April 22, 1941. R. H. KINGDON 2,239,105

CIRCUIT BREAKER ENCLOSING AND OPERATING MEANS

Filed Nov. 8, 1937

FIG. 1.

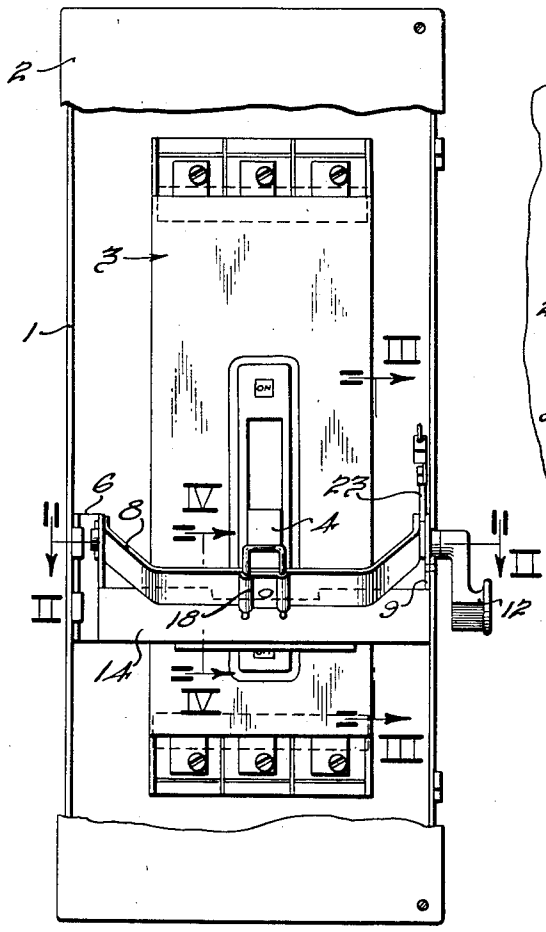
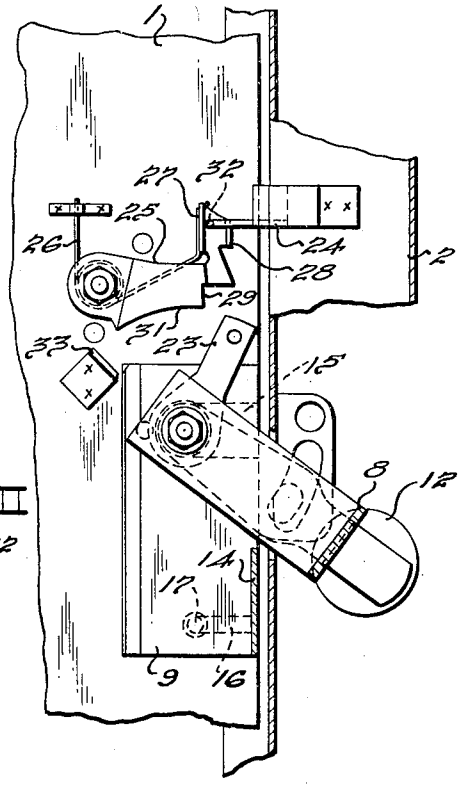


FIG. 3.



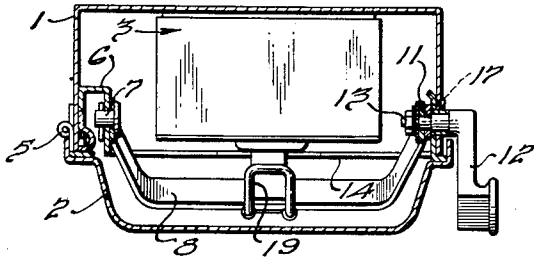


FIG. 2.

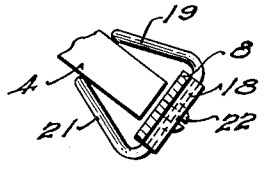


FIG. 4.

INVENTOR
Ralph H. Kingdon.
BY Myron J. Seibold
ATTORNEY

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CIRCUIT BREAKER ENCLOSING AND OPERATING MEANS

Ralph H. Kingdon, Detroit, Mich., assignor to Square D Company, Detroit, Mich., a corporation of Michigan

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7 Claims. (Cl. 200—50)

This invention relates to enclosing and actuating means for an automatic electric circuit breaker and more particularly to an industrial type circuit breaker mounted within an outer enclosing box with manual means at the exterior of the box operatively connected to move the circuit breaker handle to perform its switching operation.

One object of the present invention is the provision of an improved connection between the handle of an automatic electric circuit breaker and a manually operated actuator functioning to lessen the possibility of damage to the circuit breaker handle from the manual actuation and in which the extreme positions of the manual actuator may be positively limited.

