

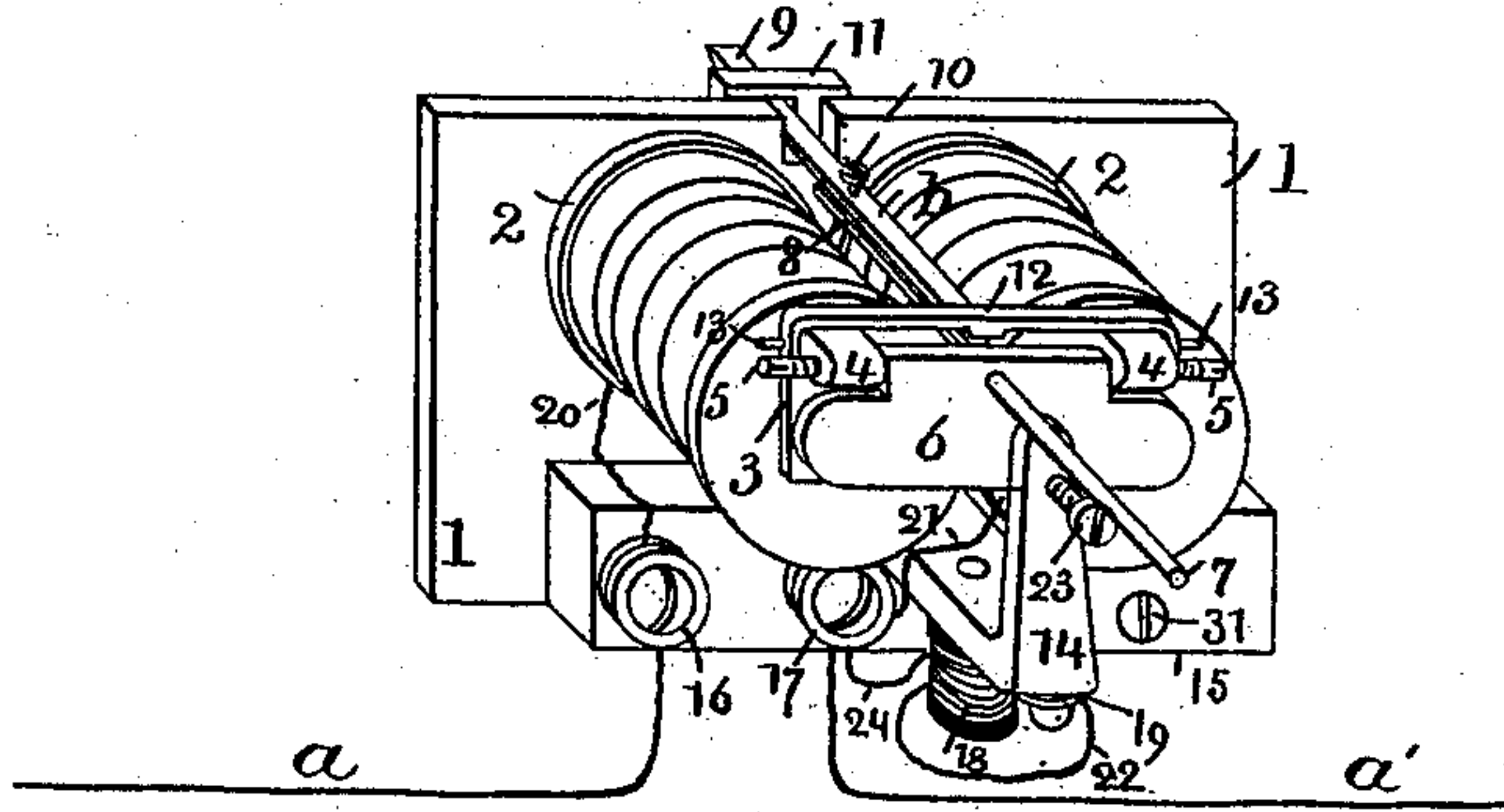
(No Model.)

