

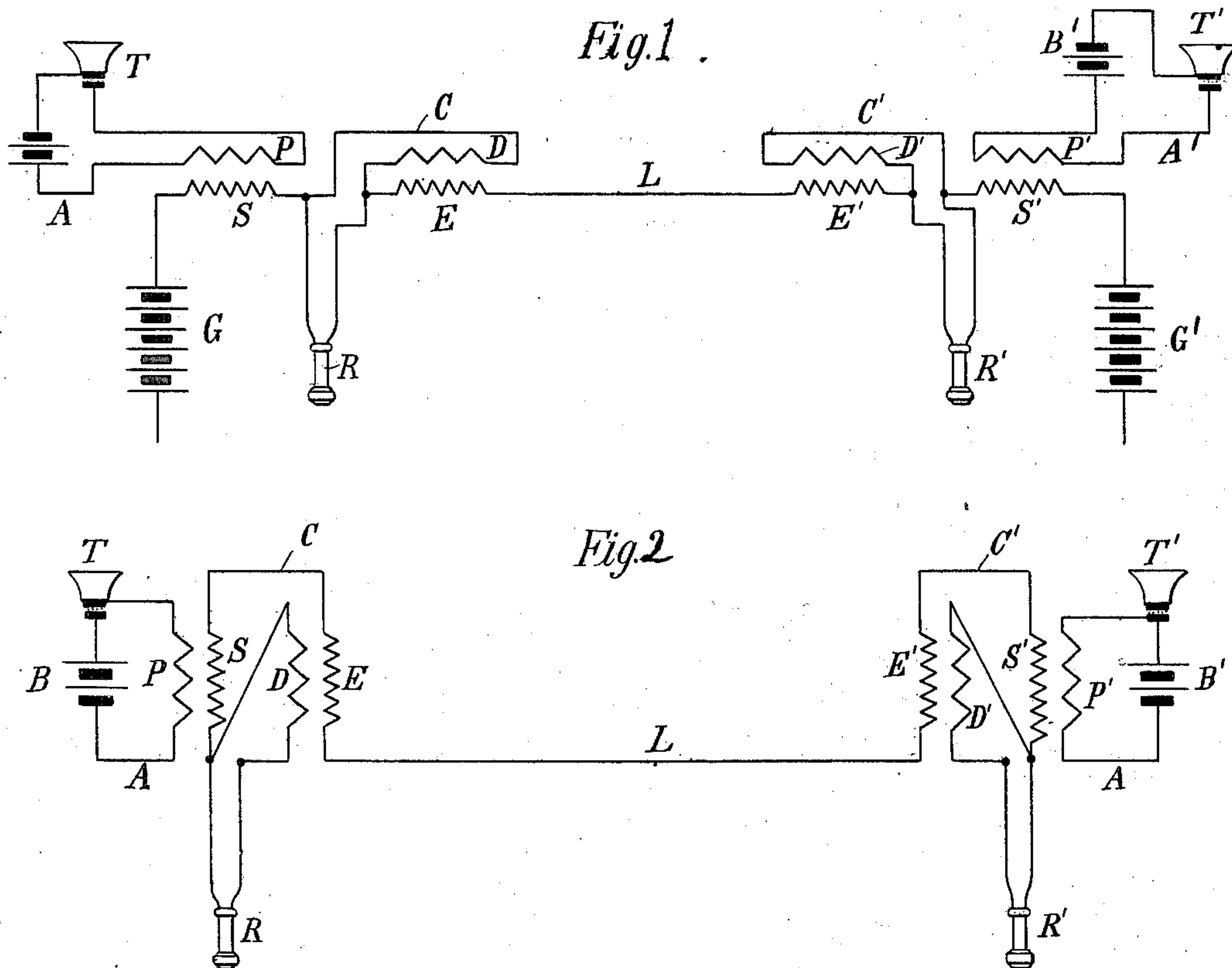
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C. G. BURKE.
TELEPHONE APPARATUS.

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NO MODEL.



Witnesses:

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UNITED STATES PATENT OFFICE.

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TO JOHN Q. A. WHITEMORE, OF BOSTON, MASSACHUSETTS.

TELEPHONE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 736,489, dated August 18, 1903.

Application filed February 14, 1901. Renewed December 20, 1901. Serial No. 86,628. (No model.)

To all whom it may concern:

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

In other applications filed by me, notably No. 36,157, filed November 12, 1900, and No. 47,191, filed of even date herewith, I have shown and described telephone systems involving features by the use of which I am enabled to transmit articulate speech over a single ungrounded conductor used as a line. My present invention is an improvement in systems of this kind; and it consists in another means by which the same result may be accomplished, the underlying principle of which is the utilization, under the special conditions hereinafter described, of undulations or impulses of current in both the line and the local circuits conjointly for the operation of a telephone-receiver.

