No. 646,676. Patented Apr. 3, 1900.

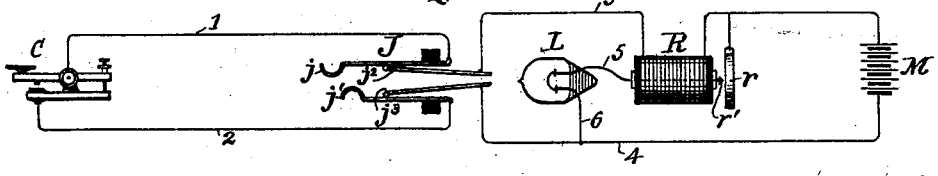
E. E. CLEMENT.

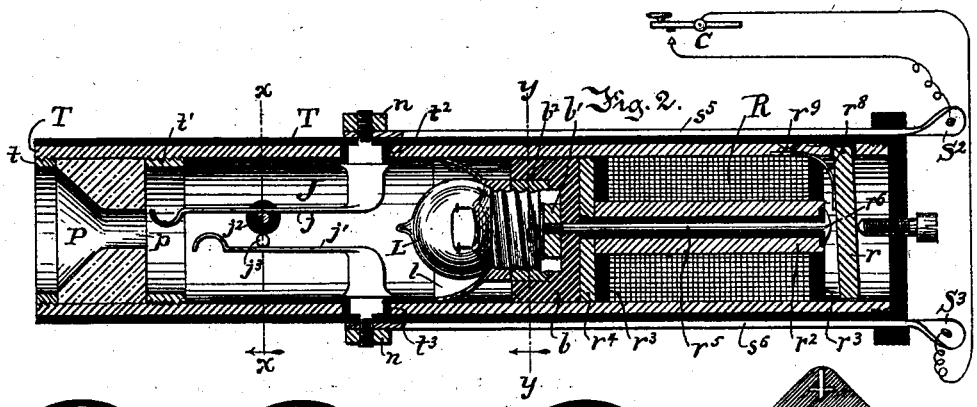
COMBINED ANNUNCIATOR AND SPRING JACK.

(Application filed June 16, 1898.)

(No Model.)

Fig. 1.





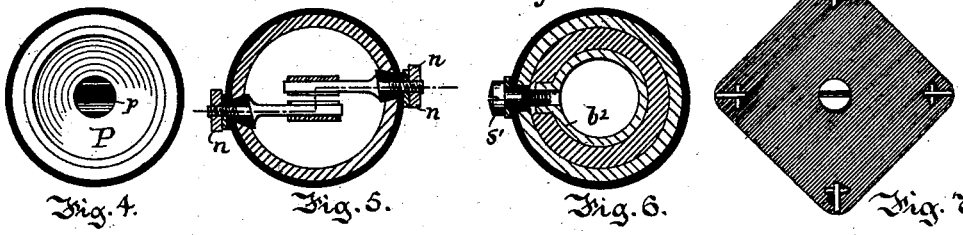


Fig. 4. Fig. 5. Fig. 6. Fig. 7.

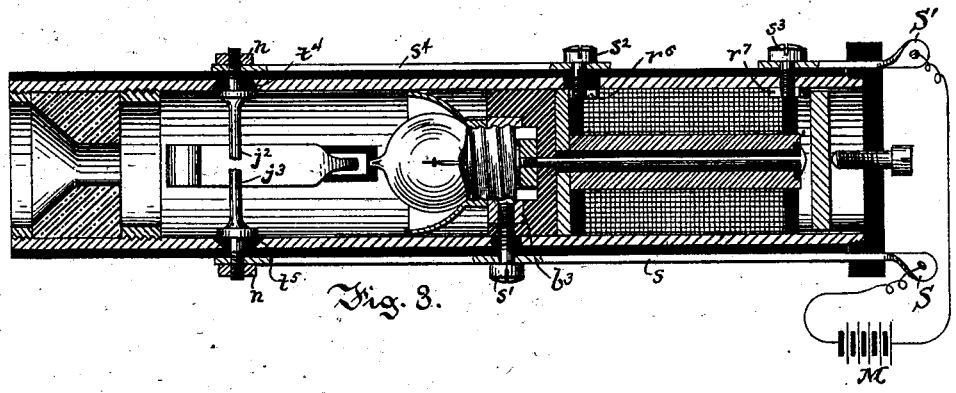


Fig. 3.

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UNITED STATES PATENT OFFICE.

EDWARD E. CLEMENT, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO THE SUN ELECTRIC MANUFACTURING COMPANY, OF NEW JERSEY.

COMBINED ANNUNCIATOR AND SPRING-JACK.

SPECIFICATION forming part of Letters Patent No. 646,676, dated April 3, 1900.

Application filed June 16, 1898. Serial No. 683,653. (No model.)

To all whom it may concern:

Be it known that I, EDWARD E. CLEMENT, a citizen of the United States, residing in the city of Washington, in the District of Columbia, have invented a new and useful Improvement in a Combined Annunciator and Spring-Jack, of which the following is a specification.

