T. H. McQUOWN.

ELECTRIC CIRCUIT CLOSER AND BREAKER.

APPLICATION FILED JULY 18, 1904.

1,011,070. Patented Dec. 5, 1911.

Fig. 1.

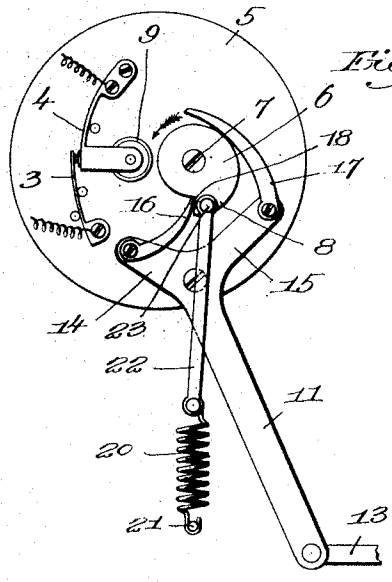


Fig. 2.

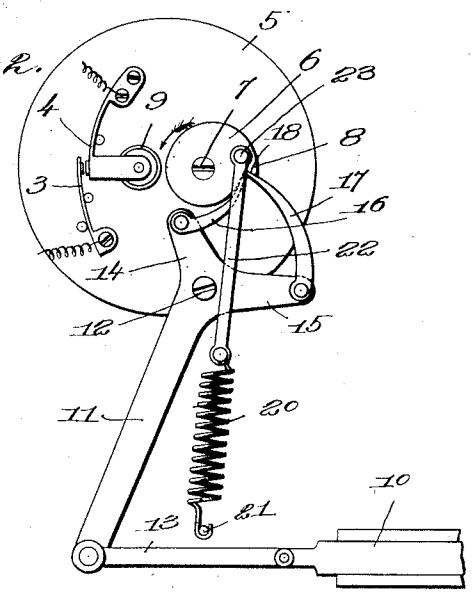


Fig. 3.

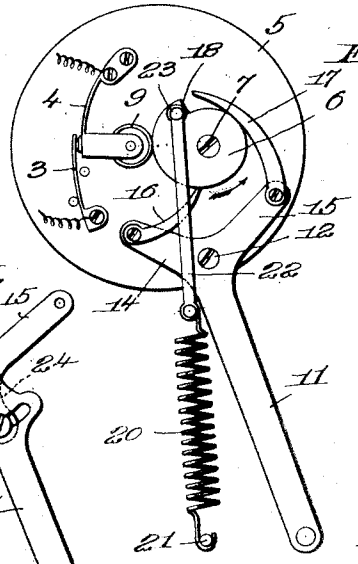


Fig. 4.

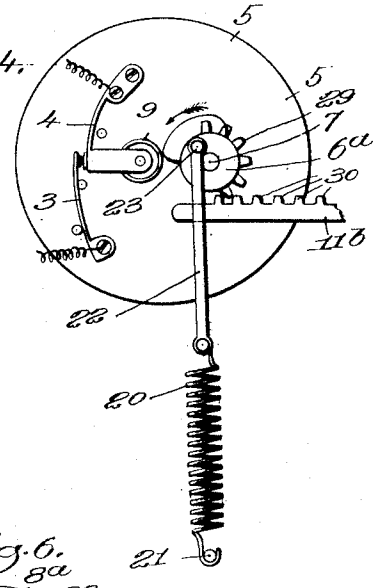


Fig. 5.

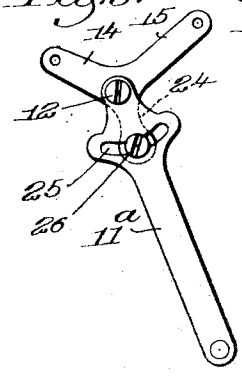
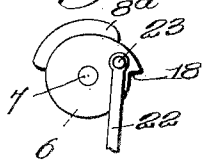


Fig. 6.



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UNITED STATES PATENT OFFICE.

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ELECTRIC-CIRCUIT CLOSER AND BREAKER.

1,011,070. Specification of Letters Patent. Patented Dec. 5, 1911.

Application filed July 18, 1904. Serial No. 216,945.

To all whom it may concern:

Be it known that I, THOMAS H. McQUOWN, a citizen of the United States, residing at Biggsville, county of Henderson, State of Illinois, and whose post-office address is Cambridgeport, Massachusetts, have invented an Improvement in Electric-Circuit Closers and Breakers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to a device for making and breaking an electric circuit. Such devices are frequently used in connection with a variety of machines where a certain function is performed by the closing of an electric circuit for a short period of time. One familiar illustration of the use of a device of this class is found in gasolene or gas engines where a circuit is closed and then broken again for the purpose of obtaining the necessary spark to explode the charge of gas. Usually devices of this class are connected to some moving part of the machine in connection with which they are used, and therefore the speed of operation of the device depends upon that of said machine. For the purpose of accomplishing the desired function it is only necessary that the circuit be closed and broken again, and the quicker that the breaking of the circuit can follow the making thereof, the less will be the consumption of the current, and the longer the life of the battery or other generator.

