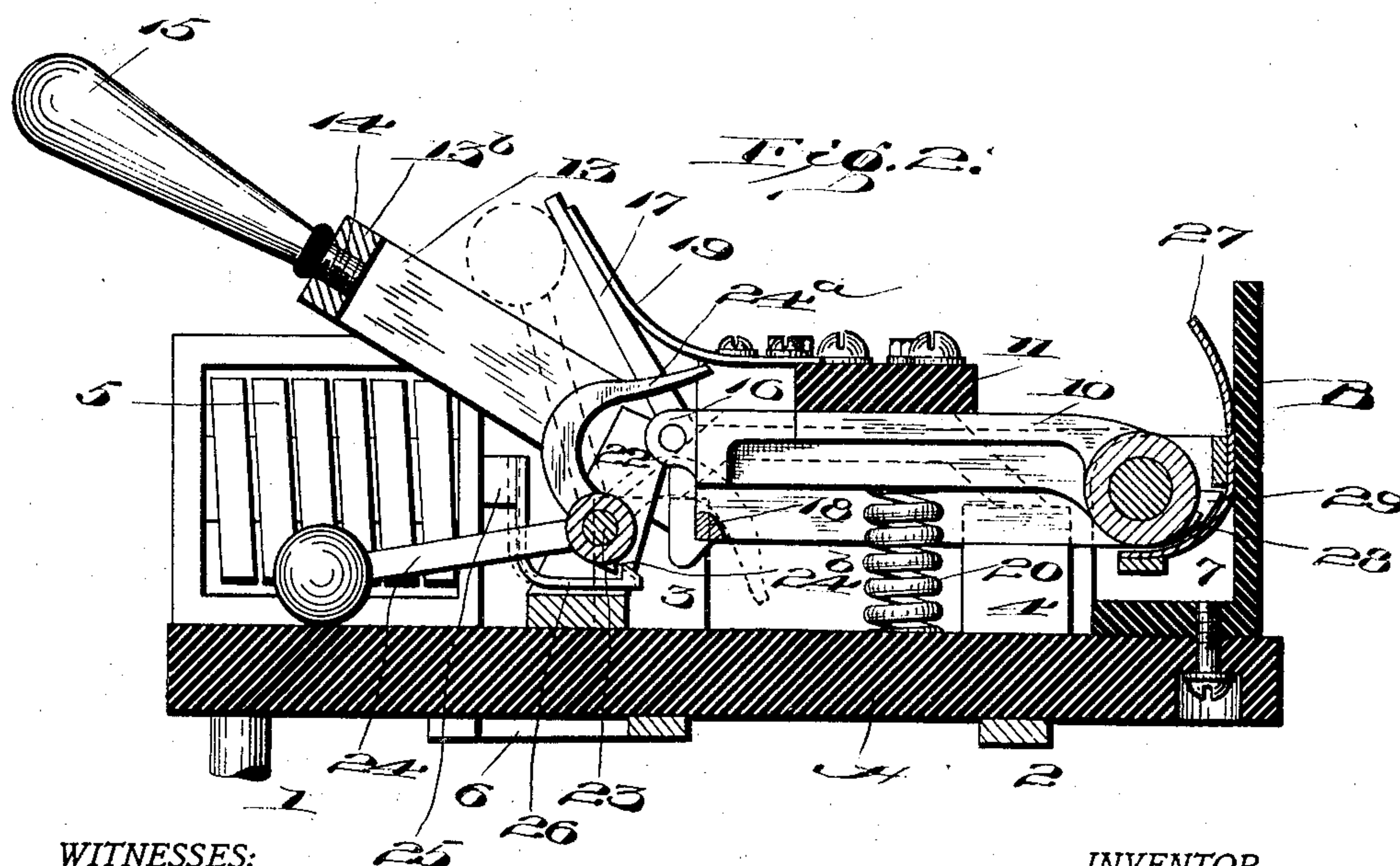
