(No Model.)

F. A. LANE.

ELECTRIC CIRCUIT CONTROLLER.

No. 417,926. Patented Dec. 24, 1889.

Fig. 1

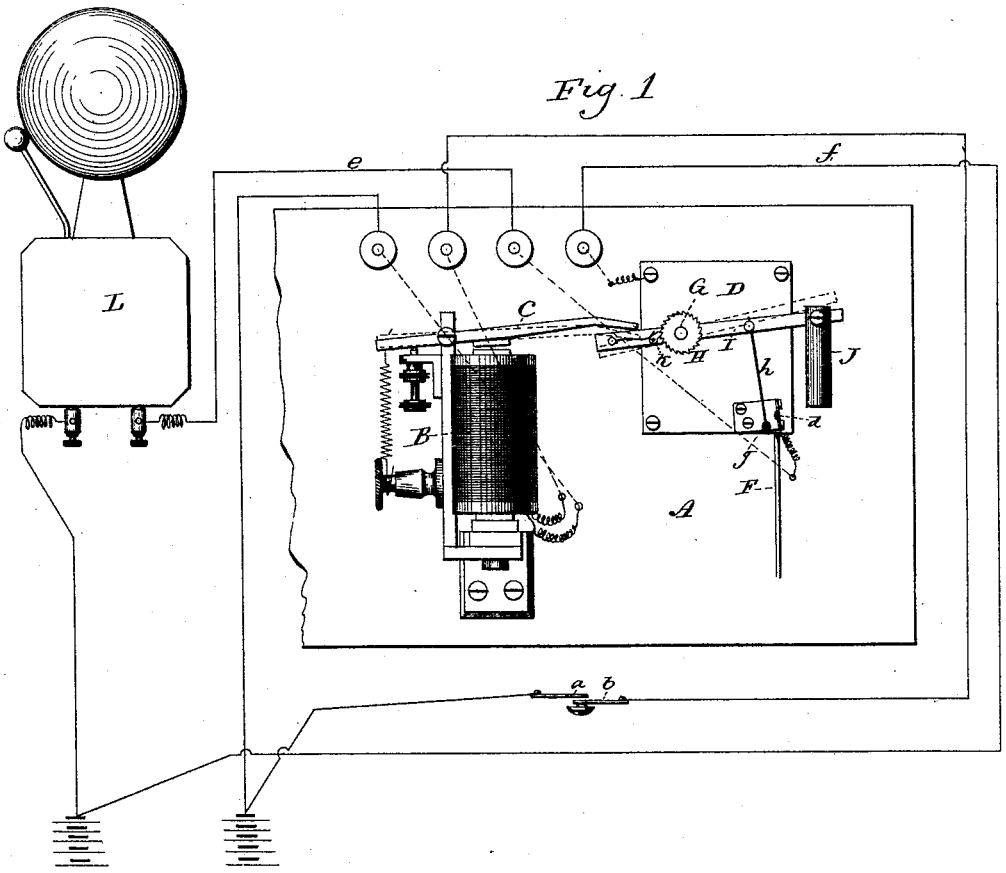


Fig. 2

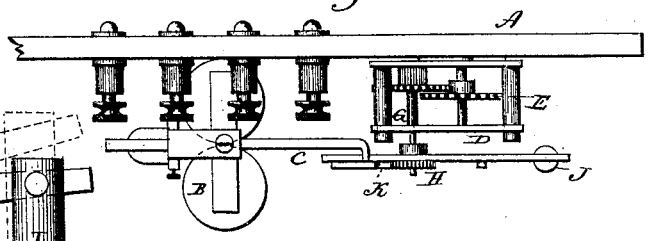


Fig. 3

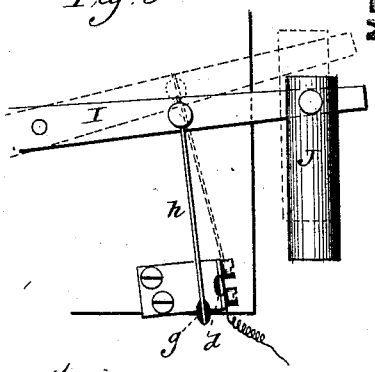


Fig. 4

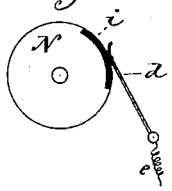
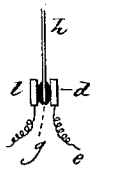


Fig. 5



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UNITED STATES PATENT OFFICE.

FREDERIC A. LANE, OF NEW HAVEN, CONNECTICUT, ASSIGNOR OF ONE-HALF TO FRANK E. MORGAN, OF SAME PLACE.

ELECTRIC-CIRCUIT CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 417,926, dated December 24, 1889.

