

No. 797,761.

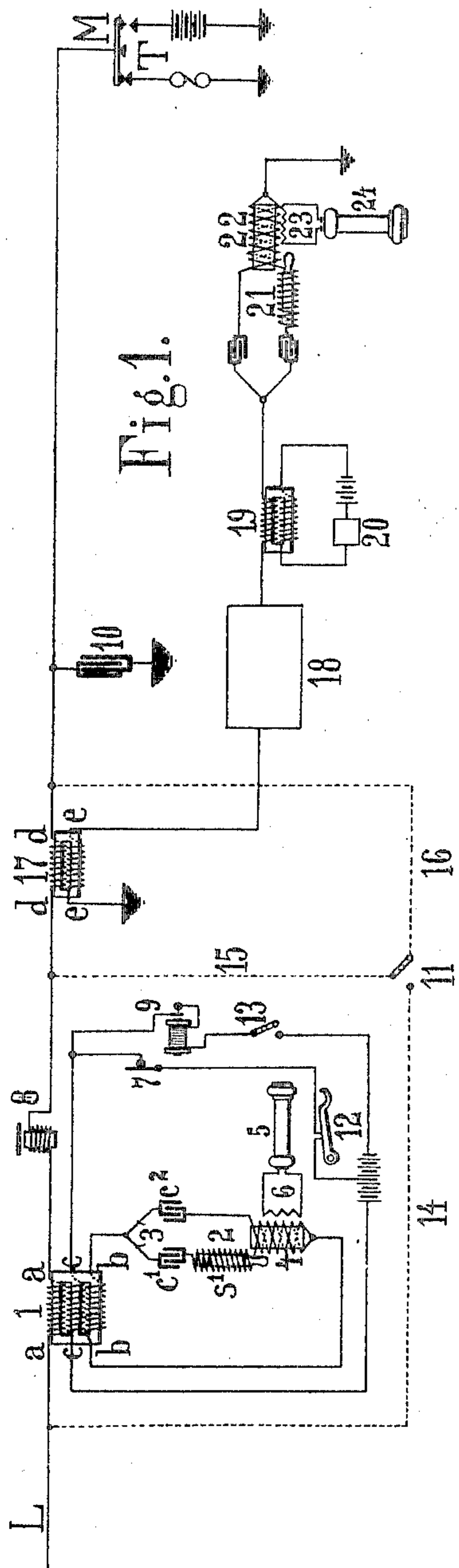
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C. TURCHI.

COMPOSITE TELEGRAPH AND TELEPHONE SYSTEM.

APPLICATION FILED NOV. 12, 1903.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig.2.

