

(No Model.)

P. MINNIS.
TELEPHONE CALL SIGNAL FOR CENTRAL STATIONS.

No. 561,422.

Fig. 1.

Patented June 2, 1896.

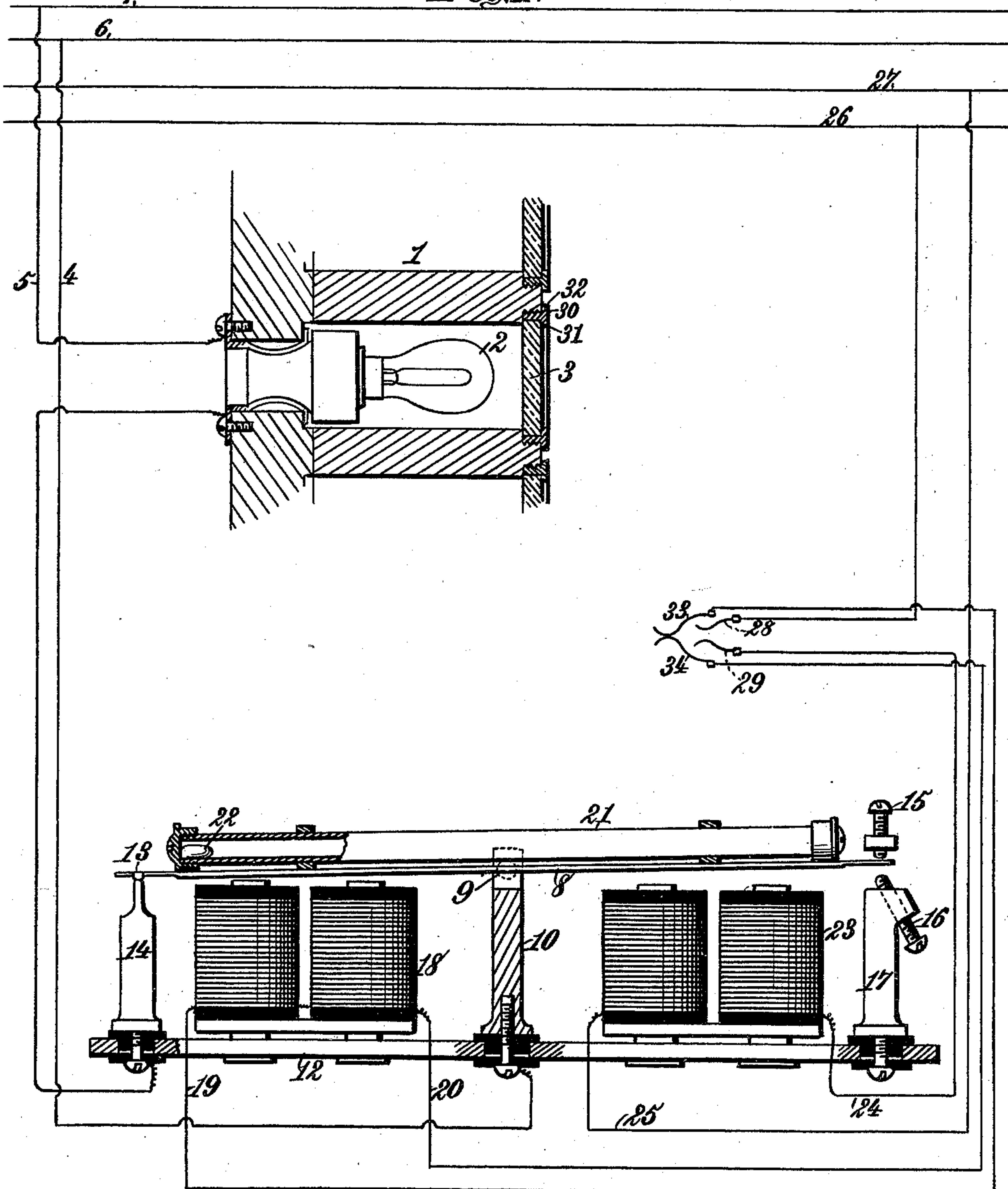
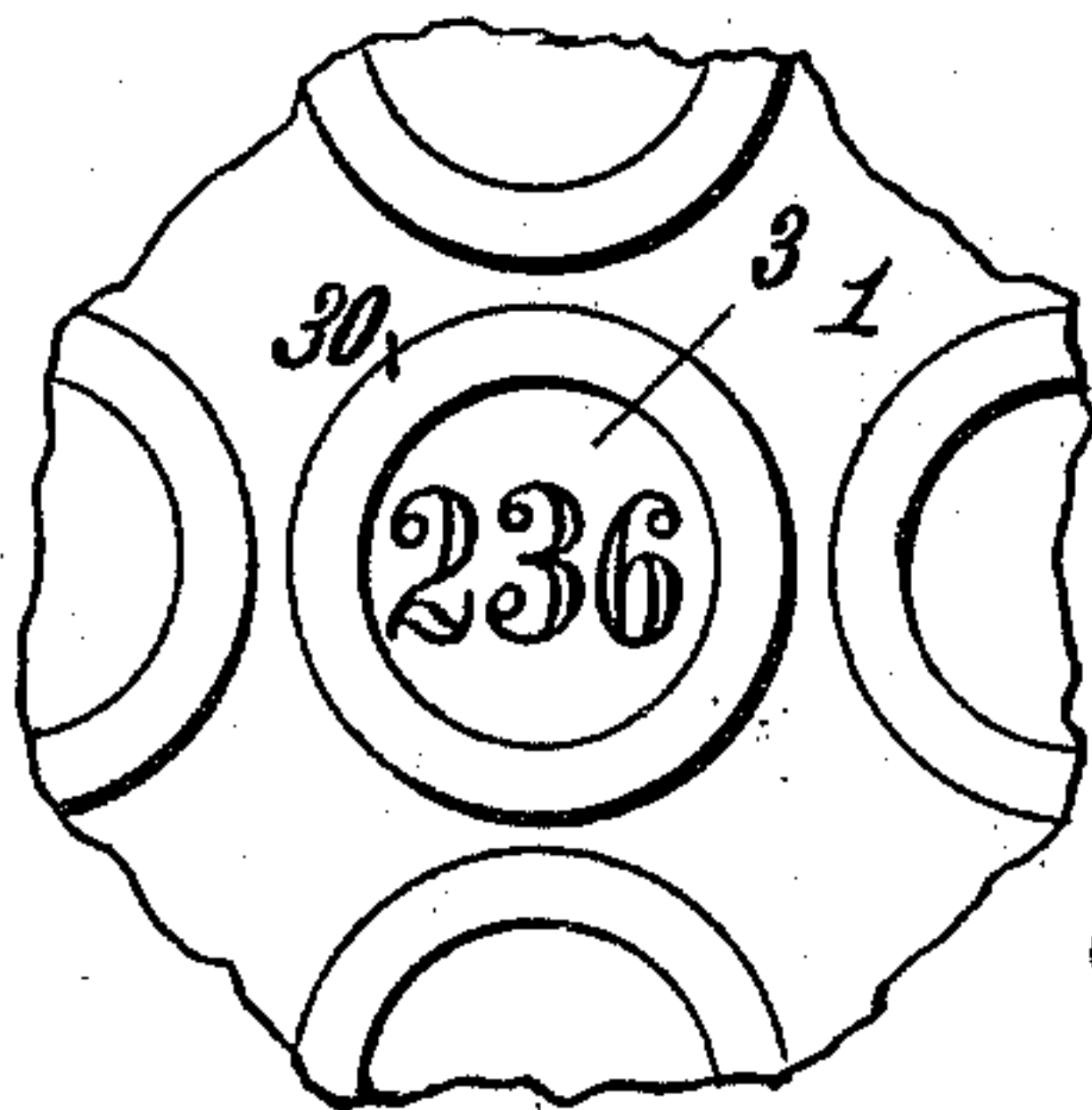


Fig. 2.



