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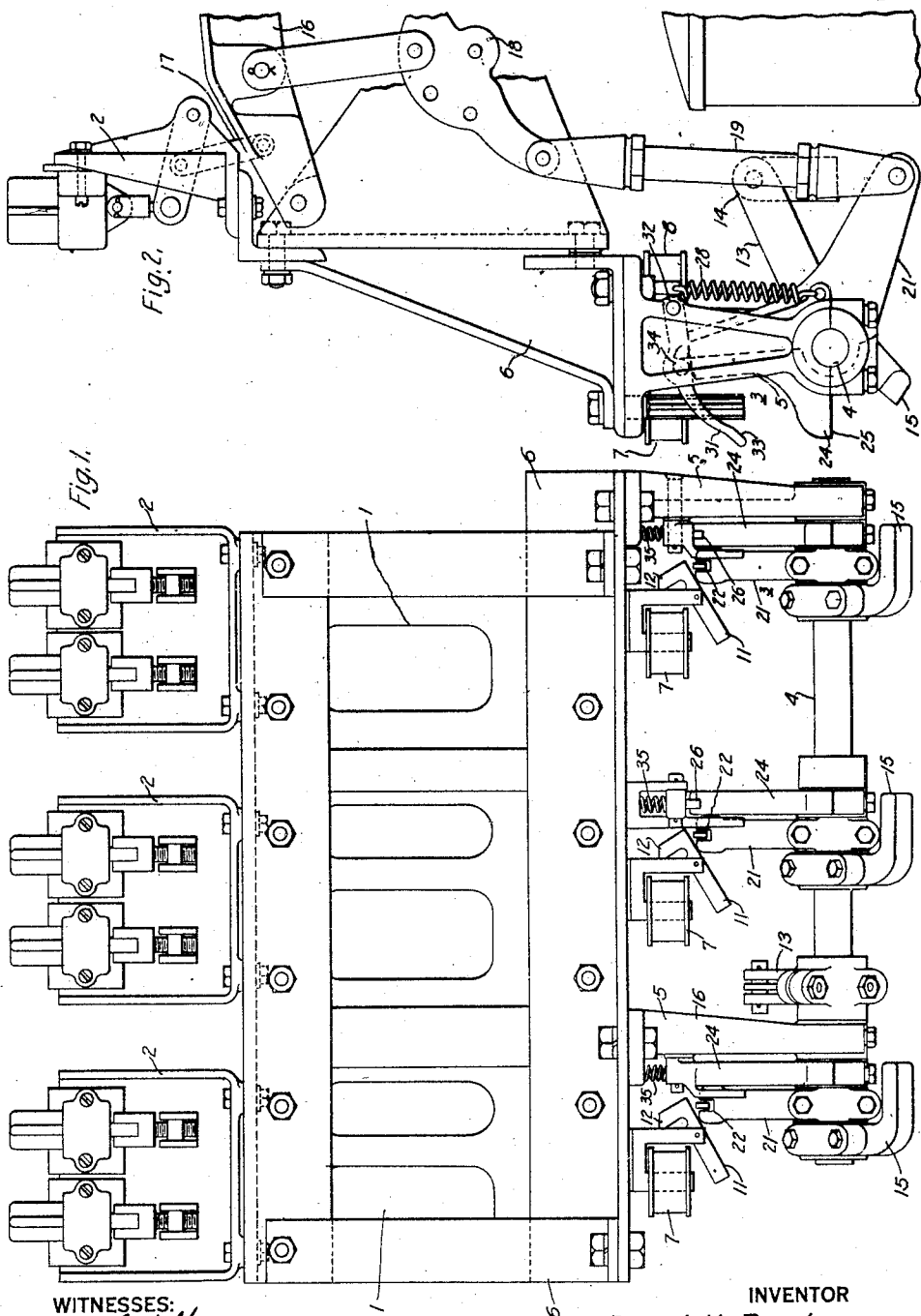
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1,611,779

CIRCUIT INTERRUPTER MECHANISM.

