H. W. EICHBAUM.

ELECTRICAL CIRCUIT CONTROLLER.

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916,958. Patented Mar. 30, 1909.

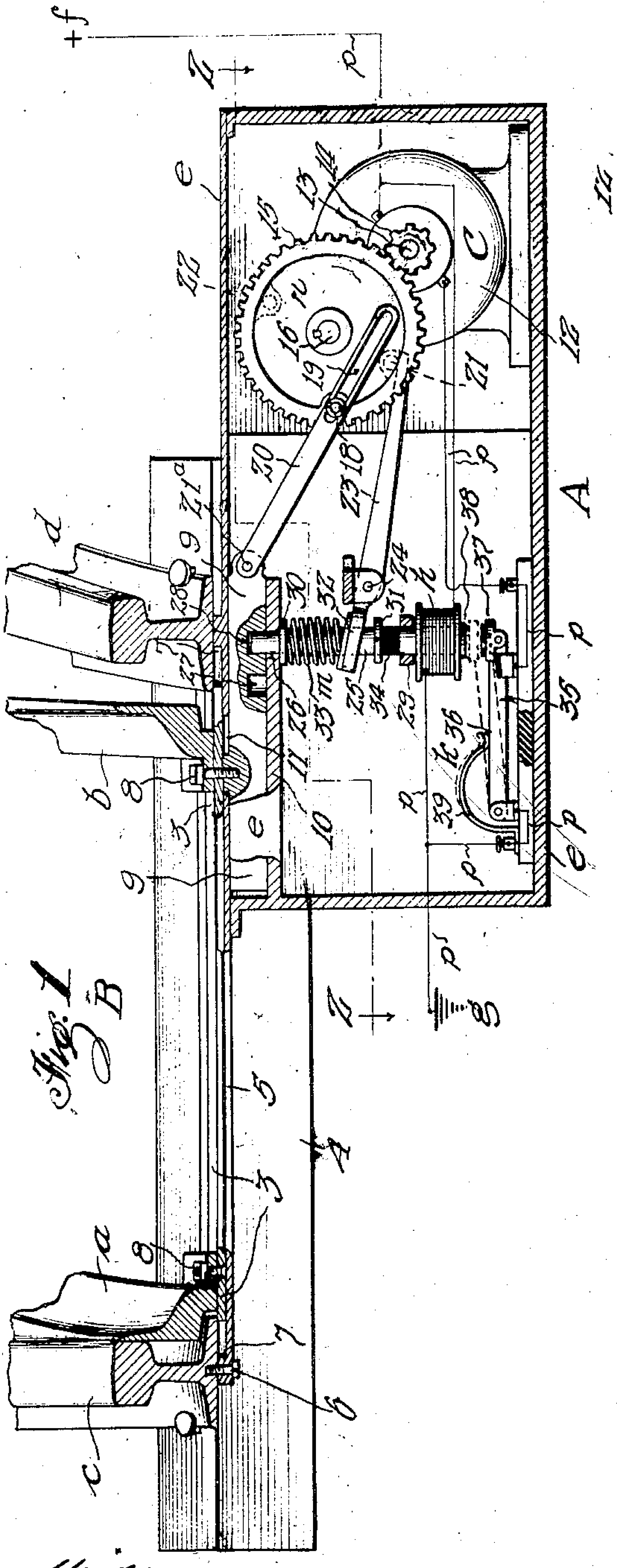

Fig. 1

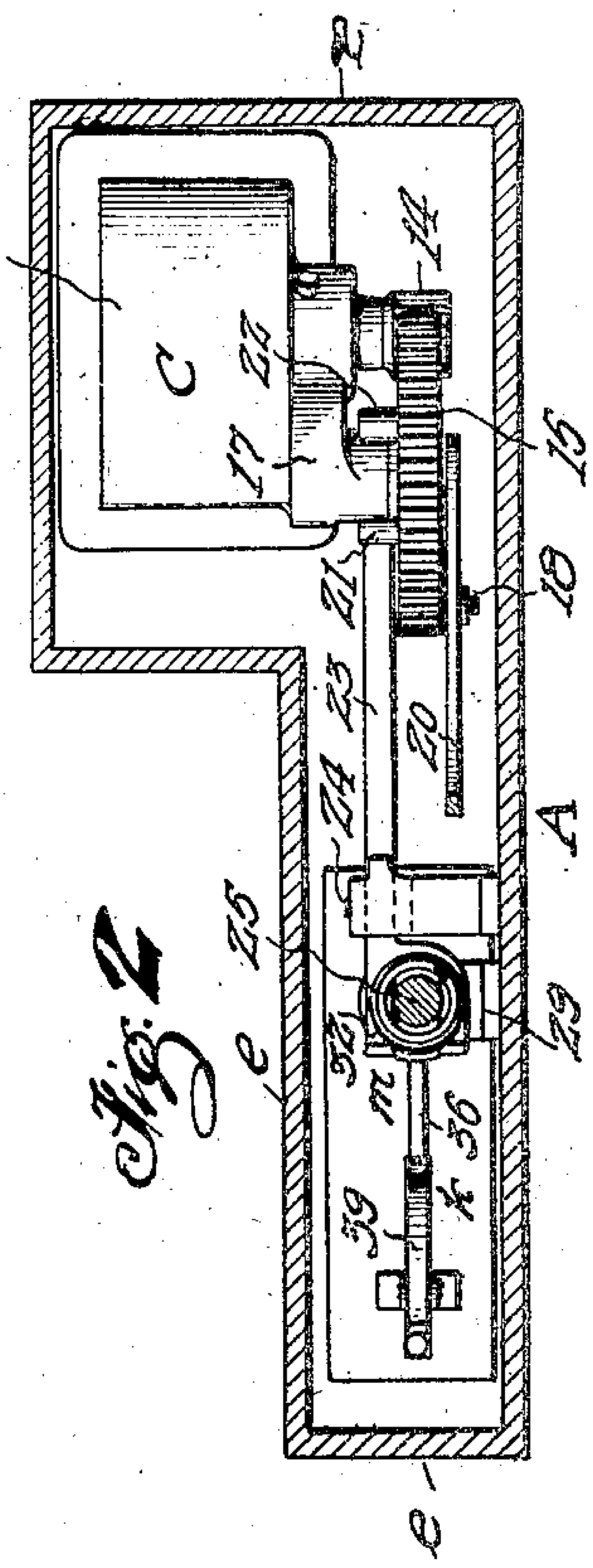

Fig. 2

Witnesses:

[signature]

Lute S. Alter.

Inventor:

Herman W. Eichbaum,

by [signature]

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UNITED STATES PATENT OFFICE.

HERMAN W. EICHBAUM, OF VENICE, CALIFORNIA.

ELECTRICAL-CIRCUIT CONTROLLER.

No. 916,958. Specification of Letters Patent. Patented March 30, 1909.

Application filed June 8, 1908. Serial No. 437,437.

To all whom it may concern:

Be it known that I, HERMAN W. EICHBAUM, a citizen of the United States, residing at Venice, in the county of Los Angeles and State of California, have invented new and useful Improvements in Electrical-Circuit Controllers, of which the following is a specification.

This invention relates to an electrical circuit controller; has for its object to provide an improved circuit controller and adaptable to a wide range of uses, and particularly adapted for controlling circuits utilized for energization of operating or actuating mechanisms, such as switch-throwing and gate-moving means. Corresponding to the principle of the invention, the electrical circuit is controlled, as to its utilization for energization purposes, by means energized by the electrical energy traversing the circuit; suitable make-and-break devices and apparatus being operatively associated with an electrical motive element, or prime mover, which performs the actuating or operating functions demanded of it in the specific use of the invention to which, in such particular case, the latter is adapted.

In the disclosure of the drawing, the circuit controller is illustrated as combined with and controlling switch-throwing means or apparatus; so that the admission of electrical energy to the entirety, for a brief period of time, causes the throwing of the switch points from one to the other position, together with its prior release and subsequent locking.