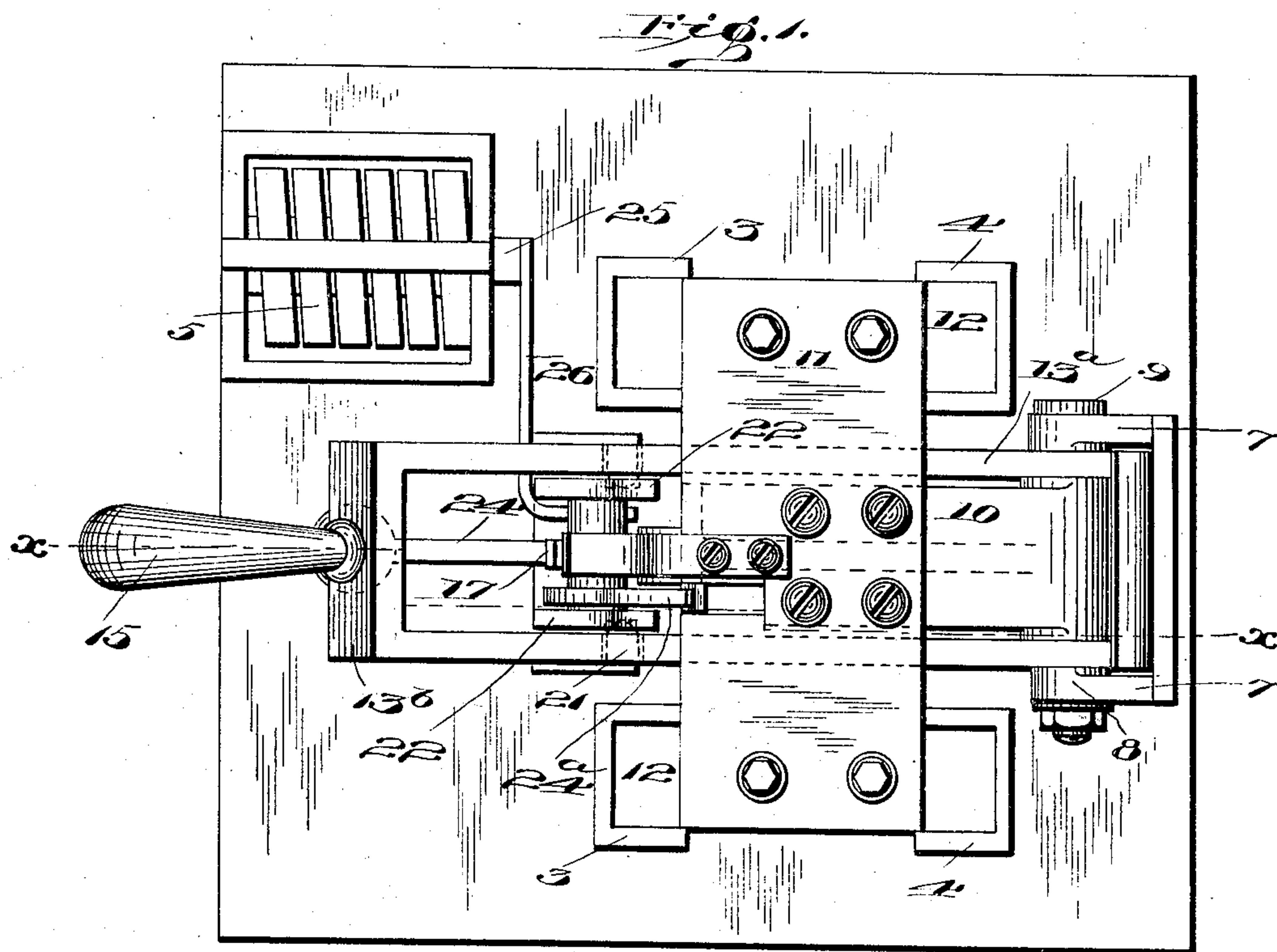


