

No. 775,665.

PATENTED NOV. 22, 1904.

A. D. SCOTT.
CIRCUIT CONTROLLER.
APPLICATION FILED NOV. 6, 1903.

NO MODEL.

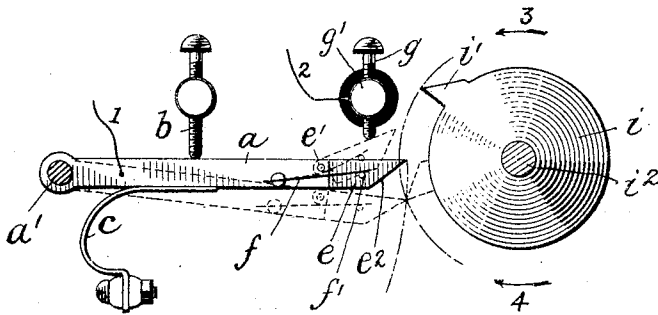


Fig. 1.

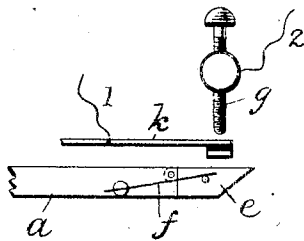


Fig. 2.

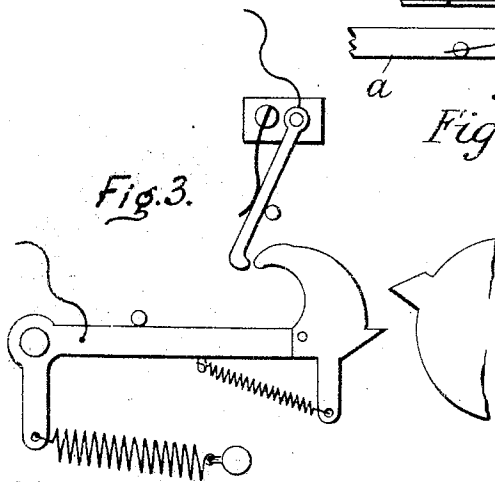


Fig. 3.

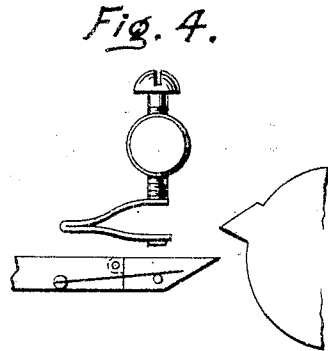


Fig. 4.

Witnesses
Frank J. Ober
Walter M. Chapin

Inventor
Archibald D. Scott
By his Attorney
W. A. Ransom

UNITED STATES PATENT OFFICE.

ARCHIBALD D. SCOTT, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO
VARLEY DUPLEX MAGNET COMPANY, A CORPORATION OF NEW
JERSEY.

CIRCUIT-CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 775,665, dated November 22, 1904.

Application filed November 6, 1903. Serial No. 180,120. (No model.)

To all whom it may concern:

Be it known that I, ARCHIBALD D. SCOTT, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Circuit-Controllers, of which the following is a full, clear, and exact description.

This invention relates to mechanically-actuated circuit-controllers, the object being to provide a device of such construction and operation that it will complete a circuit with a very rapid movement and likewise break it with a rapid movement, while the duration of the completed circuit is the shortest possible. I have designed the device for use as a mechanical circuit-closer for the primary circuit of induction-coils used to ignite the explosive charge in gas-engines; but the invention is by no means confined to such use, since it embodies what I believe to be a novel construction of circuit-controller for use in various situations and for various purposes.

The invention consists of the construction hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of the improved circuit-controller, and Figs. 2, 3, and 4 are views of modifications thereof.

a indicates a lever pivoted at *a'* and being held normally against a fixed stop *b* by a spring *c*. This lever carries at its free end an extension-piece or short lever *e*, which is attached to the end of lever *a* by means of a pivot-joint *e'*, located near the upper edge of the lever, and the construction being such that the extension-piece is permitted to swing upward and assume an angular position with respect to the main part of the lever, while it is prevented from swinging downward except in company with the main lever. At the extremity of the extension-piece *e* it is formed with an inclined surface *e''* on its under side, and it is engaged by a spring *f*, secured at one end to a post on the lever *a* and at the other end bearing freely upon a pin *f'*, fixed to the side of the extension-piece. This spring is comparatively light, its function being to normally hold the extension-piece in

line with the main lever, but to permit it to swing upward on its pivot when properly actuated. Above the extension-piece *e* is located a contact-screw *g*, which is adjustable in a post *g'*. In the same plane with the lever *a* and opposite the free end thereof is a cam-disk *i*, having a single tooth *i'*. This disk is mounted on a shaft *i''*, which is rotated by any suitable means and constitutes the actuator of the circuit-controller.

The operation is as follows: The lever *a* is supposed to be one terminal of an electric circuit, as indicated by the wire 1, while the contact-screw *g* is the corresponding terminal, as indicated by the wire 2. Normally this circuit is open, lever *a* being held against stop *b* and the free end of said lever being remote from the end of contact-screw *g*. The normal running direction of the disk *i* is as indicated by the arrow 3. When the tooth *i'* engages with the end of extension-piece *e*, the lever is carried downward to the position indicated by the downwardly-inclined dotted lines, thus compressing spring *c*. Finally the circular path of the tooth carries it free from the end of the extension-piece, thus allowing spring *c* to react and carry lever *a* somewhat violently against stop *b*. The momentum existing in the extension-piece *e* at the moment of impact with stop *b* is sufficient to overcome the spring *f* and cause the extension-piece *e* to fly upward to the position indicated by the upwardly-inclined dotted lines and make quick contact with the end of screw *g*. The stoppage of the extension-piece against screw *g* gives the light spring *f* an opportunity to react, and it quickly returns the extension-piece to its normal position, as shown in full lines. Thus the circuit is closed quickly, is held closed for an instant of time only, and is then opened as quickly. The operation is repeated at each rotation of the disk, and in case the device is used to momentarily close the primary circuit of an induction-coil the vibrator of the coil is given a series of movements at each closure, which results in a spark or flame at the terminals of the secondary winding in the usual manner.