The means by which I carry out my present improvements are illustrated in the accompanying drawings, in which—

Figure 1 is a diagram illustrating the complete system, and Fig. 2 is a diagram of a modification of the same.

Referring to Fig. 1, L designates a wire or conductor which in my system constitutes the transmission-line, A and A' being the local circuits, containing the transmitters and located at opposite ends of the line. In each transmitter-circuit is a battery B or B' and a transmitter T or T' and the coarse-wire coil P or P' of an induction-coil, the long fine-wire coils S S' of which are connected with and form prolongations of the path of the line-wire L. At each station there is a local circuit C C', containing the coarse-wire coil D or D' of an induction-coil or transformer, the fine-wire coils E E' of the same instruments being included in the line. The local circuits C and C' are, moreover, connected with the line-circuit in such manner as to afford two paths through which the line-circuit is completed, one of such paths including the coarse-wire

coils D or D' and the other the telephone-receivers R or R'. It follows from this arrangement of circuits and instruments that the operation of each receiver is due to the action thereon of the electrical effects or impulses in the line and also to the currents induced in the coils D D' by such line impulses, and I have found that this produces a very pronounced effect upon the telephone-receiver, giving the latter the property of reproducing speech not only much more loudly and distinctly than if it were connected with the line-circuit only or the local circuit only in a complete metallic circuit system, but of being capable of practical use on a single-wire system when used in connection with a special form of terminal for the ends of the wire—for example, when the ends of the line-wire L are connected with similar poles of electric cells or batteries, such as galvanic batteries and polarization-cells, or when connected with condensers or their equivalents G G'. In this arrangement, however, it is necessary to observe a definite order of connection for the coils. For example, if the inner end of the coil E be connected to the line-wire L then the corresponding and inner end of the coil E' must also be connected to the line L, and, furthermore, the opposite end of the coil E must be connected to the corresponding and outer end of the coil D and at the other end of the line the outer end of coil E' to the outer end of coil D'. When this order of connections is followed, the system will be found to give sufficiently good results to admit of its being employed for general practical purposes in lieu of the ordinary metallic circuits heretofore employed in telephone systems.

In lieu of using batteries or condensers as the terminals of the line the free ends of the line-wire may be connected to the local circuit, including the coil D and the telephone-receiver, in the manner illustrated in Fig. 2. In this figure the two fine-wire coils corresponding to coils S and E are shown as connected in series with each other and the line at each station, the outer terminal of one coil, as S, being connected to the corresponding and outer terminal of the other coil, as E. The coarse-wire coil D in this as in the previous cases serves as a secondary to the coil

E, while the inner end of the coil S is connected to the local circuit C at any point intermediate to the inner end of the coil D and the telephone-receiver. I have found that
 5 with this arrangement also speech may be transmitted from the local transmitter-circuit A at one end of the line to the receiver R' at the other end of the line, and conversely, and that the system as thus organized is capable
 10 of being used in the same way and for the same practical purposes as the ordinary metallic circuits are now employed.

I do not claim to be the first inventor of the combination of a single ungrounded line
 15 wire or conductor and condensers connected to the terminals of the said line in a telephone system, but I do claim to be the first inventor of the combination of a single ungrounded line wire or conductor and electric
 20 cells, such as storage batteries, polarization-cells, and primary batteries connected to the terminals of the said line, and I therefore disclaim the combination of a single ungrounded line wire or conductor and accumu-
 25 lators of electricity connected to the terminals of the said line.

What I claim as my invention is—

1. In a telephone system the combination
 30 of an ungrounded line wire or conductor, electric cells connected to the ends of the said

lines, local circuits at the ends of the line, induction-coils having their fine-wire coils connected in the line and their coarse-wire coils connected in the local circuits, and a transmitter in another of the said local cir- 35
 cuits, as set forth.

2. In a telephone system the combination with an ungrounded line wire or conductor, of accumulators of electricity connected to the terminals of said line, local circuits at the
 40 ends of the line, induction-coils having their fine-wire coils connected to the line and their coarse-wire coils included in the local circuits, and telephone-receivers the coils of which are connected to both line and local circuits, 45
 as set forth.

3. The combination in a telephone system of a line composed of a single ungrounded conductor, local circuits at the transmitting
 50 and receiving stations, induction-coils having their fine-wire coils connected with the line-wire and their coarse-wire coils in the local circuits respectively, and telephone-receivers each connected with the line-conductor and one of the local circuits, as set forth.

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Witnesses:

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