic opening of any one of the poles of the breaker, the latch rod 20 is turned in a counter-clockwise direction, looking at Fig. 2, which results in tripping all three poles of the breaker and causing them to move to their open position. A series of conductors 13a is mounted on the panel 16 and these conductors are connected to the various control circuits of the breaker and are provided with yieldable contacts which are adapted to engage the conduc-

tors 13 respectively when the movable unit is in the operative position or in the test position.

The control for indicating on the outside of the door whether the breaker is open or closed in any position of the unit is, in the particular instance shown, governed by a pin 31 fixed to one of the circuit breaker contact arms 19 and which extends sidewise therefrom, as shown in Figs. 1 and 5. A sidewise extending pin 32 is fixed to one of the side portions 18 of the circuit breaker frame. A pair of arms 33, 33a are pivotally mounted on the pin 32 and the arms are fixed to each other forming a bell crank lever. The arm 33a is engaged on its front edge by the pin 31; and the arm 33 at its front end is provided with a pin 34 which extends sidewise toward the right-hand side of the compartment.

A plate 35 is fixed to a frame support 36 which is at the right-hand side of the compartment. A metal strip 37 is pivoted at its rear end on the support 35 and extends forwardly close to the inner side of the door and is provided at its front end with an indicating plate 37a located opposite an opening in the door. The pin 34 extends under the lower edge of the strip 37 in the region between the pivotal support of the strip and the front end of the strip. The support 35 is provided with a lug 35a on its inner side and its top surface is inclined, as shown in Fig. 4, for limiting the extent of the downward movement of the strip 37 when released by the pin 34. Fixed to a portion of the frame of the compartment is a bent plate 38 of sheet metal and it serves as a guide for the front portion of the strip 37, the latter being freely movable in a slot 38a in the inwardly extending portion of the plate 38. This slot is open-ended at its bottom to permit downward movement of the strip 37 until it engages the inclined surface of the lug 35a.

Referring to Fig. 2, there is provided at the right-hand side of the door opposite the indicator plate 37a a small opening 40. The plate 37a bears a label "Off" at its upper portion and a label "On" at its lower portion. One or the other of these labels is visible through the opening 40 depending upon whether the breaker is open or closed.

With the door closed and with the breaker in its closed position, as shown in Fig. 2, the pin 31 is in engagement with the arm 33a which causes the arm 33 and the pin 34 to hold the strip 37 in its upper position and thereby hold the movable indicator plate in its upper position to indicate that the breaker is closed. When the breaker moves to its open position, the pin 31 no longer retains the arm 33a in the position shown in Fig. 2 which permits the strip 37 to drop to its lowest position indicated by the dotted lines in Fig. 2. This permits the indicator plate 37a to drop to its lowest position and thereby exposes the label "Off" on the front of the upper portion of the plate through the opening for indicating that the breaker is open. Upon closing the breaker, the pin 31 will turn the arms 33 and 33a in a clockwise direction, looking at Fig. 2, and thereby raise the movable indicator plate to indicate that the breaker is closed.

When the movable breaker unit is moved forwardly to the test position or to the disconnected position, the pin 34 is carried with the breaker unit under the strip 37 and it follows that in either of these positions, the indicator will be controlled in the same manner as already described to indicate whether the breaker is open or closed. Thus a common controlling means is provided for indicating the closed or open position of the breaker through the opening in the door in any location of the movable breaker unit.

The improvements herein described may be applied to any form or type of circuit breaker having any number of poles and of the air break or oil type circuit breaker, as well as to breakers which are manually or automatically closed. Various modifications may be made without departing from the scope of the invention in adapting the same to particular types and to particular applications.

I claim:

1. The combination of a movable circuit breaker unit, a stationary compartment enclosing said unit, said circuit breaker unit being movable as a unit relatively to the compartment to occupy different positions within the compartment, an indicator visible from the outside of the compartment for showing the open or closed position of the breaker, a movable element mounted within the compartment for actuating said indicator, and means controlled by the opening and closing of the breaker for actuating said movable element to control said indicator for showing the open or closed position of the breaker in the different positions to which said circuit breaker unit has been moved within the compartment.

2. The combination of a movable circuit breaker unit, a stationary compartment enclosing said unit, said circuit breaker unit being movable as a unit relatively to the compartment to occupy different positions within the compartment, an indicator visible from the outside of the compartment for showing the open or closed position of the breaker, a movable element mounted within the compartment for actuating said indicator, and pivoted means mounted on said movable circuit breaker unit and controlled by the opening and closing movement of the breaker for engaging and actuating said element to control said indicator for showing the open or closed position of the breaker in the different positions to which said circuit breaker unit has been moved within the compartment.

3. The combination of a movable circuit breaker unit, a stationary compartment enclosing said unit, said circuit breaker unit being movable as a unit relatively to the compartment to occupy different positions within the compartment, an indicator visible from the outside of the compartment for showing the open and closed position of the breaker, an elongated pivoted element mounted within the compartment for actuating said indicator, and means controlled by the opening and closing movement of the breaker for engaging and controlling said element for showing the open or closed position of the breaker in the different positions to which said circuit breaker unit has been moved within the compartment.

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