(No Model.)

C. E. SCRIBNER & F. R. McBERTY.

CIRCUIT FOR ANNUNCIATORS OF TELEPHONE LINES.

No. 574,579. Patented Jan. 5, 1897.

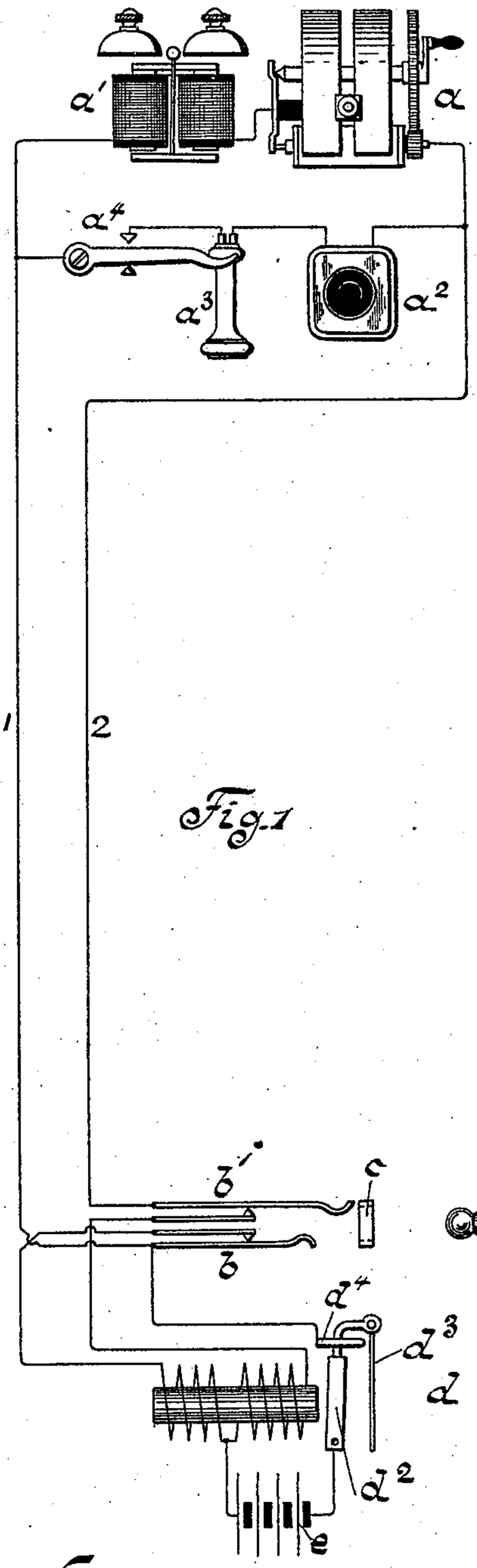


Fig. 1

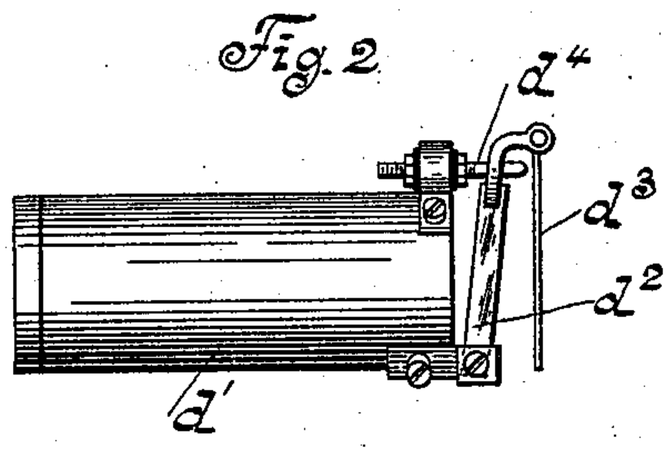
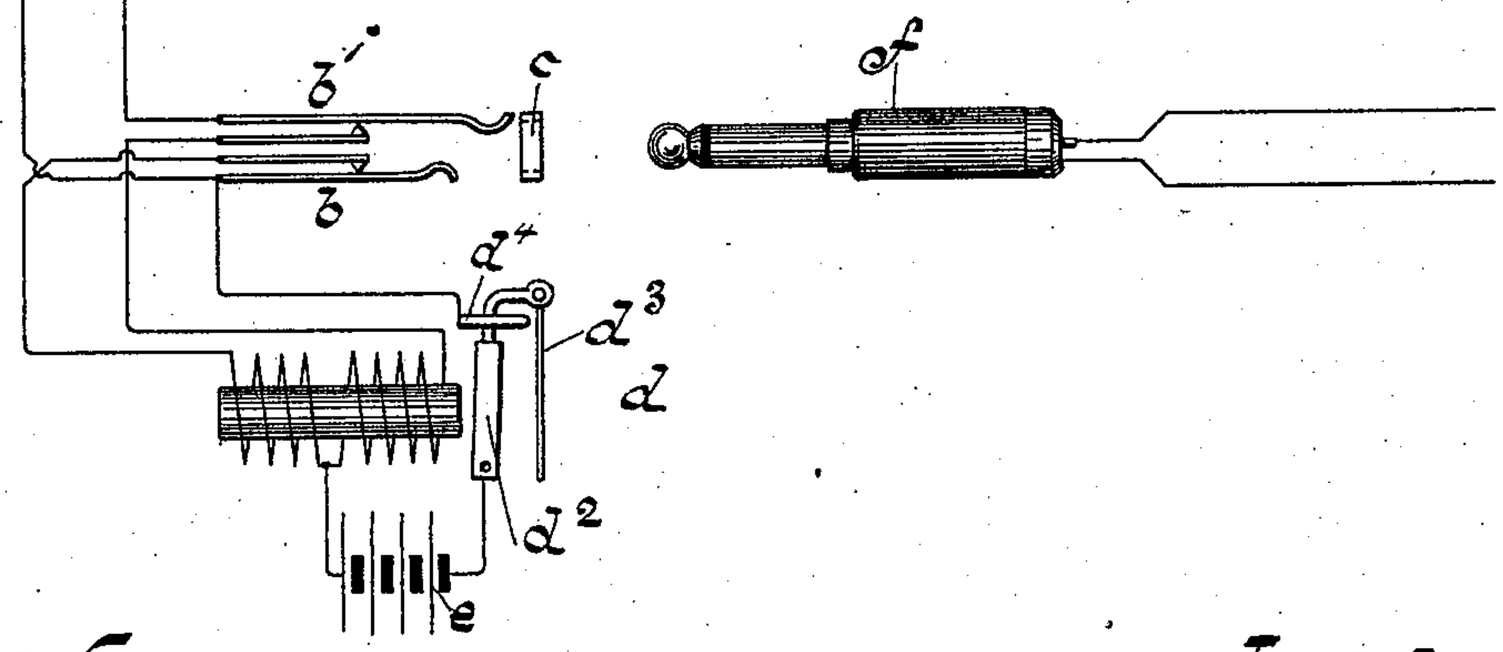


Fig. 2



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UNITED STATES PATENT OFFICE.

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CIRCUIT FOR ANNUNCIATORS OF TELEPHONE-LINES.

SPECIFICATION forming part of Letters Patent No. 574,579, dated January 5, 1897.

Application filed May 14, 1896. Serial No. 591,492. (No model.)

To all whom it may concern:

Be it known that we, CHARLES E. SCRIBNER, residing at Chicago, in the county of Cook, and FRANK R. McBERTY, residing at Downer's Grove, in the county of Du Page, State of Illinois, citizens of the United States, have invented a certain new and useful Improvement in Circuits for Annunciators of Telephone-Lines, (Case No. 422,) 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 concerns the operation of line-annunciators in telephone-switchboards.

It is a contrivance for causing the display of the line-annunciator when a momentary signaling-current is transmitted in the line and for effacing the indication of the annunciator when connection is made with the line, its purpose being to simplify the apparatus and circuits employed for producing such results.

Prior to the present invention it has been proposed to use a line-annunciator adapted to display its indicator only when excited by current and to cause this line-annunciator when excited to connect a source of local current into the annunciator-circuit to maintain its excitement after the cessation of the signaling-current, and, finally, to restore the annunciator or efface its indication by interrupting the circuit of this local source at the spring-jack switch when connection is made with the line.