Another object of the invention is the provision of an industrial type circuit breaker in an outer enclosing box in which a manual actuator remains connected to the circuit breaker handle when the cover is removed and in which the manual actuator may be subsequently swung bodily to the exterior of the box to fully uncover the circuit breaker within the box.

Other objects and features of this invention will be readily apparent to those skilled in the art from the following specification and appended drawing illustrating certain preferred embodiments of the invention in which:

Figure 1 is a front elevational view of the enclosing and actuating means according to the present invention with part of the cover broken away to show the interior of the box.

Figure 2 is a horizontal sectional view on the line II—II of Figure 1 but with only an outline representation of the circuit breaker.

Figure 3 is an enlarged detail sectional view on the line III—I of Figure 1.

Figure 4 is an enlarged detail view of the handle connection means on the line IV—IV of Figure 1.

The apparatus according to the present invention includes an outer enclosing box 1 of sheet metal or other material having a removable cover 2. Upon the back wall of the box is supported an automatic electric circuit breaker generally designated at 3 which may be of any conventional form and which includes automatic and manual means for performing its switching operations. Such circuit breakers are conventionally mounted in interior enclosures of their own and have operating handles as at 4 projecting through these enclosures. The cover 2 may be entirely removable from the box 1 or may be hingedly mounted thereon as indicated at 5 in Figure 2.

Hingedly mounted at one side wall of the box is a bearing member 6 of general U shape in cross section having one leg pivotally mounted on the side wall of the box and its other leg providing a bearing as at 7 for an operating crank 8 extending in front of the circuit breaker 3. At the opposite side wall of the box is a bearing plate 9 providing a bearing as at 11 for the opposite side of the crank 8. At the exterior of the box is a manually operable handle 12 rigidly secured by nut 13 to the crank 8 so as to be moved therewith. A strap 14 is provided integral with both the plate 9 and the bearing member 6 to further join them together for common swinging movement as a unit. The side wall of the box adjacent the plate 9 is provided with a slot 15 receiving the operating handle and a slot 16 receiving a stud 17 which is tightenable to maintain the plate 9 in position against the side wall of the box. For connecting the crank 8 to the circuit breaker handle 4 there is provided a resilient element formed of spring wire clamped together by a metallic plate 18 and having leg and connecting portions 19 and 21 disposed at opposite sides at the handle 4 to effect movement thereof in response to movement of the crank. The plate 18 is removably mounted on the crank 8 by means of a stud 22.

An interlock is provided which includes a finger 23 rigidly connected to the handle 12 and crank 8, a latch member 24 rigid with the cover 2 and a locking member 25 pivoted on the side wall of the box. The member 25 is provided with a spring 26 biasing it in a clockwise direction as viewed in Figure 3 and includes a pair of spaced ledges 27 and 28. The member 25 further includes a latching surface 29 and an arcuate abutment surface 31. The latch 24 is provided with a foot 32 making it of general L shape. A stop bracket 33 is rigidly mounted on the side wall of the box.

The operation of the device is as follows: In the normal functioning of the device the handle 12 is rotated in opposite directions to effect opposite movement of the circuit breaker handle to perform the manual switching operation. The resilient connection to the handle 4 prevents injury to this ordinarily frangible material from this manual manipulation. The stop bracket 33 is engaged by the finger 23 to positively limit the movement of the handle and crank toward the "on" position of the circuit breaker and the connecting strap 14 is engaged by the crank 8 to positively limit the opposite extreme position of the operating elements which corresponds to the

resetting position for the circuit breaker mechanism. With the cover 2 removed the stud 17 may be loosened and the crank 8, handle 12 and bearing members 6 and 9 swung bodily outward to entirely uncover the circuit breaker within the box and facilitate removal and replacement thereof.

The interlock more particularly shown in Figure 3 operates as follows: The parts as shown in Figure 3 are in the normal "off" position of the circuit breaker. The cover is closed and the manual handle 12 may be manipulated to move the circuit breaker to the "on" position. In the "on" position the end of the finger 23 abuts against the surface 31 on the pivoted latching member 25 and prevents rotation thereof. Hence the cover 2 cannot be opened because the ledge 26 engages the foot 32 on the latch 24 to prevent this removal of the cover. Should the cover be opened with the parts in the "off" position the member 25 is free to rotate in a clockwise direction as the foot 32 moves out of engagement with the ledge 27 and the latching surface 29 then engages with the finger 23 to prevent movement of the manually operable handle to throw the circuit breaker to the "on" position. When the cover is closed the foot 32 again engages ledge 27 and moves the latching member 25 into the position shown in Figure 3 whereupon the parts may be manipulated to the "on" position.

