No. 894,910. PATENTED AUG. 4, 1908.

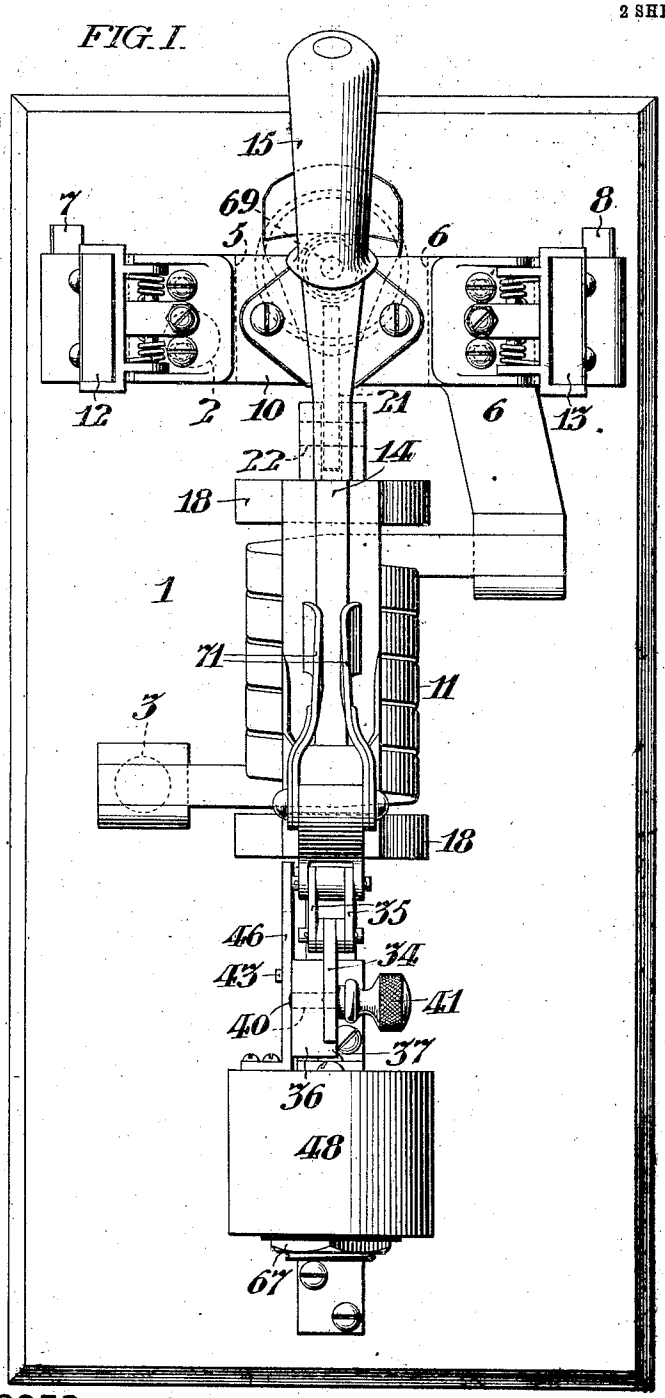
W. M. SCOTT.

AUTOMATIC MAGNETIC CIRCUIT BREAKER.

APPLICATION FILED MAY 28,1904. RENEWED MAR. 26, 1907.

2 SHEETS—SHEET 1.

FIG. I.



WITNESSES:

Clifton C. Hallowell

John C. Bergner

INVENTOR:

WILLIAM M. SCOTT,

by Paige, Paul & Th.

Attys.

No. 894,910. PATENTED AUG. 4, 1908.

W. M. SCOTT.

AUTOMATIC MAGNETIC CIRCUIT BREAKER.

APPLICATION FILED MAY 28,1904. RENEWED MAR. 26, 1907.

2 SHEETS—SHEET 2.

FIG. II.

