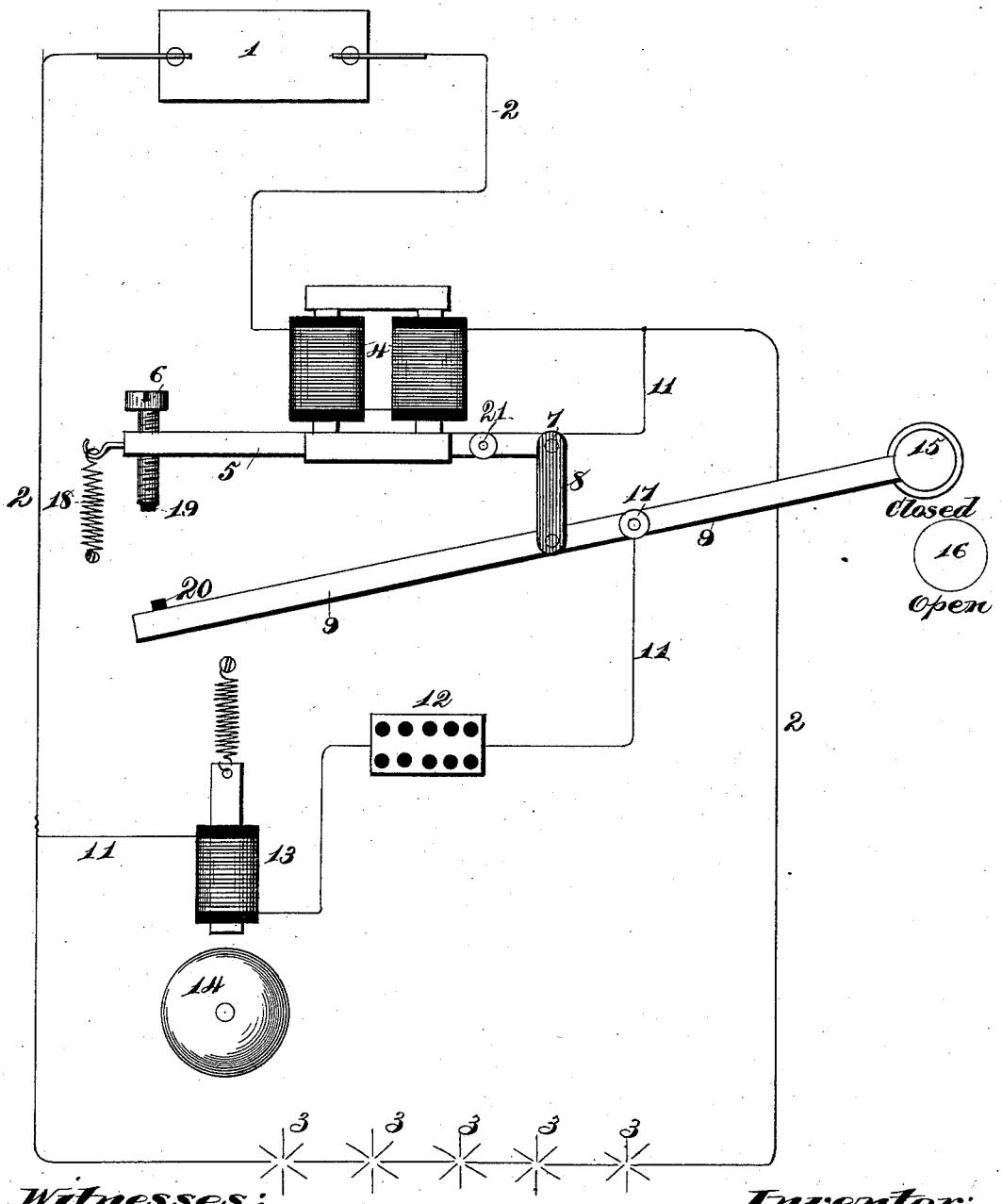
(No Model.)

T. L. DENNIS.

INDICATOR FOR ELECTRIC CIRCUITS.

No. 307,104. Patented Oct. 28, 1884.



Witnesses:
Chas. F. Myers
Robert Everett.

Inventor:
Thomas L. Dennis.
By Z. F. Wilber
Atty

UNITED STATES PATENT OFFICE.

THOMAS L. DENNIS, OF NEWBURYPORT, MASSACHUSETTS.

INDICATOR FOR ELECTRIC CIRCUITS.

SPECIFICATION forming part of Letters Patent No. 307,104, dated October 28, 1884.

Application filed January 17, 1884. (No model.)

To all whom it may concern:

Be it known that I, THOMAS L. DENNIS, a citizen of the United States, residing at Newburyport, in the county of Essex and State of Massachusetts, have invented new and useful Improvements in Indicators for Electric Circuits, of which the following is a specification.