No. 846,469.

PATENTED MAR. 12, 1907.

R. E. HELLMUND.
CIRCUIT BREAKER.

APPLICATION FILED JAN. 21, 1904.



WITNESSES:

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CIRCUIT-BREAKER.

No. 846,469.

Specification of Letters Patent.

Patented March 12, 1907.

Application filed January 21, 1904. Serial No. 190,011.

To all whom it may concern:

Be it known that I, RUDOLF E. HELLMUND, residing at New York city, in the county and State of New York, have invented new and useful Improvements in Circuit-Breakers, of which the following is a specification.

This invention relates to circuit-breakers. One of the objects thereof is to provide an automatic device whereby a circuit will be broken upon the passage therethrough of an excessive current.

Another object is to provide a device of the above type in which the circuit cannot be maintained manually in a closed position while the circuit conditions are such that the current strength is above a certain predetermined value.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts, which will be hereinafter described, and the scope of the application thereof indicated in the following claims.

In the accompanying drawings, which illustrate one of various possible embodiments of my invention, Figure 1 is a plan view. Fig. 2 is a vertical cross-section on the line $x-x$ of Fig. 1.

Similar reference characters refer to similar parts throughout the several views.

Referring now to the embodiment shown in the drawings, A represents a base-plate, of insulating material, to which the current is led at points 1 and 2. Upon this plate are mounted the contacts 3 and 4, of which in this embodiment there are two pairs arranged in parallel in the circuit. A coil 5 is mounted upon the base A at a point substantially over terminal 1 and performs the functions of an electromagnet, for a purpose hereinafter described. The electrical connections are complete from terminal 1 through coil 5, thence through connection 6, which passes through the base-plate to contacts 3, and contacts 4 are in electrical connection with terminal 2.

Mounted upon base A, at a point adjacent the end thereof, is an upright support B, of insulating or other desired material. Wings 7 of support B are provided with bearings 8, and within these bearings is mounted a pivot-bolt 9. A lever-arm 10 is adapted to swing about this bolt, and an insulating cross-piece 11 is secured to this lever by means of screws

or other desired retaining means. At each end of cross-piece 11 is secured a circuit-completing member 12, which is adapted to coact with the pairs of contacts 3 and 4, respectively. Also mounted upon bolt 9 is what may be termed an "operating" member 13. The term "operating member," however, is used throughout the following claims in a broad sense to denote any device adapted to make connection with the circuit-completing members and place the same in operative position. This member comprises, as shown, two side portions 13^a, extending parallel to each other from bolt 9, under cross-piece 11, and connected at their free ends by a cross portion 13^b. The side and cross portions are preferably integral, but may obviously be separable, if desired. Cross portion 13^b is drilled and tapped, as shown, for the reception of a threaded bolt 14, and upon this bolt is mounted an insulating-handle 15. The side portions 13^a of operating member 13 are preferably inclined upwardly, as shown, at their outer ends, so as to place handle 15 in a position in which it may readily be grasped.

A perforated lug 16 is formed upon the free end of lever 10, and a latch 17 is pivotally connected thereto. This latch is adapted to engage a lug 18, formed upon one of the side portions 13^a, and is normally held in engagement by means of a spring 19, secured to cross-piece 11 and bearing against the end of said latch above its pivot. A powerful spring 20 is mounted upon base-plate A and engages the lower surface of lever 10, tending to raise the same, together with the operating member 13. This tendency is normally counteracted by means of spring-pressed lugs 21, mounted upon and extending through the side portions of member 13 and adapted to engage corresponding depressions in the surface of posts 22. These posts, which are rigidly secured to base-plate A, also serve as supports for a spindle 23, upon which is pivotally mounted a weighted arm 24. A leg 24^a, integral with this member, serves to limit the upward movement thereof by engagement with base-plate A. The before-mentioned magnet 5 is provided with a movable core 25, which is normally partially without the coil, but upon the passage of an excessive current will be drawn within the same. Secured to the outer end of this core is a hook 26, which is adapted to engage a lug 24^b upon the weighted arm 24 and rotate the same into engagement with

the upper arm of latch 17. Leg 24^a will permit a sufficient movement of weight 24 to release latch 17, but will stop the same before it has reached a vertical position and will rest upon lug 18.

