

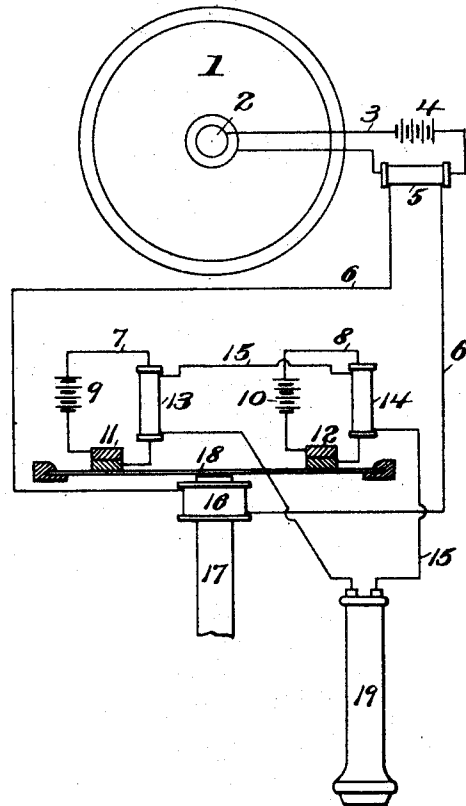
No. 666,675.

Patented Jan. 29, 1901.

G. L. HOGAN.  
TELEPHONE.

(Application filed Mar. 9, 1900.)

(No Model.)



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# UNITED STATES PATENT OFFICE.

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## TELEPHONE.

**SPECIFICATION** forming part of Letters Patent No. 666,675, dated January 29, 1901.

Application filed March 9, 1900. Serial No. 8,028. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE L. HOGAN, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Telephones, fully described and represented in the following specification and the accompanying drawing, forming a part of the same.

10 This invention relates to certain improvements in telephone apparatus.

The object of the invention is to produce an improved device for use in long-distance telephony which will operate in the same manner as a relay operates in telegraphy and by the use of which the secondary current on the line-wire can be greatly increased from point to point where necessary, so as to render it possible to transmit messages with ease  
15 over great distances.

As a full understanding of the improvements constituting the present invention can best be given by an illustration and a detailed description of an organization embodying the same, such a description will now be given  
25 in connection with the accompanying drawing, which illustrates one embodiment of the invention, and in which the figure is a view illustrating, diagrammatically, a form of telephone apparatus embodying the invention.

Referring to the drawing, 1 indicates a transmitter-diaphragm, which is or may be of any usual construction. Said diaphragm may be equipped with any suitable form of circuit-disturbing device. As shown, the circuit-disturbing device consists of an ordinary variable or loose contact 2 of a construction well known in the telephone art. This variable contact 2 is included in a primary circuit  
35 3, which circuit also includes a suitable source of electrical energy, such as a battery 4. As is usual in telephone constructions, an induction-coil 5 is included in the primary circuit, the primary of said coil forming a part of said circuit. The secondary 6 of said coil is in circuit with the line-wire, as is usual.

It is of course well known that the distance over which speech can be transmitted by the telephone apparatus now in use is limited by  
50 the amount of current which can be sent over

the line-wire, and this is controlled by the amount of current which can flow through the transmitter without arcing or producing a hissing sound. In order to increase the amount of current on the line-wire, an improved apparatus will be employed, which  
55 can be located at any desired point in the line. This apparatus comprises a plurality of primary circuits, of which two (marked 7 and 8) are shown. These circuits each include a source of electrical energy, as batteries 9 and 10, and a suitable form of circuit-disturbing device. In the construction shown these circuit-disturbing devices consist of variable contacts 11 and 12 of any suitable or  
60 well-known form. The primary circuits 7 and 8 further include suitable induction-coils 13 and 14, the primaries of said coils being included in the primary circuits. A secondary circuit 15 is employed, said circuit being connected to the secondaries of the coils, and thus being common to all the primary circuits. It is apparent from the construction so far described that if the variable contacts 11 and  
75 12 are operated substantially simultaneously the primary circuits will be disturbed and the secondary currents due to such disturbing will be collected and caused to flow over the secondary circuit 15, which is common to all the primary circuits.

Suitable electrical means which are operated by the secondary 6 of the induction-coil 5 are employed for actuating the circuit-disturbing devices. In the present construction said secondary 6 is connected to a coil 16 of  
85 a suitable electromagnet, the core 17 of which serves to operate a diaphragm 18, on which the contacts 11 and 12 are mounted. When, therefore, the diaphragm 1 of the transmitter is caused to vibrate by the sound-waves and  
90 actuate the circuit-disturbing device 2, varying impulses will be sent over the line-wire or secondary circuit 6, which varying impulses will cause the diaphragm 18 to be actuated. This diaphragm will in turn operate the variable contacts 11 and 12, causing them to disturb their primary circuits, which in turn  
95 causes impulses to be sent over the common secondary circuit 16. Inasmuch, however, as a plurality of primary circuits, such as are  
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shown at 7 and 8, will be employed, the current sent over the line-wire will be greatly increased.

In the construction shown a transmitter 19 is shown as connected to the common secondary 15. It will, however, be understood that said secondary circuit 15 might have an electromagnet included therein, which electromagnet would operate a diaphragm carrying contacts similar to that which has been before described.

While the apparatus described constitutes a preferred form of the invention, it will be understood that the invention may be embodied in apparatus which are widely different from that herein described. The invention is not, therefore, to be limited to the specific constructional details described.

What is claimed is—

1. In a telephone apparatus, the combination with a secondary circuit, of a plurality of primary circuits, a circuit-disturbing device in each primary circuit, electrical means operated by the secondary circuit for actuating the circuit-disturbing devices, and a secondary circuit common to all the primary circuits, substantially as described.

2. In a telephone apparatus, the combination with a secondary circuit, of a plurality of primary circuits, a variable contact in each primary circuit, electrical means operated by the secondary circuit for actuating the

contacts, and a secondary circuit common to all the primary circuits, substantially as described.

3. In a telephone apparatus, the combination with a secondary circuit, of a plurality of primary circuits, a circuit-disturbing device in each primary circuit, a diaphragm by which said circuit-disturbing devices are carried, an electromagnet for operating the diaphragm, said electromagnet being operated from the secondary circuit, and a secondary circuit which is common to all the primary circuits, substantially as described.

4. In a telephone apparatus, the combination with a transmitting instrument, of a secondary circuit which constitutes the line-wire, an electromagnet in said secondary circuit, a diaphragm operated by said electromagnet, a plurality of variable contacts mounted on the diaphragm, a plurality of primary circuits, one for each contact, a secondary circuit common to all the primary circuits, and a receiver in said common secondary circuit, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

GEORGE L. HOGAN.

Witnesses:

JOHN A. GRAVES,  
A. A. V. BOURKE.