My invention relates to the annunciators and spring-jacks which constitute the switchboard terminals of subscribers' lines in telephone exchanges. It has for its object the combination of the elements required in a single, compact, and highly-efficient organization.

With this end in view it involves the adoption of a tubular inclosure containing a relay, a signal operated thereby, and a spring-jack, all arranged to coöperate in the manner hereinafter described.

My invention is fully illustrated in the accompanying drawings, in which the same letters and numerals refer to the same parts throughout.

Referring to said drawings, Figure 1 is a diagram exhibiting the circuits of my annunciator and spring-jack. Fig. 2 is a vertical longitudinal section thereof. Fig. 3 is a horizontal longitudinal section. Fig. 4 is a front view. Fig. 5 is a section on the line X X of Fig. 2. Fig. 6 is a section on the line Y Y of Fig. 2. Fig. 7 is a rear end view.

Referring to Fig. 1, it will be seen that the general scheme involves the use of a relay normally connected to a line through the spring-jack controlled by a circuit-changer in the line and itself controlling the circuit of the signal.

In Fig. 1, R is the relay, L the signal, J the spring-jack, and C the circuit-changer. The relay R is included in a circuit 3 4 containing a battery M and terminating at anvils j^2 j^3 of the spring-jack J. It controls an armature r, which, normally retracted, is adapted when attracted to make contact with the front stop r', thereby closing the circuit of the battery M through wires 5 6 to the lamp L. The operation of the relay R is caused by the circuit-changer C being depressed to close the circuit. Upon the insertion of a plug (which is not shown, as it forms no part of the present invention) the jack-springs j j' are forced apart, thereby leaving the anvils j^2 j^3 and breaking the circuit of the relay R and the battery M. The armature r is thereupon retracted by a suitable spring and breaks the lamp-circuit, whereupon the lamp is extinguished.

Referring to Figs. 2 to 7, the details of the organization may be observed. The relay R, the lamp L, and the jack J are all inclosed within a containing-tube T, which I make of soft iron in order that it may constitute a portion of the magnetic circuit of the relay and at the same time have sufficient rigidity to support and protect all the parts. The front end of the tube, which is the portion that would appear as shown in Fig. 4 upon the face of a switchboard, is provided with two bezel-rings t t', sustaining between them an annular prismatic lens P. This lens is of soft glass ground with its outer face at such an angle that it will cause rays of light striking the inside of the lens to be diffused upon the outside thereof. This inclined face also serves as a guide for the plug, which is inserted through the orifice p in order to reach the spring-jack J.

Surrounding the iron tube T is an inclosing tube of hard rubber or other suitable insulating material T'. This insulating-tube extends from end to end and fully covers the iron and carries upon its surface certain of the circuit connections and the connecting-terminals.

At the top and bottom and on both sides of the tubular inclosure I provide apertures. Two of these, t^2 t^3, permit the passage of securing means for the springs j j' of the spring-jack J. The other two, t^4 t^5, are for the passage of the ends of the anvils j^2 j^3, respectively. All four of these apertures are provided with proper bushings of insulating material, such as hardened fiber, which will not be injured by the heat developed in and radiated from the filament of the lamp L. In the construction shown I have provided both the spring-supports and the anvil-terminals with internal shoulders with nuts n upon the outside of the tube. It will be understood, however, that I do not limit myself to this specific construction.

The relay R is wound upon a core r^2 between insulating-heads r^3 and is of such diameter as to fit snugly within the tube. At one end and forming a continuation of the core is an iron head or disk r^4, and resting against this head is a socket b, of porcelain or other suitable insulating material, for the lamp L. Within this socket b are provided contacts b' b^2, which may be of any suitable form to coöperate with the base of any particular lamp selected. In the construction shown the lamp-base is of the so-called "Edison" pattern, the contacts b' b^2 being therefore in the form of a nut and screw-sleeve, respectively. The contact b' serves, in conjunction with a screw-threaded rod or bolt r^5, to hold together all the parts so far enumerated. The rod r^5 passes from the rear end of the relay-core, where it is provided with a head r^6, through the length of said core, through the iron head r^4, from both of which it is insulated through the base b into the end contact b'. The relay and lamp-socket, together with the lamp itself, may thus be withdrawn from the rear end of the tube in their entirety. The sleeve-contact b^2 of the lamp-socket is provided at one side with a screw-threaded aperture b^3, and the base b and the tubes T T′ are perforated to receive the screw s'. This screw passes through and makes contact with a strip s, which extends in one direction to the rear end of the combined structure, forming a terminal S, and in the other to and under the nut n of the anvil j^3. In the same diametral plane as screw s', but on the opposite side of the tubular inclosure, are two screws s^2 s^3. Screws s' and s^2 are insulated from the tube T; but the screw s^3 is in metallic contact with the same as well as with an extension of the terminal S′. Screws s^2 and s^3 on the inside of the tube T engage with terminals r^6 r^7, to which the ends of the relay-windings are connected. The screw s^2 is connected by a strip s^4 with the nut n and the outer end of the anvil j^2. The outer terminals of the jack-springs j j' pass through and by means of their nuts n n make effective contact with strips s^5 and s^6, which pass along the tubular inclosure to form terminals S^2 S^3, similar to S and S.′

The armature r is hinged or otherwise movably secured at the rear end of the magnet R and is provided with a spring r^8, which is shown as secured at r^9 to the tube T. This spring serves to keep the armature normally away from the contact r^6 and at the same time insures a good electrical connection between tube T and the armature.

