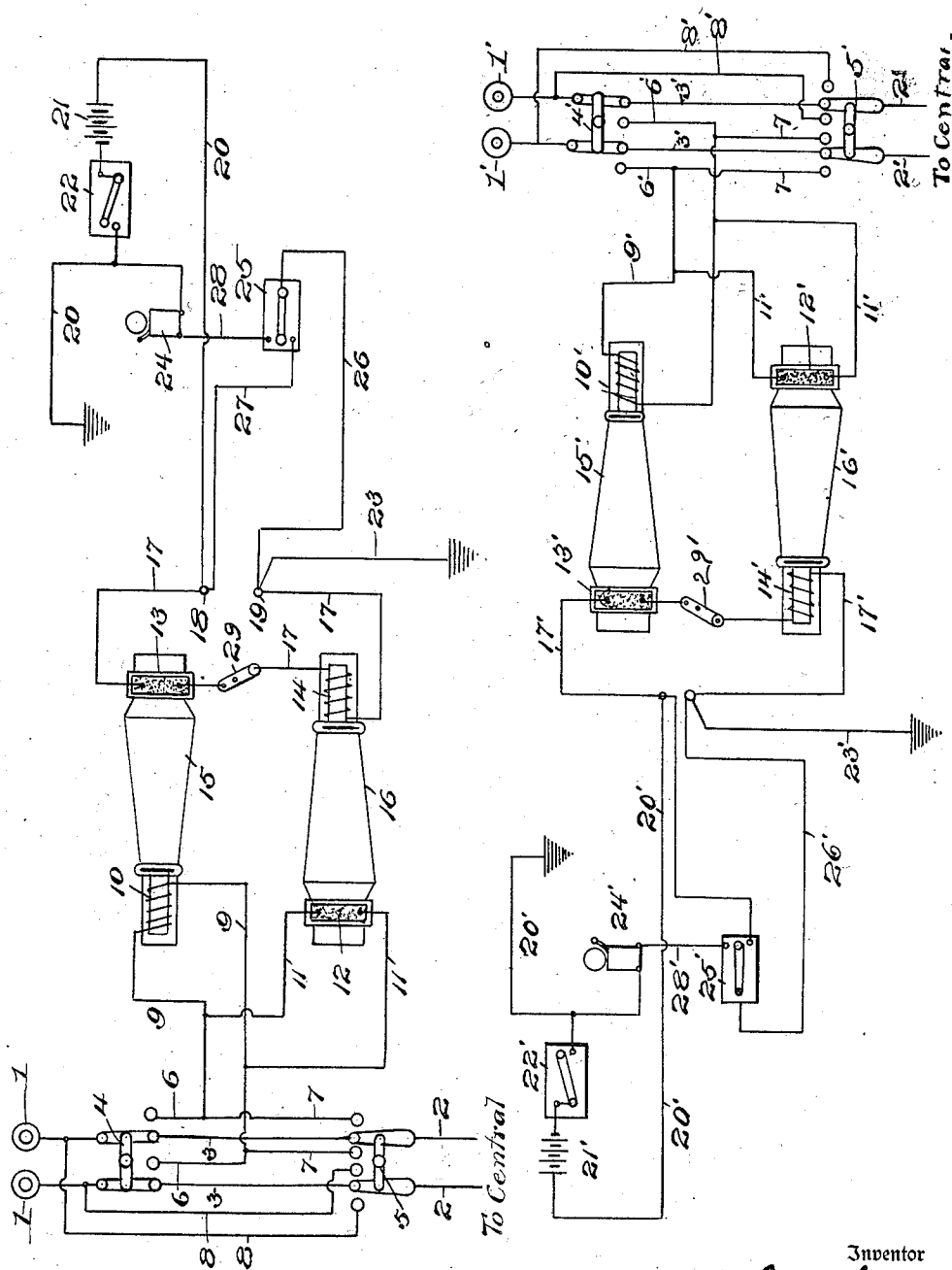


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 COMBINED WIRE AND WIRELESS TELEPHONE SYSTEM.
 APPLICATION FILED OCT. 8, 1910.

996,088.

Patented June 27, 1911.



Witnesses

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MAURICE BERNAYS JOHNSON, OF SAN ANTONIO, TEXAS.

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Application filed October 6, 1910. Serial No. 585,541.

