

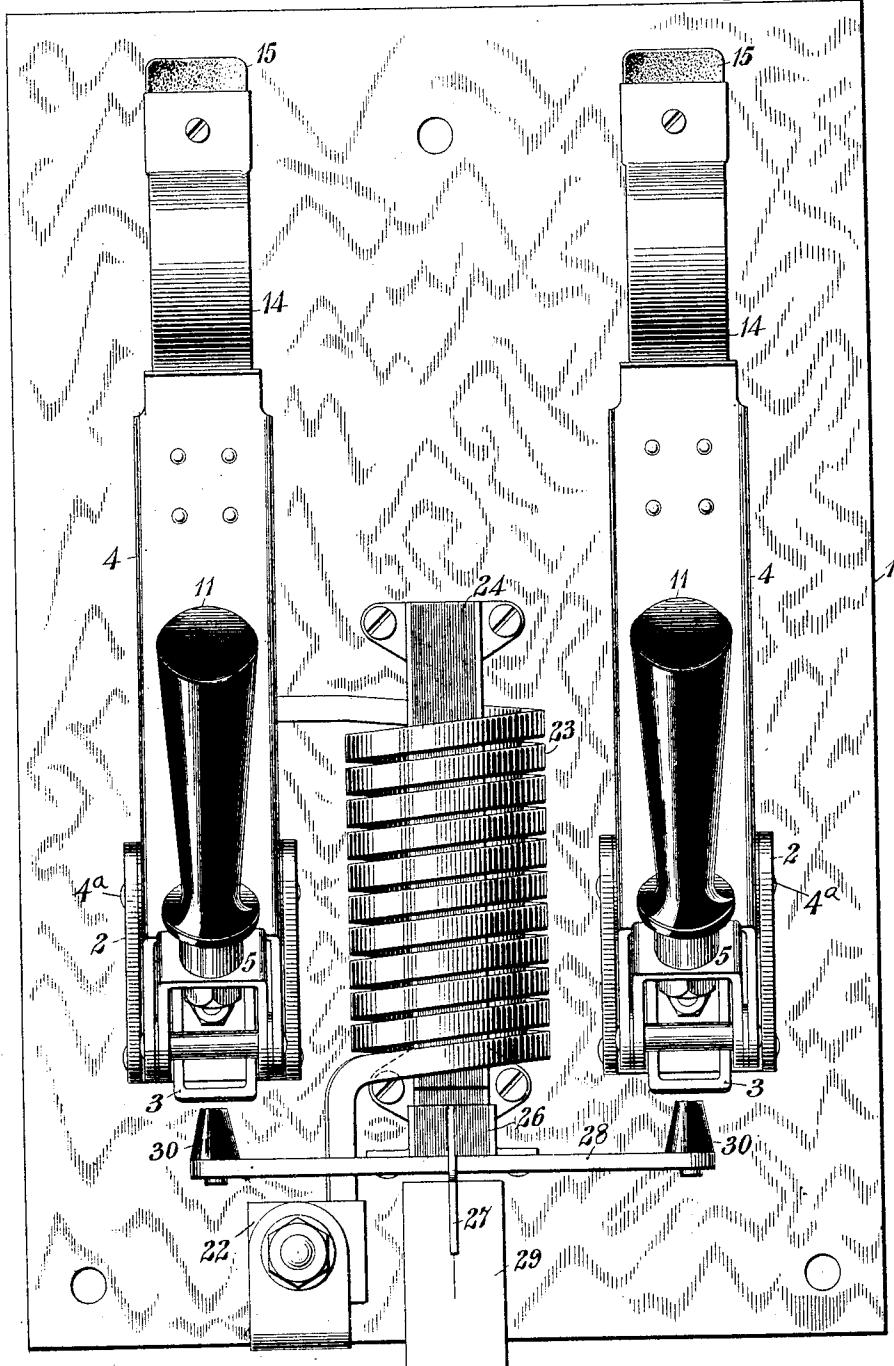
No. 797,048.

PATENTED AUG. 15, 1905.

H. P. DAVIS & A. B. REYNEDERS.
CIRCUIT BREAKER.

APPLICATION FILED FEB. 27, 1904.

2 SHEETS-SHEET 1.



WITNESSES:

C. L. Belcher
J. C. Morse

Fig. 1.

INVENTORS

Harry P. Davis
& Arthur B. Reynders
BY
Wesley S. Carr
ATTORNEY

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2 SHEETS—SHEET 2

Fig. 2.