A curved spring 27 is mounted upon upright B and is adapted to cushion the lever 10 as the same is thrown upwardly by spring 20. The lower end of this spring is curved under bolt 9 and is adapted to engage a lug 28 upon lever 10. A similar lug 29 upon operating member 13 projects slightly farther from pivot 9 than lug 28 and is adapted upon the raising of the operating member to retract the spring from engagement with lug 28.

The operation of this embodiment of my invention is as follows: Assuming the several parts to be in what may be termed "operative" position, as shown in the drawing, upon the rise of the current in magnet 5 beyond a certain predetermined point the core 25 will be attracted with sufficient force to throw weighted arm 24 into engagement with latch 17, as is indicated in dotted lines in Fig. 2, and release the same from engagement with lug 18. As leg 24^a prevents weight 24 from reaching a vertical position, it will upon the breaking of the circuit fall to the normal position shown in the drawing. Upon the release of latch 17 lever 10 will be thrown upwardly under the influence of the spring 20, carrying with it the circuit-completing members 12, and consequently breaking the circuit. Lug 28 will be engaged by spring 27, and the lever 10, with associated parts, will be retained in an inoperative position. When it is thought the circuit conditions are safe, the operating member is raised until the lug 18 strikes the beveled surface of latch 17 and opens and is engaged by the same. Simultaneously with this action lug 29 presses spring 27 away from lug 28. The contact member and operating member are now connected and free to be set in normal or operative position. If, however, the current should still be too high, the above-described operation is repeated and the contact member thrown upwardly irrespective of the position of the operating member.

It will be obvious that this device may be used in any position. If used with the base A vertical, the pivoted weight 24 will normally rest against the same, as the axis thereof is inclined with respect to the base, as shown. Upon displacement of the weight by means of hook 26 it will fall against and release latch 17. As the operating member is moved away from the base, the lug 18 will coact with the lower surface of leg 24^a and positively return the weight to normal position. It will also be obvious that the operating member may be actuated by any other desired means.

It will thus be seen that I have provided a device of few parts and simple and inex-

pensive construction which will break a circuit upon the rise of current therein beyond a predetermined point and that this action will occur even though the operating member should be held in position, thereby eliminating the personal equation of the attendant and guarding against his carelessness. Also the several component parts are simple and easily duplicated and may be assembled by unskilled labor. Moreover, by the peculiar construction of the releasing mechanism the momentum of the weight is utilized and a much less powerful electromagnet is required for the breaking of the circuit.

As many changes could be made in the above construction and many apparently widely different embodiments of my invention could be made without departing from the scope thereof, I intend that all matter contained in the above description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination, a contact member, a latch adapted to hold the same in circuit-completing position, a weight mounted above and adapted to swing about a pivotal point, said weight normally resting at one side of said pivotal point, and electromagnetic means adapted to swing said weight over said pivotal point and permit the same to fall into operative relation with said latch and release said contact member.

2. In combination, a contact member, an operating member, means connecting said contact member and said operating member adapted to hold the former in circuit-completing position, a weight mounted above and adapted to swing about a pivotal point, said weight normally resting at one side of said pivotal point, and electromagnetic means adapted to swing said weight over said pivotal point and permit the same to fall against said connecting means and release said contact member from connection with said operating member.

3. In combination, a contact member, a latch adapted to hold the same in circuit-completing position, a weight mounted above and adapted to swing about a pivotal point, electromagnetic means adapted to throw said weight over said pivotal point and permit the same to fall into operative relation with said latch and release said contact member, a spring tending to throw said contact member away from circuit-completing position, and means upon said contact member adapted to coact with means fixed upon said weight and return said weight to its original position.