While certain preferred embodiments of the invention have been specifically disclosed, it is understood that the invention is not limited thereto as many variations will be readily apparent to those skilled in the art and the invention is to be given its broadest possible interpretation within the terms of the following claims:

What is claimed is:

1. Enclosing and actuating means for an automatic electric circuit breaker comprising an outer enclosing box having an openable cover, an enclosed automatic electric circuit breaker mounted within said box and having an operating handle exterior to its enclosure and within the box, and an operating crank mounted on said box in front of said circuit breaker and connected to said handle and having a manually operating handle at the exterior of the box, said crank being mounted for rotation about a longitudinal axis under the influence of said exterior operating handle to effect movement of the circuit breaker handle within the box, said crank being pivotally mounted on the box independently of the cover and adapted to be bodily swung to the exterior of the box when the cover is opened while maintaining said circuit breaker within the box.

2. Enclosing and actuating means for an automatic electric circuit breaker comprising an outer enclosing box having an openable cover, an enclosed automatic electric circuit breaker mounted within the box, a strap pivotally mounted on a side wall of the box independently of said cover and having a portion releasably engageable with the opposite side wall of the box, an operating crank pivotally mounted on said strap and having a manually operable handle at the exterior of the box, and means for connecting said crank to said circuit breaker handle wherby said circuit breaker handle is movable in response to movement of said manually operable handle and when the cover is removed the crank may be swung bodily to the exterior of the box to uncover the circuit breaker within the box.

3. Enclosing and actuating means for an automatic electric circuit breaker comprising an outer enclosing box having an openable cover, an enclosed automatic electric circuit breaker mounted within said box upon the back wall thereof and having an operating handle exterior to its enclosure and within the box, a bearing member pivotally mounted on one side wall of the box, a second bearing member releasably engageable with the opposite side wall of the box, a strap connecting said bearing members, and an operating crank journalled in said bearing members and having an operating handle at the exterior of the box, said crank extending in front of said circuit breaker and having an operable connection with the circuit breaker handle to effect movement thereof in response to movement of the manually operable handle.

4. Enclosing and actuating means for an automatic electric circuit breaker comprising an outer enclosing box having an openable cover, an enclosed automatic electric circuit breaker mounted within said box upon the back wall thereof and having an operating handle exterior to its enclosure and within said box, a bearing member pivotally mounted on one side wall of the box, a second bearing member releasably engageable with the opposite side wall of the box, a strap connecting said bearing members for common movement as a unit, an operating crank journalled in said bearing members and having an operating handle at the exterior of the box, said crank extending in front of said circuit breaker and having an operable connection with the circuit breaker handle to effect movement thereof in response to movement of the manually operable handle, and stops for positively limiting the opposite extreme positions of said crank to prevent injury to said circuit breaker handle or connection.

5. Enclosing and actuating means for an automatic electric circuit breaker comprising an outer enclosing box having an openable cover, an enclosed automatic electric circuit breaker mounted within said box upon the back wall thereof and having an operating handle exterior to its enclosure and within the box, a bearing member pivotally mounted on one side of the box, a second bearing member releasably engageable with the opposite side wall of the box, a strap connecting said bearing members and extending in front of said circuit breaker, an operating crank journalled in said bearing members and having an operating handle at the exterior of the box, said crank extending in front of said circuit breaker and having an operable connection with the circuit breaker handle to effect movement thereof in response to movement of the manually operable handle, said bearing members, connecting strap and crank being bodily swingable to the exterior of the box when the cover is removed to fully uncover the circuit breaker within the box.

6. Enclosing and actuating means for an automatic electric circuit breaker comprising an outer enclosing box having an openable cover, an enclosed automatic electric circuit breaker mounted within said box upon the back wall thereof and having an operating handle exterior to its enclosure and within the box, a bearing member pivotally mounted on one side wall of the box, a second bearing member releasably engageable with the opposite side wall of the box, a strap connecting said bearing members, an operating crank journalled in said bearing members and having an operating handle at the exterior of the box, said crank extending in front of said circuit breaker

and having an operable connection with the circuit breaker handle to effect movement thereof in response to movement of the manually operable handle, and interlock means preventing movement of said manually operable handle to close the circuit breaker while the cover is removed and opening of the cover while the circuit breaker is closed.

7. Enclosing and actuating means for an automatic electric circuit breaker comprising an outer enclosing box having an openable cover, an enclosed automatic electric circuit breaker mounted within said box upon the back wall thereof and having an operating handle exterior to its enclosure and within the box, a bearing member pivotally mounted on one side wall of the box, a second bearing member releasably engageable with the opposite side wall of the box, a strap connecting said bearing members, an operating crank journalled in said bearing members and having an operating handle at the exterior of the box, said crank extending in front of said circuit breaker and having an operable connection with the circuit breaker handle to effect movement thereof in response to movement of the manually operable handle, and interlock means preventing movement of said manually operable handle to close the circuit breaker while the cover is removed and opening of the cover while the circuit breaker is closed, said interlock comprising an element rotatable with said manually operable handle, a second element rotatably mounted on the side wall of the box, and a third element rigidly mounted on the cover.

RALPH H. KINGDON.