In said drawing: Figure 1 is a transverse sectional view, partly in full lines of a portion of a railway roadbed and switch-throwing means associated therewith; the latter means being shown as installed in the roadbed below the level of the rails and switch; and Fig. 2 is a transverse sectional view of the same taken on the line 2—2, Fig. 1, and looking in the direction of the appended arrows.

Corresponding parts in both figures are designated by the same reference characters.

Referring with particularity to the drawing; A designates switch-throwing means or switch-operating means combined with a switch B, which latter includes, as usual, two connected movable switch-points, *a* and *b*, respectively, and two fixed rails, *c* and *d*, respectively. The switch-operating means include a prime or motive element C; and said switch-operating means comprises and includes the electrical circuit controller which constitutes the invention.

The switch-operating means A are, in the main, inclosed within the casing *e* which is set into the road bed, beneath the level of the rails, and extends in part beneath one of the rails as *d*.

f designates a line connection with any suitable source of electrical energy; and *g* designates a ground for the electrical circuit which includes the line of connection *f*, the prime mover C and the other features of the circuit controller and switch-operating means, which comprises a movable electro-magnet *h* and a circuit maker-and-breaker *k*.

The movable switch-points *a* and *b* are connected by a plate or bar 3 accommodated between the ties, such as 4, of the roadbed, and resting upon the base-plate 5 connected with one or both of the rails, as at 6, and provided with stops 7 limiting the endwise movements of the plate or bar 3 transversely of the roadbed. Each of the switch-points *a* and *b* is bolted to the plate or bar 3, as at 8, and the plate or bar 3 is also bolted, as at 8, to a slide 9 within the casing *e*, and supported upon a bracket 10; the casing being provided with an enlarged opening 11 permitting play of the connection at 8 in the shifting of the switch-points and movement of the slide 9. Locking means *m* are associated with the slide 9; and operating means *n* are operatively connected and associated with the slide 9 and with the locking means *m*.

A particular form of provision, construction, combination, association and relative arrangement of parts, members and features of the switch-operating means, and the electrical circuit controller associated with and comprised in the same, as shown in the drawing, is as follows:—At one side or end of the casing *e* a small electric motor 12 is installed; and the drive or armature shaft 13 thereof is provided with a spur-gear 14 meshing with a larger spur-gear 15 fixed to the short shaft 16 journaled in a bracket 17 upon the frame or casing of the motor 12; said motor 12 constituting the prime mover or motive element C. Projecting from one face of the spur-gear 15 is a wrist pin 18 projecting through an elongated slot 19 formed in one end portion of a link arm 20; the other end portion of which is pivotally

connected as at 21ª, with the adjacent end of the slide 9. The slide 9 and gear 15 are so relatively arranged, and, the link arm 20 and opening 19 therein, together with the diameter of the gear 15 are of such proportion that a full rotation of the gear 15, by the gear 14, serves to reciprocate the slide 9 throwing the switch-points *a* and *b* first to the right, as the drawing reads, and then to the left, with the parts initially in position shown in the drawing, and the direction of rotation of each of the gears 14 and 15 being as designated by the adjacent arrows. Upon the face of the gear 15 opposite that from which the wrist pin 18 projects, and at diametrically opposite points are disposed studs 21 and 22 properly seated relative to the wrist pin 18, and operating in connection with a trip arm 23, pivotally supported intermediate of its ends as at 24, and combined with the locking means *m*, operating in a manner hereinafter described; said locking means including a sliding bolt or pin 25, which carries the movable electro magnet *h* at its lower end and at its upper end projects through an opening 26 in the bracket 10 in position for alternate registration with chambers 27 and 28 in the slide 9. The bolt or pin 25 is guided by the bracket 10 and by a supplemental bracket 29 beneath the bracket 10, and is provided with an upper and lower stop, 30 and 31, respectively, which respectively abut against the bracket 10 and the bracket 29 in the respective upward and downward movements of the sliding bolt or pin 25. The shorter end portion of the trip arm 23 is formed into a bifurcated head 32 which embraces the bolt or pin 25; and an expansive coiled spring 33 surrounds the bolt or pin 25 between the stop 30 and the head 32. The bolt or pin 25 may be provided with insulation, as at 34, beneath the stop 31, insulating the bolt or pin above the stop 31 from the current passing through the electro-magnet *h*.