Our present invention is an improvement over the circuits heretofore employed, resulting in the elimination of some apparatus and in increased reliability of operation.

This invention may be applied to telephone-lines provided with magneto-generators of signaling-current at the substations and with spring-jack switches in a telephone-switchboard at a central station. The line-annunciator may be of the electromagnetic visible-signal type, included in the line-circuit in such a manner that it is disconnected from the line when a plug is inserted into the spring-jack. For the purpose of this invention the armature of the annunciator or allied part is equipped with switch-contacts to be brought together when the magnet of the annunciator is excited.

Our improvement in the circuits consists in connecting a local circuit including a source of current and controlled by the switch-contacts of the annunciator in parallel or shunt circuit about the annunciator, one terminal of the shunt being applied to the line-circuit between the spring-jack and the apparatus of the substation and the other being applied to the other line conductor, preferably between the spring-jack and the annunciator or some portion of the latter instrument. This contrivance permits a momentary signaling-current in the line to display the annunciator and simultaneously to close a local circuit including a source of current through the annunciator to maintain the display of the indicator, while when a plug is inserted into the spring-jack the local circuit is broken at the switch-contacts of the jack and the annunciator is permitted to return to its inert condition. Since the circuit through the annunciator is purely local, conditions affecting the line external to the exchange or variations in the resistance of the line or of apparatus at the substation do not interfere with the operation of the annunciator.

