

(No Model.)

C. E. SCRIBNER.

SUBSTATION APPARATUS FOR TELEPHONE SYSTEMS.

No. 484,613.

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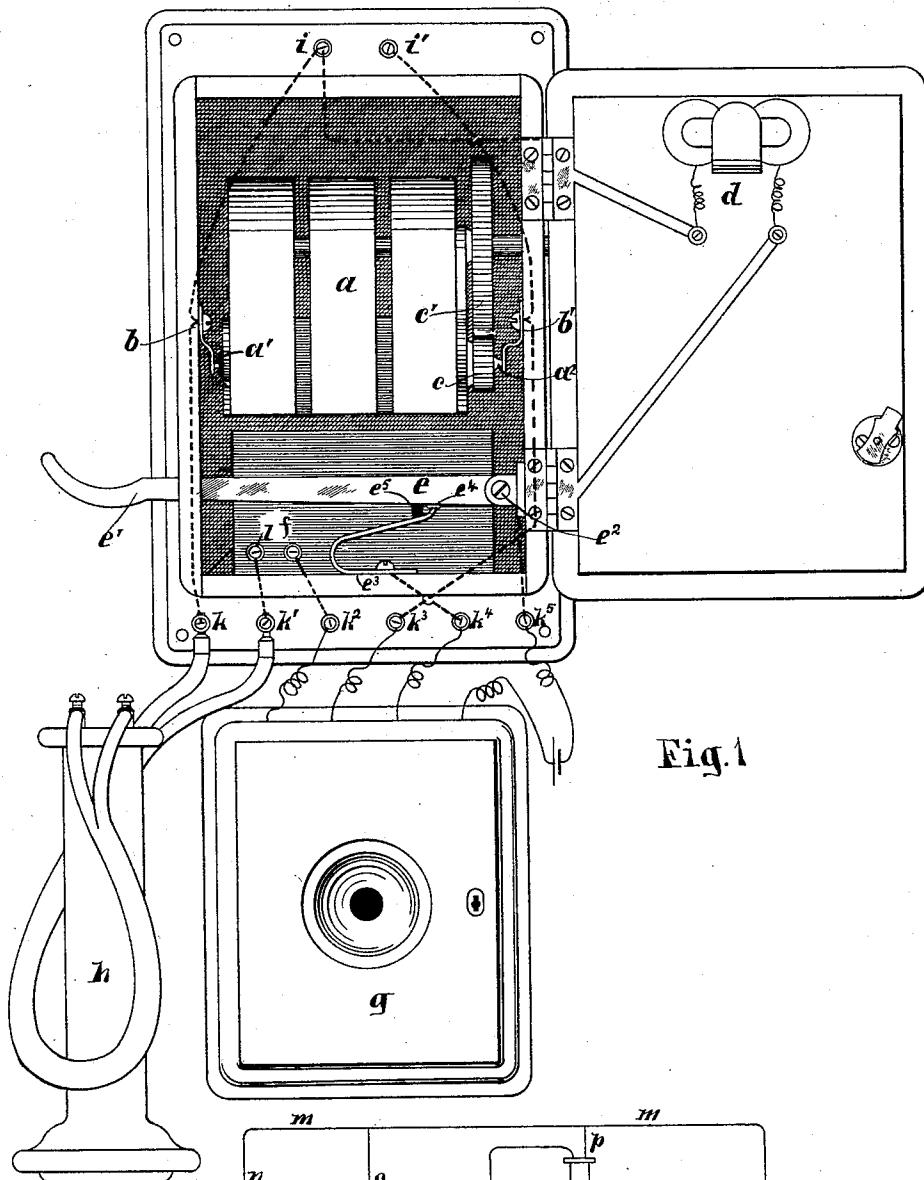
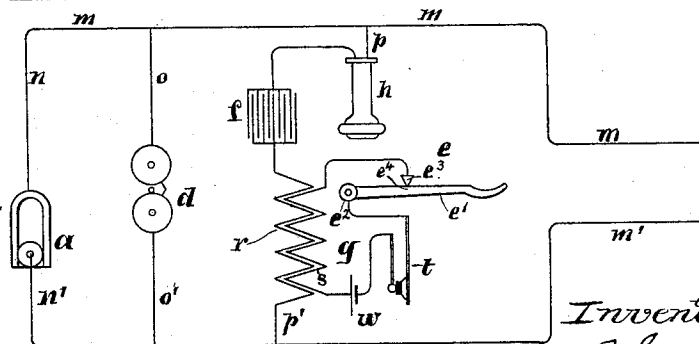


