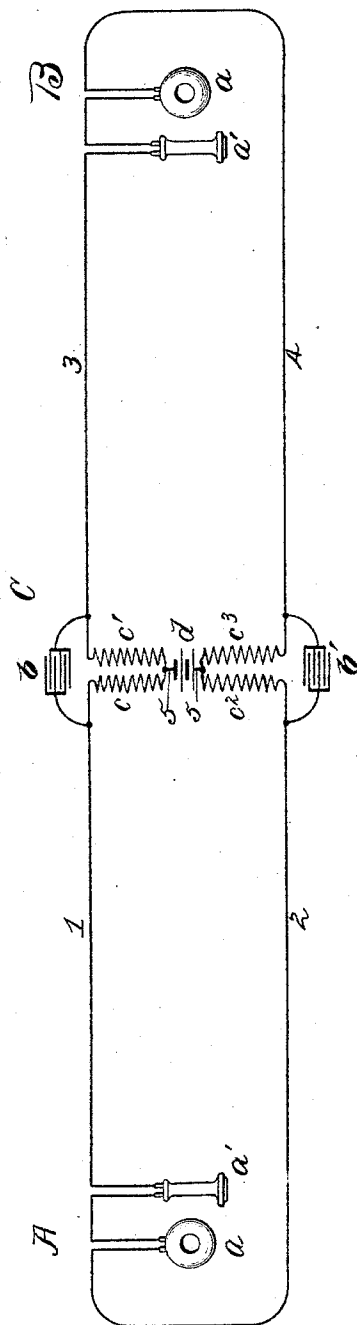


(No Model.)

C. E. SCRIBNER.
TELEPHONE CIRCUIT.

No. 597,786.

Patented Jan. 25, 1898.



Witnesses:
George L. Cragg.
J. K. Ganner.

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UNITED STATES PATENT OFFICE.

CHARLES E. SCRIBNER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTERN
ELECTRIC COMPANY, OF SAME PLACE.

TELEPHONE-CIRCUIT.

SPECIFICATION forming part of Letters Patent No. 597,786, dated January 25, 1898.

Application filed December 18, 1896. Serial No. 616,126. (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-Circuits, (Case No. 433,) 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 supply of current for transmitting-telephones at substations from a centrally-located source of energy. It is designed to improve the articulation and increase the efficiency of transmission in a certain well-known mode of supply in common use.

The mode of current-supply referred to consists in connecting the line conductors of two united lines with the opposite poles of a centrally-located source of current, two mutually-inductive windings of a repeating-coil being interposed in the line conductors, one in the circuit leading to each of the stations. Current flows from the central supply-battery through a winding of the repeating-coil to each of the lines and finds circuit through the transmitting-telephone at the corresponding station. Variations in the current produced by variations in the resistance of one of the transmitting-telephones are propagated into the circuit of the other line through the medium of the repeating-coil. It is found in practice, however, that the repeating-coil impairs the distinctness of articulation and the efficiency of transmission to some extent, possibly by suppressing the undulations of high period to a greater extent than those of lower frequency.

I have discovered that the natural characteristics of the articulation may be restored by connecting a condenser of suitable capacity in a shunt or parallel circuit with the two windings of the repeating-coil through which the different line conductors are united.

The condenser appears to permit the propagation through it most readily of vibrations of high frequency, thus supplying an efficient means of propagating those overtones which the repeating-coil tends to suppress. The two

appliances are in a sense complementary to each other in function.

It is found that in a system thus provided with condensers the telephonic transmission of speech between the stations is effected with remarkable loudness and distinctness of articulation.

It may be mentioned that in ordinary exchange practice the direct or conductive connection of two lines with each other, the source of current being placed in a bridge of the lines, is not attended with satisfactory results, since in the case of a line of low resistance connected with one of high resistance the former diverts the greater portion of the current supplied to the lines from the other, and hence prevents satisfactory transmission from the latter.

The attached drawing illustrates the invention. This represents two substations A and B, united by line-circuits and connected after the manner of my invention with a source of current at an intermediate point. At each of the substations is placed a transmitting-telephone *a* and a receiving-telephone *a'*. The instruments of station A are included in the line-circuit 1 2, which extends to a central office C. Those at station B are contained in a similar line-circuit 3 4, also extending to the same central office. The line conductors 1 and 3 are connected with the opposite plates of a condenser *b*. Wires 2 and 4 are likewise connected with the condenser *b'*. Wires 1 and 3 are further united through two helices *c* and *c'* of a repeating-coil, wires 2 and 4 being likewise united through other windings *c²* and *c³*. These windings are for convenience placed upon the same core. It is only essential, however, that windings *c* and *c'* and windings *c²* and *c³* shall be in inductive relation to each other, respectively. The points of junction of the windings *c c'* and *c² c³* are united by a conductor 5 in which a common source of current-supply *d* is interposed.

Current from battery *d* flows out through winding *c* of the repeating-coil through line conductors 1 and 2 and returns through winding *c²* of the repeating-coil. Current for supplying the transmitting-telephone at station B likewise finds circuit through windings *c'*

and c^3 and line conductors 3 and 4. The current in either line is independent of that in the other, the conductive connection of the lines with each other being interrupted at the condensers. Sounds made before either transmitter cause corresponding variations in the resistance in the transmitter, and hence create corresponding undulations in the current in the line-circuit. These undulations are in part propagated by static induction through the condensers b and b' into the other line-circuit and in part by electromagnetic induction between the windings of the repeating-coil.

The condensers and repeating-coil may be associated with the connecting-plugs and plug-circuit, by means of which it is customary to unite the lines of a telephone-exchange in a switchboard. I have not deemed it necessary to show the accessory apparatus, as it does not enter into the present invention.

I claim as my invention—

1. In combination, a source of telephonic undulatory current and a receiving instrument therefor in a closed conducting-circuit, two windings of a repeating-coil serially included in the circuit, a conductor including a condenser in shunt of the windings of the repeating-coil, and a bridge uniting the point of junction of the windings of the repeating-coil with the other side of the circuit, as described.

2. The combination with a source of telephonic undulatory current and a receiving instrument therefor at different stations, of

a closed circuit including the source of undulating current, another closed circuit including the receiving instrument, a winding of a repeating-coil in each of the circuits, said windings being in inductive relation to each other, and conductors including condensers uniting the different circuits, as described.

3. The combination with a transmitting-telephone and a receiving-telephone at different stations, of a circuit including the instruments at the different stations, two windings of a repeating-coil included serially in the circuit, a bridge of the circuit connected with the point of junction of the said windings, a source of current in the bridge, a conductor in shunt of the said serially-connected windings, and a condenser interposed in the shunt, as described.

4. The combination with a transmitting-telephone and a receiving-telephone at each of two stations and a circuit including the instruments of both stations, of two windings of a repeating-coil included serially in each of the line conductors of the said circuit, a bridge of the circuit from points intermediate of the said windings and a source of current included in the bridge, a shunt about each pair of serially-connected windings, and a condenser in each of said shunts, as described.

In witness whereof I hereunto subscribe my name this 3d day of October, A. D. 1896.

CHARLES E. SCRIBNER.

Witnesses:

ELLA EDLER,
PEARL CLENDENING.