

UNITED STATES PATENT OFFICE.

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ELECTRIC ANNUNCIATOR.

SPECIFICATION forming part of Letters Patent No. 692,471, dated February 4, 1902.

Application filed November 9, 1900. Serial No. 35,910. (No model.)

To all whom it may concern:

Be it known that I, ELSWORTH B. OVERSHINER, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Electric Annunciators; and I do hereby declare the following to be a full, clear, and exact description, such as will enable persons skilled in the art to which it appertains to make and use the same.

My invention relates to electric annunciators; and in general its object is to improve the construction and action of such annunciators as are adapted to be used as individual signals in connection with telephone-switchboards.

A conventional telephone-switchboard consists of an annunciator and spring-jack to which each subscriber's line entering the central-exchange office is connected. When the subscriber wishes to attract the attention of the operator, he rings his bell, which sends an impulse of electricity over the line-wire through the electromagnet of the annunciator, which causes the drop to fall. Annunciators of this description are usually constructed so that it becomes necessary for the operator to restore the drop by a separate operation in addition to the effort of inserting and withdrawing the switching-plug from the spring-jack. Therefore it frequently happens that the drop is left down by the neglect or inadvertence of the operator and the corresponding subscriber is entirely shut off from a means by which he may again attract the central-office operator when he desires to be put into communication with another subscriber or when he desires to communicate with the central office.

Another feature of my invention consists in an improved means for ringing a subscriber's bell by the act of inserting the plug into the spring-jack, in which the parts will return to their normal position when the plug is withdrawn and without ringing the bell when the plug is withdrawn.

Another feature of my invention consists in raising the indicating-drop by the act of inserting the plug, and should the drop fall

during the time that the spring-jack plug is inserted within the spring-jack the shutter will be again raised to its normal position by an agency put into a state capable of operating when the plug is inserted in the spring-jack and which agency performs this function after the plug has been withdrawn from the spring-jack; and still another feature of my invention consists in providing terminals for the various electrical devices comprising my spring-jack and annunciator, whereby the said spring-jack and annunciator may be automatically connected in circuit by the act of placing the said spring-jack and annunciator device in its proper position on the switchboard.

With these and other features that may hereinafter appear and be specifically pointed out in the appended claims my invention consists in certain combinations and organizations of devices for the purpose hereinbefore stated.

In the annexed drawings, Figure 1 is a side elevation of my improved annunciator and spring-jack. Fig. 2 is a similar view from the reverse side. Fig. 3 is a plan view of the same. Fig. 4 is a broken-away detail of one end of the device, showing a plan view of the connections which are designed to be maintained in contact with the conductors that are common to all of the devices of this character on the board. Fig. 5 is a side elevation of the same detail shown in Fig. 4. Fig. 6 is a longitudinal section through line 6 6 of Fig. 3. Fig. 7 is a section through line 7 7 of Fig. 1. Fig. 8 is a front view of the device. Fig. 9 is a section through line 9 9 of Fig. 6.

In all of the views the same letters of reference indicate similar parts.

a is the base of my annunciator and spring-jack, preferably made of a piece of sheet-brass.

a' and a^2 are the vertical end pieces, made, preferably, of hard rubber or other insulating material. These three pieces constitute the frame of my improved device.

b is a brass bracket attached to the end a' of the frame for pivotally supporting the armature c^4 of the annunciator.

b' is a casing for containing the annunciator-drop c^6 . The said casing and bracket b are held to the end piece a^2 by means of screws b^3 .

e^4 is a small wire which extends through the end piece a^2 and normally lies in the bottom of the case b' , as shown in its two positions in Fig. 8. This wire is the direct means by which the drop c^6 is raised to its elevated position. A perforation is made in the lower part of the casing b' for the purpose of rendering the drop visible when it falls to its lower position.

c is a magnet-coil, and c' is the core thereof. A polar extension c^2 is attached to the rear end of the said core by means of the screw c^3 . The armature c^4 is pivotally secured to the bracket b by means of the screws b^5 . The armature is bent at right angles, one pole of which confronts the end of the core c' . The other pole is immediately under the polar end of the piece c^2 . Both the core c' and the piece c^2 act inductively and jointly upon the armature c^4 when the magnet c is energized. A small wire c^5 is attached to the lower end of the armature c^4 and passes through the insulating-support a^2 and serves as a rest for supporting the drop c^6 when the said drop is in its elevated position, and it abuts against the upper inner surface of the said drop when the said drop is in its lower position.

