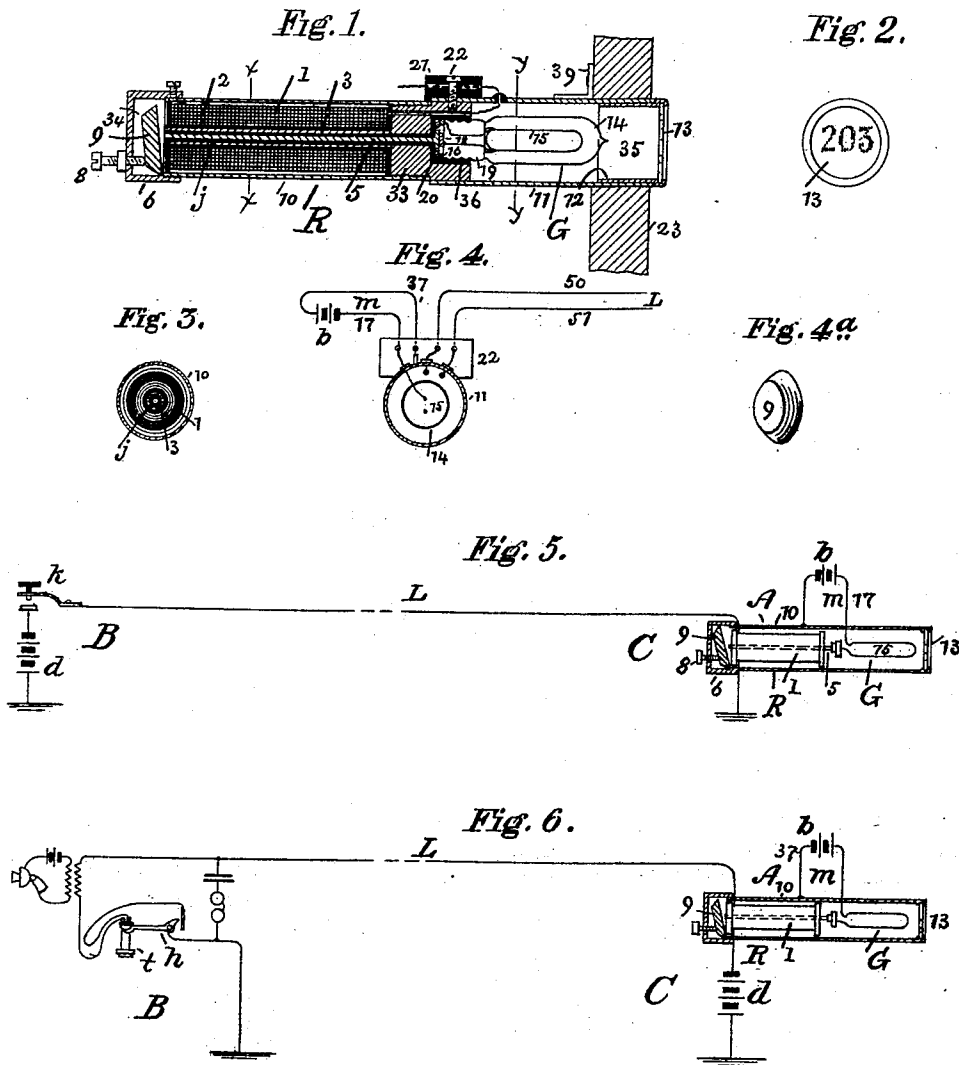


(No Model.)

M. A. EDSON.
TELEPHONE CIRCUIT SIGNAL.

No. 550,260.

Patented Nov. 26, 1895.



Attest.
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H. R. Edson

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UNITED STATES PATENT OFFICE.

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TELEPHONE-CIRCUIT SIGNAL.

SPECIFICATION forming part of Letters Patent No. 550,260, dated November 26, 1895.

Application filed May 20, 1895. Serial No. 549,966. (No model.)

To all whom it may concern:

Be it known that I, MARK A. EDSON, residing at Chicago, in the county of Cook and State of Illinois, have invented certain Improvements in Telephone-Circuit Signals, of which the following is a specification.

This invention relates to the signal-receiving apparatus employed in connection with the switchboards of a telephone central office by means of which the customer at a sub-station may indicate a wish to communicate with the operator and initiate a call or whereby the operators at the different sections at the central station may signal one another.

