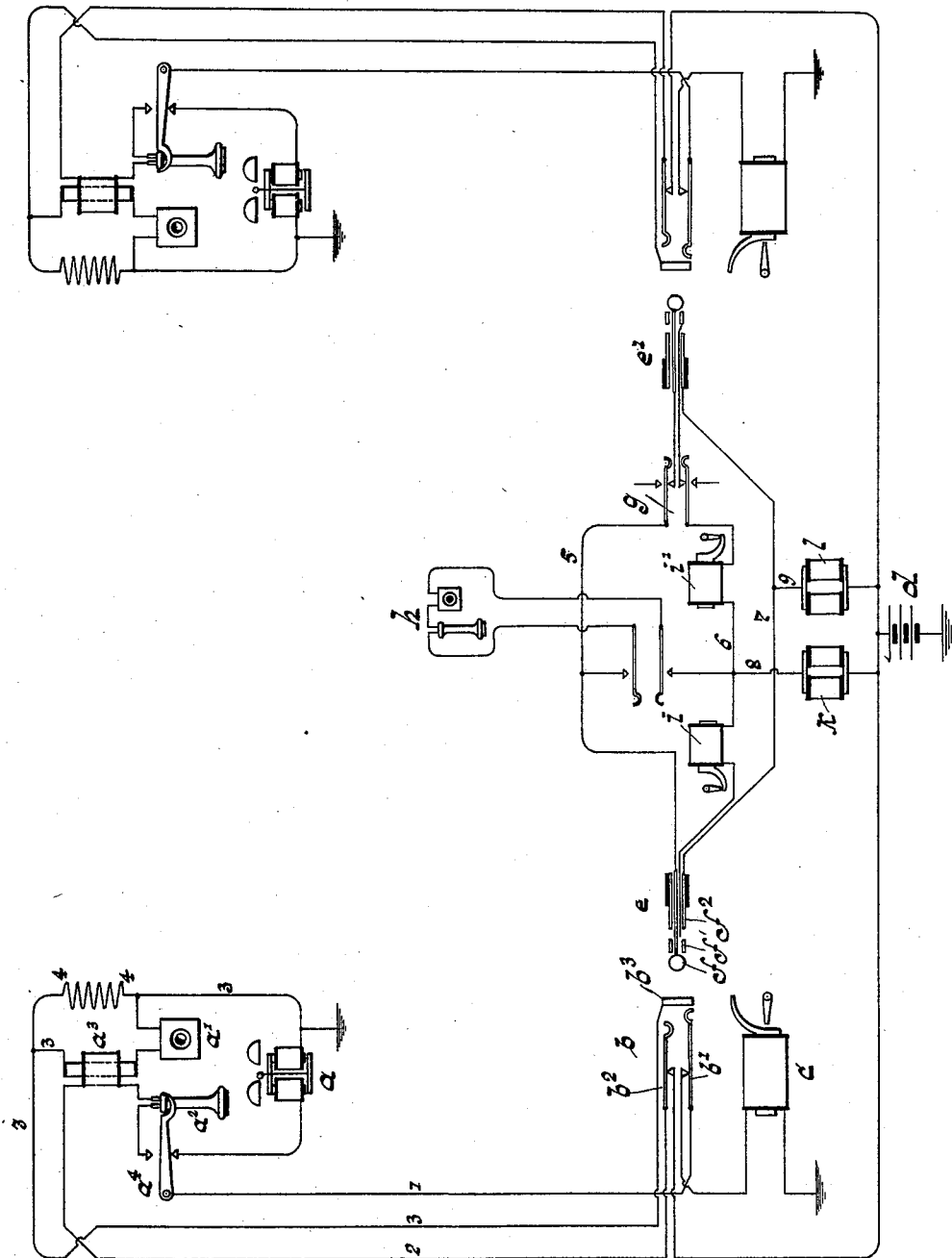


(No Model.)

C. E. SCRIBNER.
TELEPHONE SYSTEM.

No. 593,614.

Patented Nov. 16, 1897.



Witnesses:

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UNITED STATES PATENT OFFICE.

CHARLES E. SCRIBNER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTERN
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TELEPHONE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 593,614, dated November 16, 1897.

Application filed September 25, 1896. Serial No. 606,925. (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 Telephone Systems, (Case No. 429,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention concerns the supplying of current for exciting transmitting-telephones at telephone-substations. It consists in a new appliance for closing the circuit of the exciting-current during the use of the telephone.

The invention consists in the combination, with the transmitting-telephone, its line-circuit, and its inductive connection with the line, of a separate supply-circuit for the telephone terminating in the contact-piece of a spring-jack, forming also the line-terminal or other suitable contact-terminal, in a switchboard, a source of current, and a terminal thereof closed to the spring-jack or terminal of said supply-wire in the act of inserting a connecting-plug into the spring-jack.

The invention further consists in the combination, with this apparatus, first, of a shunt about the transmitting-telephone and the primary winding of its induction-coil, whereby the disturbances in the current are localized, and, second, in the interposition of an impedance-coil in the conductor leading from the source of supply to the supply-circuit, whereby cross-talk between different lines is prevented.

In this invention, then, the source of current-supply for the substation transmitting-telephone may be located at a central point and common to the different lines, and the current is applied to the transmitting-telephone through the agency of switch-contacts controlled by the operator of the switchboard and closed only during the use of the line.

The invention is shown in the accompanying drawing, wherein are represented two telephone-lines terminating in different spring-jacks in a telephone-switchboard, together with the usual connecting-plugs and signaling apparatus in a switchboard for establishing connection between lines.