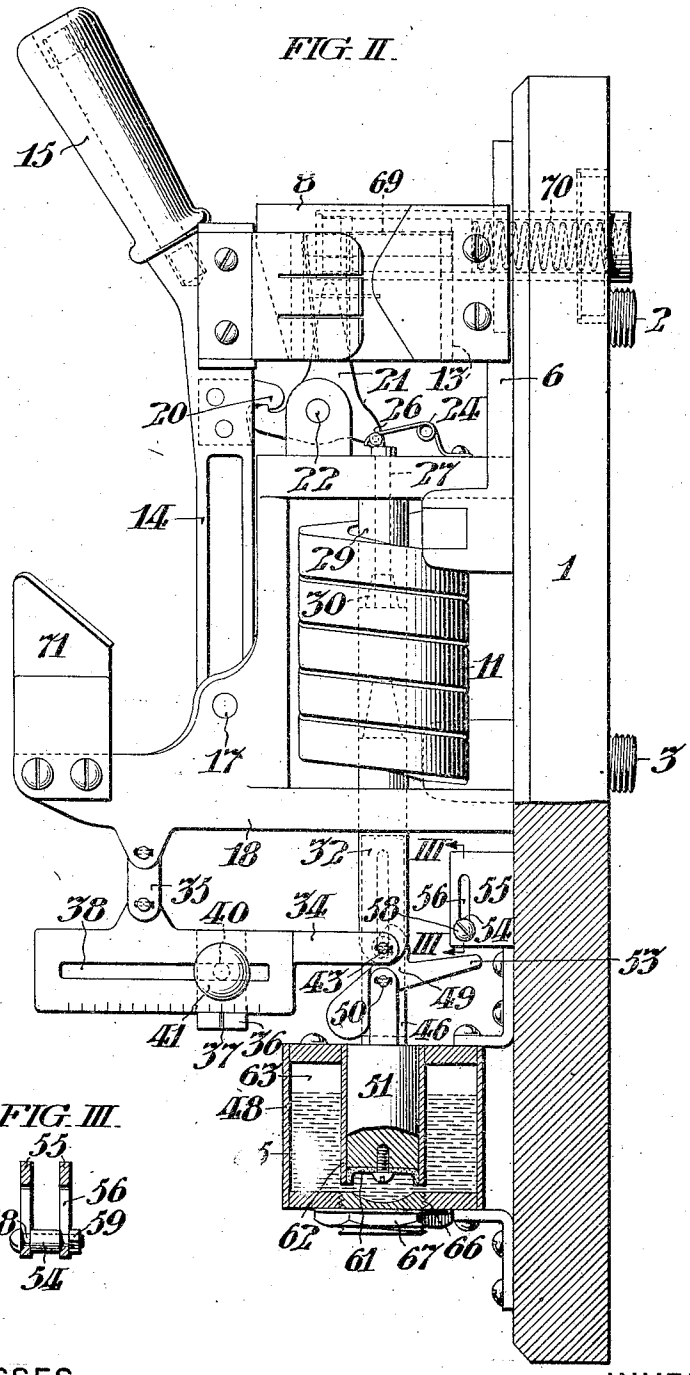


FIG. III.

WITNESSES:

Clifton C. Callowell

John C. Bergner.

INVENTOR:

WILLIAM M. SCOTT,

by Briggs, Paul & Bailey

Attys.

UNITED STATES PATENT OFFICE.

WILLIAM M. SCOTT, OF PHILADELPHIA, PENNSYLVANIA.

AUTOMATIC MAGNETIC CIRCUIT-BREAKER.

No. 894,910. Specification of Letters Patent. Patented Aug. 4, 1908.

Application filed May 28, 1904, Serial No. 210,303. Renewed March 26, 1907. Serial No. 364,658.

To all whom it may concern:

Be it known that I, WILLIAM M. SCOTT, of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Automatic Magnetic Circuit-Breakers, whereof the following is a specification, reference being had to the accompanying drawings.

My improvements are particularly applicable to circuit breakers comprising a pivotally supported bridge which is normally included in an electric circuit and provided with normally detained actuating mechanism which upon increase of the current to a predetermined limit, will be automatically tripped to break the circuit by removing said bridge. As each operation necessitates that the bridge be manually restored to its original closed position, considerable time and labor is ordinarily required to maintain such a device in proper relation to the circuit.

Therefore, it is the object of my invention to provide a device of the character specified which while having such delicacy of adjustment as to enable it to respond to slight variations in the current, yet comprises means to retard the releasing operation to a degree sufficient to prevent the unnecessary operation of the device by momentary fluctuation in the current.

My invention also comprehends the provision of means to adjustably predetermine the extent of such retardation.

The form of my invention hereinafter described comprises a retarding device of the dash pot type, comprising a plunger arranged to displace a body of liquid. Said plunger is normally connected by a detachable clutch, with the movable core of a magnet coil by which the breaking operation is initiated. The arrangement is such that said core may idly reciprocate in accordance with limited fluctuations in the current, without breaking the circuit; the breaking limit of its movement being determined by the adjustment of an abutment which when encountered by the clutch releases the latter and thus frees said core from the retarding device.

The form of my invention hereinafter described also comprises a weight bar connected to said core, and having an adjustable weight whereby the variable operation of the device is facilitated.

My invention comprises the various novel features of construction and arrangement hereinafter more definitely specified.

In the accompanying drawings, Figure I, is a front elevation of an instrument conveniently embodying my improvements. Fig. II, is an elevation of the right hand side of said instrument shown in Fig. I; a portion of the dash pot being broken away to disclose its interior construction. Fig. III, is a fragmentary sectional view taken on the line III, III, in Fig. II, showing the details of construction of the adjustable abutment.