J. A. BARRETT.  
TELEPHONE ANNUNCIATOR.

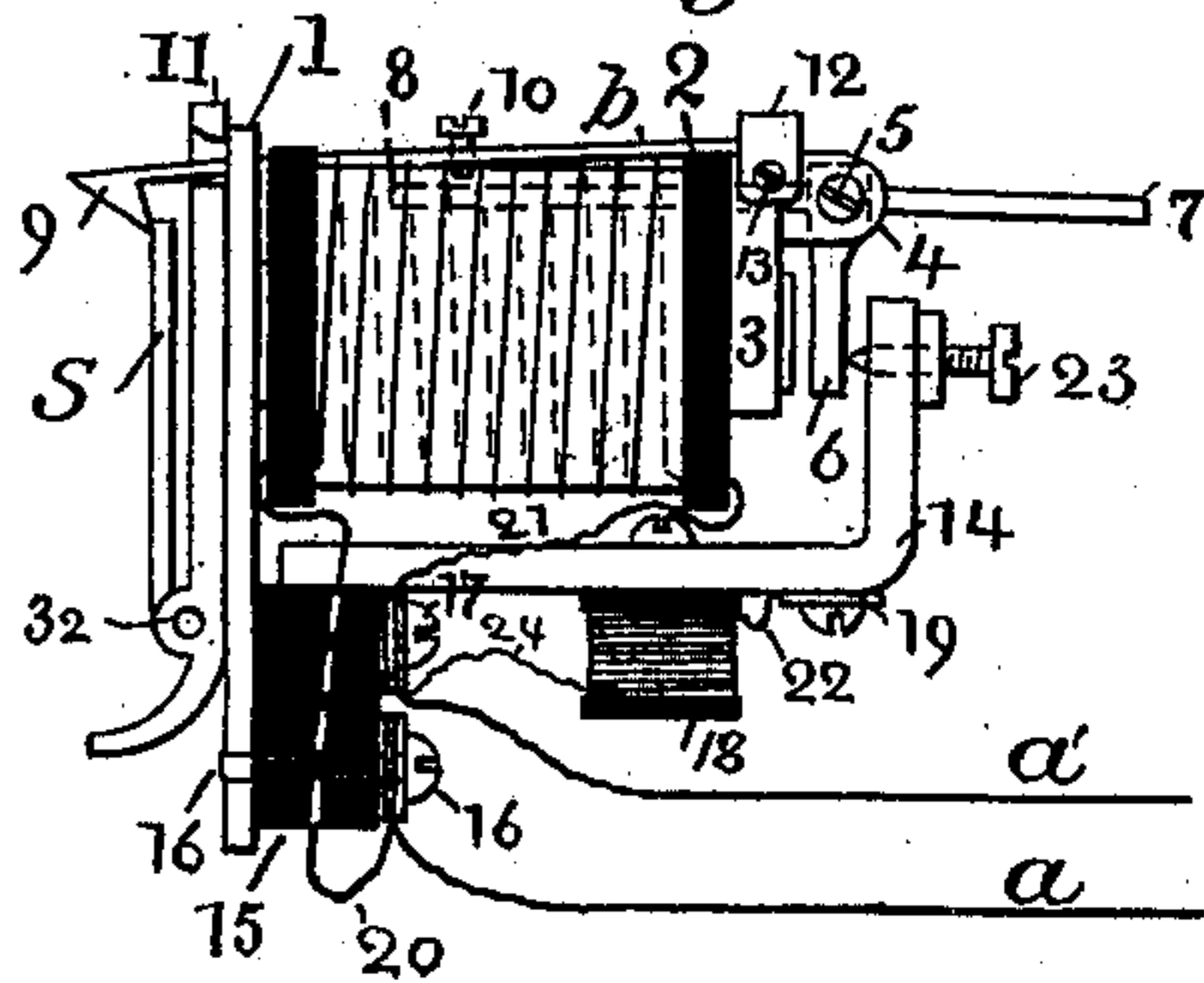
No. 358,250.

Patented Feb. 22, 1887.

*Fig. 1.*



*Fig. 2.*



Witnesses.

Philip H. H. H.  
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Inventor:

John A. Barrett  
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his attorney.

# UNITED STATES PATENT OFFICE.

JOHN A. BARRETT, OF BROOKLYN, NEW YORK.

## TELEPHONE-ANNUNCIATOR.

SPECIFICATION forming part of Letters Patent No. 358,250, dated February 22, 1887.

Application filed December 7, 1886. Serial No. 220,914. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN A. BARRETT, of Brooklyn, in the county of Kings and State of New York, have invented certain Improvements in Telephone-Annunciators, of which the following is a specification.