Fig. 1



Witnesses:

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Fig. 2

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CHARLES E. SCRIBNER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTERN ELECTRIC COMPANY, OF SAME PLACE.

SUB-STATION APPARATUS FOR TELEPHONE SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 484,613, dated October 18, 1892.

Application filed January 21, 1892. Serial No. 418,824. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. SCRIBNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Sub-Station Apparatus for Telephone Systems, (Case No. 288,) 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.

My invention relates to the construction and arrangement of apparatus at sub-stations of telephone systems. Its object is to avoid opening the line-circuit or any branch thereof at any time at the sub-station.

The apparatus at the sub-station ordinarily comprises a magneto-generator for sending signaling-currents, a bell adapted to respond to incoming signaling-currents, and the telephone receiver and transmitter.

Heretofore the bell, generator, and telephone have been placed in parallel branch or derived circuits between the two portions of the line, the telephone and generator in normally-open parallel branches, that containing the telephone being adapted to be closed when required by contact-points operated by a suitable switch and that containing the generator being closed during the operation thereof by suitable mechanism, the bell being of high resistance and retardation in order that it might not shunt the telephonic current from the telephone.

In my invention the bell, the generator, and the telephone are placed in parallel, each in a closed branch or bridge connection between the two sides of the line, the bell and generator being of high retardation to prevent them from shunting the telephonic current, and a small condenser being included in the branch with the telephone to prevent the latter from shunting the signaling-currents. The self-induction of the branches including the bell and the generator makes these branches practically open to the rapidly-undulating telephonic currents. On the other hand, the small condenser in the telephone branch, while perfectly transmitting the telephonic alternating currents of high frequency, makes the branch practically open to the

slowly alternating or pulsating signaling-currents. I am thus enabled to direct, as it were, current of each specific character through its appropriate instrument and to prevent its escape through the other instruments without opening any of the branch circuits. Thereby I avoid the inclusion in any branch circuit of contact-points, which are likely to become unreliable through corrosion and wear.

I will describe my invention in greater detail, illustrating the description by the accompanying drawings.

Of the drawings, Figure 1 is a front elevation of a telephone and transmitter and a call-box containing the signaling and other accessory apparatus. Fig. 2 is a diagram showing the circuits of the apparatus.

In Fig. 1, *a* is a magneto-generator of ordinary construction, having an armature of high resistance and retardation. One end of the armature-wire is connected to the insulated pin *a'* and the other to the shaft which terminates in the point *a''*. The pin *a'* and the point *a''* make contact with the springs *b* and *b'*, respectively. The armature is adapted to be rotated by means of the gear and pinion *c c'*, the latter having attached to it a crank projecting to the outside of the box.

d is a polarized signal-bell, also of ordinary construction. *e* is a gravity-hook switch adapted to close the local circuit, including battery, the microphone, and the primary of the transmitter induction-coil. It consists of a lever *e'*, pivoted at *e''*. A spring *e'''* gives the hook a constant upward tendency and makes contact with the contact-piece *e''''* when the hook is allowed to rise. A pin or stud *e'''''*, of rubber, comes into contact with the spring when the lever is pressed down and lifts the end of the spring away from the contact-anvil *e''''''*.

f is a condenser which may be of two-tenths or three-tenths microfarad capacity.

g is a telephone-transmitter, and *h* is a telephone-receiver.