In using voltaic-arc lamps either singly or in series it often happens that the mechanism controlling the "feed" or forward movement of the moving carbon in one or more lamps fails to act, or, as it is technically termed, "sticks." The result therof is that the arc gradually becomes greater and greater until it is of too great resistance for the current to bridge, resulting in a disruption or breaking of the circuit. In such cases the ordinary remedy first applied has been to break and make the circuit very rapidly, so as to send over the line a series of rapid or quick impulses, which often causes the magnet or magnets controlling the feed and the feeding mechanism to act, restoring the arc to its normal condition and the circuit to its normal capacity. This same disruption of the circuit may occur when other translating devices are used. In view thereof the object of my invention is to automatically transmit over the main circuit these or the necessary impulses to start the controlling or feed regulating mechanism, and at the same time to give, if desired, either audible or visual notification of the breaking or weakening of the circuit, or to give both notifications. To accomplish this in a main circuit proceeding from a suitable generator and containing lamps or other translating devices, a magnet is arranged at any desired point, preferably the central or generating station. At the same point is arranged a shunt-circuit controlled by this magnet through its armature and a lever attached thereto, so arranged that the contacts on the armature and the attached lever for the shunt-circuit shall have a large range of movement or separation one from the other to avoid danger of an arc forming between the contacts. In this shunt-circuit a resistance (preferably adjustable) is included in order that the spark upon its closing or opening may be lessened. If desired, a part of this resistance (or even all) may be the coil of an electro-magnetic alarm apparatus, so that whenever the shunt is closed an audible alarm shall be given. At the same time two visible indications may be placed at the free or outer end of the lever attached to the armature, so that its position will indicate either "line open" or "line closed." Normally, when the main line is closed, the magnet in the main circuit attracts and holds its armature, the link-connection between the armature-lever and its attached lever causing the shunt to be broken. If, however, the main line be broken, the armature falls away from the magnet and the armature and attached lever close the shunt, causing a visual or an audible notification, or both, to be given. The shunt, however, starting from a point between the magnet and the lamps or other translating devices immediately again energizes the magnet, causing it to attract its armature and break the shunt, whereupon an impulse is thrown upon the line. If the break therein be not immediately remedied, the shunt is again closed and broken. So the magnet then acts as a self-breaker, and the audible or visual alarms, or both, continue to be given until the trouble or break be remedied.

The drawing hereto annexed is typical of this invention. In it 1 is a generator located at any suitable point, from and to which is a main circuit, 2, containing at desired points the lamps or other translating devices 3 3. In this main circuit 2 is placed a magnet, 4, having an armature-lever, 5. This armature-lever is pivoted at 19, and is provided at its free end or other suitable point with a retractor, 18, which of course may be a spring, as shown, or an adjustable weight or counter-balance or other equivalent form of retractor. It is pivoted at 21, and at 7 is joined to a link, 8, connecting at 10 to a supplementary or attached lever, 9, which carries a contact, 20, while 5 carries the adjusting-screw 6, ending in contact-point 19. 9 is pivoted at 17 between the link 8 and its free end, and at its free end indications 15 (line closed) or 16 (line open) may be placed, so as to show by its position the condition of the line. Between this magnet and the lamps or translating devices 3 3 is a short or shunt circuit, 11,

a part of whose path is through the armature-lever 5 and attached lever 9. In this shunt, to lessen the spark, any desired resistance 12 may be placed. Part or all of this resistance may be the coil 13 of an electro-magnetic alarm whose gong or bell is shown at 14, preferably for quickness of action a helical solenoid. From this typical and diagrammatic drawing it will be seen that the contacts 19 20 for closing the shunt or short circuit 11 have a wide range of movement to and from each other, that in the normal or desired condition of main circuit 2 they are so far apart as to prevent the possibility of an arc between them, while they may move rapidly to the limit of their motion to and from each other. If, now, there is no "sticking" in the lamps or no trouble in the other translating devices, the shunt will be constantly broken, the magnet 4 attracting its armature. If, however, 2 be broken or even sufficiently weakened from any cause whatever, 5 will drop from its magnet 4, and 19 and 20 contact, closing shunt 11, giving, if desired, visual indications thereof by 15 16 and audible notification by the alarm 13 14. This energizes again 4, causing it to attract 5 and break the shunt 11, throwing an impulse upon the line. If this impulse does not cause the trouble thereon to cease, 5 falls away, again closing the shunt, again energizing 4, and breaking the shunt, 4 becoming a self making and breaking magnet until the trouble in the main line be remedied, constant, audible, and visible indications, either or both, being meanwhile given. Thus I am enabled to furnish an automatic and reliable "watchman," so to speak, of the main circuit, and one often in ordinary cases of derangement able to rectify or remedy any faults therein.

I am aware that indicators have before been used in electric circuits to indicate various conditions thereof—for instance, such as shown in United States Letters Patent Nos. 266,244, and 292,714; hence I do not claim such, broadly; but

What I do claim is—

1. The combination of a main circuit containing lamps or electrical translating devices, a shunt-circuit therefor controlled by an armature-lever and secondary lever attached thereto, and a magnet in the main circuit operating the armature-lever, substantially as set forth.

2. The combination of a main circuit containing lamps or electrical translating devices, a shunt-circuit therefor controlled by an armature-lever and secondary lever attached thereto, a magnet in the main circuit operating the armature-lever, and an alarm or indicating apparatus in the shunt-circuit, substantially as set forth.

3. The combination of a main circuit containing lamps or electrical translating devices, a shunt-circuit therefor controlled by an armature-lever and secondary lever attached thereto, a magnet in the main circuit operating the armature-lever, an alarm or indicating apparatus in the shunt-circuit, and a suitable or adjustable resistance in the shunt-circuit, substantially as set forth.

4. The combination of a magnet, an armature-lever carrying a contact-point, a second lever carrying a contact-point, and a link-connection between the two, substantially as set forth.

5. The combination of a main circuit, a shunt therefor, a magnet in the main circuit, an armature-lever therefor, and a second lever attached to the armature-lever, the two levers controlling the shunt-circuit, and a visual indicator of the conditon of the main circuit controlled by a prolongation of the second lever, substantially as set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

THOMAS L. DENNIS.

Witnesses:
JOS. L. COOMBS,
EWELL A. DICK.