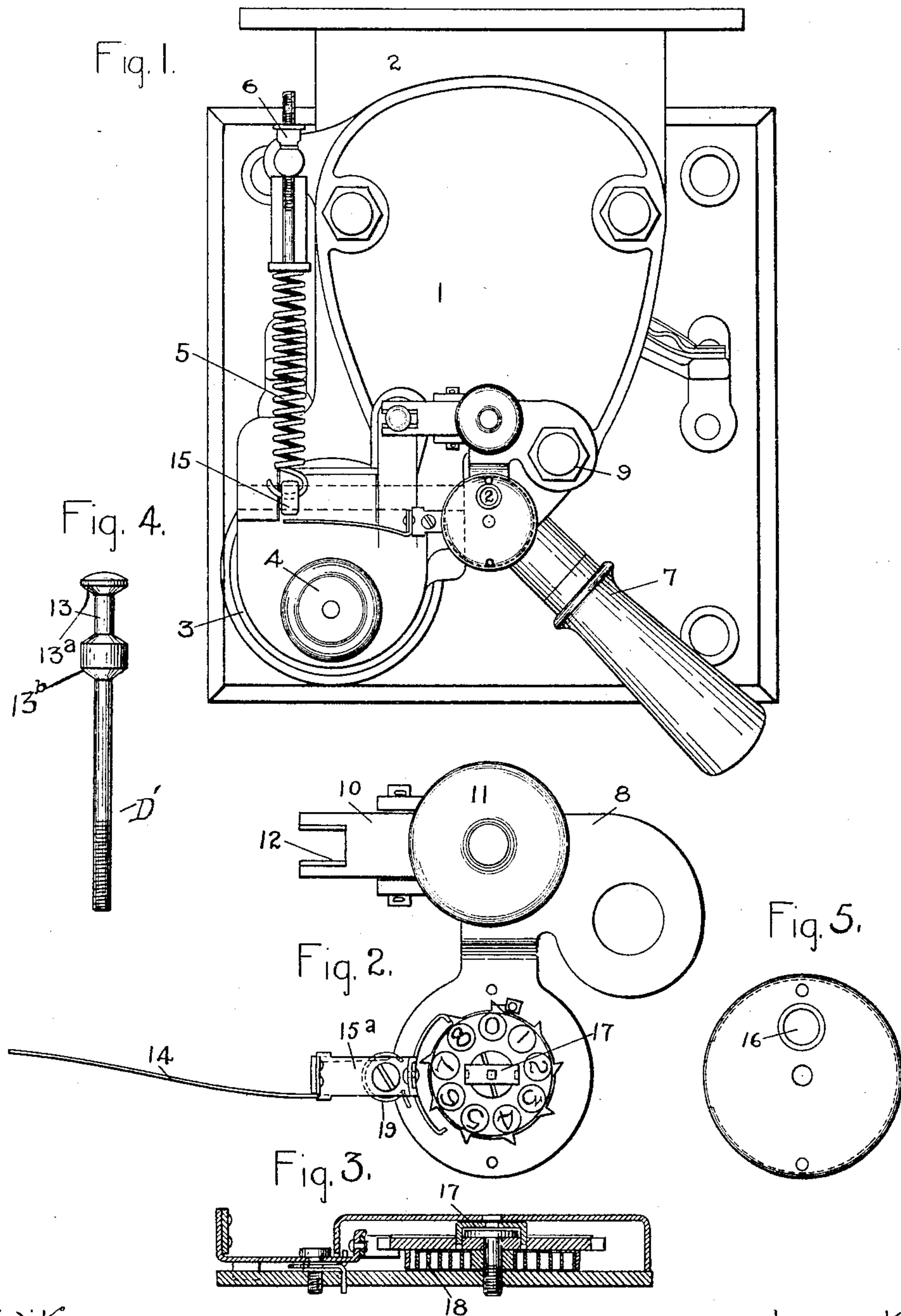


E. M. HEWLETT.  
COUNTER FOR CIRCUIT BREAKERS.

APPLICATION FILED JUNE 21, 1902.

