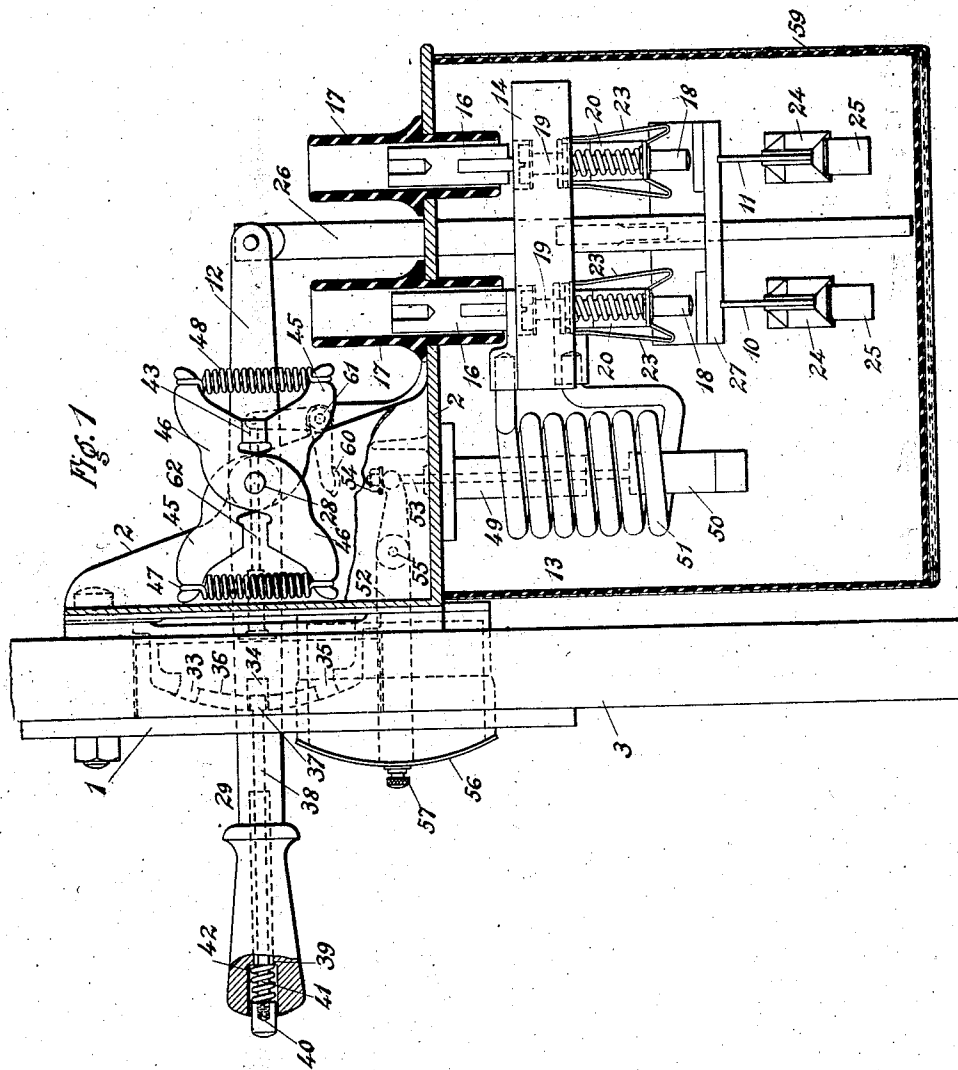


C. A. TUCKER.
ELECTRIC CIRCUIT CONTROLLER AND INTERRUPTER.
APPLICATION FILED JAN. 3, 1906.

936,584.

Patented Oct. 12, 1909.
3 SHEETS—SHEET 1.



WITNESSES:
Camille Boutin
R. J. Pearson.