Application filed April 29, 1889. Serial No. 309,033. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC A. LANE, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Electric-Circuit Controllers; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a face view of the apparatus, illustrating the circuits and operation; Fig. 2, a top view of the local-station mechanism represented in Fig. 1; Fig. 3, a detached view of the ratchet-lever and its contacts, enlarged, for the better illustration of the operation; Figs. 4 and 5, modifications.

This invention relates to an improvement in devices for limiting or controlling the time for which an electric circuit may be held broken or closed, and is applicable to signaling devices and other purposes, as will more fully hereinafter appear.

For convenience I shall describe the invention as applied for calls or signals. In the more general construction of such call-signaling apparatus contacts are provided at a given point from whence the signal is to be sent, and the signal, as a bell at a distant point, is brought into circuit by these contacts, and so that the bell will be sounded during the time which these contacts are held together—as, for illustration, in a call-bell, a button is provided at the point from whence the call is to be sounded. The bell at a distant point is in circuit with that contact, and so soon as the contacts are brought together, the circuit being closed, the operation of the bell commences, and will continue so long as those contacts are held together. This is many times a source of annoyance, as in door-bells, hotel-room calls, and other places where the signal may be prolonged at will of the person operating the button. Again, as another illustration, in railroad-signals, which are made automatic from one station or point to another distant station, the circuit being closed by an approaching train, so long as the train stands at that point the signal will sound.

The object of my invention is to positively control an electric circuit, so that its time of operation shall be automatically limited to a predetermined extent and independent of the device by which the circuit was set into operation; and the invention consists, principally, in a local electric circuit with a magnet and a circuit-breaker in said circuit, the said breaker being at the point from which the control is to be produced; a second circuit which is to be controlled, but independent of the said local circuit, the magnet of the local circuit having an armature-lever with a clock-work, and mechanism between said clock-work and said armature-lever whereby the said clock-work may be set into operation for a predetermined length of time; a circuit-breaker in said second circuit, and mechanism between the said clock-work and said second circuit-breaker whereby the said second circuit-breaker may be operated by the said clock-work and hold said circuit opened or closed, as the case may be, for a predetermined length of time, as more fully hereinafter described.

In the illustration, A represents a board upon which the mechanism at the station from which the signal is to be sent is arranged.

B represents the magnet, arranged upon the board in the usual manner and provided with an armature-lever C, which is brought into action by the closing of the circuit. The two contacts *a b*, forming a circuit-breaker, are arranged at some convenient where they may be mechanically brought together or automatically separated, these contacts here represented as a common "button." The circuit is made through the battery, the magnet, and two said contacts, as represented, and so that by bringing the contacts together the armature-lever will be drawn to its magnet, as indicated in broken lines, Fig. 1.

D represents the clock-work, which is provided with a common escapement-wheel E, from which a pendulum F extends. On one of the arbors G of this clock-work a ratchet-wheel H is fixed. On this arbor G a lever I

is hung so as to swing in a plane at right angles to the axis of the arbor G. One arm of this lever is provided with a suitable weight J, or known equivalent therefor, and the other arm extends toward the magnet and into the path of the free end of the armature-lever C. The lever I is provided with a spring-pawl K, adapted to work in the teeth of the ratchet G in one direction, but escape therefrom in the opposite direction. Normally, the magnet or local circuit being open, the armature-lever C stands away from the poles of the magnet, and the corresponding arm of the lever I rests against the armature-lever, as represented in Fig. 1; but if the magnet-circuit be closed, as by bringing the contacts *a b* together, the armature lever C is drawn to its poles and imparts a corresponding movement to the lever I of the clock-work, as also indicated in broken lines. In this movement of the lever I the pawl escapes the teeth of the ratchet-wheel H until the movement of the lever is completed. Then it engages the teeth of the ratchet, and so that when the magnet-circuit is broken, as by the separation of the contacts *a b*, the armature-lever C will rise or move away from its connection with the lever of the clock-work, thereby leaving that clock-work lever free to be operated upon by the weight J, and this weight, through the pawl K, imparts rotation to the arbor G, and thence to the escapement-wheel, causing the clock-work to run until the lever I shall have returned into contact with the armature-lever C, as represented in Fig. 1, at which point the clock-work ceases its operation. Consequently upon the closing of the magnet-circuit the clock-work is prepared for operation, but will be held in suspense so long as the magnet-circuit remains closed. Upon the breaking of this magnet-circuit the clock-work will be free to operate for a predetermined length of time, that time being from the start of the clock-work until the lever of the clock-work shall have returned into contact with the armature-lever C.

The clock-work is adapted to close the circuit with the distant-signaling device. As here represented, that signaling device is a bell mechanism L, such as commonly used for electric signaling-bells. (Not necessary to be illustrated or described.)

