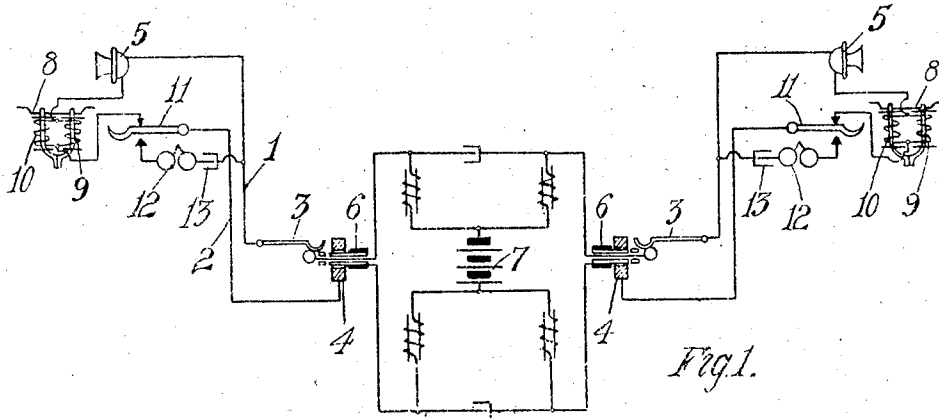
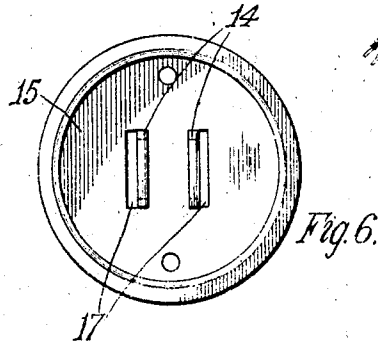
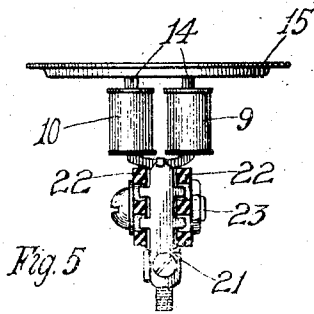
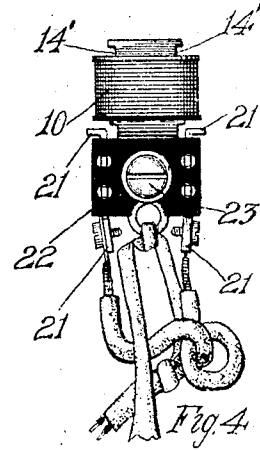
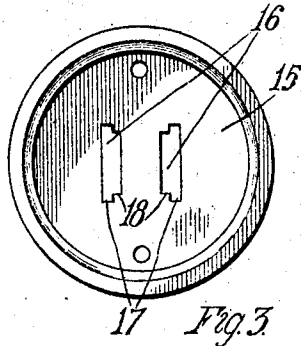
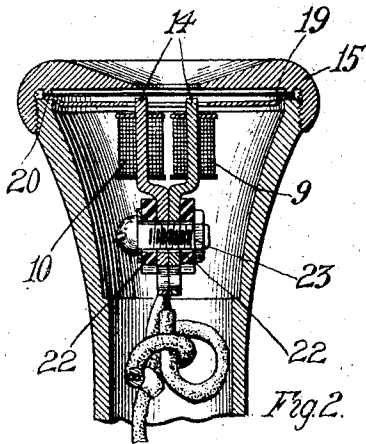


1,055,988.

Patented Mar. 11, 1913.



Witnesses:

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UNITED STATES PATENT OFFICE.

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TELEPHONY.

1,055,988.

Specification of Letters Patent.

Patented Mar. 11, 1913.

Application filed June 15, 1909. Serial No. 502,243.

To all whom it may concern:

Be it known that I, ELMER R. CORWIN, 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 Telephony, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to telephony, and has for one of its objects the provision of a telephone exchange system wherein the common battery may be employed for energizing the receivers at sub-stations when the lines are united in conversation.

I will explain my invention very fully by reference to the accompanying drawing, in which—

Figure 1 is a diagrammatic view illustrating a telephone exchange system equipped in accordance with the preferred embodiment of the invention. Fig. 2 is a longitudinal sectional view of a receiver (a part of its casing being absent) made in accordance with the preferred embodiment of the invention. Fig. 3 is a plan view of a plate adapted to be secured with respect to the receiver casing. Fig. 4 is a view showing the electro-magnet structure, one of the plates shown in Fig. 3 being absent. Fig. 5 is an elevation showing the assembly of the structures illustrated in Figs. 3 and 4. Fig. 6 is a plan view of the structure shown in Fig. 5. Like parts are indicated by similar characters of reference throughout the different figures.