To all whom it may concern:

Be it known that I, MAURICE BERNAYS JOHNSON, a citizen of the United States, and a resident of San Antonio, in the county of Bexar and State of Texas, have made and invented certain new and useful Improvements in Combined Wire and Wireless Telephone Systems, of which the following is a specification.

10 My invention relates to a combined wire and wireless telephone system to be used in connection with a central office or exchange so that a person at a remote end of a wire transmission line may carry on a conversation with a person at the remote end of another wire transmission line over a space a portion of which may not readily be traversed by a wire transmission line. Such a system is desirable, as an example, in a case where there are two central stations or exchanges with a river, or other space across which it is difficult or inconvenient to establish a wire line, intervening, under which circumstances a wireless system may be installed for communication across the river, the same being controllable from both exchanges, in which case anyone connected by telephone with either exchange may converse with anyone connected with the other through the wireless portion of the system considered as a whole.

With the premises in mind, my invention consists in the combined wire and wireless telephone system illustrated in the accompanying drawing, described in the following specification, and particularly claimed in the clauses of the concluding claim, and in such variations and modifications thereof as will be obvious to one skilled in the art to which my invention relates.

In the drawing the figure is a view illustrating in diagram, my invention.

1, 1 designate terminals with which a subscriber's wire line is connected, and 2, 2 are wires leading to the operator at the central station, communication being established through the wires 3, 3 and through two double pole switches 4 and 5. 6, 6 are wires through which the subscriber may be placed in communication with the wireless apparatus, 7, 7 are wires through which the central operator may secure communication with the wireless apparatus, and 8, 8 are wires through which the central operator may listen to ascertain when the subscriber has ceased to use the system. Each wire 6

has two branches, one 9 of which extends to a receiver 10 while the other branch 11 extends to a transmitter 12, the receiver and transmitter being thus connected in parallel with the wires 6 as is usual in telephonic apparatus. The receiver 10 and transmitter 12 are connected respectively, with a transmitter 13 and a receiver 14 by means of conduits in the form of flaring horns 15, 16, a receiver, for example, 10, its transmitter 13 and horn 15 forming an instrument for amplifying the sound waves generated by the vibration of the iron diaphragm of the receiver frequently designated as a telephonic relay. The transmitter 13 and receiver 14 are connected by wires 17, 17 with terminals such as binding posts 18, 19, the receiver and transmitter being shown as connected in series and a switch 29 being located at some point in the circuit 17 for the purpose hereinafter stated. The terminal 18 is connected with the ground through a wire 20 which extends through a battery 21 and a switch 22; and the terminal 19 is connected with the ground by means of a wire 23, the ground connections of these wires being some distance from one another.

24 is a bell, and 25 is a switch adapted to establish communication with the wire 26 connected with the terminal 19 and either the wire 27 leading to the terminal 18 or with the wire 28 leading to the bell 24, or, when the switch is in the middle position shown break both the circuits 26, 27 and 26, 28.

The apparatus thus far described and shown in the upper part of the figure constitutes one end of the wireless telephone system and the switching arrangement whereby the central operator may connect a subscriber with the wireless system. The other wireless station, or the other end of the system, is like the one above described and is shown in the lower portion of the figure, and without specifically referring to each element of the second system, prime numbers such as 1', 2', 3', etc., applied to the lower portion of the figure indicate in every case like elements appearing in the upper portion of the figure and hereinbefore specifically described.

Such being the construction of my improved combined wire and wireless telephone system, the operation thereof is as follows: A subscriber at the remote end of the wire line terminating at 1, 1 who desires

to talk over the wireless portion of the system and to one at the remote end of the wire line terminating at 1' 1' will call the central operator over the connections 4, 3, 5, 2 and express his requirements, whereupon wireless communication is established between the two wireless stations, but not as yet directly between the person who wishes to speak and he whom he wishes to speak to, as follows: The switch 29 is opened to protect the receiver and transmitter, the switch arm of the switch 25 is moved into its lower position, and the switch 22 closed; whereupon current will flow from the battery 21 through switch 22, through wire 20 to ground through wires 23 and 26' through switch 25, wires 27 and 20 to battery.