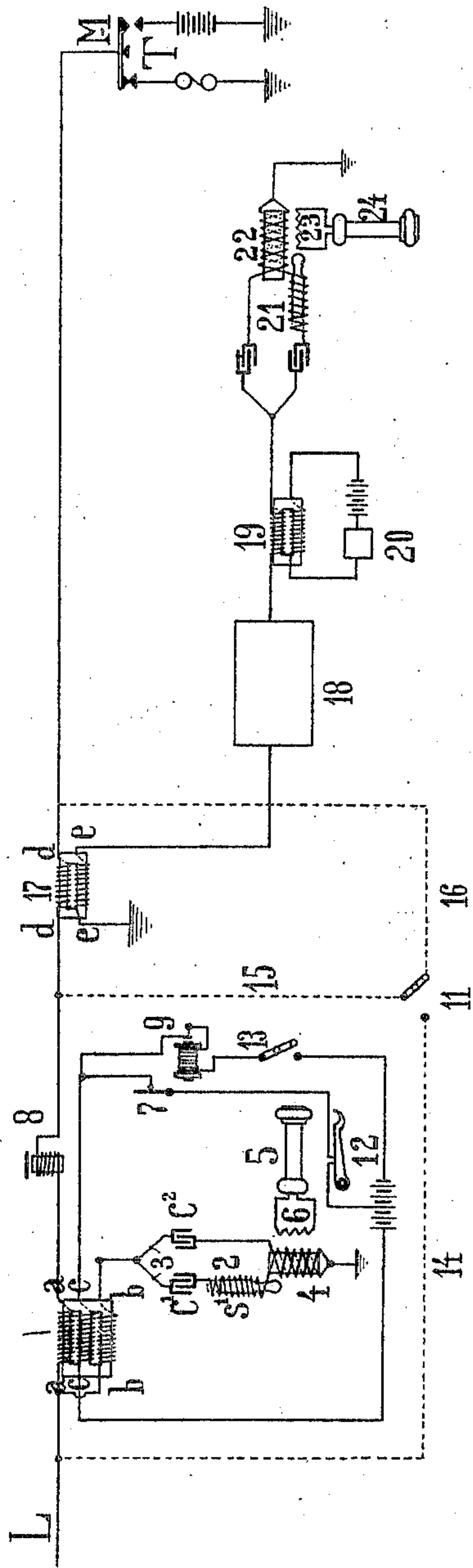
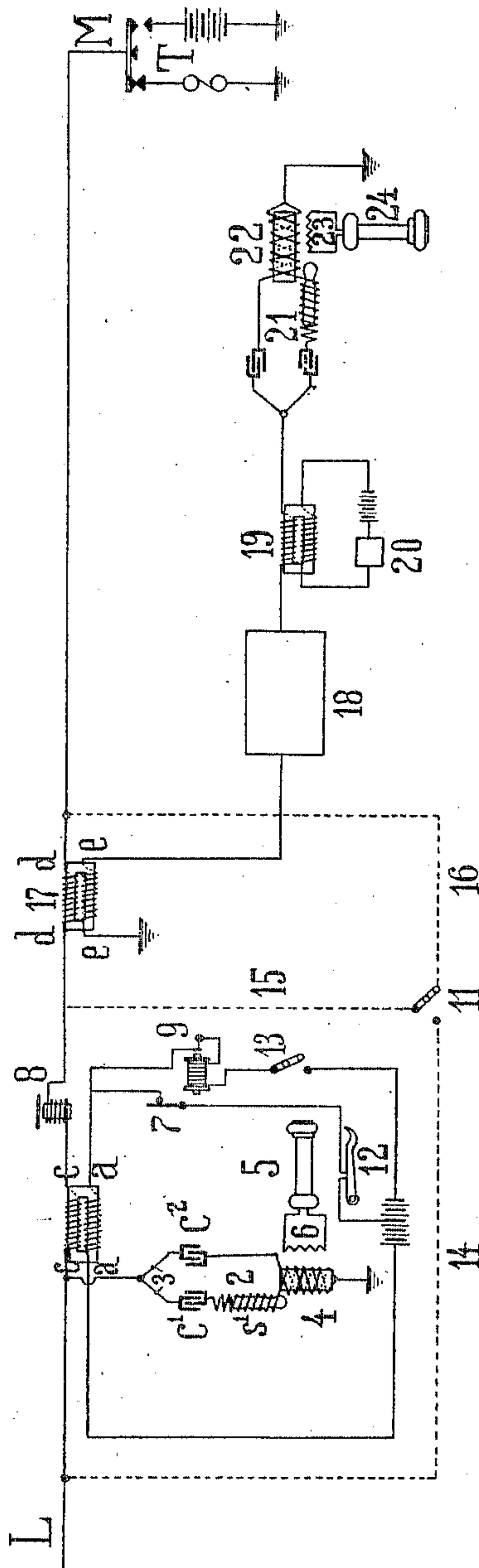


Fig.3.



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COMPOSITE TELEGRAPH AND TELEPHONE SYSTEM.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CARLO TURCHI, engineer, a subject of the King of Italy, and a resident of 89 Via Giovecca, Ferrara, Italy, have invented a certain new and useful Improvement in Composite Telegraph and Telephone Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters and numerals of reference marked thereon, which form a part of this specification.