I have illustrated metallic circuit telephone lines, but it is to be understood that the invention may be employed with grounded lines.

The sides 1 and 2 of each telephone line illustrated extend to the exchange, where they are connected with the tip and sleeve contacts 3, 4 of a jack switch. At each of the substations I have illustrated a transmitter 5, which is preferably included serially in the line between the sides thereof, battery current being supplied to the transmitter when the cord circuit illustrated at the exchange is connected with the line extending to the station where the transmitter is located. I have illustrated at the exchange a plug 6 and a common battery 7, which common battery is shown connected

in a conventional manner between the sides of the cord circuit for the purpose of supplying the transmitter with current as stated. I have not indicated at the exchange any signaling apparatus, nor any of the operator's telephonic apparatus, as these are so well known as not to require illustration. I have shown my improved receiver 8 at each telephone sub-station, and will first describe the circuit relation thereof in connection with Fig. 1 and will thereafter describe the structural characteristics thereof in connection with the remaining figures. This telephone receiver does not have a permanently magnetized core, but, instead, has a readily-magnetizable and demagnetizable iron core which is formed to present its polar ends to the receiver diaphragm, the polar ends of the core carrying the voice current windings 9 and 10, which are in parallel relation with each other and together are in serial relation with the line and the transmitter, these voice current windings performing the double function of energizing the core of the receiver due to the passage of direct current from the battery 7 through said windings and also being responsive to voice currents passed over the lines, the windings 9 and 10 being wound to present little impedence to the voice currents but being of sufficiently low resistance to permit of the proper transmission of current from the common battery, the ohmic resistance of each of the windings being preferably fifty ohms. The windings 9 and 10 are so related to each other and to the common battery, that they will so magnetize the core of the receiver as to cause one pole of said core to have a positive sign and the other pole of said core to have a negative sign. The joint resistance afforded by these windings is thus equal to one-half of the resistance that is presented by each winding alone. By this arrangement, therefore, I am enabled to secure a receiver which is well adapted to respond to incoming telephonic currents and which at the same time is well adapted to permit of the transmission of current from the energizing source 7 through the receiver, for the purpose of energizing it, and through the transmitter 5, for the purpose of supplying the same with operating current. I have illustrated at each telephone station a switch-hook 11 having an upper contact for including the re-

ceiver and transmitter in serial relation with the line when the switch-hook is relieved of the weight of the receiver and for including the signal bell 12 and condenser 13 in bridge of the line when the switch-hook supports the receiver.

I will now describe the improved structural characteristics of the receiver of my invention.

The core of the telephone receiver is made up of two core portions 14 that are of strip iron, the polar ends of these core portions being surrounded by the voice current coils 9 and 10, while the other ends of said core portions 14 are closely approached and firmly united to constitute the neutral portion of the core. Thus the core portion of the receiver is comprised of two strip iron pieces mechanically united at their rear adjacent ends to bring said core portions into the same magnetic circuit and are spread apart at their polar ends in order to permit of the disposition of the windings 9 10 about said polar ends. In this feature of my invention, the core portions are preferably formed of soft metal, but inasmuch as this feature of my invention is of a structural nature, I do not wish to be limited to the use of soft iron for the core portions. The polar portions of the receiver core are notched at 14¹ just back of the polar faces of the core and in front of the voice coils 9 10.

A shallow pan 15 has its base provided with two apertures 16 that are shaped at their outer sides 17 to permit the polar portions of the receiver to pass therethrough and are shaped at their inner sides 18 only to receive the portions of the polar extremities of the core that are reduced by the notches at 14¹, the height of the notches at 14¹ being such as to correspond with the thickness of the pan 15, so that the bottom of said pan may be slipped into said notches when the pan bottom is brought into register with said notches. In assembling the parts, the portions of the core are engaged with the pan bottom in the manner which has been described, whereafter the portions forming the core are clamped together, whereby the pan 15 and the core of the receiver are very firmly interlocked. The rim of the pan 15 is sufficiently elevated from the bottom thereof as to permit the diaphragm 19 to rest within operative range of the polar faces of the core portion 14. The pan is fastened to some suitable form of casing, such as that illustrated at 20. By the arrangement which I have described, the voice coils are upon one side of the pan and the polar projections of the receiver core are upon the other side of the pan. When the pan bottom and the core are to be interlocked, a relative lateral movement is brought about

between the core and the pan bottom, a reverse lateral movement permitting of the disengagement of the pan bottom and core.

The conductors which lead to the voice current winding are provided each with a terminal 21 formed preferably out of thick strip brass, these terminals, in turn, being connected with the joint terminals of the receiver coils. These terminals are disposed between two strips of insulation 22 which have interlocking connection with the terminals to prevent movement of the terminals with respect to the strips of insulation when the strips of insulation and the terminals are assembled. The core of the receiver is disposed between the strips of insulation and a single fastening screw 23 is passed through the core and the strips of insulation and serves to bind the core, the strips of insulation and the terminals in fixed relation.