2 SHEETS—SHEET 1.



Witnesses:

*Robert E. Chapman*  
*Helen Crawford*

Inventor:

Edward M. Hewlett  
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ATTY.

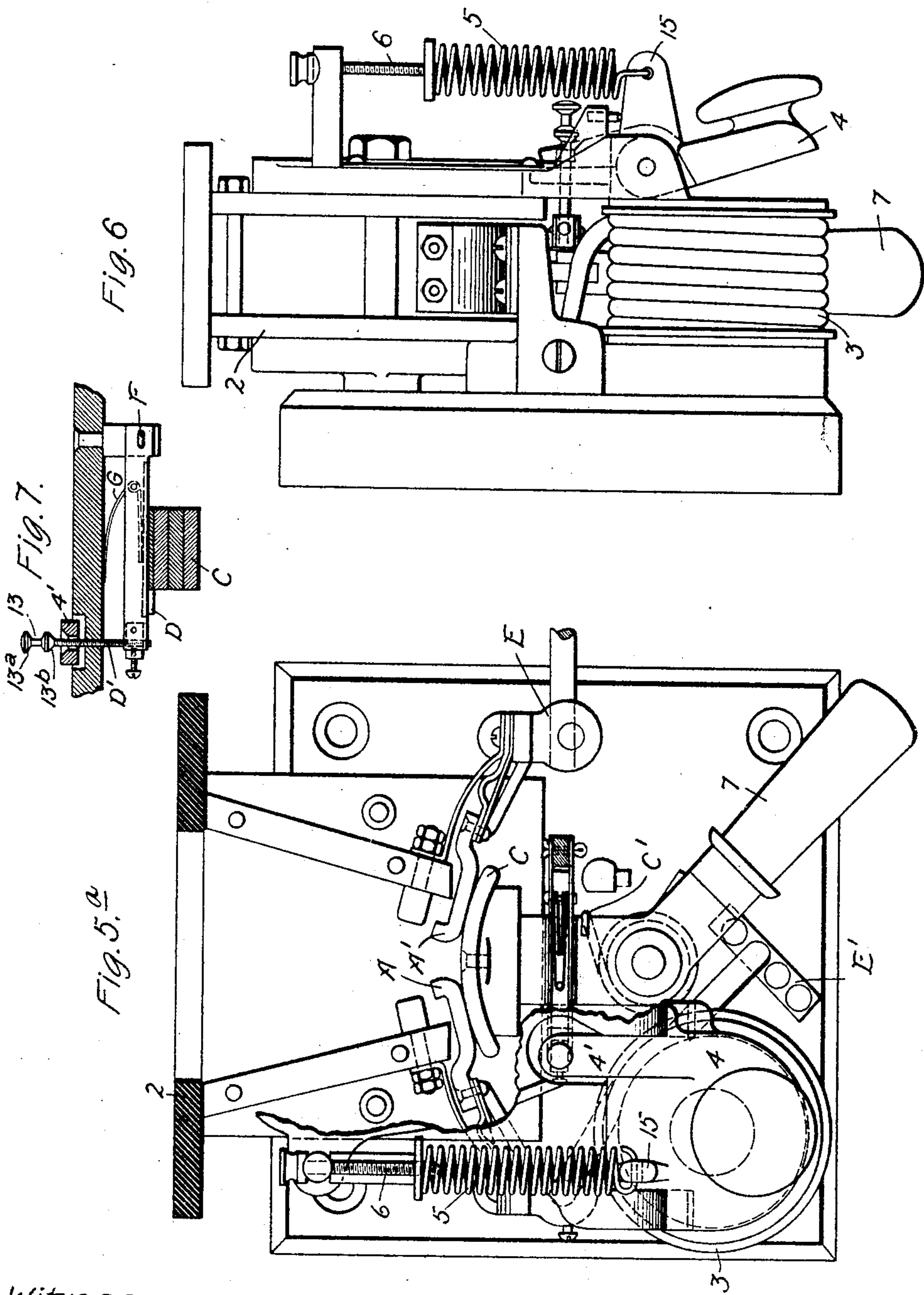
No. 803,340.

