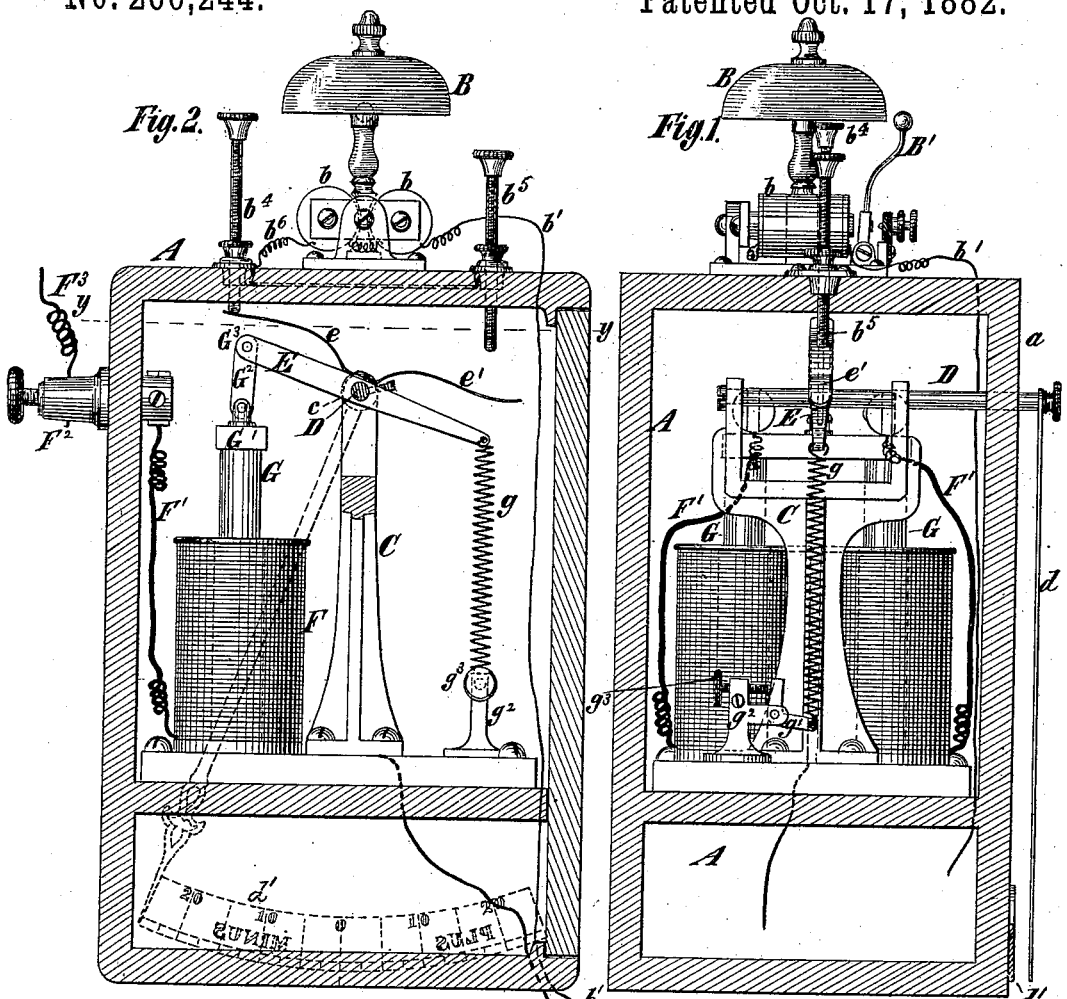
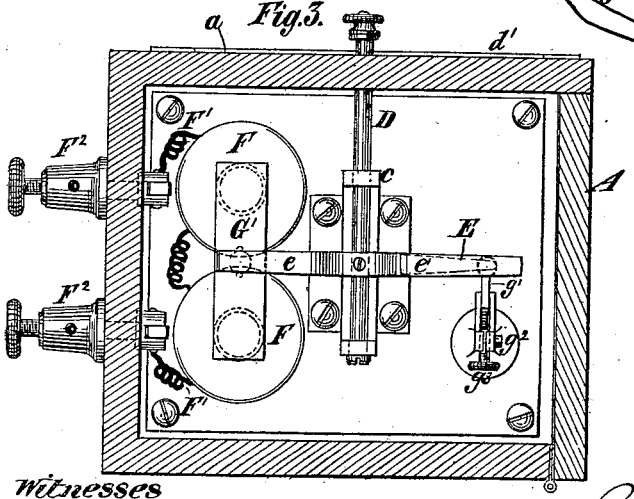
(No Model.)

E. WESTON.

ELECTRICAL INDICATOR.

No. 266,244. Patented Oct. 17, 1882.





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ELECTRICAL INDICATOR.

SPECIFICATION forming part of Letters Patent No. 266,244, dated October 17, 1882.

Application filed October 17, 1881. (No model.)

To all whom it may concern:

Be it known that I, EDWARD WESTON, of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Electrical Indicators, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

My improvements are specially designed for employment in connection with a circuit through which a current of electricity is supplied to a number of electric lamps, electric motors, or other similar devices.

