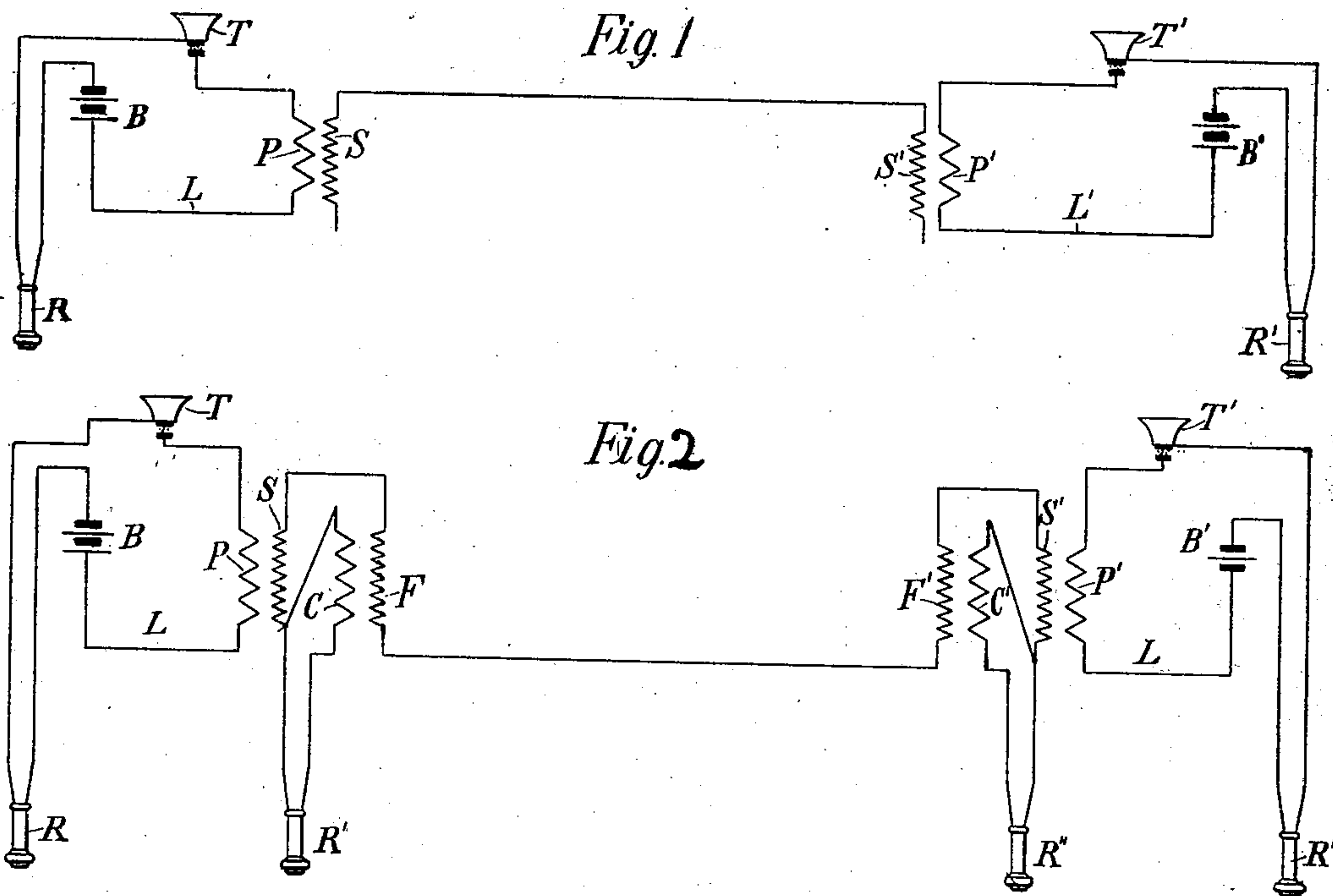


No. 701,794.

Patented June 3, 1902.

C. G. BURKE.
TELEPHONE SYSTEM.
(Application filed Feb. 14, 1901.)

(No Model.)



Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES G. BURKE, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-HALF
TO JOHN Q. A. WHITTEMORE, OF BOSTON, MASSACHUSETTS.

TELEPHONE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 701,794, dated June 3, 1902.

Application filed February 14, 1901. Serial No. 47,191. (No model.)

To all whom it may concern:

Be it known that I, CHARLES G. BURKE, a citizen of the United States, residing in the borough of Brooklyn, in the city of New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Telephone Systems, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

The invention which forms the subject of my present application is an improvement in telephone systems capable of use with what have heretofore been regarded as interrupted or broken circuits, in the sense that they involve as the transmission-line only a single metallic conductor not grounded at either end.

