

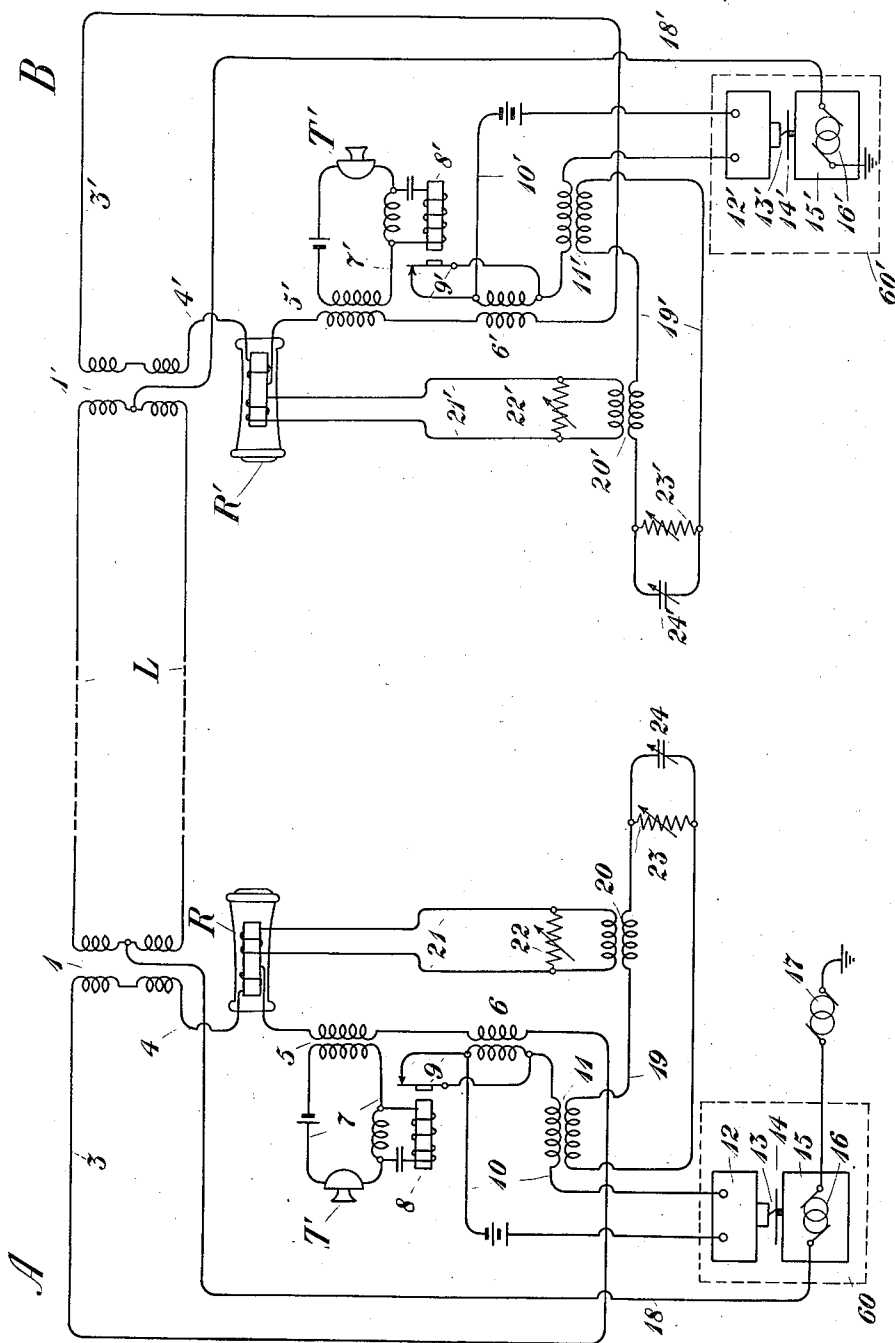
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R. D. PARKER

SECRET COMMUNICATION SYSTEM

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SECRET-COMMUNICATION SYSTEM.

Application filed December 26, 1919. Serial No. 347,305.

To all whom it may concern:

Be it known that I, RALZEMOND D. PARKER, residing at Brooklyn, in the county of Kings and State of New York, have invented certain Improvements in Secret-Communication Systems, of which the following is a specification.

This invention relates to transmission systems and more particularly to a method of and means for insuring secrecy in the transmission of messages over such systems.

It is a general purpose of the invention to provide a system of telephonic communication wherein secrecy may be assured in the transmission of messages between distant stations, so that unauthorized persons who may have access to the medium through or over which the messages are transmitted will not be able to obtain information from such messages. The secrecy arrangements of this invention are applicable to both radio telephone systems and to telephone systems employing metallic conductors as the medium of transmission. Accordingly the arrangements of the invention provide means for preventing the possibility of information being obtained from a telephone system either by tapping the wires by direct metallic connection or inductive connection or by being tuned to the frequency of the sending station in a radio system. Other features and purposes of the invention will appear more fully from the detailed description hereinafter given.