The spring-jack comprises a tube d , into which the plug is adapted to be inserted. d' is a recess cut into the side and partly through the forward end of the said tube.

d^2 is a spring placed longitudinally with the tube d and curved near its end to enter the recess referred to. The spring is attached to the said tube by means of screws d^3 . The spring d^2 has a slight upward extension on the front end for the purpose of raising the latch e . The latch e is provided with a crimp or downwardly-curved portion e' . When the said latch is in its normal position, this downwardly-curved portion is in the path of the spring d when the spring is vibrated by the act of inserting and withdrawing the switching-plug g . A detent or pawl e^3 rests normally upon the outer and free end of the latch e . The said detent is attached to the wire e^4 by means of the screw e^5 . A limiting-stop e^6 is placed in the end piece a^2 to prevent the said detent or pawl from being lifted too high. When the pawl e^3 is raised, as shown in dotted lines in Fig. 9, the wire e^4 is raised obliquely in position shown in dotted lines in Fig. 8, and the shutter or drop c^6 is thereby raised.

A flat blade-spring is connected to the ringing-circuit by means of the terminal d^7 . The spring is twisted at d^5 , a point slightly in front of the point where it is attached to the terminals d^7 . The outward end of the spring is tapered upwardly at the point d^6 . A dog d^8 is pivoted near the tube d , one end of which is adapted to enter the said tube d through a longitudinal slot cut therein. The said dog is normally held in the position shown in Fig. 3 by means of a helical spring d^{10} , which is

coiled around the support d^9 , to which the dog is pivoted. The outer end of the said dog is adapted to be brought into contact with the spring d^4 when the said dog is rotated upon the said support, as when the plug is inserted within the tube d . When the dog is returned to its normal position by means of the spring d^{10} , it engages with the tapered end d^6 of the spring d^4 and lifts the said spring upwardly from the curved part d^5 , and by this means the spring d^4 is not distended thereby outwardly, so as to be brought into contact again with the pin d^{11} , as when the dog is moved in the opposite direction to its initial movement.

Small spring-metal brushes or contacts f , f' , f^2 , and f^3 are connected to the rear upward portion of my frame a' and form the necessary electrical terminals of the spring-jack and annunciator.

f^5 , f^6 , f^7 , and f^8 are vertical wires which are common to all of the annunciators and spring-jacks of which the board is composed. When the spring-jack and annunciator device are placed in position on the board, these brushes are forced into actual contact with the respective conducting-wires. (See Figs. 4 and 5.)

The switching plug and handle g is shown in dotted lines inserted in the spring-jack in Fig. 7.

The use and operation of my device is as follows: In its normal position the drop c^6 is elevated and supported in the casing b' by the wire c^5 , which passes through a perforation in the end of the frame a^2 . When an impulse of electricity from the calling subscriber's signal-bell passes through the coil c , it energizes the magnet-poles thereof c' and the polar extension c^2 . Both of these poles attract the armature c^4 , which causes the wire or support c^5 to be withdrawn from the position it formerly occupied and allows the drop c^6 to fall in the position shown in Fig. 6, which then becomes visible from the front end of the device. When the plug g , which is a plain smooth-pointed plug, is inserted in the spring-jack tube d , the spring d^2 is displaced into the position approximately shown in dotted lines in Fig. 7 and in the outward position shown in dotted lines in Fig. 9. When the spring passes to this extreme position, it raises the latch e during its movement, by virtue of the depression e' , into the position shown in dotted lines in Fig. 9. It also raises the pawl e^3 , which rests upon the outer end of the latch, into the position also shown in dotted lines, and thereby the wire e^4 , which is contained in the casing immediately under the drop, is raised, (shown in Fig. 8,) and the drop is thereby lifted to its elevated position and is again supported by the wire c^5 . Should another impulse of current pass through the coil c , it will cause the support c^5 to be withdrawn from the drop c^6 by the attraction of the armature c^4 , and the drop will thereby fall, as before described. The act of with-

drawing the plug g from the spring-jack tube d will not directly raise the drop; but the drop will be raised as the result as soon as the plug has been withdrawn from the tube d .

5 The spring d^2 , which is held in a strained position as a result of displacement due to the plug being inserted in the tube, will return to its normal position, (shown in full lines in Fig. 9,) and in so doing will again pass under
10 the depression e' of the latch e and will again raise the said latch and the pawl e^3 , and thereby the laterally-extended wire e^4 , under the drop e^6 , and again the drop will be restored to its normal position by the said wire. The
15 drop is directly restored by the insertion of the plug; but it is indirectly restored by the withdrawal of the plug. As before stated, the dog d^8 is held in its normal position, (shown in Fig. 7,) the inner end of which is within the
20 path of the plug g . When the plug g is inserted into the spring-jack tube, it meets with the end of the dog d^8 , and the dog is thereby displaced and rotated partially upon its support d^9 . The outer end of the dog is brought into
25 contact with the spring d^4 and presses it out of its normal position into contact with an insulated pin d^{11} . The spring in this position is shown in dotted lines in Fig. 7. When the spring d^4 and the stud d^{11} are thus forced into
30 contact, the bell of the called subscriber is caused to ring, because the plug g is thus brought into electrical connection with the stud d^{11} , which stud is the terminal of the ringing-circuit. When the plug g is inserted in the
35 tube d and while it remains therein, the dog d^8 remains in the position shown in dotted lines in Fig. 7. The ringing-circuit (shown in Fig. 7) has one of its terminals connected to the stud d^{11} . The other terminal may be connected to
40 ground or to the metallic return, as desired. When the plug is withdrawn from the tube, the spring d^{10} turns the dog d^8 upon its pivot d^9 , and it is brought into contact with the spring d^4 under the tapered end d^6 , and when
45 passing simply raises the said spring without bringing it into contact with the stud d^{11} , as was the case when the plug was inserted, and therefore when the plug is withdrawn the bell of neither subscriber is caused to ring.
50 The dog d^8 is thus returned to its normal position and is ready to be again displaced and cause the bell to ring when the plug g is again inserted into the tube d .