The invention is an improvement in that class of signaling apparatus in which a small glow-lamp is used as the signal to attract attention, the same being located in a conspicuous position to indicate or illuminate any pre-arranged signal or code of signals.

The invention relates, mainly, to the structure of the signal-receiving device, and comprises the combination, in a single appliance or instrumentality, of a relay whose magnetizing-coil is in the main circuit and whose core when excited attracts a tilting-disk armature and a glow-lamp in a local circuit controlled by the said relay by means of the said armature, both being inclosed in the same casing. The local circuit contains, of course, a suitable current-generator, as a voltaic battery.

The signal is contained in a cylindrical casing and is arranged to present one end only to the observer, the main body of the casing being concealed. It includes a coil of fine insulated wire upon an insulating-bobbin, which surrounds a tubular iron core and is adapted for inclusion in the main circuit. In the center of the tubular core is an insulated rod, which projects from each end of the bobbin. The bobbin is inclosed in a magnetic-metal sheath with chambers at each end. The chamber at the outer end is formed of a non-magnetic cap and incloses a movable tilting disk-armature in the shape of a truncated cone standing on its edge and provided with suitable means for adjustment, against which it normally rests. The chamber at the other

lamp, the filament of which is included in a normally-open local generator-circuit formed in part by the rod in the center of the helix and the outer metal casing, and the said local circuit is adapted to be closed by the movable armature and thereupon make operative the lamp and illuminate any distinctive device in front thereof.

For a detailed description of the invention reference is made to the drawings, in which—

Figure 1 is a horizontal section through a signal appliance embodying my invention. Fig. 2 is an end view of the same. Figs. 3 and 4 are respectively sections on lines $x x$ and $y y$ of Fig. 1. Fig. 4^a is a perspective view of the movable armature, and Figs. 5 and 6 illustrate the working of the automatic signal.

A represents the signal as a complete device, which comprises an electromagnetically-operated relay R whose helix 1 is of fine wire to be included in the main circuit L, as shown in Figs. 5 and 6, and a glow-lamp G in the local circuit m , controlled by said relay. The helix is wound upon a bobbin 2, of insulating material, in the center of which is a tubular soft-iron core 3, extending from the plug 33, to which is screwed the cylindrical case 10, which is made of magnetic metal, preferably iron, and which extends over the helix 1 and has the non-magnetic metal cap 6 secured to its end to form a chamber 34. A rod of any metal or alloy, such as brass, is placed within the core and insulated therefrom by a rubber tube j . It projects beyond the bobbin into the chamber 34 at one end and at its other end projects into a cavity in the plug 33.

9 is a movable tilting soft-iron disk armature shaped as a truncated cone, which rests upon the floor of the cap 6 by the edge of its base, its lower inner surface bearing upon the end of the metal tube 10 and being held in place and made adjustable by the adjusting-screw 8. A great advantage of this construction is that the armature resting on its sharp edge on the internal periphery of a circle considerably larger than itself is almost frictionless.

11 is a cylindrical tube, which may be of any suitable material impervious to light-rays, in-

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closing the end of the plug 33 and secured thereto by the screw 22, which also holds in place the insulating terminal block 21. A short extension-tube 12 is inserted in the end of the tube 11, forms therewith a front chamber 35, and has a piece of ground glass 13 or other transparent or translucent substance fitted in its end, this being provided with any suitable symbol or distinctive indicating device, as a letter or number, painted or attached to its inner surface, as in Fig. 2.

14 is an incandescing or glow lamp in the chamber 35, provided with a screw-base 19 to fit a screw-socket 36 of non-conducting material, the said lamp-base supporting the filament-terminals 18 and 16, which are respectively in contact with the front end of the rod 5 and the ring 20, which is secured to the insulation 36 at the bottom of the cavity. The ring 20 is connected by the wire 17 passing through the insulating-block with one pole of a generator *b* in a local circuit, including the armature 9 and its front contact-stop—viz., the rear end of the rod 5.

The other pole of the generator is connected with the casing 10 by wire 37. A local circuit *m* is thus formed from one pole of the generator *b* through the wire 37, to the casing 10, to the lower edge of the armature 9, to rod 5, filament-terminal 16, through the filament 15 to terminal 18, to ring 20, and, finally, through wire 17 to the other pole of the generator *b*.