In the arrangements of the invention an electromotive force varying in magnitude and frequency according to a predetermined plan or scheme is superimposed on the telephone circuit at the sending station where the telephone conversation originates in order to mutilate the original telephonic variations or signals and render them unintelligible when transmitted out from the sending station. At the receiving station an electromotive force exactly similar in magnitude, but opposite in phase to the voltage of the disturbing electromotive force as received is simultaneously impressed on the telephone receiving circuit or instrument to completely neutralize the disturbing effect and thus to render the original voice currents intelligible in a receiver. The electromotive forces, thus superimposed on the circuit at the sending and receiving stations, should preferably

be within the voice range of frequencies and should be made to vary in synchronism and in identical manner at each station. The method of varying these electromotive forces may be in accordance with any desirable but predetermined scheme or plan known only at each end of the system. Accordingly by preserving secrecy as to the method or scheme of varying the disturbing electromotive forces or by constantly changing the plan or scheme therefore at each end, it will be practically impossible for one who has unauthorized access to the medium through or over which the messages are transmitted to obtain the information contained in such messages.

The invention may be more fully understood from the following description taken in connection with the accompanying drawing in the figure of which is illustrated a circuit diagram embodying the arrangements of the invention as applied to a telephone system employing a metallic line as the transmitting medium.

In the drawing is shown a transmission line L interconnecting two stations A and B. At station A is shown a local circuit including conductors 3 and 4, which circuit is coupled to line L through transformer 1. Included in the circuit of conductors 3 and 4 is one of the differentially arranged windings of the telephone receiver R, and windings of the transformers 5 and 6. Transformer 5 serves to connect to circuit 3, 4, a circuit 7 which includes the usual type of telephone transmitter T and a voice operated relay 8. The transformer 6 associates with circuit 3, 4, a circuit 10 with which is associated the device 60. The device 60 may be any suitable device which will produce an electromotive force which may be made to vary in accordance with a predetermined plan or scheme and is herein shown for purposes of illustration as comprising a phonograph transmitter 12, which may be of the type illustrated in U. S. Patent No. 1,246,895, issued November 20, 1917, to H. C. Egerton. The phonograph transmitter 12 is actuated by the needle 13 moving across the phonograph record 14. The phonograph instrument 15 is operated by the motor 16, which in turn is run by the generator 17. Accordingly the device 60 will produce in circuit 10 an electromotive force within the voice range of

frequencies which will be constantly varying and furthermore which will vary in accordance with a known plan or scheme, as determined by the character and selection of the record 14. It is understood that the specific arrangement of the elements of device 60 have been shown for purposes of illustration only, and that any device which is capable of producing an electromotive force suitable for distorting the voice currents and which may be varied in a known and desired manner may be utilized in this connection. Associated with circuit 10 by means of the transformer 11 is the circuit 19 which includes the variable resistance 23 and the variable capacity 24. Circuit 19 is coupled to a circuit 21 through a transformer 20. Associated with circuit 21 is the variable resistance 22 and one of the differentially arranged windings of the receiver R. The circuit arrangements and apparatus associated with station B are similar to those at station A and no further description thereof will be given. Similar reference numerals with the added designation of " ' " have been utilized for reference to like elements and arrangements at station B with respect to station A. It is furthermore pointed out that the motors 16 and 16' of the phonographs at each station are connected in series with each other and the generator 17 over conductors 18, 18', and the sides of line L operating as a phantom circuit, so that the devices 60 and 60' will operate synchronously.

The operation of the arrangements of the invention is as follows; the telephonic variations produced in circuit 7 by the operation of transmitter T at station A will be transmitted through transformer 5 and thence over circuit 3, 4, and through the transformer 1 to the line L. These telephonic variations in circuit 7 will furthermore actuate the voice operated relay 8 which will open a normally closed shunt 9 around the left hand winding of transformer 6. The device 60, which may be operating continuously, will be producing in circuit 10 an electromotive force constantly varying in accordance with the actuations of the transmitter 12 by the phonograph mechanism and these variable electromotive forces will be within the voice range of frequencies. Accordingly when the telephonic variations in circuit 7 actuate the voice operated relay 8 and open shunt 9 about the left hand winding of transformer 6, the constantly varying electromotive force produced in circuit 10 by device 60 will impress through transformer 6 on to circuit 3, 4, a constantly varying current which will serve to distort and render unintelligible the telephonic variations from circuit 7. The telephonic variations, distorted and rendered unintelligible in this manner, will then be transmitted over