My improvements aim to provide a novel circuit maker and breaker in which the circuit is broken the instant that it is made regardless of the speed of the mechanism to which said device is attached. The particular form herein shown is one in which the device is operated by some reciprocating or oscillating part of the machine to which it is attached, and the invention as shown comprises normally-separated contacts, forming part of an electric circuit, a movable contact-closing member adapted at a point in its movement to engage one of the contacts thereby to close them, a vibratory actuator for the contact-closing member, which actuator may either be an oscillating member or a reciprocating member, and means independent from the actuator to accelerate the movement of the contact-closing member at the point in its movement where it engages one of said contacts.

Referring to the drawings, Figure 1 is a front view of one form of my improved device; Figs. 2 and 3 are similar views showing the parts in different positions, and Figs. 4, 5, and 6 are modifications.

In Figs. 1, 2, and 3 I have designated the normally open contacts by 3 and 4, respectively. Said contacts may be of any suitable or usual kind, and are herein shown as spring contacts mounted on a backing plate or piece 5.

The contact-closing member is designated by 6 and is herein illustrated as rotatable about an axis or pin 7. Said contact-closing member has thereon a projection 8 which is adapted at a single point in its rotation to impinge against or engage one of the contacts thereby to close the contacts together. For this purpose I have illustrated the contact 4 as carrying a roll 9 against which the projection 8 engages.

In the preferred embodiment of my invention the member 6 is given its movement either by an oscillating or a reciprocating part, or by an oscillating part which is connected to and is actuated by a reciprocating part. In Fig. 2, 10 designates a reciprocating part which may be any suitable part of the machine with which the device is to be used. Said reciprocating part is connected to an actuator 11 shown as a lever fulcrumed and arranged to oscillate about a pivot 12, said lever being connected to the reciprocating member by a suitable link 13. Said actuator 11 is so constructed that during its oscillatory movement in each direction, it engages and gives forward movement to the contact-closing member 6, and for this purpose said actuator has the two arms 14 and 15 each carrying a pawl (said pawls being designated 16 and 17 respectively) which is adapted to engage a shoulder or ratchet tooth 18 on the contact-closing member. With this construction, it will be seen that when the parts are in the position shown in Fig. 1, with the pawl 16 engaging the shoulder 18, a movement of the actuator from the position shown in said figure to that shown in Fig. 2 will, through the arm 14 and the pawl 16, rotate the contact-closing member in the direction of the arrow. The parts are so arranged that as the actuator reaches the limit of its movement in one direction, the

pawl 17 slips over and engages the shoulder 18, as seen in Fig. 2. The movement of the actuator from the position shown in Fig. 2 to that shown in Fig. 3 will through the pawl 17 continue the rotary movement of the contact-closing member 6.

The complete rotation of the contact-closing member 6 brings the projection 8 against the roll 9 and thereby closes the contact, and to insure that the contact shall be broken the instant that it is closed, I have provided means independent from the actuator for accelerating the movement of the contact-closing member at the point in its movement where the projection 8 engages the roll 9. Such means may have any suitable or usual construction although I prefer a spring 20 which is connected to said member and is so arranged as to be placed under tension when the member is being turned from the position shown in Fig. 1 to that shown in Fig. 3, whereby the resiliency of the spring will act on said member to accelerate its movement. The spring herein shown is an ordinary coiled spring fixed at one end to any suitable fixed support, as at 21, and connected at its other end to a link 22 which in turn is connected to the member 6, as at 23. It will thus be seen that as soon as the contact-closing member has been rotated into the position shown in Fig. 3, and the point 23 has passed the dead center, the tension of the spring will immediately accelerate the movement of the member 6 and throw it into the position shown in Fig. 1 thereby causing the projection 8 to impinge against the roll 9 and close the circuit, and immediately pass off from said roll thereby allowing the contacts to open, this movement being accomplished entirely independent of the speed of oscillation of the actuator 11. If desired, I may make the actuator 11 in two parts which can be adjustable with relation to each other, as shown in Fig. 5, each of the parts being mounted on the pin 12, one of the parts comprising two arms 14 and 15, and another arm 24 which overlies the other part comprising an arm 11^a having a slot 25 therein. The arm 24 is held to the arm 11^a by suitable screws 26. By means of this pin-and-slot connection between the two parts, the position of the arm 11^a can be adjusted relatively to the arms 14 and 15, if it is found necessary in setting up the device and connecting it to the device with which it is used.

In Figs. 1 to 3, the projection or rise 8 upon the member 6 which impinges against the roll 9 is formed in the making of the shoulder 18, and is such that the contacts are opened the instant they are closed. If it is desired to maintain the contacts closed for a definite length of time, I may employ the contact-closing member shown in Fig. 6, which has a concentric portion 8^a of considerable length placed to engage the roll 9. With this construction the contacts will be closed during the time that the concentric portion 8^a engages the roll and this time may be varied by varying the length of said portion 8^a.