Fig. 1 represents the signal as projecting through a partition 23, to which it is secured by one or more brackets 39. The main circuit wires 50 and 51, as well as those of the local circuit, may connect, as shown, through the block 22.

Figs. 5 and 6 show diagrammatic sections of the signal, and the former figure illustrates the operation of the signal by pressing the key *k* at station B to its anvil, thereby causing current from the generator *d* to energize the helix 1 of the signal at station C, magnetizing the core and attracting the armature 5 thereto, so as to form a connection between the end of the rod 5 and the end of the tube 10 to close the local circuit *m* of the generator *b* to bring about the illumination of the signal-lamp 14, the glow of which is seen at the window 13, and if a symbol is painted, placed, or engraved thereon in front of the glowing-filament it will appear while the filament is incandescent and disappear when the controlling or main circuit, and consequently the local circuit, is opened.

Fig. 6 illustrates the method of closing the circuit of the generator *d* by raising the telephone *t* from its hook-switch *h* at a telephone-sub-station B in a manner well understood to energize the helix 1 and cause a signal to display itself at a central station C.

If desired, the same battery as is used to excite the main circuit *L* or a portion thereof may be utilized in the establishment of a local-circuit current.

In the drawings I have indicated earth-completed main circuits; but it is obvious that my signal may be associated with metallic circuits without changing its mode of operation.

I claim—

1. In a compound switchboard or telephone signal, the combination with a plug, of an incandescing or glow signal lamp secured in one side of said plug, a local circuit including said lamp and an electro-magnet for controlling said local circuit comprising a core extending from the other side of the plug, an exciting helix and an armature at the outer end of said helix, substantially as described.

2. An electro-magnetic relay comprising an electro-magnet with a central core, an iron casing, an interposed exciting helix, and a tilting disk armature resting on its edge in front of said core, substantially as described.

3. An electro-magnetic relay comprising an electro-magnet having a central iron core and an iron casing forming its poles; and an interposed exciting helix; a tilting armature having a thin edge resting upon the casing pole and extending in front of the core pole; and means for adjusting the position of said armature, substantially as described.

4. A compound switchboard or telephone signal, combining in a single appliance an electro-magnetic main circuit relay, having a disk armature in the form of a truncated cone, and resting by the edge of its base on a curved support of greater radius than that of said base; an incandescing or glow lamp in a local circuit controlled by the said relay; and a cylindrical casing containing both; substantially as described.

5. The combination in a telephone signal appliance, of an electro-magnetic main circuit relay having a tubular iron core, an iron shell, an interposed exciting helix; an insulated metal rod passing through the said tubular core and projecting therefrom at its polar end, and a disk armature in the form of a truncated cone resting on the edge of its base in contact with the magnet shell, mounted in front of the iron core, and adapted to be attracted thereby, and to make contact with the rod projecting therefrom; an incandescing or glow lamp in a local circuit including said metal rod, magnet shell and armature, and controlled by said relay; and an inclosing cylindrical case for the whole, consisting of said magnetic shell, and front and rear extension chambers therefor, the said front chamber containing the said glow lamp, and being closed by a transparent or translucent window to be illuminated by said lamp, and the said rear chamber inclosing the said armature, and supporting the edge thereof on its interior periphery, substantially as described.

6. An electric signal consisting of an incandescing or glow lamp in a local circuit contained in a tube provided with a translucent end window bearing an obscured distinctive

Symbol or indicator; combined with a relay
in a main circuit controlling the said local
circuit, the said relay having an armature in
the form of a truncated cone and supported
5 on its edge, within a cylindrical casing com-
mon to the said relay and the lamp controlled
thereby, substantially as described.

7. In an electro-magnet, the combination
with the poles and helix, of an armature in
10 the form of a truncated cone, its edge resting
upon one of said poles and adapted to tilt

thereon, and its base extending in front of
the other pole, substantially as described.

In testimony whereof I have signed my
name to this specification, in the presence of 15
two subscribing witnesses, this 10th day of
May, 1895.

MARK A. EDSON.

Witnesses:

ANNA D. RAYMOND,
S. E. FISHER.