Surrounding the lamp L, I have shown a reflector l, which, however, is not essential to the operation of the device.

Supposing the battery M or its anvils to be connected, as shown in Fig. 3, across the terminals S S′, and the line-wires 1 2 of Fig. 1 to be connected, as shown in Fig. 2, to the terminals S^2 S^3 the operation will readily be understood. When a subscriber takes his telephone off the hook or otherwise closes his circuit, as by a key, such as the one, C, shown in Fig. 1, the circuits in the instrument will be as follows: in a main circuit from line-wire 1 and terminal S^2, strip s^5, nut n, jack-spring j, anvil j^2, nut n, strip s^4, screw s^2, terminal r^6, winding of the relay R, terminal r^7, screw s^3, terminal S′, to the battery M, and back to the terminal S, thence through strip s to the nut n, and anvil j^3 to the jack-spring j', nut n, strip s^6, terminal S^3, line-wire 2, and to the subscriber's station. Battery-current will thus flow through the relay-winding and the armature r will be attracted, closing a bridge across the circuit 6, which forms another complete path for battery-current, which may be given as follows: from battery M to terminal S, strip s, screw s', sleeve-contact b^3, lamp-sleeve, filament, base-contact, nut b', rod r^5, head-contact r^6, armature r, tube T, screw s^3, terminal S′, and back to the battery. The lamp will thus become luminous. A parallel beam will be thrown forward in the line of the axis of the tubes by the reflector l and passing through the annular prism P will be broken up and diffused thereby. When the operator observes the glow, she has only to insert a plug into the circle shown in Fig. 4. The inclined outer face of the prism serves as a guide for the plug-tip, which when fully inserted through the orifice into the jack J separates the jack-springs from the anvil-contacts, breaks the wheel-circuit, and consequently the lamp-circuit, and connects the line-wires to the plug-cord circuit.

It will be apparent to those skilled in the art that this device might easily be constructed to work upon an open instead of a closed circuit, and I wish it to be understood that I consider such a change or any other changes in the details of construction, which tends to increase the efficiency without impairing the identity of the structure as a whole, to be within the scope and purview of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In an annunciator and spring-jack, the combination in a single integral structure, of the following instrumentalities: a relay provided with local terminals, a lamp or other signal connected to said terminals, jack-springs adapted to be connected to the line-wires, and anvils upon which the springs normally rest, forming terminals of the relay-circuit, substantially as described.

2. In an annunciator and spring-jack a support, a relay carried thereon and provided with terminals having a local circuit, a lamp or other signal attached to the relay, and electrically connected to said terminals, anvils carried on said support, forming terminals for the relay-circuit, jack-springs constituting line-terminals, normally resting upon said anvils, substantially as described.

3. In an annunciator and spring-jack, a supporting-casing provided with a sight-opening, a relay and jack-springs carried within said supporting-casing, a lamp or other signal also within the casing and provided with terminals controlled by said relay, substantially as described.

4. In an annunicator and spring-jack, a tubular casing, a lens attached to one end of said casing, a spring-jack in proximity to the lens and supported within the casing, a relay also within the casing, with terminals for its local circuit, and a lamp electrically connected to said terminals and supported in the casing between the relay and the lens, substantially as described.

5. In an annunciator and spring-jack a tube, an opening at one end of said tube, a spring-jack and a signal within said opening, and a relay within the tube adapted to control said signal, substantially as described.

6. In an annunciator a tube, an annular prism attached at one end of said tube, a relay within said tube, and a signal carried upon and actuated by the relay, substantially as described.

7. In an annunciator and spring-jack, an iron tube, a relay fitted within the rear end of said tube and provided with an iron core, an armature pivoted to the tube at the rear end thereof and in proximity to the core end, an iron disk completing the magnetic circuit through the core and tube, in front of the relay, a block of insulation fitted to the tube in front of the disk, and containing contacts for an incandescent-lamp base, a spring-jack secured within the tube between the lamp and the front end thereof, and a lens of circular shape fitted to the front end of the tube and provided with an orifice for the passage of a plug into the spring-jack, substantially as described.

8. In a combined annunciator and spring-jack, a containing-tube, a lens provided at one end of said tube, a spring-jack secured to the tube, a relay within the tube provided with a local circuit, terminals for said local circuit, and a lamp also within the tube between the relay and spring-jack, and connected to said local terminals, substantially as described.

In testimony whereof I have hereunto set my hand this 15th day of June, A. D. 1898.

EDWD. E. CLEMENT.

Witnesses:

MORTIMER A. JONES,

JNO. W. SCOTT.