PATENTED OCT. 31, 1905.

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2 SHEETS—SHEET 2.



Witnesses:  
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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.

## COUNTER FOR CIRCUIT-BREAKERS.

No. 803,340.

Specification of Letters Patent.

Patented Oct. 31, 1905.

Application filed June 21, 1902. Serial No. 112,627.

*To all whom it may concern:*

Be it known that I, EDWARD M. HEWLETT, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Counters for Circuit-Breakers, (Case No. 2,542,) of which the following is a specification.

In the operation of certain types of electric apparatus it is desirable to know how often a definite load is taken by the apparatus. For example, in the operation of trolley-cars a motorman may largely increase the motor-load by careless handling of the controller, and in starting or in climbing hills he may manipulate the controller so quickly that the motor-windings may be in danger, or at all events a too rapid fluctuation of the load-current produced.

It is the object of this invention to provide a check on such practices by providing the circuit-breaker, commonly included as a protective device for the motors, with an auxiliary attachment by which the number of times it has operated through overload will be indicated. I therefore provide an automatic circuit-breaker with an indicator or counting attachment which will be actuated each time the circuit-breaker blows and will indicate or record the operation at a point where the inspector can subsequently find a record of the motorman's habits.

While the invention may be carried out in a variety of ways, I have found an effective plan to comprise a spring-wound indicator carrying a series of numbers and a release device or escapement for permitting the numbers to be consecutively exposed under repeated operation of the breaker. I will therefore describe this plan in detail in the present application.

My present invention comprises the combination, with an electric current, of means for indicating consecutively the number of times the circuit varies a definite degree from a normal strength.

It comprises, in a more specific sense, a circuit-breaker provided with means for recording or indicating the number of times the circuit-breaker has tripped.

In the accompanying drawings, which illustrate the invention, Figure 1 is a front elevation of a standard type of circuit-breaker provided with my present improvements. Fig.

2 is a side elevation of the counting attachment, the cover of the counter being removed. Fig. 3 is a sectional view of the spring-controlling device. Figs. 4 and 5 are detached parts of the attachment. Fig. 5<sup>a</sup> is a front elevation similar to Fig. 1, with the counter detached and the contacts and their operating mechanism shown in detail. Fig. 6 is a side elevation of the same, and Fig. 7 is a detail illustrating the latch mechanism of the breaker.

The circuit-breaker may be of a well-known commercial type. The particular type shown is that commonly known as the "M. Q. General Electric" breaker, which is well known in the market. In this type (designated 1) there are two stationary but spring-mounted contact-plates A A', adapted to be bridged by the movable contact C, which is biased to open when closed by the operating-lever 7 and is held locked in its closed position by a latch D, which is controlled by the overload magnet-coil 3, included in series with the contact-plate A. When the breaker is closed, the circuit is completed between the terminals E and E' by way of the contact-plate A', bridging contact C, contact-plate A, and overload magnet-coil 3. The latch D is pivoted to a fixed portion of the breaker at F and normally held in the position to engage the bridging contact C by a spring G. The free end of the latch carries a pin D', which extends through an opening in the upwardly-projecting portion 4' of the armature 4 and is provided at its outer end with a recess 13, formed between the shoulders 13<sup>a</sup> 13<sup>b</sup>. The projection 4' of the armature 4 engages the shoulder 13<sup>b</sup> when the armature 4 is drawn down to draw the latch D out of engaging position and permit the movable contact C of the breaker to fly open under the action of its spring C', thus rupturing the circuit. When this occurs, any arc which forms is forced upward through the archute 2 by the field of force produced by the overload-coil 3, which serves as a blow-out coil. The armature 4 is controlled by a calibrating-spring 5, the tension of which may be adjusted by a screw 6. These parts are the same as the corresponding parts in Patent No. 730,860, granted June 16, 1903, to Baker, and their operation is identical therewith.