A stationary contact *d* is arranged upon or near the clock-work, from which a wire *e* runs to the distant-signaling device, as L. This contact *d* is insulated from the clock-work, and from the clock-work a second wire *f* runs through the battery to the signal, thus bringing the clock-work and the signaling device into electric circuit independent of the local circuit. The lever I carries a contact *g*, which is the termination of a spring-arm *h*, extending from the lever I. (Shown enlarged in Fig. 3.) The back of the contact *d* is toward the contact *g*, but the back insulated, as represented in Fig. 3, so that should the contact *g* strike the said back the circuit will not be closed. As the lever I rises under the action of the armature-lever C, as before described, and as indicated in broken lines, Fig. 3, the contact *g* rises, passes above the contact *d* into a position as seen in broken lines, Fig. 3, and so that as the lever I returns the contact *g* will pass down over the contact *d* and make actual contact therewith, and during the time which the contact *g* occupies in passing over the contact *d* the signal-circuit will be closed and the signal operate; but as the lever I completes its downward movement the contact *g* escapes from the contact *d* and returns to its normal position, breaking that signal-circuit.

As before described, the lever I will remain in the up position so long as the local or magnet circuit is closed; but instantly upon the breaking of that circuit, so as to release the armature-lever C, the clock-work commences its operation and brings the contacts *g* and *d* together, so as to close the signal-circuit and sound that signal, which sounding will continue so long as the contact *g* is in engagement with the contact *d*. The time of sounding the signal therefore depends upon the length of the contact-surfaces *d* and *g*, and this may be greater or less, according to the length of signal required.

The breaker for the signal-circuit may be otherwise arranged—say as represented in Fig. 4, in which a wheel like N is arranged upon one of the arbors of the clock-work, a portion of the periphery of which is insulated, as at *i*. The contact *d* in the form of a brush is arranged to bear upon the periphery of the wheel N, and so that normally it stands against the insulated portion of the periphery; but as the wheel revolves the metallic surface of the wheel comes into contact with the brush and closes the circuit during the time which the wheel should present such metallic contact to the contact *d*. The extent of contact may be varied according to circumstances. This illustration will be sufficient to indicate that the invention is not to be limited to any particular construction of circuit-breaker.

The illustration which I have made of closing the local circuit will be sufficient to the understanding of the invention. The device for closing this circuit will vary according to circumstances, as in the use of railroads, to indicate the position of a train, the local circuits may be automatically closed by the train itself in the usual and well-known manner of closing a circuit by means of a moving train.

In illustrating the signaling-circuit I have represented the clock-work as being directly in the circuit, and this I prefer; but it is not essential to the invention that the signaling or clock-work circuit should be made through the clock-work itself, as it may be made without placing the clock-work directly in such circuit, as seen in Fig. 5, in which the circuit-breaker is represented as consisting of two contacts *d* and *l*, arranged distant from

each other and presenting a length of face toward each other corresponding to the length of signal required, and the spring-arm *h*, carrying the contact *g*, as before, may pass up over the back of the contact *l*, as before, and return between the two contacts *l d*, as indicated in Fig. 5, the metallic end *g* of the arm *h* making engagement with both the contacts *l d* during its descent, so as to close the circuit during the time of such contact.

I have illustrated and described the apparatus as working upon open circuits. If closed circuits are desired, the reverse operation will be understood without further illustration or description. The invention is therefore not to be understood as limited to open circuits.

I have described the invention as applied to signaling or calling purposes. This will be sufficient to enable others skilled in the art to apply the invention to the controlling of a circuit for other purposes where it is desirable that an electric circuit should be set into operation, as occasion may require, and that operation continue for a predetermined length of time independent of the device or devices by which the circuit was so set into operation.

I claim—

1. The combination of a magnet, its armature-lever, an electric circuit through said magnet, a circuit-breaker arranged in said magnet-circuit, a clock-work, one of its arbors provided with a toothed ratchet, a lever hung upon the said arbor carrying a pawl adapted to engage said ratchet, the said ratchet-lever extending into the path of the said armature-lever, and whereby under the movement of the armature-lever a vibratory movement will be imparted to said ratchet-lever, a power applied to said ratchet-lever in opposition to the said armature-lever, a second circuit through said clock-work independent of the said first circuit, a circuit-breaker in said second circuit and adapted to be operated by the said clock-work, with one or more signaling devices in said second circuit, substantially as described.

2. The combination of a magnet, its armature-lever, an electric circuit through said magnet, a local-circuit breaker in said magnet-circuit, a clock-work having a ratchet upon one of its arbors, a lever carrying a pawl adapted to engage the said ratchet in one direction, but escape therefrom in the opposite direction, the said ratchet-lever adapted to engage with the armature-lever, and whereby said clock-work may be set into operation for a predetermined length of time, a stationary contact, as *d*, a spring-arm, as *h*, extending from said ratchet-lever and carrying a second contact *g*, a second electric circuit through said clock-work, the said contacts forming a circuit-breaker for said second circuit, with one or more signal devices in said second circuit, substantially as described.

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