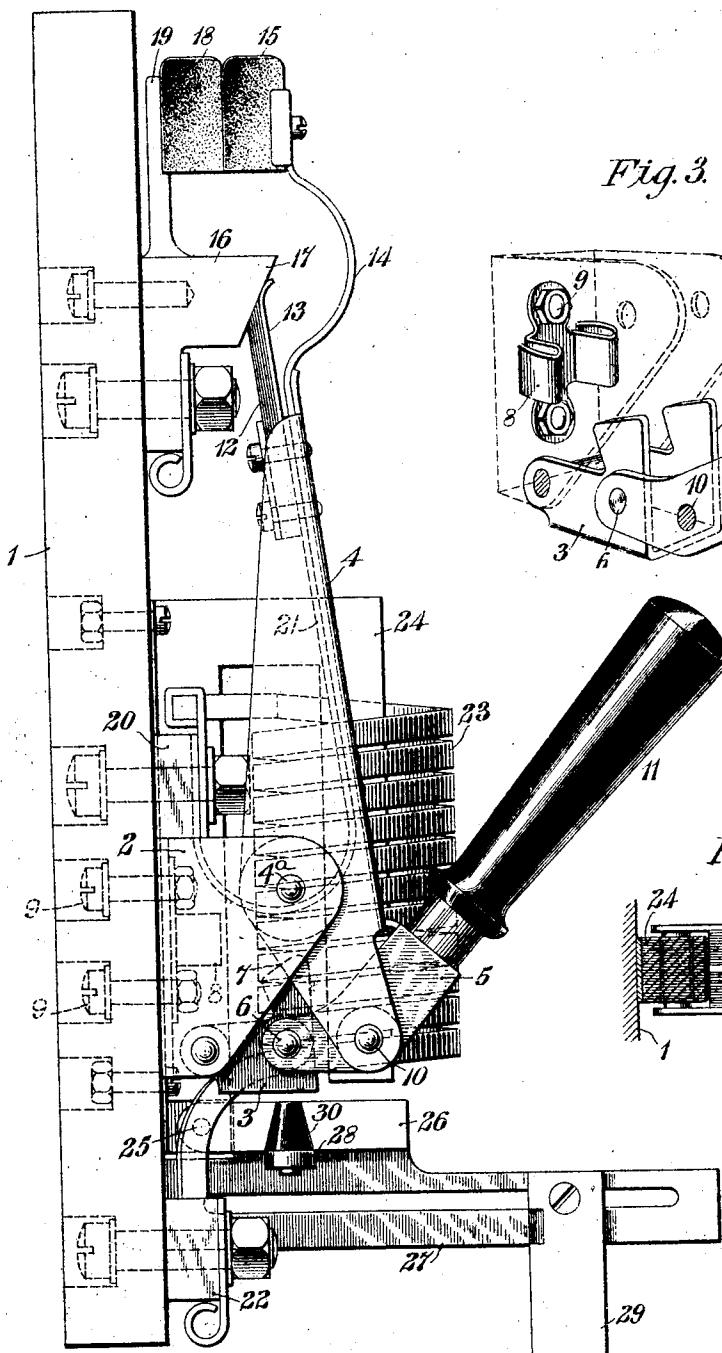


Fig. 3.

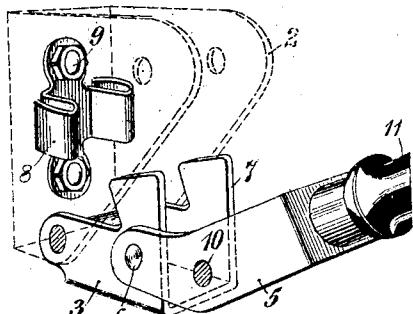
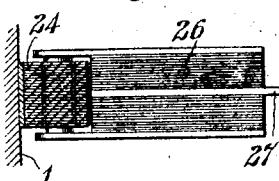


Fig. 4.



WITNESSES.

C. L. Belcher
J. C. Morse

INVENTORS
Harry P. Davis
Arthur B. Reynolds
BY
Kiley & Clark
ATTORNEY

UNITED STATES PATENT OFFICE.

HARRY P. DAVIS, OF PITTSBURG, AND ARTHUR B. REYNDERS, OF WILKINSBURG, PENNSYLVANIA, ASSIGNORS TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

CIRCUIT-BREAKER.

No. 797,048.

Specification of Letters Patent.

Patented Aug. 15, 1905.

Application filed February 27, 1904. Serial No. 195,682.