The invention is shown in the accompanying drawings.

Of the drawings, Figure 1 is a diagram illustrating the circuits of the apparatus, a single substation and telephone-line being shown connected with apparatus in a telephone-switchboard. Fig. 2 represents a form of annunciator which is especially suitable for use in connection with this invention.

The apparatus at the substation may comprise the usual magneto-generator a, a polarized bell a', a transmitting-telephone a^2, and receiving-telephone a^3, with a switch a^4, controlled by the telephone for connecting the latter instrument with the line-circuit during its use. The line conductors 1 and 2 extend from this apparatus to the switch-springs b and b' of a spring-jack c in a telephone-switchboard. From the normal resting-anvils of these switch-springs they are continued to

the terminals of the line-annunciator d. This instrument is shown in Fig. 2. It consists of a tubular magnet d' and armature d^2, pivoted at its lower edge in trunnions carried on brackets secured to the shell of the magnet, a shutter or shield d^3, carried on other brackets secured to the armature, and a pin or stud d^4, upon which the shutter is adapted to impinge near its pivotal point when the armature moves toward the magnet. The pin d^4 is carried in a bracket on the shell of the magnet, being insulated from the bracket.

Ordinarily the shutter or shield d^3 depends before the armature d^2, concealing its face. When the armature is attracted, the shutter is brought against the stud d^4, making contact with it and being at the same time thrown into a horizontal position, displaying the face of the armature. The surface of the armature may carry any suitable number or name and constitutes the indication of the appliance.

A conductor 3 is attached to line conductor 1 between the spring-jack and the apparatus at the substation and terminates in the insulated stud d^4 of the annunciator. A continuation 4 of this conductor leads from the frame of the annunciator to the central point of the winding of the magnet thereof, a source of current being included in this conductor. The conductors 3 and 4 constitute the shunt mentioned in the general description. This shunt is applied at the middle point of the winding of the annunciator for the purpose of maintaining the electrostatic balance of the line. Aside from that consideration, however, it might equally well be applied to the line conductor 2 between the annunciator and the spring-jack.

The usual connecting-plug f is furnished in the switchboard for making connection with the line through the medium of the spring-jack in response to a call.

The operation of the generator a at the substation produces in the line-circuit a current which excites the magnet of the annunciator and causes it to attract its armature. The movement of the armature toward the magnet raises the shield d^3, giving the indication of the annunciator, and also closes the circuit 3 4 of battery e through the contact established between the shield d^3 and the stud d^4. A circuit of battery f is now found through these switch-contacts to line conductor 1, thence through one line-spring b and its resting-anvil to one terminal of the annunciator, thence through half the winding of the annunciator to wire 4, and thence returning to battery e. The current in this local circuit maintains the magnetization of the annunciator after the cessation of the signaling-current from the substation and thus causes its continued display. When, however, in answering the call the operator inserts the plug f into the spring-jack c, the local circuit is interrupted by the break between the spring b and its anvil, while also both terminals of the annunciator are disconnected from the line. Hence the annunciator-magnet becomes inert and permits the shutter to fall into position to conceal the armature and to break the contact between the shutter and the stud d^4. During the use of the line for telephonic conversation the circuit is free from all earth branches or local-battery connections, excepting the short spur 3, which terminates in the stud d^4.

Our invention is defined in the following claims:

1. The combination with a telephone-line having at its substation means for producing in the line a momentary signaling-current, and at a central station a spring-jack connected with a line, of an annunciator in the line-circuit adapted to display its indicator when traversed by current, a shunt or parallel circuit of the annunciator including a source of current, normally-separated switch-contacts interposed in said shunt controlled by an electromagnet in the line-circuit, and other switch-contacts in the spring-jack interposed in the shunt-circuit adapted to be separated when connection is made with the spring-jack, substantially as described.

2. The combination with a telephone-line provided at its substation with a generator of signaling-current and including at a central station a spring-jack switch and an annunciator adapted to give its indication when traversed by current, of a shunt or parallel circuit of the annunciator including a source of current controlled by normally-separated contacts adapted to be closed by the armature of the annunciator when attracted, one terminal of said shunt being applied to the telephone-line between the spring-jack and the substation apparatus, and the other terminal being applied to the line-circuit between the spring-jack and some portion of the winding of the annunciator, substantially as described.

3. The combination with a telephone-line equipped at its substation with a generator of signaling-current; and at its central station including a spring-jack switch and the magnet of an annunciator adapted to display its indicator when traversed by current, of a local circuit including the winding of the annunciator or a portion thereof and separable contacts of the spring-jack together with a source of current, and switch-contacts controlling said local circuit adapted to be closed together when the armature of the annunciator is attracted, substantially as described.

In witness whereof we hereunto subscribe our names this 7th day of April, A. D. 1896.

CHARLES E. SCRIBNER.
FRANK R. McBERTY.

Witnesses:
ELLA EDLER,
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