(No Model.)

R. N. DYER.

TELEPHONE SYSTEM.

No. 481,483. Patented Aug. 23, 1892.

Fig. 1.

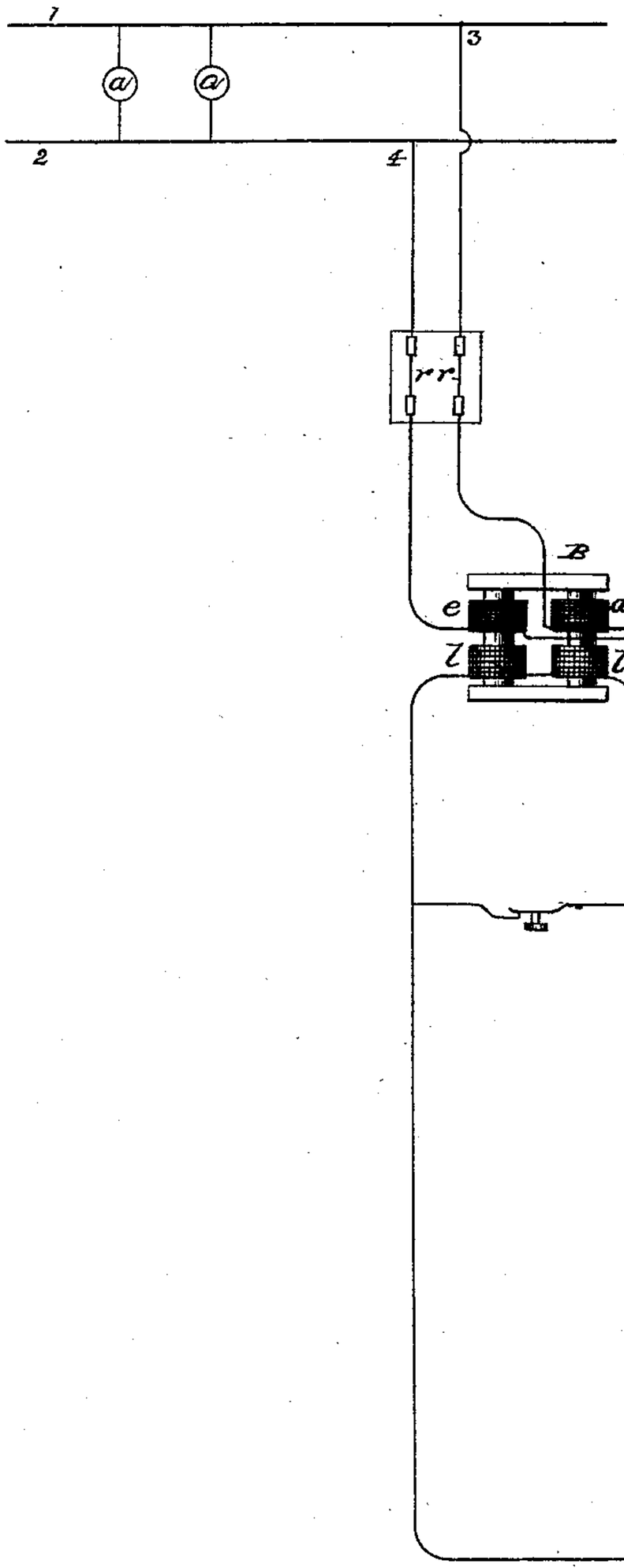


Fig. 2.

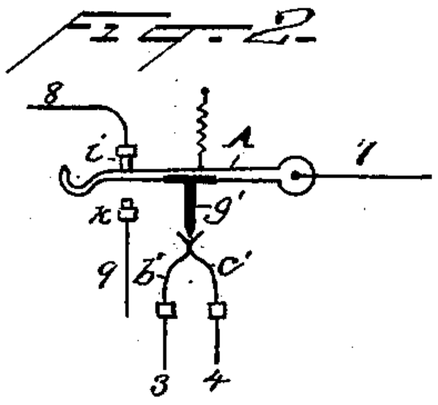
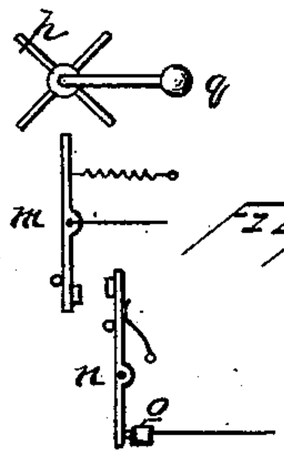


Fig. 3.