Filed June 4, 1923

4 Sheets-Sheet 1



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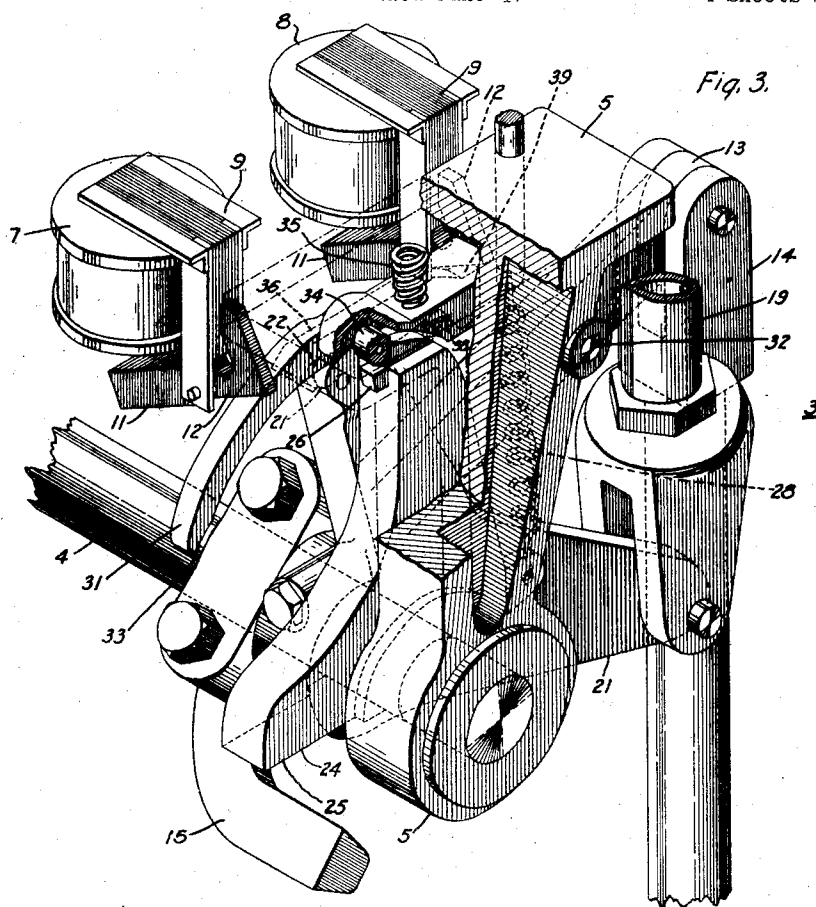
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CIRCUIT INTERRUPTER MECHANISM

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4 Sheets-Sheet 2



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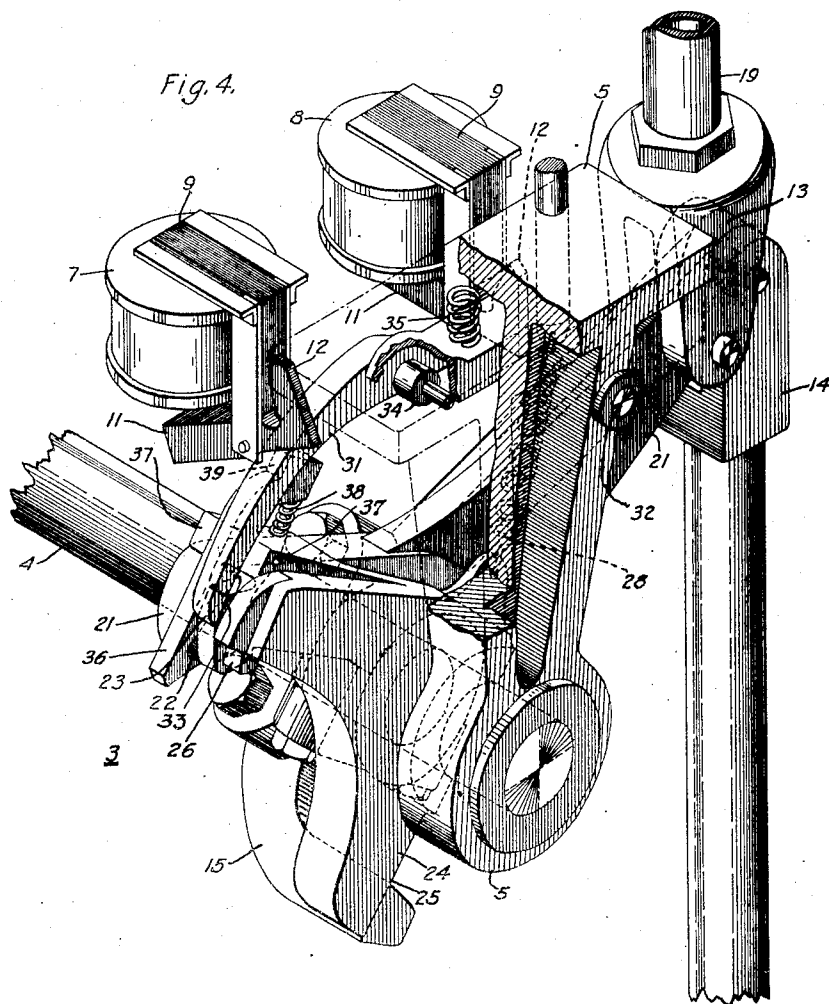
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CIRCUIT INTERRUPTER MECHANISM

