No. 840,848. PATENTED JAN. 8, 1907.

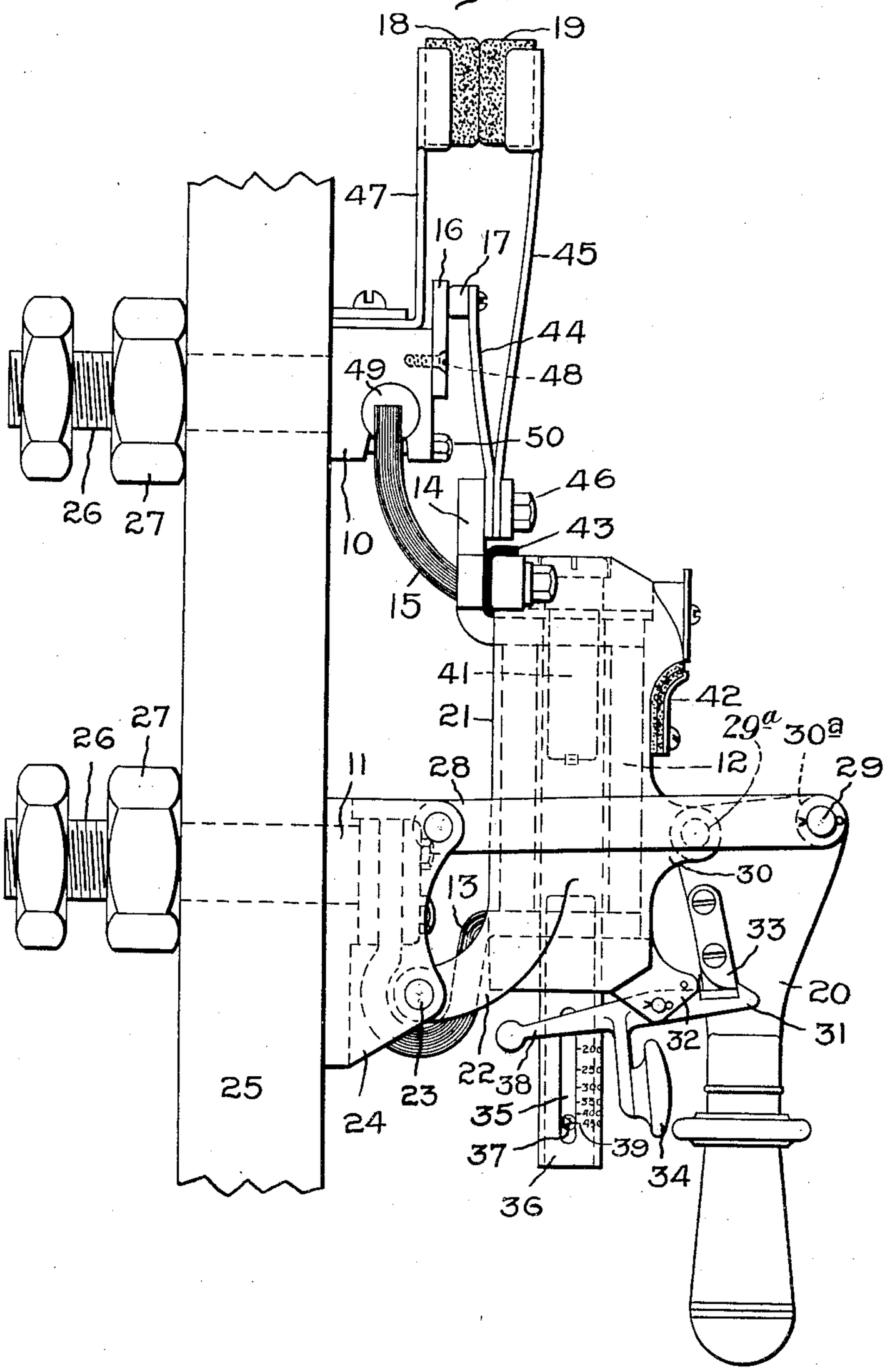
E. M. HEWLETT.

CIRCUIT BREAKER.

APPLICATION FILED NOV. 7, 1904.