Witnesses

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UNITED STATES PATENT OFFICE.

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TELEPHONE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 481,483, dated August 23, 1892.

Application filed October 30, 1890. Serial No. 369,804. (No model.)

To all whom it may concern:

Be it known that I, RICHARD N. DYER, a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Telephone Systems, of which the following is a specification.

My invention relates to the telephone system described in my patent, No. 382,461; and my object is to improve the manner of connecting the telephone and signaling devices with the current-supplying circuit or source of electrical energy, whereby great efficiency in operation and simplicity in construction are secured and so that the disturbances and dangers arising from grounding the current-supplying circuit through the telephone apparatus or line are avoided.

In the drawings, Figure 1 is a view in diagram showing apparatus and circuits embodying the invention. Fig. 2 is a view of a modified form of the telephone-switch. Fig. 3 is a separate view of a special form of bell-ringing device.

The current-supplying circuit 1 2 is represented as a lamp-circuit of a system of electric lighting, in which incandescent electric lamps are shown at *a*. The electric lighting system may be a simple multiple arc, three-wire, or other system employing continuous currents. From the circuit or loop 1 2 is taken a multiple-arc circuit 3 4, the two sides of which terminate at two of the upper points *b c* of a four-point telephone-switch A, the circuit 3 4 being completed at the points *b c* when the switch is raised and being opened at those points when the switch is depressed by hanging the receiver upon its hook, so as not to use current when the telephone is out of use. A magnet B has its coils *d e* located in the circuit 3 4, one of these coils being preferably in each side of the circuit, so as to reduce the liability to the formation of injurious grounds and crosses. This electro-magnetic or inductive-resistance acts by resistance and self-induction to reduce and steady the current flowing from the supply-circuit through the loop and transmitter, and for said purpose this resistance is properly proportioned, as will be well understood with reference to the electro-motive force of the circuit 1 2.

In order that the circuit 3 4 should never be directly connected with the telephone-line, while at the same time it is opened and closed by the telephone-switch, so as not to be using current when the telephone is out of use, I prefer that the points *b c* should not touch the body of the switch A, but should bear upon a plate *f*, which is carried by the switch, but is insulated therefrom by a block *g* of insulating material. By this means the disturbances which would arise from grounding the circuit 3 4 will be avoided; or, as shown in Fig. 2, the circuit 3 4 can terminate in spring-plates *b' c'*, which spring together and close the circuit 3 4 when the switch is raised, but are separated by a plate *g'* of insulating material when the switch is depressed. The plate *g'* is carried by the switch and is forced between the spring-plates *b' c'*, not only separating such plates, but cutting off any spark or arc, the insulating-plate being wider than the metal plates.

In either side of the circuit 3 4 is a determining-resistance *h*, around which is a shunt-circuit 5 6, in which are located the telephone-transmitter C and the primary of the usual induction-coil D. The resistance *h* will be proportioned with relation to the other elements of the circuits 3 4 and 5 6, as will be well understood, so that the desired quantity of current will flow through the transmitter-circuit. The telephone-line 7 is connected with the switch A. The third upper point *i* of the switch is connected by a wire 8 with the earth E through the secondary of the induction-coil D and the telephone-receiver F. This completes the telephone apparatus proper.

