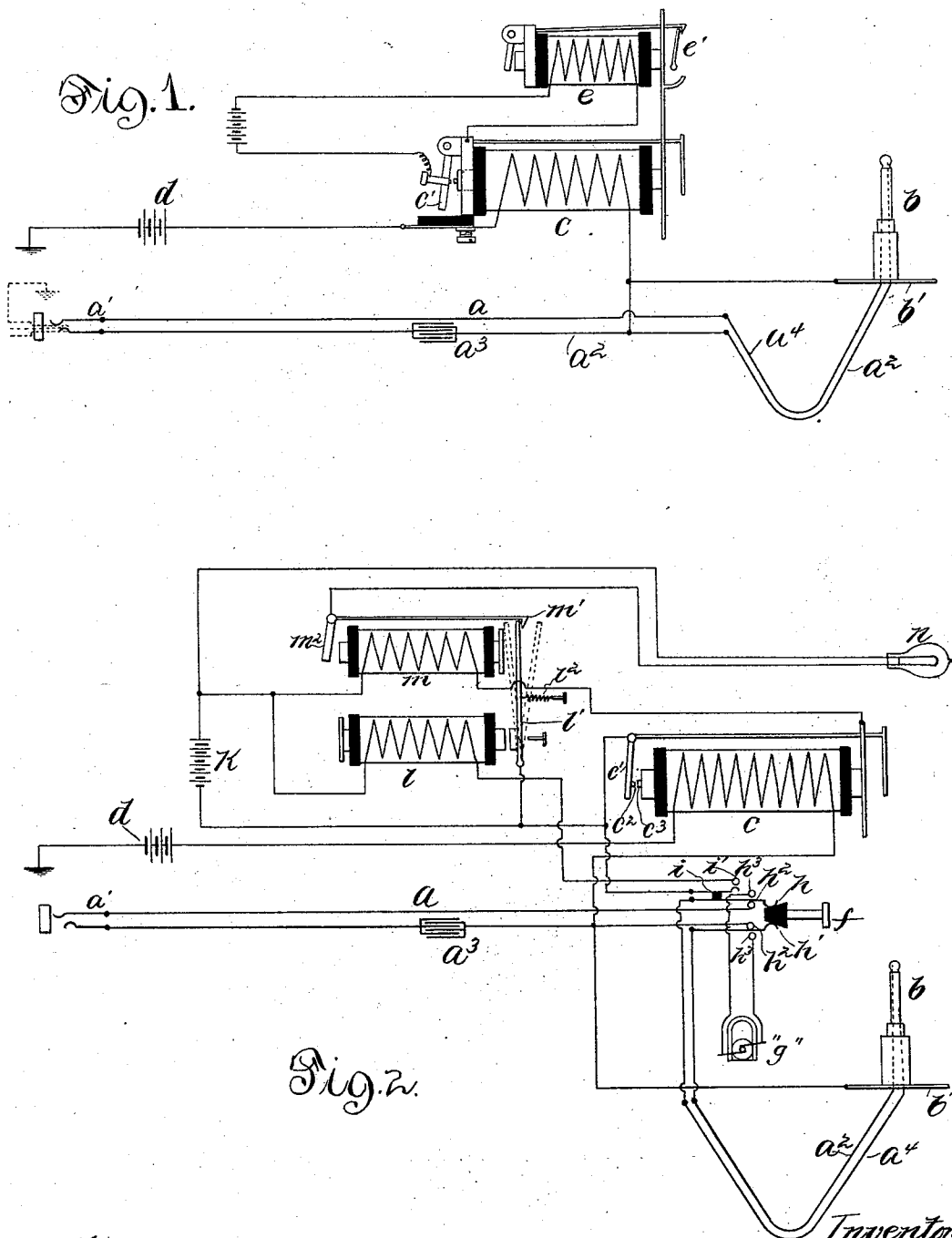


(No Model.)

J. I. SABIN & W. HAMPTON.
TELEPHONE INDICATING APPARATUS.

No. 531,650.

Patented Jan. 1, 1895.



Witnesses:

George L. Cragg.
Harriet S. Pennington.

Inventors
John I. Sabin.
William Hampton.
By Barton & Brown,
Attorneys.

UNITED STATES PATENT OFFICE.

JOHN I. SABIN AND WILLIAM HAMPTON, OF SAN FRANCISCO, CALIFORNIA.

TELEPHONE INDICATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 531,650, dated January 1, 1895.

Application filed July 25, 1894. Serial No. 518,543. (No model.)

To all whom it may concern:

Be it known that we, JOHN I. SABIN and WILLIAM HAMPTON, citizens of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented a certain new and useful Improvement in Telephone Indicating Apparatus, (Case No. 11), of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

Our invention relates to telephone indicating apparatus, and its object is the provision of means for conveying to the operator at the central station definite information as to the action of the subscriber in calling for disconnection.