While I have herein shown and particularly described the preferred embodiment of my invention, I do not wish to be limited to the precise construction and arrangement set forth, as changes may readily be made without departing from the spirit of the invention.

Having thus described my invention, I claim as new and desire to secure by Letters Patent the following:—

1. A telephone system including a telephone line extending between a telephone station and an exchange, a source of direct current at the exchange for supplying current to the telephone line, the telephone receiver at said station including a readily magnetizable and demagnetizable core and having two voice current windings each of low impedance and in parallel relation with each other and in serial relation with the line and both adapted to be traversed by telephonic current and thereupon cooperating to operate the receiver and both being also adapted to be traversed by direct current from said source of direct current to magnetize the core of the receiver, the transmitter at said telephone station being in serial relation with the line and the two voice current windings taken together, whereby said transmitter may also be supplied with direct current from said source of direct current.

2. A telephone system including a telephone line extending between a telephone station and an exchange, a source of direct current at the exchange for supplying current to the telephone line, the telephone receiver at said station including two voice current windings each of low impedance and in parallel relation with each other and in serial relation with the line and both adapted to be traversed by telephonic current and thereupon cooperating to operate the receiver and both being also adapted to be traversed by direct current from said source

of direct current to energize the receiver, the transmitter at said telephone station being in serial relation with the line and the two voice current windings taken together, whereby said transmitter may also be supplied with direct current from said source of direct current.

3. A telephone system including a telephone line extending between a telephone station and an exchange, a source of direct current at the exchange for supplying current to the telephone line, the telephone receiver at said station including a readily magnetizable and demagnetizable core and having two voice current windings each of low impedance and in parallel relation with each other and in serial relation with the line and both adapted to be traversed by telephonic current and thereupon cooperating to operate the receiver and both being also adapted to be traversed by direct current from said source of direct current to magnetize the core of the receiver.

4. A telephone system including a telephone line extending between a telephone station and an exchange, a source of direct current at the exchange for supplying current to the telephone line, the telephone receiver at said station including two voice current windings each of low impedance and in parallel relation with each other and in serial relation with the line and both adapted to be traversed by telephonic current and thereupon cooperating to operate the receiver and both being also adapted to be traversed by direct current from said source of direct current to energize the receiver.

5. A telephone system including a telephone line extending between a telephone station and a source of direct current, the telephone receiver at said station including a readily magnetizable and demagnetizable core and having two voice current windings each of low impedance and in parallel relation with each other and in serial relation with the line and both adapted to be traversed by telephonic current and thereupon cooperating to operate the receiver and both being also adapted to be traversed by direct current from said source of direct current to magnetize the core of the receiver, the transmitter at said telephone station being in serial relation with the line and the two voice current windings taken together, whereby said transmitter may also be supplied with direct current from said source of direct current.

6. A telephone system including a telephone line extending between a telephone station and a source of direct current, the telephone receiver at said station including two voice current windings each of low impedance and in parallel relation with each other and in serial relation with the

line and both adapted to be traversed by telephonic current and thereupon cooperating to operate the receiver and both being also adapted to be traversed by direct current from said source of direct current to energize the receiver, the transmitter at said telephone station being in serial relation with the line and the two voice current windings taken together, whereby said transmitter may also be supplied with direct current from said source of direct current.

7. A telephone system including a telephone line extending between a telephone station and a source of direct current, the telephone receiver at said station including a readily magnetizable and demagnetizable core and having two voice current windings each of low impedance and in parallel relation with each other and in serial relation with the line and both adapted to be traversed by telephonic current and thereupon cooperating to operate the receiver and both being also adapted to be traversed by direct current from said source of direct current to magnetize the core of the receiver.

8. A telephone system including a telephone line extending between a telephone station and a source of direct current, the telephone receiver at said station including two voice current windings each of low impedance and in parallel relation with each other and in serial relation with the line and both adapted to be traversed by telephonic current and thereupon cooperating to operate the receiver and both being also adapted to be traversed by direct current from said source of direct current to energize the receiver.

9. A telephone system including a telephone line extending between a telephone station and an exchange, a source of direct current at the exchange for supplying current to the telephone line, the telephone receiver at said station including a readily magnetizable and demagnetizable core and having two windings in parallel relation with each other and in serial relation with the line at least one of said windings being traversed by telephonic current and both being adapted to be traversed by direct current from said source of direct current to magnetize the core of the receiver, the transmitter at said telephone station being in serial relation with the line and the two windings taken together, whereby said transmitter may also be supplied with direct current from said source of direct current.