The object of my invention is mainly to call attention to deviations from the required strength of the current in the circuit and to indicate at any desired point—as, for instance, at the station where the current is generated—the character and extent of the changes which occur. For this purpose I make use of an apparatus adapted to be actuated by the current itself, and which will be capable of indicating variations in the resistance of the circuit and of calling attention to all such as are material by sounding an alarm or in any other convenient manner. The mechanism which I may employ for effecting this may evidently be varied in many ways, nor is the invention restricted to the specific devices hereinafter described, as they form one instance only of many devices capable of operating in substantially the same manner for the attainment of like results. I have adopted, however, as a convenient means of carrying out the invention a combination of devices that may, in general terms, be described as composed of an electric helix, with a movable core, a pivoted lever, or its mechanical equivalent, adapted to be controlled as to position by the said core and helix, and an electro-magnetic alarm in a circuit which is closed or opened by the movement of the lever. The helix above mentioned is included in the main or operative circuit, so that the position of the lever is dependent at all times upon the strength of the current passing through the circuit. This is taken advantage of to indicate the resistance of the circuit by attaching to the lever a pointer arranged to move over a properly-graduated scale, and also to close the local or alarm circuit when the resistance has increased or diminished beyond certain predetermined limits. With the above devices, and connected either to the core or the lever operated thereby, is employed some means of adjustment—such as a spring or weight—and other details, the nature of which will be more fully explained hereinafter.

The accompanying drawings illustrate an apparatus embodying my invention, here shown as contained within a box or case suitable for attachment to a wall in a convenient position to be observed.

Figure 1 is a side elevation of the apparatus with one of the side walls and a contiguous portion of the case removed. Fig. 2 is a rear elevation of the apparatus with the rear wall and a contiguous portion of the case removed. Fig. 3 is a horizontal section of the apparatus through the line *y y* of Fig. 2.

A represents a case of suitable material and of any desired shape; B, an electric bell conveniently mounted thereon. Its hammer B′ is operated by an electro-magnet, *b*, the coils of which may be either included in a shunt from the main circuit, or, as represented, in a local circuit composed of the wire b', connected with one pole of the battery, b^2, and the wire b^3, connected with the other pole of the battery and with the base of the metallic standard C, which affords the bearings *c* for the horizontal shaft D of a lever, E.

To the top of the lever E are affixed two metallic contact-pieces, consisting of light springs *e* and *e′*, projecting up in position to be brought in contact respectively, as the lever tilts in either direction, with the ends of adjustable contact-screws b^4 b^5, electrically connected with one another, and by means of the wire b^6 with the coils of the electro-magnet *b* of the alarm, the disposition and adjustment of the parts being such that when the lever stands in a horizontal position neither of the springs is in contact with the screws, and the shunt or local circuit is then open; but by the tilting of the lever in either direction one or other of the contact-springs makes contact with the end of one or other of the screws, and thereby closes the local circuit and rings the bell.

I would here state that the springs and con-

tact-points may be supplanted by various other circuit-closing devices of a similar kind—for example, a pair of rods or wires attached to the lever and dipping into mercury-cups; or the springs may be arranged to slide over the contact-plates, as is well understood by those skilled in the art.

The position of the lever E is governed by the helices F and cores G. The coils composing said helices are designed to form a path for the whole or a portion of the main or operative current, connecting-wires F′, affixed to the inner ends of the binding-posts F^2, to which the main-circuit wires F^3 are brought, being employed for introducing the current.

The movable cores G of the solenoids are fixed to the cross-bar G′, which is connected by means of the pitman G^2 with the end G^3 of the lever E. The opposite end of the lever has fastened to it the upper end of the spiral spring g, the lower end of which is connected to the adjustable bell-crank lever g', pivoted in the standard g^2 and adjusted by means of the set-screw g^3. Sufficient range of movement is provided for the bell-crank lever g' to permit the tension of the spiral spring g to be so adjusted that the lever E will occupy a horizontal position when the current in the operative circuit is of the desired strength, the organization being such that when the current increases beyond the desired strength, owing to removals of resistance in the circuit or other causes, the attractive force of the helices pulls down the end of the lever with which the cores are connected. On the other hand, when the current diminishes below what is required the spring g preponderates and draws the other end of the lever down.

The shaft D, upon which the lever E is mounted, extends through the front wall, a, of the case, and has affixed to it the pointer d, which oscillates in front of the scale d', arbitrarily graduated to indicate resistance or current units, or otherwise, and shown in dotted lines in Fig. 2. The central portion of the scale is conveniently selected as the zero or starting point, and the graduations made off to either side in any proper manner.

In operation, when the pointer stands vertically the bell is silent; but if it swings to either side of the center the local circuit is closed and the bell set ringing. By this means attention is directed to the change of the electrical condition of the line. The amount or direction of the change will be indicated by the pointer, the movement of which is not perceptibly impeded by the contact-springs, which are very light and pliable.

By means of the above-described devices a person at any point along the line of an electrical circuit, or at the station where the current is generated, may be advised at all times of the number of lamps, motors, or other devices that are running by an inspection of the indicator, while the alarm serves to call attention to the removal or insertion of lamps or other devices along the line, thus affording information of what steps are necessary for an increased or diminished supply of current.

As stated above, the devices described may be greatly modified. For instance, it is evident that many forms of magnets, helices, and armatures or cores may be utilized. So, too, the devices employed for indicating the changes of the condition of the line and for closing the local circuit may be correspondingly varied and modified without departing from the invention.

Having now described my invention and illustrated the best manner of which I am at present aware for carrying the same into effect, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with an electrical indicator substantially such as described, and included in a main circuit, of an alarm mechanism included in an independent or shunt circuit, and a circuit-closer adapted to be operated by the indicator without arresting the movement of the same, and thereby close the circuit through the alarm, substantially in the manner set forth.

2. An electro-magnet having its coils included in an operative electric circuit and its core in conjunction with yielding contact-pieces for closing a shunt or local circuit, and operating an electrical alarm, in combination with a graduated scale and index-arm connected with the said core, substantially as and for the purpose set forth.

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