At such times as the wireless system is not in use the switch arm of the switches 25, 25' will be in upper position and the switches 22, 22' will be open, and, such being the condition of the switches in the second station, current flowing through the earth from the first station as above explained will flow to the second station and through the wire 20', bell 24', wire 28', switch 25' and wires 26', 23' to ground, thus ringing the bell 24'. The operator at the second station upon receiving a signal will close the switch 22' and place the switch arm of the switch 25' in its middle position, and, the operator, at the first station having done likewise and closed the switch 29 after sending out a signal, a telephone circuit is established from the transmitter 13 through the wires 17 and 20, battery 21, switch 22 and wires 20 to ground: to the distant station, through wires 23', 17', receiver 14', wire 17', switch 29', transmitter 13', wires 17' 20', battery 21' switch 22' and wire 20' to ground; and back to the first station and through wires 23 and 17, receiver 14, wire 17, and switch 29 to the place of beginning. Telephonic communication being thus established through the wireless portion of the system, the double pole switches 4 and 4' are moved to the right and left, respectively, whereupon the speaker at the remote end of the wire line 1 1' is placed in communication with the wire line 1' 1' and may converse with a person at the remote end thereof, the vibrations of the diaphragms of the receivers 10 and 10' being amplified so as to increase the magnitude of the sound waves which act upon the transmitters 13 and 13', as will be understood.

The double pole switches 5 and 5' are for the purpose of enabling the central stations to converse over the wireless section of the system, or to converse with the person at the end of either wire line; and the switches are movable to connect with the wires 8 and 8' in order that either operator may listen in order to determine whether the conversation has been concluded.

Having thus described my invention and

explained the mode of operation thereof, what I claim and desire to secure by Letters Patent is:

1. In a combined wire and wireless telephone system, a wire line; wireless telephone instruments; a switch whereby said wire line may be connected with said wireless instruments; other wireless telephone instruments located at a distance from said first mentioned instruments; a second wire line; a second switch whereby said second wireless instruments may be connected with said second line; and means whereby wireless communication may be established across the space between said two sets of wireless telephone instruments.

2. In a combined wire and wireless telephone system, a central station; a wire line leading thereto; wireless telephone instruments connected with said central station; two switches at said station one for connecting said wire line with said wireless instruments and the other for connecting said wireless instruments with the central operator; a second central station located at a distance from said first station; a wire line leading therefrom; a second set of wireless telephone instruments connected with said second central station; and two switches at said second station one for connecting said second wire line with said second wireless instruments and the other for connecting said second wireless instrument with the operator at the second central station.

3. In a combined wire and wireless telephone system, a wire line, a telephone receiver connected with said line, a telephone transmitter operated from said receiver, and wires whereby said transmitter is connected with the earth, said instruments, collectively, being located at one end of a space across which wireless communication is to be established; and other instruments located at the other end of the space aforesaid and among which are a telephone receiver, wires whereby said receiver is connected with the earth, a telephone transmitter operated from said receiver, and a wire line connected with said transmitter.

4. In a combined wire and wireless telephone system, a wire line, a telephone receiver, a switch whereby said wire line may be connected with either a central operator or with said receiver, a telephone transmitter operated from said receiver, and wires whereby said transmitter is connected with the earth, said instruments, collectively, being located at one end of a space across which wireless communication is to be established; and other instruments located at the other end of the space aforesaid and among which are a telephone receiver, wires whereby said receiver is connected with the earth, a telephone transmitter operated from said receiver, a wire

line, and a switch whereby said wire line may be connected with either a central operator or with said transmitter.

5 In a combined wire and wireless telephone system, a wire line, a telephone receiver connected with said line, and a telephone transmitter operated from said receiver, said instruments, collectively, being located at one end of a space across which
10 wireless communication is to be established; other instruments located at the other end of the space aforesaid and among which are a telephone receiver, a telephone transmitter operated from said receiver, and a wire line
15 connected with said transmitter; and means whereby wireless communication may be established between said first mentioned transmitter and said second mentioned receiver.

6. In a combined wire and wireless telephone system; a wire line; wireless telephone instruments adapted to be connected with said wire line, said instruments being connected with the earth by means of wires; other wireless telephone instruments located at a distance from said first mentioned

instruments and connected with the earth by means of wires; and a second wire line adapted to be connected with said second mentioned wireless telephone instruments.

7. In a combined wire and wireless telephone system; a wire line; wireless telephone instruments adapted to be connected with said wire line; other wireless telephone instruments located at a distance from said first mentioned instruments; a second wire line adapted to be connected with said second mentioned wireless telephone instruments; and means whereby wireless communication may be established across the space between said two sets of wireless telephone instruments.

Signed at New York, borough of Manhattan, in the county of New York and State of New York, this 30th day of September, A. D. 1910.

MAURICE BERNAYS JOHNSON.

Witnesses:

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