10. A telephone system including a telephone line extending between a telephone station and an exchange, a source of direct current at the exchange for supplying current to the telephone line, the telephone receiver at said station including two windings in parallel relation with each other and in serial relation with the line at least

one of said windings being adapted to be traversed by telephonic current and both being adapted to be traversed by direct current from said source of direct current to energize the receiver, the transmitter at said telephone station being in serial relation with the line and the two windings taken together, whereby said transmitter may also be supplied with direct current from said source of direct current.

11. A telephone system including a telephone line extending between a telephone station and an exchange, a source of direct current at the exchange for supplying current to the telephone line, the telephone receiver at said station including a readily magnetizable and demagnetizable core and having two windings in parallel relation with each other and in serial relation with the line at least one of said windings being adapted to be traversed by telephonic current and both being adapted to be traversed by direct current from said source of direct current to magnetize the core of the receiver.

12. A telephone system including a telephone line extending between a telephone station and an exchange, a source of direct current at the exchange for supplying current to the telephone line, the telephone receiver at said station including two windings in parallel relation with each other and in serial relation with the line at least one of said windings being adapted to be traversed by telephonic current and both being adapted to be traversed by direct current from said source of direct current to energize the receiver.

13. A telephone system including a telephone line extending between a telephone station and a source of direct current, the telephone receiver at said station including a readily magnetizable and demagnetizable core and having two windings in parallel relation with each other and in serial relation with the line at least one of said windings being adapted to be traversed by telephonic current and both being adapted to be traversed by direct current from said source of direct current to magnetize the core of the receiver, the transmitter at said telephone station being in serial relation with the line and the two windings taken together, whereby said transmitter may also be supplied with direct current from said source of direct current.

14. A telephone system including a telephone line extending between a telephone station and a source of direct current, the telephone receiver at said station including two windings in parallel relation with each other and in serial relation with the line at least one of said windings being adapted to be traversed by telephonic current and both being adapted to be traversed by direct current from said source of direct current to

energize the receiver, the transmitter at said telephone station being in serial relation with the line and the two windings taken together, whereby said transmitter may also be supplied with direct current from said source of direct current.

15. A telephone system including a telephone line extending between a telephone station and a source of direct current, the telephone receiver at said station including a readily magnetizable and demagnetizable core and having two windings in parallel relation with each other and in serial relation with the line at least one of said windings being adapted to be traversed by telephonic current and both being adapted to be traversed by direct current from said source of direct current to magnetize the core of the receiver.

16. A telephone system including a telephone line extending between a telephone station and a source of direct current, the telephone receiver at said station including two windings in parallel relation with each other and in serial relation with the line at least one of said windings being adapted to be traversed by telephonic current and both being adapted to be traversed by direct current from said source of direct current to energize the receiver.

17. A telephone system including a telephone line extending between a telephone station and an exchange, a source of direct current at the exchange for supplying current to the telephone line, the telephone receiver at said station including a magnetizable core and having two circuits in parallel relation with each other and in serial relation with the line and both adapted to be traversed by current from said source of direct current, and each including a winding serving to magnetize the receiver core, due to the passage of the direct current, one of said windings serving to permit of the passage of voice currents, the transmitter at said station being in serial relation with the circuits of the receiver taken together, and thereby being adapted to be supplied also with current emanating from the source of direct current.

18. A telephone system including a telephone line extending between a telephone station and an exchange, a source of direct current at the exchange for supplying current to the telephone line, the telephone receiver at said station having two receiver energizing circuits in parallel relation with each other and in serial relation with the line and both adapted to be traversed by direct current from said source of direct current, to energize the receiver, one of said windings serving to permit of the passage of voice currents, the transmitter at said station being in serial relation with the circuits of the receiver taken together, and thereby

being adapted to be supplied also with current emanating from the source of direct current.

19. A telephone system including a telephone line extending between a telephone station and an exchange, a source of direct current at the exchange for supplying current to the telephone line, the telephone receiver at said station including a magnetizable core and having two circuits in parallel relation with each other and in serial relation with the line and both adapted to be traversed by current from said source of direct current, and each including a winding serving to magnetize the receiver core, due to the passage of the direct current, one of said windings serving to permit of the passage of voice currents.

20. A telephone system including a tele-

phone line extending between a telephone station and an exchange, a source of direct current at the exchange for supplying current to the telephone line, the telephone receiver at said station having two receiver energizing circuits in parallel relation with each other and in serial relation with the line and both adapted to be traversed by direct current from said source of direct current, to energize the receiver, one of said windings serving to permit of the passage of voice currents.

In witness whereof, I hereunto subscribe my name this 14th day of June A. D., 1909.

ELMER R. CORWIN.

Witnesses:

L. G. STROH,

G. L. CRAGG.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."