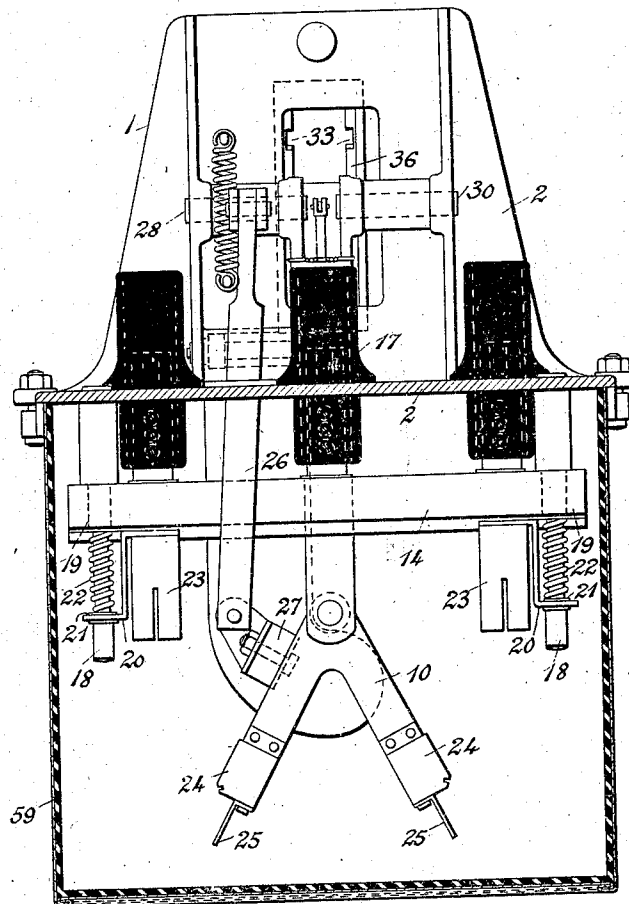
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Fig. 2



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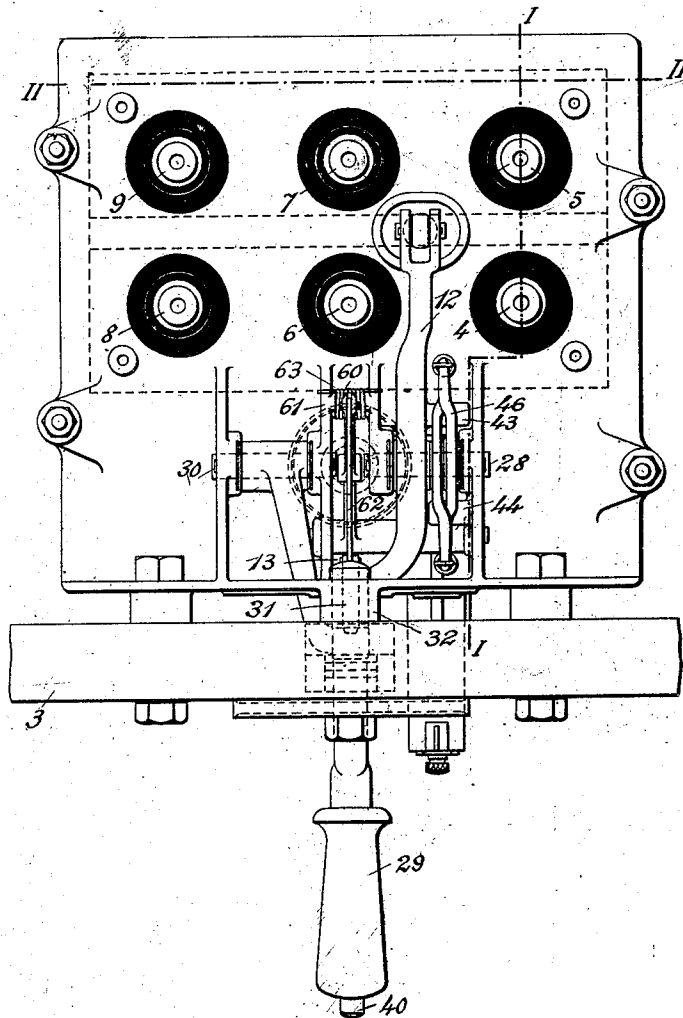
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3 SHEETS—SHEET 3.

Fig. 3



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UNITED STATES PATENT OFFICE.

CURTIS A. TUCKER, OF EDGEWOOD PARK, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

ELECTRIC-CIRCUIT CONTROLLER AND INTERRUPTER.

936,584.

Specification of Letters Patent.

Patented Oct. 12, 1909.

Application filed January 3, 1906. Serial No. 294,443.

To all whom it may concern:

Be it known that I, CURTIS A. TUCKER, a citizen of the United States, and a resident of Edgewood Park, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Electric-Circuit Controllers and Interrupters, of which the following is a specification.

10 My invention relates to controlling and interrupting means for electric circuits and it has for its object to provide a double throw switch that is adapted for high voltage circuit control; that may be manually operated and that automatically opens the circuit and renders the controller handle inoperative when excessive electric currents traverse the circuits in which it is located, thus making it impossible to hold the switch closed under abnormal conditions.

20 My invention includes a mechanical arrangement of particular advantage for returning the movable contact parts from either closed position to open circuit position which insures a quick break in the circuit and requires a relatively inconsiderable motion of the operating lever to close the circuit.