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4 Sheets-Sheet 3



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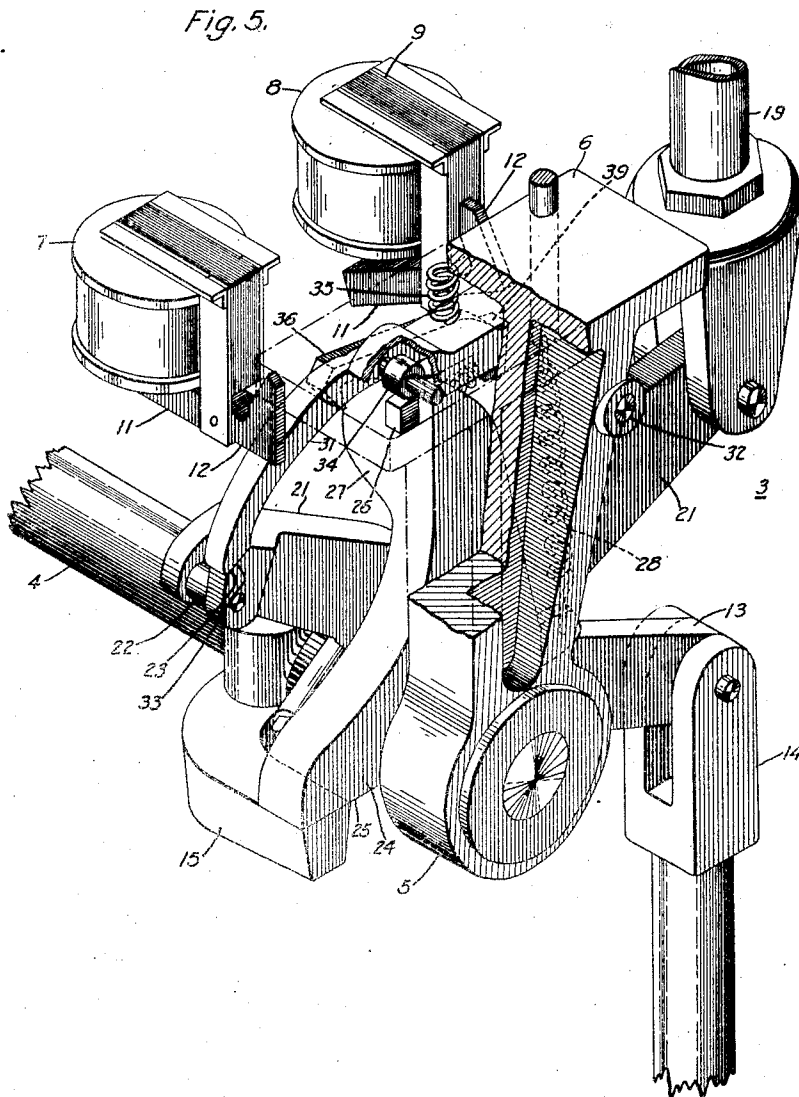
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CIRCUIT INTERRUPTER MECHANISM

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4 Sheets-Sheet 4



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CIRCUIT-INTERRUPTER MECHANISM.