The call-box is provided with various binding-posts adapted to receive the different external connections to it. The two posts *i i'* are adapted to be connected to the lines. The posts *k k'* are connected to the telephone *h, k'' k'''* to the secondary of the transmitter induction-

coil, $k^4 k^5$ to the battery and to the primary of the induction-coil. Connections extend from binding-posts i to the spring b and by the post k to the telephone and from post i to one side of bell d . Post i' is connected to spring b' , to post k^3 , and to the other side of bell. Post k' is connected to one post l of condenser f and post K to the other side thereof. Post k^4 is connected to spring e^3 , and post k^5 to pivot e^2 of the lever e' .

The circuit connections may be more readily traced in Fig 2, in which three parallel branches $n n'$, $o o'$, and $p p'$ are shown, connecting the two sides $m m'$ of line. One branch $n n'$ contains the generator a , another $o o'$ includes the bell d , and the third $p p'$ includes the telephone h , the condenser f , and the secondary r of the induction-coil of the transmitter g . The primary s of this coil is in circuit with the microphone t and battery w . The circuit is open at the points $e^3 e^4$ while the telephone is on the hook, but is automatically closed when the telephone is removed from the hook for use.

When the generator a is operated, a small part of its current is shunted through the bell d , operating it, and thus indicating to the subscriber that his apparatus is working properly. The remainder of the current passes out on lines $m m'$. When current comes in on the lines $m m'$, a large part of it traverses the bell d , a little escaping through the high-resistance generator a . In neither of these cases does any considerable current traverse the branch $p p'$, containing the telephone, on account of the smallness of capacity of the condenser f . When, however, telephonic current comes over lines $m m'$, substantially the whole of this current traverses the branch $p p'$, since the condenser f is practically a perfect transmitter of its undulations and the generator a and the magnets of bell d are practically opaque to currents having undulations of such high frequency.

It is not essential that the generator a be always in circuit. If it be desired, the generator may be in a normally-open branch circuit and may be provided with the well-known mechanism for closing the circuit continuously during the operation of the generator, this mechanism not being open to the usual objection to contact-points to the same extent, since the contact-surfaces are large and are constantly cleaned during use.

Obviously my invention is not limited to use with alternating currents, such as ordinarily employed, but is adapted for use with pulsating or continuous currents, since these also will fail to pass the condenser, although traversing the bell-coils readily.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with a line extending to a sub-station, of signal-receiving apparatus and a telephone at the sub-station, said signal-receiving apparatus and said telephone being in permanently-closed independent parallel branches between the two sides of said line, substantially as described.

2. The combination, with a telephone-line extending to a sub-station, of a telephone and a signal-receiving device in separate permanently-closed parallel branches between the two sides of said line, said signal-receiving device being of high retardation, substantially as described.

3. In combination with a telephone-line extending to a sub-station, a telephone and a signal-receiving device in separate parallel permanently-closed branches between said line, said signal-receiving device being of high retardation, and a condenser included in the branch containing the telephone, substantially as described.

4. The combination, with a telephone-line extending to a sub-station, of a signal-receiving device and a signal-sending device, both of high resistance and retardation, and a telephone in separate permanently-closed parallel branches between the two sides of said line, and a condenser in that branch including the telephone, substantially as described.

5. The combination, with a telephone-line extending to a sub-station, of a signal-sending and a signal-receiving device, both of high resistance and retardation, in two permanently-closed parallel branches between the two sides of said telephone-line, and a telephone, the secondary of a transmitter induction-coil, and a condenser in a third parallel permanently-closed branch between the two sides of said line, substantially as described.

6. The combination, with line-wires, of a signal-receiving device adapted to receive undulatory or alternating currents of comparatively low frequency and a receiving device adapted to receive or respond to telephonic or undulatory currents of high frequency in separate parallel branch circuits between said line-wires, said slow pulsation-receiver being of high retardation, and a condenser in circuit with said telephonic receiver, whereby pulsating currents of low frequency and telephonic currents upon the line are directed each through its appropriate receiving device and prevented each from traversing the receiving device adapted to the other, substantially as described.

In witness whereof I hereunto subscribe my name this 9th day of January, A. D. 1892.

CHARLES E. SCRIBNER.

Witnesses:

FRANK R. MCBERTY,
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