The circuit maker-and-breaker *k* is arranged beneath the movable electro-magnet *h*, in position to be affected by the latter; and may comprise a knife switch 35; the switch arm 36 of which is arranged to work vertically and is provided with a head or armature 37 arranged directly beneath the pole piece 38 of the electro-magnet *h*. The switch arm 36 is normally maintained in lowered and switch-closing position by tension means or a spring 39. The switch arm 36 has a range of play which permits it to travel upwardly, so that its armature 37 shall be in contact with the pole piece 38 when the electro magnet *h* is in elevated position. The electrical path, designated at *p*, is from the line connection *f*, to and through the electric motor 12, to and through the circuit maker-and-breaker *k* and to the ground *g*, as a motor circuit; and from the line connection *f*, to and through electro-magnet and to the ground *g*, as an electro-magn circuit.

The operation, method of use and adva tages of the improved electrical circuit co troller constituting the invention, and of t switch-operating means A embodying t invention, as shown and described, will readily understood from the foregoing d scription, taken in connection with the a companying drawing and the followin statement:—With the parts in the positio shown in the drawing, electrical energy fro the line connection *f* which can be made i any suitable manner, passes through and en ergizes the electric motor 12, the circuit b ing closed through the circuit maker-and breaker *k*. The gear 15 is immediately ro tated, causing the disengagement of th larger end portion of the trip arm 23 fro the stud 21 into the path of which latter th former projects; and, the electro magnet being at the same time energized, the cir cuit through the same from the line of con nection *f* to the ground *g* being at all time closed, and the electro magnet being inde pendent of the circuit maker-and-breaker the armature 37 is attracted to the pole piec 38, breaking the circuit through the circuit maker-and-breaker *k* and opening the cir cuit through the electric motor 12 to termi nate action of the same during the fall of the bolt or pin 25 and the electro-magnet *h*, permitted by the freed trip arm 23, and un der actuation of the spring 33, thus releasing the slide 9. The fall of the electro-magnet *h* and of the bolt or pin 25 bears down the armature 37 with its switch-arm 36 and again closes the circuit through the circuit maker-and-breaker *k*, again energizing the electric motor 12, which turns the gear 15 until the wrist pin 18 causes the link arm 20 to move the slide 9 to the right, throwing the switch, consisting of the switch-points *a* and *b*. As soon, however, as the other stud, namely 22, upon the gear 15, is brought to bear upon the trip arm 23, the electro-magnet *h* and bolt or pin 25 begin to rise, and the switch-arm 36 is again elevated by the electro-magnet *h*, through the armature 37 of the former, and the circuit through the electric motor 12 is again broken, stopping the rotation of the gear 15. As the trip arm 23 is given its final actuation by the stud 22, it forces the bolt or pin 25, at its upper end, into locking engagement with the slide 9 in the chamber 27, acting through the spring 33 which yields to prevent binding or fracture of the parts. If now the line connection *f* be deënergized, the electro magnet *h* will be correspondingly deënergized and the switch-arm 36 will be permitted to fall under pressure of the tension means 39, and the parts will be in position for actuation of

the slide 9 back to the position shown in the drawing to throw the switch back to the position in the drawing indicated. In such latter operation, or series of operations, the steps described above in detail will be repeated, with the exception that the trip arm 23 will initially be released from the stud 22 and finally engaged to operate the locking means *m* by the stud 21. The elongated slot connection of the wrist pin 18 and link arm 20 permits of the operation of the locking means *m* with relation to the slide 9 both before and after movement of said slide.

It will be seen that the electrical circuit controller constituting the invention comprises controlling elements or a controlling element in itself controlled by an element energized by the electrical circuit, and also mechanically controlled in connection with the prime mover or motive element, such as the electric motor 12, which performs the work in question. It will also be noted that the electro magnet *h* is controlled as to its field area, by the motive element C and the operative connection between the same and the electro-magnet.