line L to station B where they will be transmitted through transformer 1' and over circuit 3', 4', which includes the right hand winding of receiver R'. The device 60' at station B, which is operating in synchronism with device 60 at station A, will be producing an electromotive force equal in magnitude and of the same characteristics as that produced by device 60 and utilized to distort and render unintelligible the outgoing telephonic variations from station A. This electromotive force produced by device 60' will impress a current on circuit 10', which current will be transmitted through transformer 11', over circuit 19', through transformer 20', and over circuit 21', and through the left hand one of the differentially arranged windings of receiver R'. Circuits 19' and 21' include the arrangements 23' and 22' of variable resistance and the variable capacity 24'. By adjusting these resistances and capacity the above mentioned current produced by device 60' and transmitted through the left hand winding of receiver R' may be made to be opposite in phase and equal in magnitude to the distorting current produced by device 60 and superimposed on the telephonic current outgoing from station A and transmitted through the right hand winding of receiver R'. As the windings of receiver R' are arranged differentially and as the currents from devices 60 and 60' are equal in magnitude and opposite in phase to each other when transmitted through said windings, then said currents will neutralize each other and will not have any effect on the receiver R' and the receiver will respond only to the telephonic variations transmitted from station A. These telephonic currents, while being transmitted from station A to station B, will be so distorted however that they will be unintelligible to anyone who might have access to the line L.

Arrangements are provided at station B, similar to those already described with respect to station A, for transmitting telephonic currents from station B to station A and for rendering said telephonic currents unintelligible while being transmitted over line L by superimposing thereon a constantly varying distorting current. In order to neutralize this distorting current at the receiver at station A there is provided the circuits 19 and 21, which includes the resistance 23 and 22 and the capacity 24, which are similar to the arrangements already described with respect to station B and which operate in a similar manner to neutralize in the receiver circuit at station A the distorting current applied at station B so that the receiver at station A will be operated only by the incoming telephonic variations from station B.

While the invention has been illustrated

as associated with a telephonic system employing metallic conductors, such as line L, as the medium of transmission, it is pointed out that its use is not so limited but that it may equally well be used in radio telephone systems. Furthermore while the arrangements of the invention are desirable in maintaining secrecy in the transmission of messages of a telephonic nature, it is understood that they may equally well be utilized for maintaining secrecy on systems wherein the nature of the messages may be other than telephonic. Accordingly while the arrangements of the invention have been illustrated as embodied in certain specific arrangements which are deemed desirable it is understood that they are capable of embodiment in many and widely varied forms without departing from the spirit of the invention as defined by the appended claims.

What is claimed is:

1. In a transmission system including a sending station and a receiving station the method of maintaining secrecy in the transmission of messages between stations which consists in mutilating and distorting the outgoing message currents by superimposing thereon at the sending station a current of continuously varying frequency, and in neutralizing the effect of said superimposed current at the receiving station.

2. In a transmission system including a sending station and a receiving station the method of maintaining secrecy in the transmission of messages between stations which consists in mutilating and distorting the outgoing message currents by superimposing thereon at the sending station a current of continuously varying frequency and in neutralizing the effect of said superimposed current at the receiving station by applying to the receiving circuit simultaneously with said superimposed current a current equal in magnitude and opposite in phase thereto.

3. In a transmission system including a sending station and a receiving station the method of maintaining secrecy in the transmission of messages between stations which consists in mutilating and distorting the outgoing message currents by superimposing thereon at the sending station a current of continuously varying frequency and in neutralizing the effect of said superimposed current at the receiving station by applying to the receiving circuit simultaneously with said superimposed current a current equal in magnitude and opposite in phase thereto.

4. A transmission system including a sending station and a receiving station, means for transmitting telephonic currents between said stations, a source at said sending station generating currents of continually varying characteristics, means for su-

perimposing said currents on the telephonic currents outgoing from said sending station, a receiving circuit at said receiving station, a source at said receiving station generating currents of characteristics varying in an identical manner with the currents from the source at said sending station, and means for applying the currents from said second mentioned source to said receiving circuit simultaneously with and in opposite phase relation to said superimposed currents.

5. A transmission system including a sending station and a receiving station, means for transmitting telephonic currents between said stations, a device at said sending station constantly generating current of characteristics varying continuously and in accordance with a predetermined plan, means for superimposing said current on said telephonic currents outgoing from said sending station, a receiving circuit at said receiving station, a device at said receiving station constantly generating current of characteristics varying continuously and in accordance with the same predetermined plan as the device at said sending station, means for applying the current from said second device to said receiving circuit in opposite phase relation to that of the current from said first device, and means for operating said devices in synchronism.

6. A transmission system including a sending station and a receiving station, means for transmitting telephonic currents between said stations, a device at said sending station constantly generating current of characteristics varying continuously and in accordance with a predetermined plan, means for superimposing said current on said telephonic currents going out from said sending station, a receiving circuit at said receiving station, a telephone receiver including two windings arranged differentially, one of said windings being included in said receiver circuit, the other of said windings being included in a local circuit, a device at said receiving station constantly generating current of characteristics varying continuously and in accordance with the same predetermined plan as the device at said sending station, means for applying the current from said second device to said local circuit and the differentially arranged receiver winding included therein in opposite phase relation to the superimposed currents transmitted through the differentially arranged winding in said receiver circuit, and means for operating said devices in synchronism.

In testimony whereof, I have signed my name to this specification this 23rd day of December, 1919.

RALZEMOND D. PARKER.