In a patent No. 518,332, issued to us April 17, 1894, we have described an express system in which a visual self restoring indicator, which is actuated by the act of making connection with one end of a trunk line, may be switched into circuit with the called subscriber who is connected with the other end of the trunk line, to be thus used in the latter position in the capacity of a clearing-out indicator. The visual self-restoring indicator is usually constructed to show white before the called subscriber removes his telephone from its hook, and black thereafter to indicate that the called subscriber responds and is in conversation. It may often happen when there is a rush on the board and the operator has to attend to a great many calls, that she will make connection with the called subscriber, and the called subscriber will respond and hang up his telephone before the operator has had time to attend to intervening calls and glance at his indicator to see if he has responded. Thus if the calling subscriber desires to speak with a certain party and the party desired is not in, the one who answers the telephone of the called subscriber will remove the telephone, the indicator then showing black, and will immediately replace it when he has informed the calling subscriber that the party wanted is not in, the indicator thus showing white again. The operator not having noted the indicator at the time of conversation will not know that

the conversation has been completed but may suppose that the called subscriber has not yet responded. It is to remove this uncertainty and convey definitely to the operator the information that the called subscriber has responded and desires disconnection that our present invention is designed.

Our invention in this particular consists in an auxiliary non-restoring indicator adapted to be actuated when the called subscriber removes his telephone from the hook or hangs the same thereon, to thus positively convey to the operator the fact that the called subscriber has responded and that the inert indication of the visual self-restoring indicator means that the subscriber desires disconnection.

Our invention consists further in means for throwing the self-restoring indicator from a position to serve as a calling indicator to a position to serve as a clearing-out indicator of the called subscriber, by the act of making connection with the called subscriber's line. In the Letters Patent hereinbefore referred to we have illustrated means for performing this by hand, while in the present case automatically actuated means are shown.

Our invention consists, third, in such other features as will be particularly set forth.

Referring to the accompanying drawings: Figure 1 diagrammatically illustrates one embodiment of our invention. Fig. 2 is a similar view illustrative of another embodiment thereof.

Like letters refer to like parts in both the figures.

The trunk line *a* terminates at one end in a spring jack *a'* and at the other end in a plug *b*. In the tip strand *a²* of the line is included a condenser *a³*. The plug rests upon a metallic plate *b'* which makes contact with the sleeve of the plug, the plate *b'* being connected with the tip strand *a²* of the line. Between the tip strand *a²* and ground is included the visual indicator *c*, adapted to be actuated when a plug is inserted in the spring-jack *a'*. A plug is shown in dotted lines inserted in jack *a'*, the strand of the cord that makes connection with the sleeve strand *a⁴* of the line being grounded, whereby the insertion of the plug closes the circuit of the

battery *d* through the indicator. Instead of grounding the battery and the indicator they may be connected in metallic circuit.

When the operator at the first board desires to complete a connection through the trunk line, she inserts the plug as shown in dotted lines, thus actuating the indicator and looping the calling subscriber into circuit with the trunk line. The circuit of battery *d* may be traced through indicator *c* to plate *b'*, thence through sleeve strand *a'* and back to battery *d*. The operator at the second board removes plug *b* and inserts it in the springjack of the called subscriber. The connection between plate *b'* and sleeve strand *a'* to the sleeve of the plug inserted in spring jack *a'*, thence by the ground connection to ground is now broken, and indicator *c* is removed from the influence of the calling subscriber and thrown under the influence of the called subscriber to serve as a clearing-out indicator. Circuit may now be traced from battery *d* through indicator *c*, to tip strand *a'*, through the line of the called subscriber back to the sleeve strand *a'* and thence by ground to the battery.

As described in the patent hereinbefore referred to, the call bell of the called subscriber is included in a ground branch, calling currents being sent over a ground return; or it is included in a bridge with a condenser, or other device to prevent the passage of the battery current, an alternating current being employed for calling purposes. The condenser *a*³ is now included in the circuit of the calling subscriber and prevents the actuation of the indicator therefrom. The connection being made, as soon as the called subscriber responds and removes his telephone from its hook, the circuit of battery *d* is closed to actuate indicator *c*. The attraction of the armature *c'* serves to complete the circuit of the non-restoring indicator *e* and the shutter *e'* thereof falls to positively convey to the operator the information that the called subscriber has responded. Should the called subscriber hang up his telephone before the operator has had time to observe that he was in conversation, the fallen drop of the indicator *e* will inform her that the conversation has been completed.

In practice it is found most desirable to leave all of the drops down normally, and then, when a call is received, to put up the particular shutter. In consequence, all the shutters that are up give a positive signal that the called subscriber has not responded.