3 SHEETS—SHEET 1.

Fig. 1.



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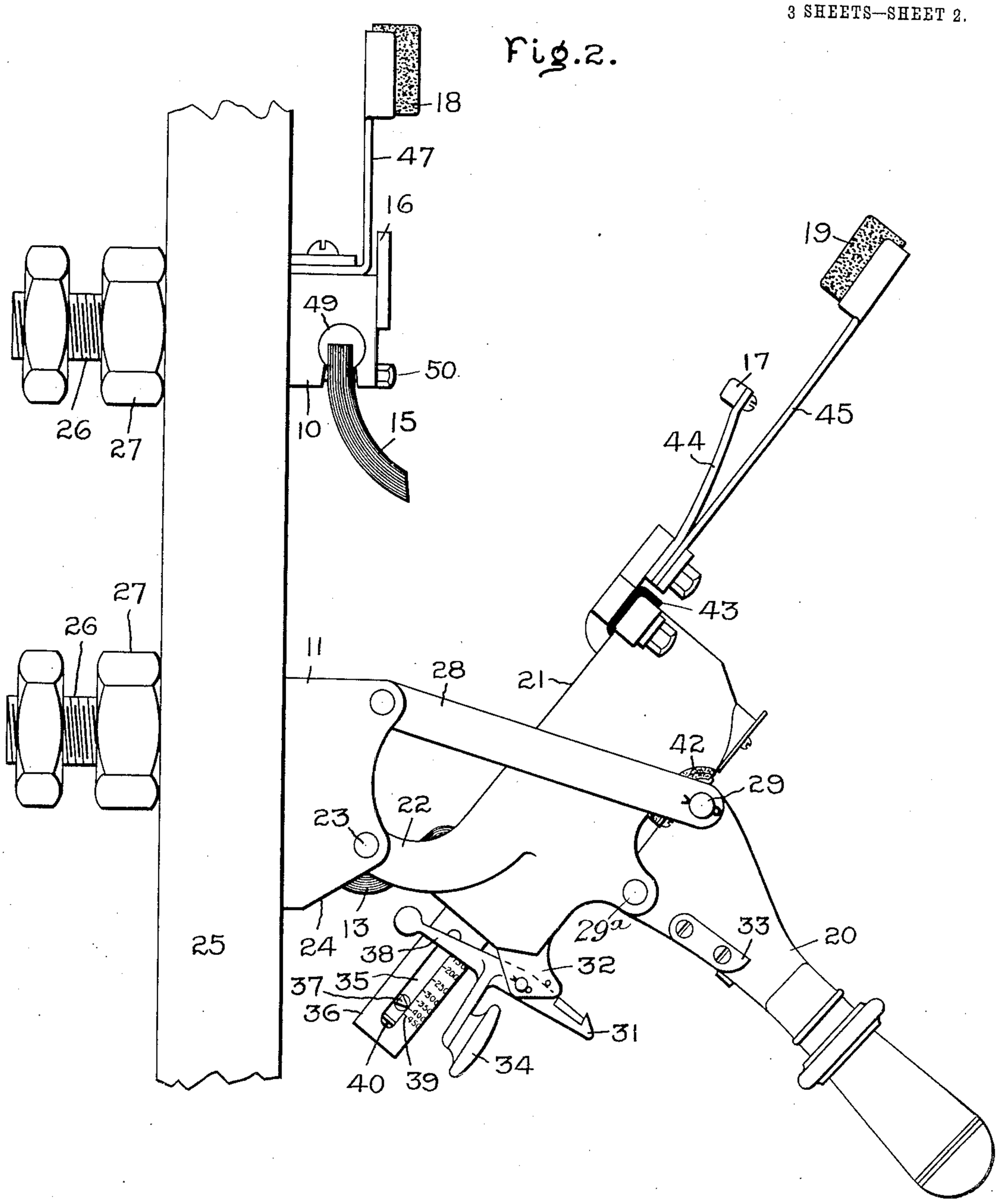
3 SHEETS—SHEET 2.

Fig. 2.