Application filed June 4, 1923. Serial No. 643,149.

My invention relates to circuit interrupters and more particularly to operating mechanisms therefor that are actuated by a member common to several circuit interrupters.

One object of my invention is to provide a plurality of circuit interrupters with a common actuating member, each of the circuit interrupters being provided with a mechanism for selectively engaging or disengaging such common member.

Another object of my invention is to provide a plurality of circuit interrupters with a common shaft to which any one or all of the circuit interrupters may be connected.

A further object of my invention is to provide a circuit interrupter with certain mechanical and electrical details for selective connection on to, or disconnection from, a driving member.

The circuit interrupter shown in my invention is particularly adapted for use in connection with the circuit-interrupter system shown and described in the application of A. J. A. Peterson, Serial No. 681,785, filed Dec. 20, 1923, and which is assigned to the Westinghouse Electric and Manufacturing Company.

In the accompanying drawings:

Figure 1 is a front elevational view of a three-pole circuit interrupter embodying my invention.

Fig. 2 is a fragmentary side elevational view thereof.

Fig. 3 is a view, partially in perspective and partially in section, of the controlling mechanism in its operative position when the circuit interrupter is in closed position.

Fig. 4 is a similar view of the controlling mechanism when the circuit interrupter is in open position and the controlling mechanism is about to close the circuit interrupter, and.

Fig. 5 is a similar view of the controlling mechanism when the circuit interrupter is locked in open position.

In the several figures of the drawings similar reference characters indicate like parts.

In Figs. 1 and 2, I have shown a plurality of aligned circuit interrupters 1 and their associated signal switches 2. While I have shown three circuit interrupters for controlling a three-phase electrical circuit, it is to

be understood that my invention is applicable to any number of aligned circuit interrupters or to any polyphase circuit. These features may be of any preferred construction as they form no part of the present invention.

A controlling mechanism 3 is associated with each circuit interrupter 1, and is actuated from a shaft 4 which extends adjacent to, and is common to, all the aligned circuit interrupters 1. Shaft 4 is secured in juxtaposition to the circuit interrupters 1 by a series of brackets 5 that are bolted to a frame 6. A pair of electromagnets 7 and 8 are secured beneath the frame 6 for each circuit interrupter 1, the electromagnet 7 being placed in front of the electromagnet 8. Each electromagnet comprises a core member 9 of inverted U-shape and a pivoted armature 11 having a projecting portion 12 that is adapted to complete the magnetic circuit through the core member 9 upon the energization of the electromagnet.

As is shown in Figs. 1 and 2, the shaft 4 is given a rocking motion by means of a lever 13 clamped thereto and a linkage mechanism 14 actuated from any source of power (not shown). Clamped to the shaft 4 in alignment with each circuit interrupter 1, is a curved driving cam 15 which extends outwardly from, and parallel to, the shaft 4. The lever 13 and the cam 15 may be formed as a unit, if desired. As shown in Fig. 2, a lever 16 having a link 17 connected to the signal switch 2, is pivoted on the frame 6, for co-operation with a link mechanism 18 which terminates in a rod 19. Rod 19 is actuated by the mechanism 3 to open and close the associated circuit interrupter 1, in a manner hereinafter more fully described.

Rod 19 is pivotally attached to an arm of a bell crank 21 which is loosely mounted on the shaft 4, the other arm of which carries a roller 22 and is provided with a cam face 23.

A second bell crank 24 is loosely mounted on the shaft 4, one arm being provided with a face 25 for engagement with the driving cam 15. As is shown in Fig. 5, the other arm of the crank 24 terminates in a hardened steel insert 26 and an enlarged bearing surface 27 for the attachment of parts hereinafter described. It is to be observed that the bell crank, 21 is mounted on shaft

4 between the driving cam 15 and the crank 24. A spring 28 is secured between the frame 6 and the crank 24 to balance the latter in a counter-clockwise direction in order to normally keep the cam 15 and face 25 in co-operative relation.