My invention relates to electro-magnetic annunciators of the class chiefly utilized as call-receiving appliances for telephone-circuits; and its objects are to diminish the resistance offered by the helices of such annunciators to the passage of the rapidly-varying telephonic currents, and to provide a shunt or derived circuit around the said helices, whereby I am enabled not only to furnish an alternative path for the telephonic currents, but, in addition to this, to constitute a short circuit wherein the counter-currents developed by the reactions of the electro-magnet upon its surrounding coils may circulate, these being thereby prevented from circulating in the main line or main circuit, where otherwise they would adversely affect the legitimate telephonic impulses.

In telephony it has been found that when electro-magnets are included in the circuit the telephonic currents are rendered sluggish and comparatively inefficient to a greater degree than can possibly be due to the mere electrical resistance of the circuit and the instrument-helices, and it has further been demonstrated that this inefficiency is due to a partial neutralization effected by counter-currents generated in the several electro-magnetic helices under the influence of the magnetic variations of the iron cores thereof, which variations are primarily caused by the passage through the convolutions of the said helices of the constantly-varying voice-currents which traverse the main circuit. Even in comparatively short telephone-lines this adverse influence is plainly perceptible, and its ultimate effect is to diminish the strength and volume of the legitimate or voice currents. When, however, the telephone-lines are of great length, (as, for example, when the local lines of two central stations at a distance from one another are united by trunk lines,) the opposing currents due to the magnetic reaction exercise a greatly-intensified influence upon the line and render the main current so sluggish as to diminish very seriously the distinctness of the reproduced articulate sounds and to run the words

very much together; and inasmuch as it is essential in the operation of long telephone-lines that they shall be disconnected as promptly as possible after the discontinuance of a conversation, it is not practicable to dispense with the use of intervening annunciator-magnets, which are required to give a disconnecting signal.

By the use of my invention these evils are materially ameliorated; and to this end it consists in establishing a temporary derived or shunt circuit round the electro-magnetic helix of the annunciator, which derived circuit shall be of or include a sufficient electrical resistance to allow an adequate amount of the current to pass through the magnet-helix (when a call-signal is transmitted) to excite the core and to attract the working-armature thereof. I also arrange the mechanical details of the shunt-circuit in such a way that the first movement of the said armature operates to break or open the derived circuit, and thus to permit the entire electric signaling-current to pass through the annunciator-helix, which thereupon effectuates the release of the signaling drop, shield, or shutter, giving the disconnecting or other signal.

In a separate application for Letters Patent, filed of even date herewith, I have shown and described an annunciator of a special form having but a single electro-magnetic spool, but provided with a shunt-circuit capable of being and adapted to be operated by the action of the electro-magnet armature.

In the invention which forms the subject of this specification a shunting and shunt-breaking device is applied to an annunciator of the form ordinarily used in telephonic communication.

In the drawings which illustrate and form a part of this specification, Figure 1 is a perspective view of an ordinary annunciator fitted with the shunting device; and Fig. 2 is a sectional elevation of the same, showing the electrical circuits.

In the drawings, a horseshoe electro-magnet, 2, is shown as being mounted on an iron plate, 1, which subserves the double purpose of a base-plate and magnet-yoke or heel-piece. The armature 6 is hung in pivot-screws 5, screwed in lugs 4, which project from a bracket, 3, fastened to the face of the electro-magnet.



A metal rod is passed through the armature, and one of its arms, 8, projects between the helices of the electro-magnet, while the other, 7, projects rearwardly from the armature, 5 serving as a counter-balance. A block, 15, of non-conducting material, is attached to the front plate, 1, by screws 16 and 31. 16 and 17 are binding-screws, to which the circuit-wires are connected. The block 15 supports also a 10 metal bracket, 14, which, at its outer end, is bent upwards so as to overlap the armature 6, and a set-screw, 23, is passed through this vertical arm, and constitutes a back limit-stop for the armature. It has, however, another 15 function, which will be referred to hereinafter.

A fixed metal plate or scutcheon, 11, is mounted upon the base-plate 1, externally thereto, and to this at the point 32 is hinged or pivoted the shutter *s*, which forms the visual signal. This is normally held in place in 20 a vertical plane by the detent 9 at the end of a light lever, *b*, which is fulcrumed by means of the cross-bar 12 in the pivot-screws 13. The detent end of the lever, as shown, projects through a slot in the base-plate 1. The 25 lever is not rigidly or otherwise attached to the armature, but extends parallel to the arm 8 of the armature-lever, and a set-screw, 10, passes through the lever *b* at a point about 30 midway between the fulcrum and detent ends, and is normally adjusted so that it nearly reaches the lever-arm 8, but is not absolutely in contact therewith.