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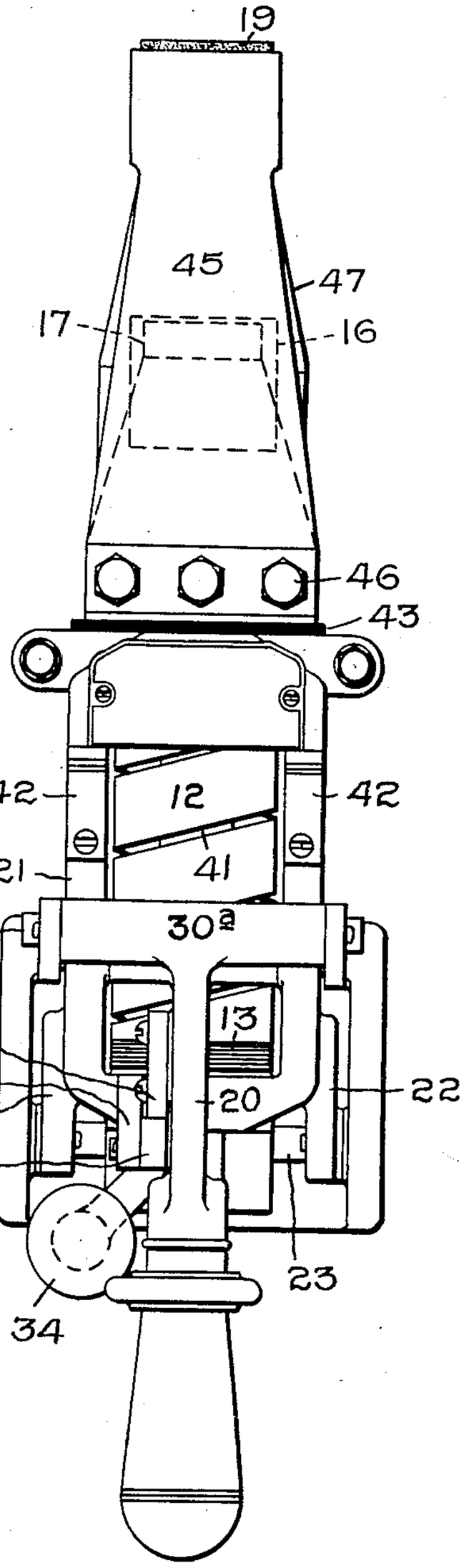
3 SHEETS—SHEET 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

EDWARD M. HEWLETT, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

CIRCUIT-BREAKER.

No. 840,848. Specification of Letters Patent. Patented Jan. 8, 1907.

Application filed November 7, 1904. Serial No. 231,666.

To all whom it may concern:

Be it known that I, EDWARD M. HEWLETT, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Circuit-Breakers, of which the following is a specification.

The present invention relates to circuit-breakers of the carbon-break type. Devices of this kind are provided with laminated main or bridging contacts and carbon shunt-contacts.

The object of the invention is to insure a safer break by permitting all metal parts to swing free from the supporting-board and effecting a long break at the shunt-contacts.

The invention consists chiefly in structural features which conduce to such a result and to simplicity and durability.

The particular arrangement and specific features of the invention will be best understood upon reference to the following detailed description, taken in connection with the accompanying drawings, and the improvements, combinations, and parts which I regard as my invention will be specifically pointed out in the appended claims.

In said drawings, Figures 1 and 2 are side elevations of the breaker constructed in accordance with my invention, the former showing the breaker closed and the latter open; and Fig. 3 is a front elevation of the breaker.

Throughout the figures like characters refer to like parts.

The breaker illustrated consists, essentially, of vertically-arranged contact-studs 10 and 11, a tripping-coil 12, pivotally supported at its lower end and permanently connected with the lower stud 11 by a flexible connection 13 and carrying a contact 14, adapted to engage the laminated contact 15, carried by the upper stud 10, primary shunt-contacts 16 17 of metal, secondary shunt-contacts 18 19, of carbon, and an operating-lever 20 for cramping the contacts into engagement.

