

Aug. 4, 1925.

1,548,028

H. C. EGERTON

TRANSMISSION SYSTEM

Filed Oct. 7, 1918

Fig. 1.

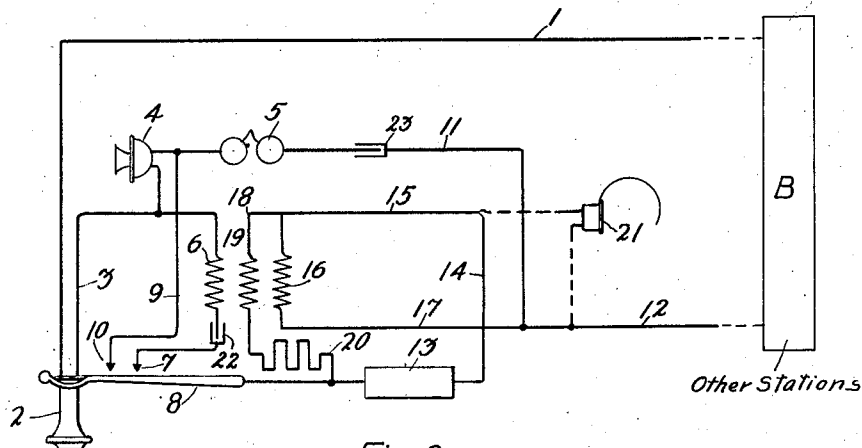
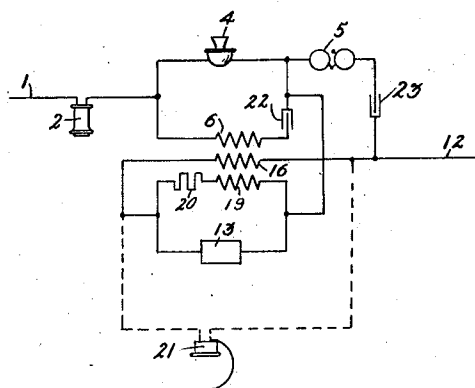


Fig. 2.



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UNITED STATES PATENT OFFICE.

HENRY C. EGERTON, OF RIDGEWOOD, NEW JERSEY, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

TRANSMISSION SYSTEM.

Application filed October 7, 1918. Serial No. 257,099.

To all whom it may concern:

Be it known that I, HENRY C. EGERTON, a citizen of the United States, residing at Ridgewood, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Transmission Systems, of which the following is a full, clear, concise, and exact description.

This invention relates to the transmission of speech and has for its object to provide a substation circuit including a voice recorder so arranged that speech currents received will be very efficiently recorded.

In substation circuits the ordinary side tones from the local transmitter are sometimes of such intensity as to interfere seriously either with the audible reception or the recording of speech. It is commonly the practice, in order to avoid side tone in a receiver to arrange the circuits so that the receiver is in an anti-side tone relation to the circuit and is not affected by local transmitter currents to such an extent as to interfere with the clear reception of speech.

The invention comprises a recorder of any type suitable to record voice currents which is placed in anti-side tone relation with the circuit, and a receiver of the usual type which is placed in a substantial side tone relation with the circuit. The full side tone produced in the receiver causes the talking subscriber to soften his tones, which in turn leads the responding subscriber to talk louder and thereby produce a better impression on the recorder.

The invention is illustrated in the drawing, of which Fig. 1 represents a substation circuit adapted to employ my invention; and Fig. 2 a diagrammatic representation of the circuits involved, arranged in a simplified manner. Similar parts in the two figures have the same numerals attached thereto.