A lever 31 which is pivoted to the bracket 5, as at 32, terminates in a face 33 which is adapted for engagement with the cam 23 on the crank 21. Mid-way of the length of lever 31, there is mounted a roller 34 which is adapted to engage the insert 26 on the crank 24. A coiled spring 35 which is carried on the under surface of the frame 6, bears against the lever 31. By reference to Figs. 3, 4 and 5, it will be observed that over-travel of the lever 31 is prevented by reason of the fact that it is always in engagement with one or both of the cranks 21 and 24.

Bearing 27 on the crank 24 carries a latch 36, pivoted as at 37, and which is biased in a counter-clockwise direction by the spring 38. Latch 36 is provided with an enlarged tail-piece 39 for engagement with the bill 12 of either electromagnet 7 or 8.

As shown in Fig. 5, in the open position of the circuit interrupter, crank 24 is kept in engagement with the driving cam 15 by the tension in the spring 28, and the shaft 4, to which any number of driving cams 15 may be attached, may be given a rocking movement for an indefinite period. Accordingly, the cranks 24 of all the open circuit interrupters are rocking or oscillating with the shaft 4.

Assuming the circuit interrupter is in the open position shown in Fig. 5, it can not be closed as long as the electromagnet 7 remains in an energized condition, as the projection 12 of the energized electromagnet 7 engages the tail-piece 39 of the latch 36 thereby preventing engagement between the latch 36 and the roller 22 when they approach during the rocking movement of the crank 24.

After de-energization of the electromagnet 7, the latch 36 engages the roller 22 upon the next forward movement of the crank 24, as is shown in Fig. 4. On the reverse movement of the crank 24, or the upward movement of the cam 15, the crank 21 is drawn to the closed position of the circuit interrupter, shown in Fig. 3. During the closing movement of the crank 21, rod 19 actuates the link mechanism 18, the operating lever 16 of the circuit interrupter, and the signal switch 2 to their closed positions. At the end of the reverse stroke of the crank 24, roller 34 drops behind the insert 26 and holds the crank 24 in closed position.

It is to be observed that, in the closed position of the circuit interrupter, the associated operating mechanism is out of operative engagement with the shaft 4.

In order to open the circuit interrupter, the electromagnet 8 is energized, whereupon the associated projection 12 engages the tail-piece 39 of the latch 36 to cause the latter to turn about the pivot 37, which operation releases the roller 22 from engagement therewith. The crank arm 21 returns to its forward position under the influence of the force of gravity acting upon rod 19 and the mechanism 18 attached thereto. When the crank 21 nears the end of its forward stroke, the cam 23 engages the surface 33 of the lever 31 whereby the latter is given a clockwise movement about its pivot point 32. This turning movement is sufficient to release the insert 26 from under the roller 34, whereupon the crank 24 moves into its forward position by reason of the tension in the spring 28. So long as the crank 21 remains in its forward position, roller 34 is held out of engagement with the insert 26 on the oscillating crank 24 by reason of the engagement between the cam 23 and the surface 33 of the lever 31.

It will accordingly be seen that I have provided a circuit-interrupter mechanism which permits the selective engagement or disengagement of any one or all of a plurality of circuit interrupters with a common driving member. I have also provided suitable electrical and mechanical operating details for accomplishing this result.

While I have shown and described my invention in its preferred form, it is apparent that modifications may be made in the arrangement of the mechanism for controlling the positions of the circuit interrupters without departing from the spirit of my invention. I desire, therefore, to be limited only to the scope of the appended claims.

I claim as my invention:

1. In combination, an oscillatable shaft, a plurality of circuit interrupters, a plurality of members loosely mounted on said shaft, and means for selectively and independently controlling the connection between said shaft and said circuit interrupters through said members.

2. In combination, an oscillatable shaft, a circuit interrupter, a plurality of members loosely mounted on said shaft, and electro-responsive means for selectively controlling the connection between said shaft and said circuit interrupter through said members.

3. In combination, an oscillatable shaft, a circuit interrupter, a plurality of members loosely mounted on said shaft, and electro-responsive means comprising an electromagnet for selectively controlling the connection between said shaft and said circuit interrupter through said members.

4. In combination, an oscillatable shaft, a circuit interrupter, a plurality of members loosely mounted on said shaft, and a pair of

electromagnets for selectively controlling the connection between said shaft and said circuit interrupter through said members.