So far the device is of standard construction, with which the engineering public is well familiar. My present invention involves an at-



attachment to this device. This comprises a frame 8, adapted to be secured by one of the screws 9, which holds one of the pole-plates in position. This frame carries a pivoted trip-  
 5 lever 10, on one end of which is an operating-knob 11. This lever is forked at one end, as indicated at 12, which fork surrounds the recess 13, formed at the end of the pin D'. The armature 4 of the trip-magnet also surrounds  
 10 this trip-pin below the shoulder 13<sup>a</sup>, so that when the armature is actuated it will act against the shoulder 13<sup>a</sup> and lift the trip-pin, thereby tripping the breaker. Thus the breaker may be tripped by pushing in on the button 11 or  
 15 automatically when the armature is drawn down.

My counting device is preferably arranged so as to be operated only in case of automatic action. To this end therefore I provide a  
 20 spring-tongue 14, which lies in the path of the lug 15 on the trip-armature and is adapted, therefore, when that armature is actuated to rock an escapement-lever 15<sup>a</sup>, controlling an escapement-wheel which carries a plurality  
 25 of numbers, as indicated in Fig. 2. The casing over this number-wheel is shown removed in Fig. 2 and is shown in detail in Fig. 5. As will be seen from the latter figure, the cover is provided with a hole 16, which may  
 30 be glazed, through which one of the numbers of the number-wheel may be seen. The number-wheel is provided with a yoke 17, having a square hole into which a key or other similar device may be inserted to wind up a spring  
 35 18. Thus by winding up the spring the number-wheel is put under tension, and when the escapement is rocked by an automatic action of the circuit-breaker it permits one tooth to escape, thereby changing the number seen  
 40 through the hole 16. The number-wheel may be made of any desired diameter, so as to provide the requisite number of indications. I have shown eight in the drawings, which is merely, of course, for convenience of illus-  
 45 tration. More or less might be employed.

The escape-lever 15<sup>a</sup> is provided with a weak tension-spring 19, which shifts it toward normal position. Thus it will be seen that if it becomes desirable to open the circuit-breaker  
 50 by hand the knob 11 may be pushed, and the pin 13 will be lifted without disturbing the trip-armature. Consequently no record will be left of this proceeding; but if the motorman operates the controller too quickly, so as  
 55 to throw an extraordinary load on the motors

through carelessness, the trip-armature 4 will be pulled down, releasing the breaker and simultaneously actuating the counter.

The parts are normally covered, so as to be inaccessible to the motorman, by a wooden  
 60 box. These parts are not shown in the drawings, since their use is a commonly-adopted practice.

The invention in its broadest sense is not restricted to use with circuit-breakers, since  
 65 it may be employed wherever a definite change of current above or below normal, which is likely to appear and disappear periodically, is desired to be registered.

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

1. In a circuit-breaker, the combination with automatic tripping mechanism, of an attachment comprising a supporting-plate, a  
 75 lever pivoted thereto and manually operative to trip the breaker, a counter mounted on said plate, and an operating member extending into the path of movement of a portion of said mechanism.

2. In a circuit-breaker, the combination  
 80 with a tripping-magnet and its armature, of an attachment comprising a supporting-plate, a lever pivoted thereto and manually operative to trip the breaker, a counter mounted on said plate, and an operating-arm therefor  
 85 extending into the path of movement of said armature.

3. In a circuit-breaker, the combination with a tripping-magnet, a tripping-pin and an armature operated by the magnet to trip  
 90 said pin, of a supporting-frame secured to said breaker, a lever pivoted to said frame and adapted to engage said tripping-pin to operate it independently of the tripping-magnet, and a counter carried by said plate and compris-  
 95 ing a member extending into the path of movement of said armature to be actuated thereby.

4. In a circuit-breaker, the combination with a tripping-magnet and its armature, of  
 100 a disk counter lying adjacent to and substantially in the plane of said armature, and means for normally tripping said breaker without actuating said counter.

In witness whereof I have hereunto set my hand this 19th day of June, 1902.

EDWARD M. HEWLETT

Witnesses:

BENJAMIN B. HULL,  
 HELEN ORFORD.