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UNITED STATES PATENT OFFICE.

PAUL MINNIS, OF MOBILE, ALABAMA, ASSIGNOR OF ONE-HALF TO THE HOME TELEPHONE COMPANY, OF SAME PLACE.

TELEPHONE CALL-SIGNAL FOR CENTRAL STATIONS.

SPECIFICATION forming part of Letters Patent No. 561,422, dated June 2, 1896.

Application filed February 17, 1896. Serial No. 579,650. (No model.)

To all whom it may concern:

Be it known that I, PAUL MINNIS, a citizen of the United States, residing at Mobile, in the county of Mobile and State of Alabama, have invented new and useful Improvements in Call-Signals for Central Telephone-Stations and Means for Operating the Same, of which the following is a specification.

My invention relates to call-signals for central telephone-stations and means for operating the same, my purpose being to provide a visible signal, such as a small incandescent lamp, adapted to illuminate a glass plate containing a numeral or character which denotes a particular line-station, the ignition of the lamp and illumination of the number or character upon the transparent or translucent wall of the call-box containing such a lamp being notice to the operator at a central station that the line-station denoted by such number or character desires to communicate with some other station. It is my purpose also to provide means for establishing and maintaining the lamp-circuit by a single momentary completion of a call-circuit, and to combine therewith means for opening the lamp-circuit and maintaining it in that condition until another call from the same line-station is sent in.

My invention also comprises further novel features, all of which will be fully explained hereinafter, and then particularly pointed out and defined in the claims which complete this specification.

To enable those skilled in the art to which my said invention pertains to fully understand and practice the same, I will proceed to describe said invention in detail, reference being had for this purpose to the accompanying drawings, in which—

Figure 1 is a sectional view of a call-box, lamp, and lamp igniting and extinguishing apparatus, including a diagram of the circuits. Fig. 2 is a front elevation of the call-box, showing the illuminated plane and number thereon denoting a line-station.

In the said drawings the reference-numeral 1 indicates one of a series of call-boxes arranged at a central telephone-station, the number of such boxes being equal to the number of line-stations in the system. Each box comprises a small compartment of suitable

form to contain a small incandescent lamp 2, which lies behind a front wall 3, formed of glass or of any suitable transparent or translucent material, upon which is placed a number or character to denote one of the line-stations—as, for example, the number “236” shown in the drawings, which denotes a station identified by said number. I may of course substitute any preferred combination of numbers and other symbols or characters, or I may use any preferred characters or symbols without numbers.

The lamp is supplied with current by wires 4 and 5, which take current from open-circuit feed-wires 6 and 7. These feed-wires are supplied with current from any suitable source of electric energy. The wire 5 goes from feed-wire 7 to the first terminal of the lamp and a continuation of said wire goes from the second terminal to the apparatus, by which the lamp-circuit is closed.

This apparatus consists, as shown in Fig. 1, of a balanced armature 8, mounted on a pivotal center 9 upon a post 10, which rises from the base-plate 12. The post 10 is of conducting metal and is insulated on the base-plate. The balanced armature 8 is also a conductor, and upon one end it is provided with a contact 13, which overhangs a conducting-post or other suitable contact 14, mounted on and insulated from the base-plate near the end of the latter. At its other end the extremity of the armature lies between two screw-points 15 and 16, which are adjustable toward and from each other in a post 17 at or near the other end of the base-plate. This post is insulated and forms no part of any circuit.