A resistance-coil, 18, is secured to the under side of the bracket 14, or elsewhere, as 35 may be convenient.

I will now describe the electrical connections of the annunciator and its shunt. The posts 16 and 17 are the screw-terminals for 40 both direct and shunt circuits. The main wire *a*, coming in, is connected with binding-screw 16. There the circuit divides, the main annunciator branch leading by wire 20 through the magnet-helices consecutively, and by wire 45 21 to the opposite binding-screw, 17, and thence out by wire *a'*.

The shunt branch or derived circuit is traced as follows: from the binding-screw 16 to the frame 1, the end of the screw penetrating the metal thereof for that purpose, 50 through the frame, magnet-cores, and armature, then to limit-screw 23 by contact of the armature therewith, and through the substance of the insulated bracket 14 to the connection-screw 19, and by the wire 22 to the resistance-coil 18, and by wire 24 to the outgoing terminal 17 and main circuit *a'*. 55

It is evident that the electrical variations employed in electric telephony are not sufficiently energetic to move the armature 6, and 60 that, therefore, during conversation the currents employed may traverse the double route, through the electro-magnet helices, and also through the frame and resistance-coil. When, 65 however, a call-signal is transmitted, the armature is energetically attracted, and the result is, first, that the derived circuit is broken at

the point of contact between the armature and its limit-stop, thus permitting the full energization of the magnet, and then that the arm 70 8 of the armature-lever strikes the set-screw 10 of the detent-lever and lifts that lever, giving the signal. It will be observed that the proper succession of these sub-operations is maintained by the adjustment of the screws 75 10 and 23, and the lever 8 must not strike the former until after the armature 6 has parted company with the latter. The wire of the resistance-coil 18 is, in a manner well understood, wound differentially, to prevent self-in- 80 duction.

The resistance of the shunt or derived circuit resistance-coil may be varied within limits of considerable width, according to the degree of sensitiveness with which the mechanical parts move, and I have found it advisable 85 to use resistances of from one-fourth to one-half that of the magnet-coil.

By the use of this shunted annunciator it will be seen, first, that the electrical resistance 90 between the binding-screws is during the transmission of speech diminished in accordance with the law of joint resistances; second, that the voice-currents have an alternative and non-magnetic route between the said binding- 95 screws; and, third, that the magneto-electric counter-currents developed in the magnet-helix have a short circuit provided for them to circulate in, consisting of the electro-magnet, its circuit, and the derived circuit, united 100 at the terminal binding-screws, and therefore that but an infinitesimal portion of such currents can find their way past the junction-points of the two branches to the main line, where they tend to oppose the voice-currents. 105

I am well aware that it is not broadly new to construct a shunt-circuit around an electro-magnet to prevent the detrimental results of magneto-electrical counter-currents, and, furthermore, that it is not broadly new to provide means operated by the magnet itself under certain conditions, whereby the derived circuit can be automatically broken. 110

I do not therefore claim such an organization; but 115

I claim—

1. The combination, in an annunciator, of an electro-magnet, an armature and armature-lever therefor, a shutter or drop constituting a visual signal, an independent lever serving 120 as a detent for the said drop and adapted to be actuated by the armature-lever, and a branched or bifurcated circuit, one branch passing through the electro-magnet, and the other branch passing through a constant resistance and through the armature and its back limit-stop to constitute a shunt for the electro-magnet, substantially as described herein. 125

2. In an electric annunciator, the combination of the electro-magnet, armature, and armature-lever, a derived circuit including a resistance-coil passing through the armature and back limit-stop thereof, a drop or shutter forming a visual signal, and a lever controlling 130

the said drop and adapted to be actuated by  
the armature-lever, the said drop-lever being  
so adjusted that the actuating-lever engages  
therewith after the completion of a portion of  
5 its stroke, and after the shunt-circuit is broken  
by the severance of the armature from its  
back limit-stop, as and for the purposes speci-  
fied.

In testimony whereof I have signed my name  
to this specification, in the presence of two 10  
subscribing witnesses, this 3d day of Decem-  
ber, 1886.

JOHN A. BARRETT.

Witnesses:

F. H. WORTMANN,  
HENRY W. LOHMEYER.