The improvement primarily depends upon a phenomenon which occurs in the use of telephones in connection with induction-coils and which may be thus described: If at the transmitting end of a telephone-circuit an induction-coil be employed in the usual manner, with its short primary in the local circuit of the transmitter and its long secondary in the line, a telephone-receiver at the receiving end with its coil connected directly in the line will respond to the undulations of current transmitted and reproduce the speech or sounds directed into the transmitter with sufficient loudness and distinctness to answer all practical requirements of communication between points not far remote from each other; but, as is well known, the clearness of reproduction decreases to a marked degree with the distance, and the limits of possible communication are soon reached. If, however, a second transformer or induction-coil be used at the receiving end of the circuit, its long fine-wire coil being included in the line and its short coarse-wire coil in a local circuit including a battery, and a telephone-receiver with a coil of low resistance be connected up in such local, the action of the telephone is very greatly improved, and it gives a much louder and clearer effect. I have, however, discovered that with the use of such local circuits containing both the battery and receiver I am enabled to transmit speech practically over a single ungrounded

line-wire, including at each end the long fine-wire coils of the induction-coils, the short coarse-wire coils of which are included in the local circuits.

Referring now to the accompanying drawings, in which I have illustrated in detail the above-described system, Figure 1 is a diagram showing the complete system as applied to a single line-wire or incomplete circuit, and Fig. 2 is a modification of the same.

Referring to Fig. 1, L, L' are the two local circuits at the ends of a line formed by a single ungrounded conductor. In the local circuit L is included a battery B, a transmitter T, a telephone R, and the primary P of an induction-coil, and in a similar manner the local circuit L' contains a battery B', a transmitter T', a telephone R', and a primary P'.

The above-named instruments or devices are or may be of the usual character; but the resistance of the telephone-coils should be quite low, preferably not more than one to three ohms.

In the line or transmission conductor are connected the two secondaries or long fine-wire coils S S' of the induction-coils, as indicated. I have found that in this case the order of connections is not arbitrary, as it is to a large extent in the case of a complete circuit, but that as between the two fine-wire or secondary coils S S' corresponding ends of each must be connected to line—that is, if the outside terminal of S be connected to the line-wire the outside terminal of S' must be similarly connected, else the best result is not secured. If two receivers be used at each end of the line, one connected with the line and the other with the local circuit, greatly improved results will be obtained. Such an arrangement is shown in Fig. 2. In this figure in addition to the parts shown in Fig. 1 I have inserted at each end of the line the fine-wire coils F F' of other induction-coils and have connected the coarse-wire coils C C' to telephones R''. The free ends of the fine-wire coils S S' are also connected to the corresponding ends of the coils C C', as shown. In this case also a certain order of connection must be observed—that is to say, if the outside end of coil S is connected to line the corresponding end of coil S' must also be con-

connected to line, and the additional coils F F' must be connected in the order which would bring their outer ends in connection with the outer ends of coils S S'. The inner ends of the coarse-wire coils C C' must be connected to the inner ends of coils S S', respectively, to secure the best results.

The above-described arrangements of circuits and apparatus I have found to yield much better results than are obtainable with the same class of instrument when used in the ordinary way.

Having now described my invention, what I claim is—

1. In a telephone system the combination of local circuits and a line composed of a single ungrounded conductor, batteries and transmitters included in the locals, induction-coils having one terminal of the fine-wire coils connected to the line conductor and their coarse-wire coils included in the local circuits, and telephone-receivers connected up in the said local circuits, as set forth.

2. In a telephone system the combination with a main line composed of a single ungrounded conductor, of local circuits, induction-coils having corresponding terminals of their fine-wire coils connected to the line con-

ductor, and their coarse-wire coils included in the local circuits, and batteries and telephone-receivers connected up in the local circuits, as set forth.

3. In a telephone system, the combination with an ungrounded line conductor, of local circuits, induction-coils having corresponding terminals of their fine-wire coils connected to the line conductor, and their coarse-wire coils included in the local circuits, batteries and telephone-receivers connected up in the local circuits, supplemental induction-coils having their fine-wire coils connected by corresponding terminals with the fine-wire coils of the first-named induction-coils, and coarse-wire coils in local circuits, the free ends of the fine-wire coils of the said first-named induction-coils being connected with the corresponding ends of the coarse-wire coils of the supplemental induction-coils, and telephone-receivers in the local circuits of the coarse-wire coils of said supplemental induction-coils, as set forth.

CHARLES G. BURKE.

Witnesses:

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