Between the posts 10 and 14 is a group of electromagnets 18, mounted on the base 12 and insulated from it. These magnets are included in a circuit comprising wires 19 and 20, which pass through spring-contacts 33 and 34 of the line-jack and its multiples of the switchboard, corresponding to the line-station denoted by the number on the transparent front 3 of the box 1, and are supplied with current from the common main battery of the system. The circuit is normally open at the line-station and is closed by the person wishing to use the wires. The magnets 18 being thus

energized, the armature 8 is attracted, bringing the contact 13 upon the top of the post 14, and thus establishing the lamp-circuit from the feed-wires 6 and 7 over the wires 4 and 5, post 10, armature 8, and post 14. As long as the current flows the contact 13 will be held in electrical engagement with the posts 14, but as the closing of the circuit at the line-station may be momentary only I provide means for maintaining the lamp-circuit after the magnets 12 are cut out. These means are as follows: On the balanced armature 8 I mount a glass tube 21, projecting equally on each side of the central support 9. In this tube, which is sealed at both ends, is placed a globule of mercury 22, which will run to either end of the tube whenever the latter is slightly inclined. Mercury is the only substance suited for this purpose, because it has no affinity for or adherence to the glass and will run to either end of the tube with great speed and with but slight inclination of the tube. When the magnets 18 attract the armature 8, therefore, and close the lamp-circuit, the mercury will pass to the end of the tube 21 and will maintain the electrical engagement of the contact 13 and post 14. Even if the magnets remain in circuit for no more than an instant the mercury will move with such speed as to pass the pivotal center 9 before the magnets 18 cease to attract the armature.

When the call-circuit, including wires 19 and 20 and electromagnets 18, is opened, the lamp 2 will continue to burn until the armature is lifted off the post 14. To do this, electromagnets 23 are arranged between the posts 10 and 17 and included in a circuit which comprises wires 24 and 25, deriving current from feed-wires 26 and 27, the latter being fed from a suitable source of electrical generation. The wire 24 is interrupted in the line-jack of the station denoted by the call-box and its ends have separated contacts 28 and 29, lying behind closed contacts 33 and 34. The plug used for insertion in the line-jacks and their multiples has an insulated end, on the extremity of which is mounted a tip of conducting material. The insertion of this plug separates the closed contact 33 and 34, breaking the circuit of wires 19 and 20 and the magnets 18 by the interposition of the insulated portion of the plug between said contacts 33 and 34. At the same time the tip of conducting material on the extremity of the plug comes into contact with the separated contacts 28 and 29, thus completing the circuit of wires 24 and 25 and magnets 23, which magnets attract the end of the armature directly over them, lifting the contact 13 off the post 14 and breaking the lamp-circuit. At the same time the mercury globule passes to the end of the tube depressed by said magnets 23 and maintains it in its depressed condition after current ceases to flow through the helices of the magnets and until a call again comes from the same line-station.

A convenient and simple construction of the transparent wall of the call-box is to make the same circular and set it within a surrounding ring 30, having an inner flange 31 and an outer flange 32 formed upon the exterior edge of the ring. The latter is screwed into a countersunk seat in the front of the box. The inner flange 31 presses the glass or other material of which the pane 3 is formed against the bottom of the countersink, while the outer flange overlaps the front of the box and limits the insertion of the screw-threaded ring.