For receiving and sending call-signals the following arrangement is provided: The lower point *k* of the switch is connected by a wire 9 with the earth E through the vibrating bell G and through one or more coils *l* upon the magnet B. When the receiver is hung on the switch, the line will be completed to earth through the bell and call-signals can be received, as usual heretofore. For sending signals I provide a means for making and break-

ing the circuit 3 4 through the coils *d e* of the magnet B, which then become primary coils, producing induction impulses in the secondary coils *l* and sending them out over the line. To make and break the circuit through the coils *d e*, I may employ a normally-open spring key or lever *m*, which in its forward movement makes contact with a spring-lever *n* and moves it off of a point *o*. The key *m* and point *o* are connected across the circuit 3 4 between the coils *d e* and the resistance *h*. The key or lever *m* thus both makes and breaks the circuit through the magnet-coils in its forward movement and resumes a position in which the circuit is open. The operation does not affect the transmitter. To secure a continuous vibration, the lever *m* may be moved by a wiper-wheel *p*, rotated by a crank *q*, as shown in Fig. 2. As shown in Fig. 1, a shunt 12, provided with a push-button for opening the same, may be extended across the two sides leading to and from coils *l l*, so that said coils will be short-circuited when not actually in use for signaling. By producing the signal impulses by induction from the current-supplying circuit or source of electrical energy the direct connection of that circuit with the telephone-line becomes unnecessary. The magnet-coils *d e* not only serve to reduce the current flowing in the circuit 3 4, as well as to act as the primary for the induction-signal impulses, but they further act advantageously in the operation of the telephone-transmitter by exerting a retarding influence upon vibrations of the current passing through the circuit 3 4, and thus render such vibrations incapable wholly or partly of affecting the transmitter and producing disturbing sounds in the receivers.

For the better protection of the telephone apparatus the circuit 3 4 is provided with a suitable safety-catch link *r* in each side of the circuit.

What I claim is—

1. The combination, in a telephone sub-station apparatus, of a telephone-transmitter, a current-supplying circuit therefor, a normally-open loop from said supply-circuit to the said transmitter, a resistance in a shunt-circuit of the said loop around the transmitter, a circuit-closer controlled by the automatic telephone-switch and acting, as the telephone is removed from or replaced on its support, to close or open the loop-circuit through the transmitter, and an electro-magnetic resistance included directly in the loop-circuit and acting as its resistance and self-induction to control the strength and steady the current flowing through said loop and transmitter, substantially as described.

2. The combination, with the telephone-transmitter, of a current-supplying circuit therefor, a loop from said supply-circuit to the transmitter and including the same, an electro-magnetic resistance in the said loop, constituting, also, the primary helix or helices of an induction-coil for sending call-signals, and a circuit-controller for alternately making and breaking the circuit of the loop at a point between the transmitter and the said electro-magnetic resistance.

3. The combination, with a telephone-transmitter, of a current-supplying circuit, a branch or loop circuit therefrom extending to said transmitter, a controlling and steadying electro-magnetic or inductive resistance in said branch circuit the helices of which also constitute the primary helix or helices of an induction-coil for sending call-signals, and a determining-resistance included in a shunt of said loop-circuit around the transmitter, substantially as set forth.

4. In combination with the mains of a constant-direction electric-light or power circuit, a telephone-transmitter, a loop from said mains to the said transmitter, a steadying and current-regulating electro-magnetic resistance included in said loop, a safety-catch interposed in said loop between the said resistance and the main-line junction, and a determining-resistance in a shunt of said loop uniting the transmitter-terminals, substantially as set forth.

5. The combination, with a telephone, of a current-supplying circuit, a branch therefrom supplying the transmitter, current-reducing magnet-coils located in said branch, secondary coils upon such magnet connected with the line through the bell-circuit, and a key closing the branch circuit through the magnet-coils and not through the transmitter, substantially as set forth.

6. The combination, with a telephone, of a current-supplying circuit, a branch therefrom supplying the transmitter, current-reducing magnet-coils located in said branch, secondary coils upon such magnet connected with the line through the bell-circuit, a key closing the branch circuit through the magnet-coils and not through the transmitter, and the telephone-switch opening and closing the branch circuit without grounding the same, substantially as set forth.

This specification signed and witnessed this 13th day of October, 1890.

RICHARD N. DYER.

Witnesses:
D. H. DRISCOLL,
E. LOURAN.