I do not desire to be understood as limiting myself to the specific construction, provision, combination, association and relative arrangement of parts, members and features shown and described, but reserve the right to vary the same, in adapting the improvements to varying conditions of use, without departing from the spirit of the invention or the terms of the following claims.

Having thus described my invention, I claim and desire to secure by Letters Patent:—

1. In an improved electrical circuit controller, a circuit maker-and-breaker, a motive element controlled by the circuit maker-and-breaker, and an electro-magnet independent of and controlling the circuit maker-and-breaker and controlled as to its field area by the motive element.

2. In an improved electrical circuit controller, a circuit maker-and-breaker, a motive element controlled by the circuit maker-and-breaker, and a movable electro-magnet independent of and controlling the circuit maker-and-breaker and controlled in its movement by the motive element.

3. In an improved electrical circuit controller, an electric motor, a circuit maker-and-breaker controlling the energization of the electric motor, a movable electro-magnet controlling and independent of the circuit maker-and-breaker, and means actuated by the electric motor for actuating the electro-magnet to vary the position of the latter.

4. In an improved electrical circuit controller, an electric motor, a circuit maker-and-breaker controlling the energization of the electric motor, a movable spring actuated electro-magnet controlling the circuit maker-and-breaker, and means actuated by the electric motor for actuating the electro-magnet to vary the position of the latter.

5. In improvements of the character described, an electric motor, a circuit maker-and-breaker controlling the energization of the electric motor, a movable electro-magnet controlling and independent of the circuit maker-and-breaker and controlled by the electric motor as to its field area; and other mechanism mechanically actuated by the electric motor.

6. In improvements of the character described, an electric motor, a circuit maker-and-breaker controlling the energization of the electric motor, a movable electro-magnet controlling the circuit maker-and-breaker and controlled as to its field area by the electric motor, other mechanism mechanically actuated by the electric motor, and locking means for said other mechanism movable with said electro-magnet.

7. In improvements of the character described, an electric motor, a circuit maker-and-breaker controlling the energization of the electric motor, a movable electro magnet controlling and independent of the circuit maker-and-breaker, and other mechanism actuated by said electric motor, said electric motor mechanically controlling said electro-magnet as to its field area; and locking means for said other mechanism movable with said electro-magnet and actuated by said electric motor.

8. In improvements of the character described, an electric motor, a tension actuated circuit maker-and-breaker controlling the energization of the electric motor, a movable electro-magnet controlling and independent of the circuit maker-and-breaker, and other mechanism actuated by said electric motor, said electric motor mechanically controlling said electro-magnet as to its field area; and locking means for said other mechanism movable with said electro-magnet and actuated by said electric motor.

9. The combination, with a switch of the character described; of switch-operating means for the switch comprising a slide, an electric motor, mechanical connections between the slide and the electric motor, a circuit maker-and-breaker controlling the energization of the electric motor, locking means for the slide, an electro-magnet connected with and movable with the locking means and controlling though independent of the circuit maker-and-breaker, and means actuated by the electric motor for moving the locking means and the electro-magnet.

10. The combination, with a switch of the character described; of switch operating means for the switch comprising a slide, an electric motor, a gear operated by the electric motor and provided with a plurality of studs, a link arm pivotally connected with

the slide and having a connection with the gear permitting play between the same, a circuit maker-and-breaker controlling the energization of the electric motor, locking means for the slide, an electro-magnet connected with and movable with the locking means and controlling the circuit maker-and-breaker, and a trip-arm arranged for actuation by said studs upon said gear and serving to move the locking means and electro-magnet.

11. In an improved electrical circuit controller, a circuit maker-and-breaker, a motive element controlled by the circuit maker-and-breaker, and an electro-magnet controlling the circuit maker-and-breaker and controlled as to its field area by the motive element; there being separate electrical circuits through the electro-magnet and the circuit maker-and-breaker and motive element respectively.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

HERMAN W. EICHBAUM.

Witnesses:

MAY C. OLDFIELD,

A. S. LEE.