4. In combination, a contact member, an operating member, a latch connecting said

contact member and said operating member. and adapted to hold said contact member in circuit-completing position, a spring tending to throw said contact member out of such position, a weight mounted above and adapted to swing about a pivotal point, electromagnetic means adapted to swing said weight over said pivotal point and permit the same to fall against said latch and release said contact member, and means upon said contact member adapted to coact with means upon said weight and return said weight to its original position upon said contact member being released.

5. In combination, a pivotally-mounted contact member, a latch adapted to hold said contact member in circuit-closing position, a spring tending to throw said contact member out of such position, a weight mounted above and adapted to swing about a pivotal point, a leg in fixed relation to and adapted to swing with said weight, electromagnetic means adapted to throw said weight over said pivotal point and permit the same to fall against and release said latch, and means upon said contact member adapted to coact with said leg and return said weight to its original position upon said latch being released.

6. In combination, a pivotally-mounted contact member, a pivotally-mounted operating member, a latch connecting said members and adapted to hold said contact member in circuit-completing position, a spring tending to throw said contact member out of such position, a weight mounted above and adapted to swing about a pivotal point, a leg in fixed relation to said weight, said weight normally resting at one side of said pivotal point, electromagnetic means adapted to swing said weight over said pivotal point and permit the same to fall against and release said latch, and means upon said contact member adapted to coact with said leg and return said weight to its original position upon said contact member being released.

7. In combination, a circuit-closing member, means adapted to retain the same in operative position, a pivoted weight adapted to be swung against said retaining means to release the same, an electromagnet, a core adapted to be actuated by the same, and a hook mounted upon said core adapted to engage and operate said pivotally-mounted weight.

8. In combination, a contact member, means adapted to retain said contact member in inoperative position, and a member adapted to operate said contact member and to render inoperative said retaining means.

9. In combination, a contact member, a spring adapted to retain said contact member in inoperative position, and a manually-actuated member adapted to render inoperative said retaining-spring.

10. In combination, a contact member, a lug upon the same, means adapted to engage said lug and retain said contact member in inoperative position, and a manually-actuated member adapted to operate said contact member and to render inoperative said retaining means.

11. In combination, a contact member, a lug thereon, means adapted to engage said lug and retain said contact member in inoperative position, and a member adapted to actuate said contact member and having a lug adapted to render said retaining means inoperative.

12. In combination, a contact member, a lug thereon, a spring adapted to engage said lug and retain said contact member in inoperative position, and a member adapted to actuate said contact member and having a lug adapted to render said retaining-spring inoperative.

13. In combination, a contact member, an operating member, a member connecting the same, and a pivotally-mounted weight adapted to engage said connection to release the same.

14. In combination, a contact member, an operating member, a member connecting the same, and a pivotally-mounted current-actuated weight adapted to engage said connecting member to release the same.

15. In combination, a contact member, an operating member, a member connecting the same, a pivotally-mounted current-actuated weight adapted to engage said connecting member to release the same, and a stop adapted to limit the movement of said weight.

16. In combination, a contact member, an operating member, a latch adapted to connect the same, a pivotally-mounted current-actuated weight adapted to engage said latch to release the same, and a stop adapted to limit the movement of said weight.

17. In combination, a contact member, an operating member, a connection between the same, automatic current-operated means adapted to release said connection, means adapted to retain said contact member in inoperative position, and means whereby said operating member is adapted to render said retaining means inoperative.

18. In combination, a contact member, an operating member, a connection between the same, automatic current-operated means adapted to release said connection, a spring adapted to retain said contact member in inoperative position, and means whereby said operating member is adapted to render said retaining-spring inoperative.

19. In combination, a pivotally-mounted contact member, an operating member adapted to swing about the same axis, a latch connecting said contact member and said operating member, means adapted to re-

tain said contact member in inoperative position, and means carried by said operating member adapted to render said retaining means inoperative.

20. In combination, a pivoted contact member, an operating member adapted to swing about the same axis, a member connecting said contact member and said operating member, and automatic current-actuated, gravity-retracted means adapted to release the same.