It will readily be understood from the foregoing description that when a subscriber at a line-station completes the circuit which includes the electromagnets 18, by which the armature 8 is brought into such position as to complete the circuit of the lamp 2, he causes the control of the lamp-circuit to pass out of his hands entirely and into the control of the operator at the central station. This is due to the fact that the armature 8 is held in either of its two positions by the weight of the mercury globule 22, which runs from end to end of the tube 21 as the latter is inclined in the direction shown in Fig. 1. This result takes place even if the closing of the circuit of the magnets 18 at the subscriber's station continues for a mere fraction of a second. If the contact made is sufficient to transmit an electrical impulse through the helices of the magnets 18, the armature 8 will tilt, and the shifting of the mercury globule will be so quick that it will pass the central support of the armature and exert its weight on the side or end adjacent to the contact-post 14. The instant said globule passes this central point it controls the position of the armature by maintaining the circuit of the lamp 2 until such time as the operator at the central station responds by inserting his plug in the line-jack, whereupon the contacts 33 and 34 are separated, thus breaking the circuit of the magnets 18. At the same time, or practically so, the plug completes the circuit of the magnets 23 through the contacts 28 and 29, thus tilting the armature down upon the post 17 and breaking the circuit of the lamp 2. By drawing the plug the attendant at the central station shifts the control of the lamp back to the line-station. The subscriber is not required to give the call-signal any further attention than is necessary in order to actually close the circuit of the magnets 18 through his own switch, as he is not obliged to hold the switch until his call is answered. Such an action on his part would be useless, since all control of the call-signal passes out of his hands the instant that he completes the circuit by his switch, and the lamp in his call-box 1 continues to turn until the operator at the central station gives proper attention to the call, whereupon the control of the signal or call passes from the central station back to the line-station.

What I claim is—

1. A visible call-signal for a telephone central station, consisting of a call-box having a transparent or translucent front, containing a designation of a line-station, an incandescent lamp in said call-box, a circuit for said lamp, an electrically-operated switch for closing and opening said lamp-circuit, separate circuits for magnets which operate said switch to open and to close said lamp-circuit and automatic mechanical means for maintaining the switch either open, or closed, substantially as described.

2. In a visible call-signal for a central telephone-station, the combination with a call-box having a transparent, or translucent front, bearing a designation of a line-station, of an incandescent lamp in said call-box, a circuit for said lamp, electrically-operated devices for closing and for opening said lamp-circuit, a circuit for electromagnets which close said lamp-circuit by their attraction, a separate circuit for electromagnets which open said circuit, and contacts arranged in the line-jack and forming part of the circuits of said magnets, said contacts being normally closed and opened, respectively, and so located as to be respectively opened and closed by the insertion of the plug, substantially as described.

3. A visible call-signal for a central telephone-station, consisting of a call-box having a transparent or translucent pane containing a designation of a line-station, an incandescent lamp in the call-box, a circuit for said lamp including a balanced armature and a post on which said armature rests when one end is attracted, electromagnets arranged beneath both ends of the armature, an independent circuit for the magnets under each end, and a tube mounted on the armature and containing a fluid globule, substantially as described.

4. A visible call-signal for a central telephone-station comprising an incandescent lamp, a circuit for said lamp including a balanced armature and a post, or contact, with which a contact on one end of said armature has engagement when attracted, electromagnets arranged beneath the end carrying the

armature-contact, a circuit for said magnets, electromagnets arranged under the other end of said armature, an independent circuit for said magnets, and a glass tube mounted on the armature and containing a globule of mercury, substantially as described.

5. A circuit-closing apparatus for telephone call-signal, consisting of a balanced armature forming part of the circuit, a post, or contact arranged beneath one end of the armature and forming part of the circuit, independent magnets to attract the ends of the armature, independent circuits for said magnets, and a glass tube mounted on the armature and containing a globule of mercury, substantially as described.

6. The combination with a telephone-circuit of a signal, such as a lamp arranged in a call-box at the central station, a circuit for said signal including a balanced armature, and a conducting post or contact under one end of said armature, separate electromagnets under each end of said armature, a circuit for the magnets which tilt the armature to close the lamp-circuit, the same including a normally open switch at the subscriber's station and normally closed but separable contacts at the central station, a circuit for the magnets which attract the other end of said armature including permanently-separated contacts at the central station adapted to be coupled upon inserting the plug to answer the call, and automatic means for maintaining either circuit and shifting the control of the signal-circuit from the line-station to the central station, upon the completion of the circuit for the magnets closing the signal-circuit, and from the central back to the line station upon completing the circuit of the magnets which break said signal-circuit, substantially as described.

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

PAUL MINNIS.

Witnesses:

CLAYTON B. CLARK,
WILLIAM H. SULLIVAN.