30 The controller comprises, in general, a plurality of movable contact members which may engage either of two sets of stationary members and an operating lever which is connected to the movable contact members by a link and is kept in this mid position by a pair of springs that are attached to the extremities of a pair of spring dogs which engage projections on the operating lever and on the stationary frame. A handle lever is normally connected to the operating lever but may be disengaged therefrom under overload conditions.

45 Figures 1, 2 and 3 of the accompanying drawings are, respectively, a front elevation partially in cross section, a side elevation and a plan view of a controller constructed in accordance with my invention which, as illustrated, is mounted upon a switchboard but is, of course, not restricted to such mounting.

50 Referring to the drawings, the circuit interrupter 1 comprises a frame 2 which is mounted upon an insulating slab or switchboard panel 3 and supports a plurality of stationary contact members 4, 5, 6, 7, 8 and 9, movable contact members 10 and 11, an

operating lever 12 and an overload release magnet 13. The stationary contact members 4, 5, 8 and 9 are supported by an insulating plate 14 and comprise arcing contact members and current-carrying switch members which extend below the plate 14 and connectors 16 that are surrounded by insulating bushings 17 and extend above the plate. The arcing contact members comprise pin terminals 18 which are movably fitted into holes 19 in the plate 14 and are connected to the current-carrying switch members by angle plates or strips 20. Movement of the pin terminals 18 is limited and controlled by the collars 21 and springs 22 the latter of which surround the pin terminals and are interposed between the plate 14 and the collars 21.

The stationary current-carrying switch members have contact terminals formed of flexible strips 23 the lower ends of which are bent inwardly and upwardly to form substantially V-shaped recesses. The stationary contact members 6 and 7 are similarly provided with connectors and bushings above the plate 14 but below the plate they serve as supports for the movable contact members 10 and 11 which are pivotally mounted thereon. The movable contact members are similar to each other and consist of flat V-shaped plates which are pivotally mounted near their vertices upon the stationary contact members 6 and 7 and rotate in parallel planes. Hollow wedge terminal blocks 24 are so attached to the arms of the V-shaped plates that they may engage the stationary contact terminals 23, and contact strips 25 extend outwardly from the wedge blocks to engage the arcing terminal pins 18, the arrangement of parts being such that the circuit is always broken at the extremities of these pins. The simultaneous action of the movable members 10 and 11 is accomplished by a link 26 one end of which is pivoted to a block 27 of insulating material with which the V-shaped plates are provided and the other end of which is pivoted to the operating lever 12 having a fulcrum shaft 28. The connecting link 26 is of such length that the operating lever is substantially in a horizontal position when the movable contact members 10 and 11 occupy a position midway between the stationary terminals 4 and 5, and 8 and 9, consequently, as the lever is moved through a

slight angle in one direction in a vertical plane, the movable contact members will move into engagement with one set of stationary contact terminals and, as it is moved through a similar angle in the opposite direction from the central position, the movable members engage the opposite pair of stationary contact terminals.

The operating lever 12 may be manually operated, under normal conditions, by means of a handle lever 29 which is pivotally mounted near its inner extremity by means of a shaft 30 that is in alinement with the shaft 28, the two levers being so constructed that a single forked lever is formed when a connecting pin 31 is forced through a bushing or hub 32 at one extremity of the operating lever into a hollow bored handle member of the other lever. It follows that the handle lever may also occupy any one of the three positions hereinbefore described which are accentuated by three notches 33, 34 and 35, that are located at equal intervals in a concave cylindrically curved surface 36 and are engaged by a latch 37. This latch 37 is attached to a rod 38 which is located in a tubular bore 39 in the handle lever and is provided with a push button 40 which projects from the end of the handle. The latch is held in engagement with any one of the notches by a spring 41 interposed between the push button 40 and a shoulder 42 in the handle bore and may be withdrawn therefrom by sufficient pressure against the push button.

The operating lever 12 is provided with a projection 43 and the frame 2 is provided with a corresponding projection 44, which are engaged by two similar spring actuated dogs 45 and 46, both of which are rotatably mounted upon the fulcrum shaft 28 of the operating lever. The spring actuated dogs are so interconnected by springs 47 and 48 that the operating lever and the handle lever will return to the mid position, which is accentuated by the notch 34, when released from the other positions, since a motion in either direction from the mid position puts the springs under tension. The levers may be released from positions corresponding to notches 33 and 35 by the push button 40, or only the operating lever may be released and returned to the mid position by the action of the release magnet 13 which comprises a stationary core member 49, a movable core member 50, a magnetizing coil 51, which may be included in the circuit when the switch occupies either or both of its closed positions, and an adjusting lever 52. The movable core member 50 is attached to the lower extremity of a hammer rod 53 which extends through a hole in the stationary core member 49 and serves as a guide for the movable member. The motion of the member 50 is limited by a nut 54 which is

screw threaded on to the upper extremity of the hammer rod 53 after the rod has been thrust through the hole in the stationary member.