The various parts of the device may be in-

5 insulated from each other in different ways, as judgment or the requirements may dictate. For instance, the screw *g* may be an insulated terminal, while the lever *a* may be grounded to the supporting-frame, in which case the circuit will be completed to ground when the extension-piece touches screw *g*. This being the arrangement it must not be possible for the disk *i*, which is also usually connected to the frame, to ground the insulated screw *g* at any time except the proper time. Under certain conditions the disk *i* may be rotated backward, as indicated by arrow 4. Then the tooth *i'* will lift the extension-piece *e*, but will not carry it into contact with the screw *g*, because the radial length of the tooth is not sufficient to do this. Likewise, in case the disk comes to rest with its tooth against the extension-piece *e* the circuit will not be closed, and the battery will not be exhausted while the apparatus is still.

25 The lever *a*, as well as the screw *g*, may be insulated and the conductors 1 and 2 be insulated conductors independent of the frame, in which case it would be well to insulate the disk *i* from the frame to prevent grounding the wire 1 at the instant when the tooth collides with the end of the lever.

30 In Fig. 2 I have shown a slight modification wherein the lever *a* forms no part of the circuit, the terminal opposing the terminal *g* being a spring *k*, having its end interposed between the end of screw *g* and the extension-piece *e* and having an insulated plate on its under side to receive the stroke of the extension-piece. In the operation of this device the extension-piece under its momentum strikes the spring and lifts it into contact with the screw, the natural resiliency of the spring *k* being relied upon to immediately break the circuit. It is thus evident that the particular manner of insulating the terminals and parts is not so essential to my invention as the mechanical construction of the device itself.

45 The lever *a*, with its extension-piece *e*, is for some purposes the equivalent of a single spring-plate fixed at one end, bearing against a fixed stop similar to *b* and similarly located and actuated at its free end by the tooth of the disk. Such a spring-plate would be put under tension by the moving tooth, then suddenly released and allowed to fly into contact with the screw *g*, and immediately thereafter it would leave the contact by its own resiliency stored by the momentum. This arrangement, however, is not desirable for many purposes, since the spring would be left in vibration after each operation and its action would not be sufficiently definite and certain. It is sufficient to point out that whether the lever *a* be in one spring-piece or two pieces connected by a spring it is the equivalent of a resilient lever or element.

65 It is obvious that any other striking device can be substituted for the disk, the essential

feature of my invention being the construction whereby the circuit is instantaneously made and broken.

70 While I have stated the object of my invention to be the provision of a device capable of giving the shortest possible duration of contact, yet for many purposes it is desirable to allow the contact to dwell slightly—as, for instance, in cases where time is to be allowed for magnetism to build up. In such cases I am able to retain all the features of my device that give the quick make and break and by slight modifications obtain in conjunction therewith a contact of predetermined duration. For instance, in Fig. 3 the contact-screw terminates in a spring *o*, which yields to the stroke of the extension-piece *e*, allowing the contacts to remain together an appreciable time, while the movement of the extension-piece is as rapid as before. Again, in Fig. 4 the contact member *p* is yielding, and the extension-piece *e* is provided with a cam-contact surface *p'*, which in swinging from the center *e'* engages the end of member *p* and remains in contact with it through a large portion of the stroke of part *e*.

Having described my invention, I claim—

1. A circuit-controller comprising a movable element having a resilient portion, a contact-point normally out of contact therewith, means for putting said element in motion, means for suddenly arresting it and means whereby the momentum thus created in the resilient portion will cause it to move into and out of contact with said contact.

2. In a circuit-controller, the combination of a lever pivoted at one extremity and free at the other, the free end being resilient in one direction but stiff in the other, a stop limiting the swing of the lever in the direction toward which it is resilient, a yielding force tending to hold the lever against said stop, means for moving the lever against said force and suddenly releasing it and a contact-point in the path of the resilient movement of the end of the lever.

3. In a circuit-controller, the combination of a lever pivoted at one extremity and free at the other, the free end being resilient in one direction but stiff in the other, a stop limiting the swing of the lever in the direction toward which it is resilient, a yielding force tending to hold the lever against said stop, a rotary cam arranged to engage said lever, move it against said force and afterward release it and a contact-point in the path of the resilient movement of the end of the lever.

4. In a circuit-controller, the combination of a lever pivoted at one end and having an extension pivoted to its free end, the pivot of said extension being so arranged as to permit it to swing in one direction but not in the other, a spring tending to hold the extension in its normal position, a fixed contact-point opposed to the extension, a stop normally

holding the lever in a position to be out of contact with the contact-point and means for violently throwing said lever against its stop to thereby cause the extension to move under
5 momentum against the contact-point and return by the action of the spring.

5. In a circuit-controller, a pivoted lever having a flexible extremity, a contact-point opposed to said extremity, a stop normally
10 holding the lever out of contact with said point, means for violently throwing the lever

against said stop to create momentum in the flexible extremity and means for prolonging the contact thus produced between the lever and the contact-point, substantially as de- 15 scribed.

In witness whereof I subscribe my signature in presence of two witnesses.

ARCHIBALD D. SCOTT.

Witnesses:

FRANCES E. MILLIGAN,
FRANK A. RAYWORTH.