To all whom it may concern:

Be it known that we, HARRY P. DAVIS, a resident of Pittsburg, and ARTHUR B. REYNDERS, a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, citizens of the United States, have invented a new and useful Improvement in Circuit-Breakers, of which the following is a specification.

Our invention relates to circuit-breakers; and it has for its object to provide a circuit-interrupting device which may be utilized both as an automatic circuit-breaker and as a circuit-closing switch, which is inexpensive to manufacture because of the minimum number of simple parts comprising it, and which is also light, compact, and durable, as well as effective in operation.

In the accompanying drawings, Figure 1 is a view in front elevation, and Fig. 2 a view in side elevation, of a combined switch and circuit-breaker constructed in accordance with our invention. Fig. 3 is a perspective view of the buffer and toggle-joint. Fig. 4 is a detail view of a portion of the armature and its support.

Upon a marble or other insulating base 1 is mounted a sheet-metal bracket 2 of U shape in cross-section, to which the toggle member 3 and the main circuit-breaker arm 4 are pivoted. The toggle member 3, which is made from sheet metal and is also of U shape in cross-section, is hinged to the other sheet-metal toggle member 5 at 6 and is provided with projecting arms 7, which engage with a spring-buffer 8 when the circuit-breaker is thrown to full-open position, rebounding of the arms 4 being thus prevented. Bolts 9 serve to secure both the bracket 2 and the buffer 8 to the base 1, the buffer being located between the side arms of the bracket. The toggle member 5 is pivoted at 10 to one end of the arm 4 and is provided with an operating-handle 11.

The arm 4, which is made from sheet metal and is of U shape in cross-section, carries at its free end a laminated copper contact-terminal 12, which is reinforced by a spring-piece 13 of greater electrical resistance and is provided with a spring 14, to the outer end of which a carbon terminal block 15 is secured.

Secured to the base 1 is a metal terminal and contact block 16, having an inclined face 17, with which the contact-terminal 12 makes

engagement, and a carbon block 18 is attached to an arm 19, that projects from the block 16 and is engaged by the block 15 when the circuit-breaker is closed.

It will be noted that the fulcrum 4^a of the arm 4 is located between the end which is provided with the contact-terminals and the pivot 10, to which the power is applied for closing the breaker, and since the distance between the fulcrum 4^a and the pivot 10 is small as compared with the distance between the fulcrum and the contact-terminals the toggle-levers 3 and 5 may be short and the fulcrum be located comparatively close to the base-plate 1. By reason of this arrangement of parts we are enabled to secure a desirable economy of material and space.

While the circuit-breaker remains in its closed position the main portion of the current passes through the laminated copper terminal 12 and the block 16 because of the low resistance of the path thus provided. When the circuit-breaker is opened, the contact between the laminated terminal 12 and the face 17 is first broken, and the current then takes the higher-resistance path through the spring 13, the circuit being finally interrupted at the carbons 15 and 18, between which the arc occurs. The remoteness of the arc from all other parts prevents injury to such parts.

Located on the inside of the arms 4 and connecting terminal blocks 20 with the contact-pieces 12 are flexible low-resistance straps or ribbons 21, provided for the purpose of conducting the current directly to the separable contact members.

Between the two circuit-breaker arms 4 and secured to the base 1 by means of terminal blocks 20 and 22 is a coil 23, which surrounds one leg of a U-shaped iron core 24, that is also secured to the base 1. Loosely hinged to the magnet-core 24 at 25, whereby a certain amount of tilting motion is permitted, is an armature 26, which is provided with two arms 27 and 28 at right angles to each other. Adjustably mounted on the arm 27 is a weight 29, by means of which the breakers may be set to open at the desired predetermined current value. The ends of the arm 28 are provided with insulating-buttons 30 for striking the toggle members 3 in order to trip the breakers.

The several parts of the breaker are so adjusted with reference to each other that when

the arm 4 is in closed position it is locked by the toggle-levers 3 and 5 against the pressure that is exerted by the parts 12, 13, and 14. When the toggle-joint lock is released, the spring-pressure exerted by the parts 12, 13, and 14 serves to impart an initial opening movement, and the action of gravity is sufficient to complete the movement.

It is to be noted that there are two circuit-breakers, which, except for the fact that they are tripped by the same mechanism, are independent. If it is attempted to close either arm 4 when the other is closed and while the circuit is still overloaded or while there is a short circuit, the armature 26 will be drawn up, and since it is capable of a tilting motion the toggle-joint of the breaker which was first closed will be operated by the corresponding button 30 to release its arm 4, and thus insure the breaking of the circuit. Both sides of a circuit may thus be protected by the apparatus; but it will be understood that more than two breakers may be combined or that a single breaker may be utilized, as may be desired.