In said figures,—1, is the base, of insulating material, provided with rear connections 2, and 3, for the line circuit, and having the opposed terminals 5, and 6, secured in stationary position on said base 1, and, comprising the resiliently supported carbon contact plates 7, and 8, for engagement with the bridge 10. The bridge 10, normally connects said terminals 5, and 6, as shown in Fig. I; and, the magnet coil 11, by which the automatic tripping action is effected, is included in the circuit between said terminal 6, and the connection 3, for the line. Said bridge 10, is provided with spring pressed carbon contact plates 12, and 13 to respectively engage the contact plates 7 and 8, and is supported by the lever 14, provided with the operating handle 15. Said lever 14, is pivoted on the pin 17, in the frame 18, which is secured in stationary relation with said base 1. Said lever 14, is provided with the hook 20, arranged to operatively engage the detent lever 21, which latter is pivoted on the pin 22, in said frame 18, and provided with the spring 24, which tends to press it into engagement with said hook 20. The arm 26, of said detent lever 21, overhangs the tripping pin 27, which is mounted to reciprocate in the stationary core 29, in concentric relation with the coil 11. The lower extremity of said core 29, is provided with a conical socket 30, in which the end of said pin 27, normally depends. The movable core 32, extends in axial alinement with said coil 11, and pin 27, through the lower portion of the frame 18, and is pivoted below the latter to the weight bar 34, which is pivotally suspended by the link 35, from the frame 18. Said weight bar 34, is provided with the weight 36, having the index point 37, and is adjustable from end to end of the slot 38, in which it is secured in adjusted position by the screw 40, which is conveniently provided with the milled head 41. Accidental rotary displacement of said core 32, is prevented by its pivot pin 43, which projects through the

vertical guide plate 46, which is mounted upon the top of the casing 48, as shown in Fig. I. Said pin 43, at the lower extremity of said core 32, is arranged to engage the clutch lever 49, which is pivoted on the pin 50, in the upper end of the dash pot plunger 51, and the arm 53, of said lever 49, extends beneath the abutment 54, which is adjustable vertically in the housing 55, to the extent of the slot 56, therein. Said abutment may be secured in any desired position of adjustment, by the bolt 58, and nut 59, best shown in Fig. III. Said plunger 51, is provided at its lower extremity with the cup leather 61, and is mounted to reciprocate in the cylinder 62, which is normally maintained in stationary position in the chamber 63, in the casing 48. Said chamber contains the retarding liquid 65, which is primarily introduced through the opening 66, closed by the cap 67, and, the arrangement is such that said liquid is displaced through the narrow opening at the bottom of the cylinder 62 by the movement of said plunger which is consequently retarded. Said lever 14, is opposed by the plunger 69, pressed by the spring 70, which normally tends to thrust the bridge 10, away from the terminals 5, and 6; and, said frame 18, is provided with the opposed spring buffer plates 71, which receive the lever 14, when the circuit is broken.

Said instrument operates as follows:— The parts being set in the position shown in Figs. I, and II, slight fluctuations occurring in the current may cause the core 32, to rise and fall idly to a limited extent; however, upon the upward movement of said core 32, to a predetermined limit, determined by the position to which the abutment 54, has been adjusted, the clutch lever 49, encounters said abutment and is rocked to release said core 32, and, thereupon, the latter is carried upward by the magnetic stress in the coil 11, and drives the tripping pin 27, against the arm 26, of the detent lever 21, releases the latter from the hook 20, and permits the bridge 10, to be thrown away from the terminals 5, and 6. The extent of the idle movement of said core 32, which may occur without effecting the automatic breaking operation above described, may of course be varied in accordance with the position of adjustment of the abutment 54; and, the length of time which any fluctuation in the current is required to persist, to effect the breaking operation, may also be varied in accordance with the position of the weight 36, whose moment may augment or diminish the inertia of the core 32, in accordance with its adjustment respectively toward or away from the latter, and thereby determine the strength of the current required to raise the core.

I do not desire to limit myself to the precise details of construction and arrangement herein set forth, as it is obvious that various modifications may be made therein without departing from the essential features of my invention.

I claim:—

1. In a circuit breaker, the combination with a movable bridge which is normally included in the circuit; of a spring tending to remove said bridge from the circuit; a detent normally retaining said bridge in the circuit; a magnet coil included in the circuit, provided with a core arranged to release said detent when the current rises to a predetermined degree; a retarding device; a clutch normally directly connecting said retarding device with said core; and, an adjustable abutment independent of said core arranged to release said clutch when said core is shifted to a predetermined point, substantially as set forth.

2. In a circuit breaker, the combination with a movable bridge, which is normally included in the circuit; of a detent normally retaining said bridge in the circuit; a magnet coil included in the circuit and provided with a movable core arranged to release said detent when the current rises to a predetermined degree; a retarding device; a clutch normally directly connecting said retarding device with said core; and, an adjustable weight supported independently of, but operatively connected with said core, substantially as set forth.