The apparatus at the substation comprises a signaling-bell a , a transmitting-telephone a' , a receiving-telephone a^2 , an induction-coil a^3 for the transmitting-telephone, and a telephone-switch a^4 . The lever of the telephone-switch forms the terminal of one line conductor 1, while the contact-point upon which it closes when the switch is relieved from the weight of the telephone constitutes the normally open terminal of the other line conductor 2, in which the receiving-telephone a^2 and the secondary winding of the induction-coil a^3 are serially included. The normal resting-contact of the switch is grounded through the polarized signal-bell a . In the present invention a third conductor 3, which is represented as a grounded circuit, is provided. In this conductor are included the transmitting-telephone a' and the primary winding of the induction-coil a^3 . About the transmitting-telephone and this primary winding is connected a shunt-circuit 4, which in ordinary practice may have a resistance of thirty ohms. These conductors 1, 2, and 3 of the telephone-circuit are led to three contact-pieces of the spring-jack b in the switchboard. From the normal resting-contact of spring b' of this jack conductor 1 is continued through an individual signal-indicator c to ground, while from the similar contact of spring b^2 conductor 2 is extended through battery d to ground. The conductor is normally open at the thimble b^3 of the spring-jack.

The usual connecting-plugs e and e' are provided in the switchboard for uniting lines. Each plug consists of three portions—a tip f , a short thimble or sleeve f' , and a longer sleeve or shank f^2 . The first-mentioned contacts are adapted to lift the springs b^2 and b' , respectively, from their normal resting-anvils, at the same time making contact with them, while the last-mentioned contact f^2 is arranged to make electrical connection with the thimble b^3 of the jack. The like contacts of the two plugs which constitute a pair are united through flexible conductors, designated 5, 6, and 7, respectively. The switch-contacts of a calling-key g are interposed in conductors 5 and 6 for the purpose of looping a generator of signaling-current into circuit

with plug e' . Other switch-contacts are provided for connecting an operator's telephone h in a bridge of the plug-circuit. In the conductor 6 are interposed two supervisory signals i and i' . From a point of the conductor intermediate of these signals a branch 8 is led to the free pole of battery d , an impedance-coil k being included in the branch to prevent the shunting of telephonic current from the line. Conductor 7 which unites the sleeves f^2 of the plugs is connected also with the free pole of battery d through the medium of a wire 9. An impedance-coil l of very low resistance is included in that conductor also.

The operation of the system may be very briefly described. The removal of the telephone from the switch-hook at a station permits the switch to close the circuit of battery d through line conductor 2 to line conductor 1, and thence to the signal c , whereby the latter is excited and displays its indicator. Answering the call the operator inserts plug e into the spring-jack b of the calling-line, at the same time placing her listening-key in position to connect the telephone h in a bridge of the plug-circuit 5 6. By these acts the line-circuit 1 2 is extended to the operator's telephone, whereby she is brought into communication with the calling subscriber; also, the circuit of battery d is connected through conductors 9 and 7 with the thimble b^3 of the spring-jack, and thence to the supply-circuit conductor 3 of the line. A current is thus produced in the supply-circuit which finds a path through the transmitting-telephone a' and the primary winding of the induction-coil a^3 in multiple with the branch 4 in shunt of these instruments. Now when the subscriber speaks into the transmitter the variations of its resistance cause inverse variations in the current through the primary winding of the induction-coil, and hence induce in the line-circuit 1 2 telephonic currents in the usual way. Thus the same act which brings the operator's telephone into connection with the subscriber's telephone supplies the necessary current to the substation for operating the latter instrument. Having learned the calling-subscriber's order, the operator inserts the other plug e' into the spring-jack of the station to be called, at the same time manipulating the calling-key g to signal to that station. Until the subscriber at the called station responds a circuit exists from battery c through conductor 6 of the plug-circuit to line conductor 1, thence to the station and through

the ground branch, including the bell a there. The current through this circuit excites the supervisory signal i' and causes it to display its indicator. When the called subscriber, responding, removes his telephone from the switch-hook, this circuit is interrupted at the substation, whereby the indicator of the supervisory signal is caused to disappear and the operator is apprised of the response. The act of making connection with the called substation has completed a circuit from battery c to the supply-wire 3 of that line also, so that the transmitting-telephone at that station is in condition for use. Hence the two subscribers are enabled to converse together in the usual way.

When the subscribers at the termination of their conversation replace the telephones on the switch-hooks, each switch closes the circuit through the corresponding supervisory signal before the operator. The simultaneous appearance of the indicators of these signals shows the operator that the conversation has been terminated, and she removes the plugs from the spring-jacks and returns all the appliances to their normal conditions.

It is not essential to my invention that the current through the supply-wire should be controlled through registering contacts in the plug and spring-jack, on which account I do not desire to be limited to the specific appliances which I have shown and described.

I claim as new and desire to secure by Letters Patent—

The combination with a telephone-line having a transmitting-telephone and an induction-coil at its substation, and terminating in an appliance for establishing connection with another telephone at a central station, of a supply-circuit distinct from the line permanently including the said transmitting-telephone and the primary winding of the induction-coil at the substation, and terminating in a separate contact-piece of said appliance, a source of current at the central station, a switch-contact forming the terminal thereof, and means for applying said switch-contact to the contact-terminal of said supply-circuit in the act of making connection with the line, substantially as described.

In witness whereof I hereunto subscribe my name this 17th day of July, A. D. 1896.

CHARLES E. SCRIBNER.

Witnesses:

FRANK R. MCBERTY,
ELLA EDLER.