The tripping-coil 12, which is in direct connection with the contact-stud 11, is located within a supporting-frame 21, which is provided at its lower end with arms 22, which are pivoted at the points 23 to the base 24, suitably secured to the switchboard or other suitable support 25, adjacent to the lower contact-stud 11. As clearly illustrated, the contact-studs 10 and 11 are mounted upon the support 25 and are provided with threaded shanks 26 and the usual clamping-nuts 27. To the upper end of the base 24 are pivoted outwardly-extending links 28, which are connected at their outer ends by means of a hinge-pin 29 to the sleeve 30^a of the operating-lever 20. The links 28, together with the pin 29, serve as a supporting-frame for the operating-lever 20, and through the agency of the pivotal connection 29^a, between the frame projections 30 and the adjacent portion of the operating-lever 20, a toggle action is obtained between the pivots 23 and 29, by which the contacts of the breaker are cramped into position, the portion of the operating-lever lying between the points 29 and 29^a constituting one link of the toggle and the portion of the frame 21 lying between the points 23 and 29^a constituting the other link of the toggle.

In order to hold the breaker in closed position, a latch 31 is mounted on a lug 32 at the lower end of the frame 21 and extends into position to engage the coöperating projection 33 on the operating-lever 20. This latch is adapted to be tripped either manually or automatically. A push-button 34 on the latch 31 provides for its manual operation, while a plunger or core 35, movable within the calibrating-tube 36, through the agency of a laterally-projecting pin 37 and the rearwardly-extending arm 38 of the latch, provides for its automatic operation when the coil 12 is sufficiently energized. The laterally-projecting pin 37 is provided at its outer end with a knife-edge which serves as an index to indicate upon the scale 39 of the calibrating-tube the particular calibration for which the stop 40 within the tube is set. A pole-piece 41 extends down through the upper end of the supporting-frame 21 within the coil 12 to improve the magnetic circuit and also limit the upward movement of the core 35. The frame 21 is also provided with a buffer 42, located above the projections 30 in a position to engage the sleeve 30^a and the operating-lever 20 when the circuit-breaker is open. In order to prevent the frame 21 from carrying current, the upper end of the frame is insulated from the contact 14, as in-

dicated, by the insulating-strip 43. The contact 14, which engages the laminated contact 15, carries at its outer end the spring-arms 44 and 45, which carry the shunt-contacts 17 and 19, respectively. These arms 44 and 45 have a common fastening means 46 and may be readily detached from the contact 14 at any time for the purpose of repairs or renewing either of the shunt-contacts. The secondary shunt-contact 18 is also carried by the spring-arm 47, which is removably secured at its lower end to the upper side of the contact-stud 10, and the primary shunt-contact 16 is removably secured to the face of the stud 10 by the screws 48 or other suitable means.

The laminations of the contact 15 are rigidly secured at their upper end within a cylindrical member 49, which is seated within a laterally-extending circular opening in the stud 10, so as to permit a rocking movement of the contact 15 to and from the contact 14. Suitable screws 50 extend through the bifurcated portions of the stud 10 beneath the member 49 and are adapted to draw said portions together, so as to bind the member 15, and consequently clamp the contact 15, against movement. In this construction the openings in the contatct 15, through which the screws 50 pass, are of sufficient size to permit the necessary movement of said contact without the interference of the screw.

It will be noted that with this construction the trip-coil and its supporting-frame constitute one link of the cramping-toggle and that a fixed part of the handle forms the other link, the swinging arms or links 28 constituting a rocking frame within which the toggle may be cramped. The latch is carried by the same moving system. This renders the device more compact; but it is obvious that the latch might without disturbing the operation be otherwise mounted.

I do not wish to be limited to the specific construction herein disclosed, since it is apparent that many alterations and modifications therein may be made without departing from the spirit and scope of my invention; but I aim to cover by the terms of the appended claims all such alterations and modifications.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a circuit-breaker, the combination with fixed and movable contacts, of a movable tripping-coil, and an operating-handle having a permanent controlling relation to said coil but movable relatively thereto.

2. In a circuit-breaker, the combination with fixed and movable contacts, of a tripping-coil movable with said movable contact, and an operating-handle having a permanent controlling relation to said coil to shift it, but movable relative thereto.

3. In a circuit-breaker, the combination with fixed and movable contacts, of a swinging tripping-coil movable with said movable contact, a support therefor and lever mechanism comprising an operating-handle pivoted to the coil and linked to the support for forcing said contacts into engagement.