3. In a circuit breaker, the combination with a movable bridge which is normally included in the circuit; of a spring tending to remove said bridge from the circuit; a detent normally retaining said bridge in the circuit; a magnet coil included in the circuit and provided with a movable core arranged to release said detent when the current rises to a predetermined degree; a retarding device; a clutch normally directly connecting said retarding device with said core; means arranged to release said clutch when said core is shifted to a predetermined point; a weight lever connected with said core; and an adjustable weight on said lever, substantially as set forth.

4. In an automatic magnetic circuit breaker, the combination with an insulating base; of a frame mounted on said base; circuit terminals mounted on said base; a magnet coil included in the circuit; a bridge for said terminals; pivotally supported in said frame; a detent arranged to normally retain said bridge in contact with said terminals; a tripping pin mounted to reciprocate in said coil, arranged to release said detent; a movable core for said coil, in operative relation with said tripping pin; a casing supported by said base plate, comprising a chamber; a retarding liquid in said chamber; a plunger arranged to reciprocate in said casing and displace said liquid; a clutch carried by said

plunger, arranged to normally directly engage said core; and, means arranged to release said clutch when said core is shifted to a predetermined point, substantially as set forth.

5. In an automatic magnetic circuit breaker, the combination with an insulating base; of a frame mounted on said base; circuit terminals mounted on said base; a magnet coil mounted on said base and included in the circuit; a bridge for said terminals; a lever supporting said bridge, provided with an operating handle and pivoted in said frame; a hook on said lever; a pair of spring buffer plates arranged on said frame to receive said handle lever when the circuit is broken; a detent lever arranged to engage said hook and normally retain said bridge in contact with said terminals; a spring tending to thrust said detent lever into engagement with said hook; a tripping pin concentrically disposed in said coil, arranged to release said detent lever; a movable core for said coil, in operative relation with said tripping pin; a weight bar pivotally connected to said frame and to said core; a weight carried by said bar; means to secure said weight in different positions; a casing supported by said base plate, comprising a chamber; a retarding liquid in said chamber; a cylinder mounted in said casing in communication with said chamber; a plunger arranged to reciprocate in said cylinder; a clutch lever carried by said plunger, arranged to normally directly engage said core; an adjustable abutment arranged to release said clutch lever; and, means arranged to secure said abutment in adjusted position, substantially as set forth.

6. In an electrical switch, tripping mechanism comprising a restraining latch, a core or armature member for actuating said latch, a dash pot plunger, a clutch carried by said plunger and connecting the same directly to said core or armature member, and means for disconnecting said plunger from said member after predetermined extent of travel.

7. In an electrical switch, tripping mechanism comprising a latch, a core or armature member for actuating said latch, a dash pot plunger, a clutch pivoted thereon and normally locking the same directly to said core or armature member, and means for releasing said member from said plunger after predetermined travel.

8. In an electrical switch, tripping mechanism comprising a latch, a core or armature member for actuating said latch, a dash pot plunger, a clutch for normally connecting said dash pot plunger directly with said core or armature member to retard the same, and an adjustable abutment for actuating said clutch to release said core or armature member after predetermined travel.

9. In an electrical switch, tripping mechanism comprising a latch, a solenoid core for actuating said latch, a dash pot plunger, a clutch carried by said plunger and normally directly engaging said core to retard the same, and an abutment engaged by said clutch after predetermined travel to release said core.

10. In an electrical switch, tripping mechanism comprising a latch, a solenoid core for actuating the same, a dash pot plunger in substantially axial alinement with said core, a clutch normally locking said plunger to said core, and means for releasing said core from said plunger after predetermined travel.

11. In an electrical switch, tripping mechanism comprising a latch, a core or armature member for actuating the same, a reciprocating dash pot plunger, a clutch for locking said plunger directly to said core or armature member to retard the same, and an abutment engaged by said clutch after predetermined movement to release said member.

12. In an electrical switch, tripping mechanism comprising a latch, a solenoid core for actuating said latch, and a dash pot plunger latched directly to said core for retarding the same.

13. In an electrical switch, separable cooperative contacts, a latch for restraining said contacts in normal position, a solenoid core for actuating said latch, a retarding device comprising a movable member, a latch directly connecting said movable member to said core for retarding said core, said core and member latched thereto being disposed beneath said contacts.

14. In an electrical switch, separable cooperative contacts, a latch for restraining said contacts in normal position, a solenoid core for actuating said latch, a dash pot plunger latched directly to said core for retarding the same, said core and plunger being disposed beneath said contacts and in alinement with each other.

In testimony whereof, I have hereunto signed my name at Philadelphia, Pennsylvania, this 25th day of May, 1904.

WM. M. SCOTT.

Witnesses:
ARTHUR E. PAIGE,
JAMES H. BELL.