In Fig. 4 I have shown a form of my invention wherein the contact-closing member 6^a is in the form of a segmental or mutilated gear, that is, it has gear teeth 29 throughout only a part of its periphery. The actuator is in the form of a reciprocating member 11^b which has gear teeth 30 thereon to mesh with the gear teeth 29. The relation between the gear teeth 29 and 30 is such that during the movement of the actuator to the right, the contact-closing member 6^a is closed sufficiently to bring the point 23 beyond the upper dead center and to just clear the teeth 29 from the teeth 30. With the parts in this position the tension of the spring 20 will accelerate the movement of the contact-closing member 6^a and thereby quickly close and open the contacts independently of the movement of the actuator.

In all the forms of my invention herein illustrated the construction is such that the contact-closing member 6 is given a complete rotation during the time that the actuator makes a complete oscillation or reciprocation, that is, a forward and backward movement.

By the terms "complete vibration" or "complete oscillation" or "complete reciprocation" as used in the claims, I mean, a back and forth movement or a movement of the actuator from its starting point to the end of the stroke and back again to the starting point.

While I have herein described some forms of my invention, I do not wish to be limited thereto, as it will be obvious that the details of construction may be changed in many ways without departing from the invention expressed in the appended claims.

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

1. In a circuit-maker and breaker the combination of a pair of normally open contacts, a rotary contact-closing member adapted at a point of its rotation to impinge against one of said contacts and thereby close said contacts, an oscillatory member having means to engage the contact-closing member during its movement in each direction and to rotate it through more than half of a revolution, and means independent of said oscillatory member to accelerate the rotation of said contact-closing member at the point in its rotation where it engages said contact.

2. In a circuit maker and breaker the combination of a pair of normally open contacts,

a rotary contact-closing member adapted at a point in its rotation to impinge against one of said contacts to close a circuit, a forked oscillatory actuator, a pawl carried by each arm thereof and adapted to engage said contact-closing member and to rotate it through more than a half revolution during a single forward and backward oscillation of said actuator and the means independent of said actuator to accelerate the movement of said contact-closing member at the point where it engages said contact, and to return said contact-closing member to its original position.

3. In a circuit maker and breaker the combination of a pair of normally open contacts, a rotary contact-closing member, adapted at a point in each movement to impinge against one of said contacts and close said contacts, an oscillatory member, connections between the latter and said contact-closing member to move said contact-closing member through more than a half revolution during each complete oscillation of said oscillatory member, and means independent of said oscillatory member to accelerate the movement of said circuit-closing member as it engages said contact and to return said circuit-closing member to its original position.

4. In a circuit maker and breaker the combination of a reciprocating member, a rotary contact-closing member, means operated by said reciprocating member to turn said rotary member through a pre-determined arc in one complete reciprocation of said reciprocating member, and independent means for turning said rotary member through the remainder of its complete rotation and to restore it to its original position before said reciprocating member begins its next reciprocation and a pair of open contacts closed by said rotary member when said rotary member is moving under the influence of said independent means.

5. In a circuit maker and breaker the combination of a rotatable circuit-closing member, a vibrating actuator on one side of said member, yielding means tending to hold said member at a fixed predetermined position, means between said actuator and said member to turn said rotary member a pre-determined distance in its rotation by each complete oscillation of said actuator and beyond the dead center on the opposite side of the axis of said rotary member whereby said yielding means are free to move said rotary member through the remainder of one complete revolution, and a pair of contact points closed by said rotary member while the same is returning to its normal position under the action of said yielding means.

6. In a circuit maker and breaker the combination of a rotatable circuit-closing member, yielding means acting normally in a line passing through the axis of said member to hold it in a predetermined position, a vibrating actuator on one side of said member for rotating said member against the action of said yielding means, past the dead center on the opposite side of the axis of said rotatable member, by one complete vibration of said actuator, whereby said rotatable member is turned through the remainder of its rotation and to its original position at an accelerated speed by said yielding means, and a pair of normally open contacts closed by said rotary member while moving under the action of said yielding means.

7. In a circuit maker and breaker the combination of a pair of normally open contacts, a rotary contact closing member comprising a ratchet having a single tooth and adapted at a point in its rotation to operatively engage one of said contacts to close a circuit, yielding means tending to hold said rotary member at a fixed predetermined position, a pivoted actuator on one side of said member, a pair of pawls pivoted to said actuator, one of said pawls being in operative engagement with said tooth, means to oscillate said actuator, the travel of said means to oscillate said actuator in one direction causing the pawl in engagement with said tooth to advance said ratchet and to retract the other of said pawls until both pawls are in engagement with said tooth, and the travel of said means to oscillate said actuator, to the other end of its movement, causing said first mentioned pawl to reverse its movement and to move to its original position and said second pawl to continue the advance movement of said ratchet until said rotary member and ratchet have advanced beyond the dead center on the opposite side of the axis of said rotary member, whereby said yielding means are free to move said rotary member through the remainder of one complete revolution.

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

THOMAS H. McQUOWN.

Witnesses:
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BERTHA F. HEUSER.