21. In combination, a pivotally-mounted contact member, an operating member adapted to swing about the same axis, a latch connecting said contact member and said operating member, a spring adapted to retain said contact member in inoperative position, and means carried by said operating member adapted to render said retaining-spring inoperative.

22. In combination, a pivoted contact member, an operating member adapted to swing about the same axis, a member adapted to connect said contact member and said operating member, automatic current-actuated, gravity-retracted means adapted to release the same, and means adapted to retain said contact member in inoperative position.

23. In combination, a contact member, an operating member, a member adapted to connect the same, automatic current-actuated, gravity-retracted means adapted to release said connecting member, means adapted to retain said contact member in inoperative position, and means carried by said operating member adapted to render said retaining means inoperative.

24. In combination, a pivotally-mounted contact member, an operating member adapted to swing about the same axis, a member adapted to connect said contact member and said operating member, automatic current-actuated, gravity-retracted means adapted to release the same, means adapted to retain said contact member in inoperative position, and means carried by said operating member adapted to render said retaining means inoperative.

25. In combination, a contact member, an operating member, a connection between the same, a pivotally-mounted weight adapted to release said connection, and means adapted to retain said contact member in inoperative position.

26. In combination, a contact member, an operating member, a connection between the same, a pivotally-mounted current-actuated weight adapted to release said connection, and means adapted to retain said contact member in inoperative position.

27. In combination, a contact member, an operating member, a connection between the same, a pivotally-mounted, current-actuated, gravity-retracted weight adapted to release said connection, and means adapted to re-

tain said contact member in inoperative position.

28. In combination, a contact member, an operating member, a connection between the same, a pivotally-mounted weight adapted to release said connection, means adapted to retain said contact member in inoperative position, and means carried by said operating member adapted to render said retaining means inoperative.

29. In combination, a contact member, an operating member, a connection between the same, a pivotally-mounted weight adapted to release said connection, a spring adapted to retain said contact member in inoperative position, and means carried by said operating member adapted to render said retaining-spring inoperative.

30. In combination, a contact member, an operating member, a connection between the same, a pivotally-mounted current-actuated weight adapted to release said connection, means adapted to retain said contact member in inoperative position, and means carried by said operating member adapted to render said retaining means inoperative.

31. In combination, a contact member, an operating member, a connection between the same, a pivotally-mounted current-actuated, gravity-retracted weight adapted to release said connection, means adapted to retain said contact member in inoperative position, and means carried by said operating member adapted to render said retaining means inoperative.

32. In combination, a movable contact member, a lug upon the same, means adapted to engage said lug and retain said contact member in inoperative position, a member adapted to render inoperative said retaining means, and means adapted to cushion the movement of said contact member.

33. In combination, a contact member, a lug thereon, means adapted to engage said lug and retain said contact member in inoperative position, a member adapted to actuate said contact member and having a lug adapted to render said retaining means inoperative, and means adapted to cushion the movement of said contact member.

34. In combination, a pivotally-mounted contact member, an operating member adapted to swing about the same axis, a latch adapted to connect said contact member and said operating member, means adapted to retain said contact member in inoperative position, means carried by said operating member adapted to render inoperative said retaining means, and means adapted to cushion the movement of said contact member.

35. In combination, a contact member, an operating member, a connection between the same, a pivotally-mounted current-actuated weight adapted to release said connection, means adapted to retain said contact mem-

ber in inoperative position, and means adapted to cushion the movement of said contact member.

36. In combination, a pivotally-mounted
5 contact member, an operating member, a
connection between the same, a pivotally-
mounted current-actuated, gravity-retracted
weight adapted to release said connection,
means adapted to retain said contact mem-
10 ber in inoperative position, and means adapt-

ed to cushion the movement of said contact member.

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

RUDOLF E. HELLMUND.

Witnesses:

FRANZ ERICH JUNGE,
MAX COLLBOHM.