Referring now to Fig. 2, the trunk line connections are similar to those shown in Fig. 1, with the addition of a key *f*, which may be depressed after the plug *b* has been inserted in the jack of the called subscriber to loop into circuit the calling generator "*g*;" the springs *h h'* being normally in contact with anvils *h² h²* but moved out of contact therewith and into contact with anvils *h³ h³* when the key is depressed. Movable with the spring *h* is a spring *i* which, when the key is depressed, is brought

into contact with anvil *i'*. Circuit is thus completed through battery *k* and electromagnet *l* to move the lever *l'* from the position shown in dotted lines to the right to the position indicated in dotted lines to the left of its full line position. When the key *f* is raised, circuit through battery *k* and magnet *l* is opened, and the lever *l'* is released and moves back under the action of spring *l²* to the position indicated in full lines where it rests against the hooked end of lever *m'* secured to the armature *m²* of magnet *m*. Circuit is now closed from battery *k* through lever *l'*, lever *m'*, lamp *n* and back to the battery. When the called subscriber responds and removes his telephone from its hook, visual indicator *c* is actuated and circuit is closed between contacts *c²* and *c³*, thus closing circuit from battery *k* through contacts *c²*, *c³*, magnet *m* and back to the battery. Armature *m²* being thus attracted, lever *m'* is moved upward to release lever *l'*, which, returning to its rightward position, opens the circuit through the lamp. Thus the lamp is lighted until the called subscriber responds and is extinguished when he responds and the operator noting that the indicator shows white and that the lamp is lighted, will know that the subscriber has not as yet responded, while if the indicator shows white and the lamp be extinguished, she will know that a disconnection is desired.

While we have described our invention in connection with our express system, it may be equally applied in other connections.

It is evident that our invention is susceptible of various modifications and we do not, therefore, desire to limit ourselves to the constructions shown, but

Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a telephone system, the combination with a self-restoring visual indicator, of a non-restoring indicator, and means for actuating the non-restoring indicator when the self-restoring indicator is actuated, substantially as described.

2. In a telephone system, the combination with a self-restoring visual indicator, of a non-restoring indicator, and a pair of contacts adapted to be closed by the actuation of the self-restoring indicator to complete the circuit through and thereby actuate the non-restoring indicator, substantially as described.

3. In a telephone system, the combination with a self-restoring indicator, of a non-restoring indicator, means for actuating the self-restoring indicator to cause the same to convey a signal, and means operated by said self-restoring indicator for actuating said non-restoring indicator to cause the same to convey a second signal, substantially as described.

4. In a telephone system, the combination with a telephone line extending from a substation to the central station, of an electric lamp, a key adapted to be depressed to complete circuit through said lamp, a self-restor-

ing indicator in circuit with said sub-station and adapted to be actuated therefrom, and means actuated by said indicator for opening the circuit through said lamp; whereby the lamp is lighted before the subscriber actuates the indicator, and extinguished after the indicator is operated, substantially as described.

5 5. The combination with an electromagnet, of a key for closing circuit therethrough to complete the circuit through a lamp, a self-restoring indicator, a second electromagnet, and contacts controlled by said self-restoring indicator for completing the circuit through said second magnet to thereby open the lamp circuit, substantially as described.

10 6. The combination with the magnet l , of the key f for completing the battery circuit therethrough, the lever l' moved thereby to complete the circuit through lamp n , said lamp n , self-restoring indicator c , contacts c^2 , c^3 , controlled thereby, magnet m , the armature thereof being adapted when attracted to release said lever l' to open said lamp circuit, substantially as described.

15 7. The combination with key f' , of magnets l and m , battery k , levers l' and m' , lamp n , self-restoring indicator c and contacts c^2 c^3 , combined substantially as set forth.

20 8. The combination with two limbs of a trunk line terminating at one end in the con-

tacts of a spring jack, and at the other end in a plug, of an indicator in circuit with said trunk line and adapted to be actuated by the insertion of a plug in the switch end of said trunk line, a socket in which the plug of said trunk line normally rests, and means actuated by the removal of the plug from its socket for switching said indicator in position to serve as the clearing out indicator of a subscriber into whose spring jack said plug is inserted, substantially as described.

9. The combination with the two limbs of a trunk line, of a condenser in one limb thereof, an indicator and a battery adapted to be connected between the two limbs of the line, a plate connected with the side of the line containing the condenser, and a plug, the terminal thereof, connected with that limb of the line which does not contain the condenser, being adapted to make electrical connection with said plate when the plug rests in its socket, substantially as described.

In witness whereof we hereunto subscribe our names this 17th day of July, A. D. 1894.

JNO. I. SABIN.
WM. HAMPTON.

Witnesses:

A. J. STEISS,
M. COUCHOT.