5 In a circuit interrupter structure, an oscillatable shaft, a plurality of cranks loosely mounted on said shaft, a driving connection between said shaft and one of said cranks, an operating connection between one of said cranks and a circuit interrupter, and means carried by the first of said cranks for engaging the second of said cranks.

6. In a circuit interrupter structure, an oscillatable shaft, a plurality of cranks loosely mounted on said shaft, a driving connection between said shaft and one of said cranks, an operating connection between one of said cranks and a circuit interrupter, and means comprising a latch carried by the first of said cranks for engaging the second of said cranks.

7. In a circuit interrupter structure, an oscillatable shaft, a plurality of cranks loosely mounted on said shaft, a driving connection between said shaft and one of said cranks, an operating connection between one of said cranks and a circuit interrupter and means comprising an electrically controlled latch carried by the first of said cranks for engaging the second of said cranks.

8. In a circuit interrupter structure, an oscillatable shaft, a plurality of cranks loosely mounted on said shaft, a driving connection between said shaft and one of said cranks, an operating connection between one of said cranks and a circuit interrupter, and means carried by one of said cranks for engaging another of said cranks.

9. In a circuit interrupter structure, an oscillatable shaft, a plurality of cranks loosely mounted on said shaft, a driving connection between said shaft and one of said cranks, an operating connection between one of said cranks and a circuit interrupter, and electroresponsive means for controlling the engagement between said cranks.

10. In combination, an oscillatory shaft, a circuit interrupter, a plurality of cranks mounted on said shaft, means mounted on said shaft for driving one of said cranks, and means for connecting said cranks whereby the driven crank is held from co-operative relation with said shaft when said circuit interrupter is in closed position.

11. In combination, an oscillatory shaft, a circuit interrupter, a plurality of cranks loosely mounted on said shaft, means for actuating one of said cranks from said shaft, and means normally biasing said crank into engagement with said actuating means.

12. In combination, an oscillatory shaft, a circuit interrupter, a plurality of cranks loosely mounted on said shaft, means for actuating one of said cranks from said shaft, means normally biasing said crank into engagement with said actuating means and

means adapted for holding said crank out of operative engagement with said shaft when said circuit interrupter is in closed position.

13. In combination, an oscillatory shaft, a circuit interrupter, a plurality of cranks loosely mounted on said shaft, means for actuating one of said cranks from said shaft, means normally biasing said crank into engagement with said actuating means, means adapted for holding said crank out of operative engagement with said shaft when said circuit interrupter is in closed position, and means for controlling said holding means.

14. In combination, an oscillatory shaft, a circuit interrupter, a plurality of cranks loosely mounted on said shaft, means for actuating one of said cranks from said shaft, means normally biasing said crank into engagement with said actuating means, means adapted for holding said crank out of operative engagement with said shaft when said circuit interrupter is in closed position, and means comprising an electromagnet for controlling said holding means.

15. In combination, an oscillatory shaft, a circuit interrupter, a plurality of cranks loosely mounted on said shaft, means for actuating one of said cranks from said shaft, means normally biasing said crank into engagement with said actuating means, means adapted for holding said crank out of operative engagement with said shaft when said circuit interrupter is in closed position, and means comprising a second crank for controlling said holding means.

16. In combination, an oscillatory shaft, a circuit interrupter, a plurality of cranks loosely mounted on said shaft, means for actuating one of said cranks from said shaft, means normally biasing said crank into engagement with said actuating means, means adapted for holding said crank out of operative engagement with said shaft when said circuit interrupter is in closed position, and means comprising a second crank and an electromagnet for controlling said holding means.

17. In combination, an oscillatory shaft, a circuit interrupter, a plurality of cranks loosely mounted on said shaft, means for actuating one of said cranks from said shaft, means normally biasing said crank into engagement with said actuating means, means adapted for holding said crank out of operative engagement with said shaft when said circuit interrupter is in closed position, and means comprising a second crank for controlling said holding means, said second named crank having operative connection to said circuit interrupter.

In testimony whereof, I have hereunto subscribed my name this 26th day of May, 1923.

ERNEST K. READ.