It is obvious that by the use of our invention a considerable economy may be effected in apparatus for the manipulation and protection of electric circuits, since the switch and circuit-breaker are combined in one device comprising a minimum number of simple parts, all of which may be cheaply manufactured.

We claim as our invention—

1. An electric-circuit breaker comprising a sheet-metal hinged arm provided with main and shunt contact-terminals, sheet-metal closing and locking toggle-levers, a tripping-coil, a flexible strap connecting one end of said coil to the main contact-terminal on said hinged arm, a loosely-mounted armature, a base-plate and stationary contact-terminals mounted thereon.

2. An electric-circuit breaker comprising a sheet-metal hinged arm of U shape in cross-section and provided with main and shunt contact-terminals, sheet-metal toggle-levers for moving said arm to and locking it in circuit-closing position, a tripping-coil and a loosely-mounted armature having a laterally-projecting bar provided with a button to engage and trip said toggle-levers.

3. An electric-circuit breaker comprising a base having contact-terminals and a U-shaped sheet-metal bracket, a sheet-metal arm pivotally supported between the arms of said bracket and having main and shunt contact-terminals, sheet-metal toggle-levers for closing and locking said arm, a tripping-coil and a loosely-mounted armature having a laterally-projecting bar provided with a button to engage and trip said toggle-levers.

4. An electric-circuit breaker comprising a base having contact-terminals, a sheet-metal bracket and a sheet-metal spring-buffer, a sheet-metal arm having contact-terminals and

hinged to said bracket, sheet-metal toggle-levers connecting the outer end of said arm with said bracket one of which has arms to engage the spring-buffer and a coil and armature for tripping said toggle-levers.

5. An electric-circuit breaker comprising a base having two sets of contact-terminals, two sheet-metal U-shaped brackets and two sheet-metal spring-buffers, hollow sheet-metal arms hinged to said brackets and having main and shunt contact-terminals, sheet-metal toggle-levers for operating said hinged arms, a coil and a loosely-mounted armature for tripping both sets of levers when the current becomes excessive or either of them alone if the other is held in locking position.

6. A double-pole circuit-breaker comprising a base having two sets of contact-terminals and two sheet-metal brackets, sheet-metal arms hinged to said brackets and having main and shunt contact-terminals, sheet-metal toggle-levers for closing and locking said arms, a coil and an armature therefor the tripping projections of which have substantially uniform movement to trip said locking-levers simultaneously when both are free from manual restraint but either of which will act alone to trip the corresponding locking-lever when the other locking-lever is manually held in closed position.

7. A double-pole circuit-breaker having independent sets of contact-terminals and independent closing and locking toggle-levers, a tripping-magnet and a loosely-hinged armature therefor having tripping projections that normally have uniform movement to directly trip both sets of toggle-levers simultaneously but either of which will act alone when the other toggle-lever is held in its closed position.

8. In a double-pole electric-circuit breaker, the combination with two independent sets of stationary contact-terminals, two corresponding movable members and independent closing and locking toggle-levers between which and the contact-terminals the movable members are pivotally supported, of a tripping-magnet and a movable armature having tripping projections that normally have uniform movement to directly trip both toggle-levers simultaneously but either of which will act alone when the other toggle-lever is held in its closed position.

9. In a circuit-breaker, the combination with a stationary contact-terminal and a movable member having a contact-terminal at one end, of a closing and locking toggle-lever the manually-operated arm of which is pivoted to said member, and a fulcrum for said member that is located between the contact-terminal and the toggle-lever and adjacent to said lever.

10. In a circuit-breaker, the combination with a base having a contact-terminal, of a movable member having a contact-terminal, a closing and locking toggle-lever one arm of

which is provided with an operating-handle and is pivoted to said movable member and a bracket to which the movable member is pivoted between the contact-terminal and the toggle-lever and adjacent to the latter.

11. In a circuit-breaker, the combination with a base having a contact-terminal, of a movable member having a contact-terminal, a bracket to which said member is pivoted adjacent to one end and a closing and locking toggle-lever one arm of which is pivoted to said bracket and the other arm of which is

pivoted to the end of said member that is adjacent to its fulcrum and is provided with an operating-handle.

In testimony whereof we have hereunto subscribed our names this 20th day of February, 1904.

HARRY P. DAVIS.
ARTHUR B. REYNERS.

Witnesses:

CAROLINE SMYERS,
BIRNEY HINES.