4. In a circuit-breaker, the combination with fixed and movable contacts, of a tripping-coil movable with said movable contact, a link connected with the fixed part of the breaker, and an operating-handle pivoted to said link and to said coil so as to form a toggle for cramping said contacts into engagement.

5. In a circuit-breaker, the combination with fixed and movable contacts, of a tripping-coil movable with said movable contact and pivotally supported at one side of said coil, and an operating-handle pivotally supported beyond said coil and having a pivoted connection with said coil at the opposite side thereof and intermediate of said supporting-points, so arranged that said coil and handle serve as a toggle to cramp said contacts into engagement.

6. In a circuit-breaker, the combination with fixed contact-studs, of a bodily-movable tripping-coil permanently included in circuit with one of said studs, and an operating-handle having a permanent controlling relation to said coil to shift it, but movable relatively thereto.

7. In a circuit-breaker, the combination with fixed contact-studs, of a pivotally-supported tripping-coil, a flexible electrical connection between one of said studs and said coil whereby said coil is permanently included in circuit with said fixed stud, and an operating-handle permanently connected to shift said coil but movable relatively thereto.

8. In a circuit-breaker, the combination with fixed and movable contacts, of a tripping-coil movable with said movable contact, an operating-handle linked to a fixed point and pivoted to said coil so as to form a toggle for cramping said contacts into engagement, a latch for holding said contacts in cramped position, and means actuated by said coil for tripping said latch.

9. In a circuit-breaker, the combination with fixed and movable contacts, of a movable tripping-coil, lever mechanism having a permanent controlling relation to said coil, but movable relatively thereto for forcing said contacts into engagement, a latch mounted at the lower end of said coil and operative to hold said lever mechanism against movement when the contacts are in engagement, an armature for said tripping-coil, and means carried by said armature for engaging and tripping said latch.

10. In a circuit-breaker, the combination with a movable tripping-coil, of a core movable into and out of said coil, a lever mechanism permanently connected to said coil, but

movable relatively thereto, a latch carried by said coil and arranged to lock said mechanism against movement, and a laterally-projecting pin carried by said core and extending into the path of movement of said latch so as to trip it when said coil is sufficiently energized.

11. In a circuit-breaker, the combination with a movable tripping-coil pivotally supported at its end, fixed and movable contacts adjacent to the upper end of said coil, and an operating-handle permanently connected to shift said coil and movable relatively thereto, and operated by a downward movement to bring said fixed and movable contacts into engagement.

12. In a circuit-breaker, the combination with a movable tripping-coil pivotally supported at its lower end, fixed and movable contacts adjacent to the upper end of said coil, an operating-handle permanently connected to said coil and operated by a downward movement to bring said fixed and movable contacts into engagement, a latch located at the lower end of said coil for holding said handle in its down position, and means actuated by said coil for tripping said latch.

13. In a circuit-breaker, the combination with fixed contacts, of a pivoted frame carrying a contact, a tripping-coil mounted therein and included in circuit with said contact, means for insulating one end of said coil from said frame, and an operating-handle for said frame permanently connected to said coil and movable relative thereto.

14. In a circuit-breaker, the combination with fixed and movable contacts, of a pivoted movable open frame carrying said movable contact, a tripping-coil located within said frame, and means pivoted to said frame for moving said frame to carry said movable contact into and out of engaging position.

15. In an automatic circuit-breaker, the combination of a swinging trip-coil carrying main and shunt contacts, a rocking cramping-frame pivoted to a fixed part at one end an operating-lever, and a toggle formed by said operating-lever and coil pivoted to the other end of the rocking cramping-frame.

16. In an automatic circuit-breaker, the combination of a swinging trip-coil carrying main and shunt contacts, a rocking cramping-frame pivoted to a fixed part at one end, an operating-lever, and a toggle formed by said operating-lever and coil pivoted to the other end of the rocking cramping-frame, and a latch to hold toggle set off center.

In witness whereof I have hereunto set my hand this 4th day of November, 1904.

EDWARD M. HEWLETT.

Witnesses:
BENJAMIN B. HULL,
HELEN ORFORD.