As illustrated, line wire 1 leads to a receiver 2, and thence by wire 3 by one path to transmitter 4 and bells 5 and by another path to coil 6, condenser 22 and contact 7 of the receiver-arm switch 8. A wire 9 leads from contact 10 of the switch to the far side of transmitter 4. From bell 5 a wire 11 leads through a condenser 23 to the other line wire 12. The rear of switch 8 is connected to a voice recorder 13 of any suitable type, and from this a wire 14 connects with a wire 15 which leads through a coil

16 to a wire 17, connecting to line wire 12. From wire 15 a wire 18 leads through a coil 19 and net-work 20 to a point between voice recorder 13 and the switch 8. This net-work 20 comprises a suitable resistance, capacity or inductance, or any combination of the three. The value of these units are so predetermined that the impedance of the net-work will, for instance, balance that of the line and the remainder of the substation apparatus. A receiver 21 may be used in place of receiver 2, or in conjunction therewith, and may be connected between wire 15 and wire 17, as shown by the dotted lines. The blocked portion B represents one or more other substations on the line which may or may not be similar to the circuit shown.

It will be noted therefore (see Fig. 2) that for an incoming current over line wire 1, when arm 8 is raised by lifting receiver 2 therefrom, two circuits in series are provided, each having a plurality of parallel branches. The first has the transmitter 4 in one branch, and coil 6 in the other. The second has the net-work 20 and coil 19 in one branch and a voice recorder 13 in the other. These two circuits are in series with each other, and a coil 16 and the line wire 12. The coils 6, 16 and 19 are so arranged as to interact: and the various impedances in the substation circuit and in the line are of such values that when local conversation is taking place only a predetermined amount of side tones therefrom reaches the voice recorder, but it does affect either receiver 2 or 21, or both, if both are used, since they are in substantially full side-tone relation with the line. This anti-side tone circuit is described and claimed in a pending application to K. S. Johnson, Serial No. 210,265, filed January 4, 1918, issued as Patent No. 1,396,760, Nov. 15, 1921, and entitled Signaling circuits.

In the actual operation of the substation, when a call is received, the receiver 2 or 21 is raised from the hook, and the local subscriber may talk. When he does so the substantial side-tone relation of his receiver causes a loud sound in it, due to the transmitter currents generated by local speech. The voice recorder, however, is less affected by such locally generated currents because of its anti side-tone relation with the circuit. The effect of side-tone in the receiver

causes the local subscriber to unconsciously speak more quietly. When he does so the speech currents received by the distant subscriber, being weak, cause the distant subscriber to assume that the transmission is weak, owing to a long line or other causes, and he will speak more forcefully into his transmitter and thereby cause the voice currents received at the local subscriber's station to be much stronger than normal, thereby obtaining a very much stronger impression on the voice recorder than would otherwise be the case.

What is claimed is:

15 1. A substation circuit comprising a transmitter for converting energy of sound waves into electrical energy, a receiver in side tone relation therewith for converting a part of said electrical energy from said transmitter and electrical energy received from a distant station into sound waves, a second receiver, and means for causing said second receiver to receive a large proportion of the electrical energy from said distant station and a smaller proportion of said electrical energy from said transmitter.

2. A transmission system comprising a distant station, a substation circuit to receive electrical energy from said distant station, a transmitter in said circuit for converting sound waves into electrical energy, a receiver in said circuit in a substantial side-

tone relation therewith, a voice recorder in said circuit, and means for causing said voice recorder to receive a large proportion of said electrical energy from said distant station and a smaller proportion of said electrical energy from said transmitter.

3. A transmission system comprising a substation, said station comprising a coil, a receiver in series therewith, a plurality of circuits also in series therewith, a transmitter and a coil in parallel in one of said circuits, and a voice recorder in parallel with a coil and a net-work in another of said circuits.

4. A transmission system comprising a distant station, a substation circuit to receive electrical energy from said distant station, a transmitter in said circuit for converting sound waves into electrical energy, a receiver in said circuit in a side-tone relation therewith, a second receiver in said circuit, and means for causing said second receiver to receive a large proportion of the electrical energy from said distant station and a smaller proportion greater than zero of the electrical energy from said transmitter.

In witness whereof, I hereunto subscribe my name this 24th day of September, A. D., 1918.

HENRY C. EGERTON.