It is of course obvious that I may not use
55 the polar extension c^2 , and in that event the laterally-extending portion of the armature c^4 will not be required. I may surround the coil c with the usual iron tube and use both ends of the magnet directly upon the straight
60 depending armature c^4 , and other similar changes may be made without departing from the spirit of my invention.

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

1. An annunciator comprising a vertical

support, a casing, or guide, on the front of said support, an aperture in the lower portion of said casing, or guide, a disassociated drop comprising a signal, adapted to be moved vertically and freely in said casing, a support for retaining said drop in an elevated position, an electromagnetic armature adapted to remove said support, and a means located in said casing for raising said drop, substantially
70 as set forth. 75

2. An annunciator comprising a vertical support, a casing, or guide, on the front of said support, an aperture in the lower portion of said casing, or guide, a disassociated drop comprising a signal adapted to be moved vertically and freely in said casing, a support for retaining said drop in an elevated position, an electromagnetic armature adapted to remove said support, a spring-jack and a means
80 associated with said spring-jack and annunciator for raising said drop, substantially as set forth. 85

3. An annunciator comprising a vertical support, a casing, or guide, on the front of said support, an aperture in the lower portion of said casing, or guide, a disassociated drop comprising a signal, adapted to be moved vertically and freely in said casing, a support for retaining said drop in an elevated position, an
90 electromagnetic armature adapted to remove said support, a spring-jack associated with said annunciator, a lever located in said casing, and a means associated with said spring-jack for automatically lifting said lever, whereby said drop is restored, substantially
95 as set forth. 100

4. A spring-jack annunciator, comprising a drop, a spring-jack, a switching-plug adapted to enter the said jack, a lever in the path of the said plug, a means for lifting the drop, and a device intermediate of the said lever and the said means, adapted to be operated by the said lever for raising the drop, substantially as set forth.
105 110

5. In a spring-jack annunciator, the combination of a spring-jack tube, a pointed switching-plug adapted to be inserted therein, a recess on one side of said tube, a spring-lever having an extension adapted to be held normally within said recess and within the path of said plug, a drop for said annunciator, and a device between said drop and said spring-lever, adapted to lift said drop by the coöperation of the said lever at the time when said
115 spring-lever is displaced from its normal position, and to lift said drop when said spring-lever returns to its normal position, after said plug is withdrawn from said spring-jack, substantially as set forth.
120 125

6. In a spring-jack annunciator, the tube d , recess d' , the spring-lever d^2 adapted to extend into said recess, a latch e adapted to be vibrated when said spring-lever is displaced, and when it returns to its normal position, a
130 pawl e^3 adapted to be raised by the said latch, a drop-lifter e^4 operated by said pawl and

latch, a drop and a plug adapted to displace said spring-lever, when said plug is inserted within said tube, substantially as set forth.

7. In a spring-jack a switching-plug adapted to enter the said jack, a device in the path of said plug adapted to be displaced thereby, circuit-terminals approximately near said device, said circuit adapted to be closed when said device is displaced by said plug, and a spring for returning said device to its normal position, after said plug has been withdrawn, without closing said circuit, substantially as set forth.

8. In a spring-jack a switching-plug adapted to enter the said jack, a dog adapted to extend into the path of said plug and to be displaced thereby, a spring for holding said dog normally in said position, a lever adapted to be laterally displaced, by said dog, when the latter is displaced by said plug, and to ride

upon said dog when the latter is returned to its normal position, substantially as set forth.

9. In an annunciator and spring-jack, an upright support, a series of terminal spring-blades or brushes extending inwardly therefrom, a series of uncovered conducting-wires or rods, at right angles thereto and common to a vertical series of said annunciators, and a means for retaining said annunciator-terminals in contact therewith, substantially as set forth.

In testimony whereof I have signed this specification, in the presence of two subscribing witnesses, this 3d day of November, A. D. 1900.

ELSWORTH B. OVERSHINER.

Witnesses:

FOREÉ BAIN,
M. F. ALLEN.