Adjusting lever 52 is pivotally mounted upon a stationary shaft 55 and is forked at one end to so engage the nut 54 on the rod that by rotating the lever through a small angle it is possible to determine the limit to which the core member 50 may be moved. The outer extremity of the lever 52 extends through the switchboard 3 and a slotted dial 56 and is provided with a thumb screw 57 and an indicating finger by means of which the lever may be fixed at any desirable point along the slotted dial 56. The outer surface of the dial is cylindrically curved concentrically with the shaft 55 and may be calibrated in amperes to indicate the position to which the lever should be set in order that the circuit may be automatically interrupted by the action of the tripping mechanism.

When the interrupter is closed and the current flowing through the coil 51 reaches a value such that the movable core member 50 is moved into engagement with the stationary member 49, the upper end of the hammer rod 53 strikes one arm of a bell crank lever 60 which is rotatably mounted on a shaft 61, the other arm of the bell crank lever being so connected with the pin 31 by a link 62 that the motion of the crank transmitted by the hammer rod pulls the pin 31 out of the handle lever bore and releases the operating lever 12, which is immediately returned to the mid position. In order to again close the switch, the latch 37 must be released from its notch and the handle lever returned to its mid position when the pin 31 reengages the hub 32 by reason of a spring 63 which tends to hold the bell crank lever in its normal position. This arrangement removes the possibility of holding the interrupter closed by the handle lever when excessive currents traverse the circuit in which it is located since the automatic release mechanism effects the return of the movable contact members to the open circuit position irrespective of the handle lever.

It will be observed that no current-carrying parts are located on the face of the switchboard and the switch parts and the tripping coil may be immersed in oil for which purpose a detachable tank 59 is provided.

Variations in size, form and details of construction may, of course, be made within the scope of my invention.

I claim as my invention:

1. The combination with a double-throw switch, and an operating handle therefor, of a pair of pivoted, spring-connected dogs for automatically returning the movable contact member to its mid position under predetermined conditions.

2. The combination with a double-throw switch, and an operating handle therefor, of a pair of pivoted, spring-connected dogs for automatically returning the movable contact member to its mid position from either closed-circuit position under predetermined conditions.

3. The combination with a double-throw switch, an operating lever therefor, and a handle interlocked with said lever, of means for returning the switch to its open-circuit position after it has been closed, said means comprising a pair of rotatably-mounted dogs connected together by springs and adapted to engage a projection on the operating lever and a corresponding stationary projection.

4. The combination with a double-throw switch, an operating lever therefor, a handle interlocked with said lever and adapted to occupy a plurality of accentuated positions, of means for disengaging the operating lever from the handle lever and returning the switch to its open-circuit position after it has been closed, said means comprising a pair of rotatably-mounted dogs connected together by springs and adapted to engage a projection on the operating lever and a corresponding stationary projection.

5. The combination with a double-throw switch, a movable contact member therefor, an operating lever connected to said movable member, a handle interlocked with said operating lever and rotatably mounted on a shaft which is in alinement with the operating lever shaft, and a latch mechanism for said handle lever adapted to engage a plurality of notches which correspond, respectively, to the open and closed-circuit positions, of means for disengaging the operating lever from the handle lever and for re-

turning the switch to its open-circuit position after it has been closed, said means comprising a pair of rotatably-mounted dogs connected together by springs and adapted to engage a projection on the operating lever and a corresponding stationary projection.

6. The combination with a double-throw switch, a movable contact member therefor, an operating lever connected to said movable member, a handle lever interlocked with said operating lever and rotatably mounted on a shaft which is in alinement with the operating lever shaft, and a latch mechanism for said handle lever comprising a rod located in a tubular opening in the handle lever, and a pawl attached thereto and adapted to engage a plurality of notches that correspond, respectively, to the open and closed-circuit positions, of means for disengaging the operating lever from the handle lever and for returning the switch to its open-circuit position after it has been closed, said means comprising a pair of rotatably mounted dogs connected together by springs and adapted to engage a projection on the operating lever and a corresponding stationary projection.

7. The combination with a double-throw switch, an operating lever therefor and a handle lever interlocked with said lever, of a pair of spring-connected dogs for returning the switch to its open-circuit position after it has been closed, without changing the position of the handle lever.

In testimony whereof, I have hereunto subscribed my name this 30th day of December, 1905.

CURTIS A. TUCKER.

Witnesses:

HARVE R. STUART,
BIRNEY HINES.