My invention relates to improvements in apparatus for enabling telephonic and telegraphic messages to be transmitted over the same line-wire.

The present invention relates to the connection of the central station with a telephone-subscriber's line to the connections of the separator and line-condensers, as I shall now describe with reference to the accompanying illustrative drawings, wherein—

Figure 1 shows diagrammatically a central station and a subscriber's station with the connections therefor according to the present invention, and Figs. 2 and 3 are two other embodiments of the invention, shown diagrammatically.

The separator 2 at the central station has the divided portion or branches 3 of its circuits shown provided with two capacities c' c'' and one inductive resistance device s' . The subscriber's apparatus is arranged to be placed in inductive relation with the line-wire through a transformer 17. The connection of the central station with the subscriber's station is modified according to the present invention in the following manner, such connection constituting an important feature of the present invention: The switching out of the telephone 5 of the central station and the switching in of the telephone 24 of the subscriber is effected by operating a switch 11, which is connected to a conductor 15 and is adapted to be placed in connection with one or other of two other conductors 14 and 16. The conductors 14 and 16 are connected to the line-wire L at points thereof at the outer sides of the line-transformers 1 and 17, and the conductor 15 is connected to the line-conductor at a point between the transformers 1 and 17. As will be seen, the arrangement is such that when the switch 11 is

moved into the position shown it will short-circuit the primary winding $d d$ of the line-transformer 17, thereby short-circuiting the subscriber's telephonic apparatus so that the central station can speak to a distant telephone-station connected to the line L. When the subscriber has been called up, the switch 11 is operated so as to connect the conductors 14 and 15 and short-circuit the primary winding $a a$ of the line-transformer 1 of the central station and switch in the transformer 17. The primary coil $d d$ of the transformer 17 is included in the line-wire L in series with the line-transformer 1 situated at the central station. Its secondary winding $e e$ is earthed at one terminal and is connected at the other terminal with the distributing-board 18. From this board the local telephone-line passes to the subscriber.

A small microphone-transformer 19 has its primary winding included in series with a separator 21 in the subscriber's current-circuit. The primary winding of the microphone-transformer is connected in the usual manner to a small battery and to the microphone 20. The separator 21 is connected and constructed in the same manner as the separator 2 at the central station, and it acts with its differential coil 22 directly upon the coil 23 of the subscriber's telephone 24. It is also connected to earth for the purpose of closing the current-circuit, because one terminal of the secondary winding $e e$ is connected to earth. This improved connection between the subscriber and the central station is distinguished, therefore, essentially by the fact that according to this invention each subscriber is provided with his own separator. By this means local disturbances, such as the influence of electric tramways upon the local connections or circuits, are obviated.

Fig. 2 illustrates a modified connection of the separator. In this modification the separator 2 is not included in circuit between the two terminals of the secondary winding $b b$ of the line-transformer 1, as in Fig. 1, but is connected at one end through the winding $b b$ with the line-wire L and is earthed at the other end. The secondary winding $b b$ for the separator 2 and the secondary winding $c c$ for the microphone-transmitter 7 are, however, both arranged opposite to the primary winding $a a$ of the transformer 1. In a further modification (shown in Fig. 3) the separator 2 is likewise earthed at one end or terminal, and at the other end or terminal it is

directly connected to the line-wire L without the interposition of a secondary winding $b\ b$, as in the other examples, while the microphone-transmitter acts upon the line-wire by means of a line-transformer, as in the example shown in Fig. 2.

In each of the arrangements shown in Figs. 2 and 3 a non-symmetrical form of the separator 2 has been selected, each part or branch 3 of the separator-circuit having a capacity c' c^2 , but an inductive resistance device s' is arranged in one branch only. Of the many other possible ways of connecting the separator only the following one need be mentioned—viz., that it is not necessary, as has been assumed in Fig. 1, to connect the two windings of the differential coil 4 together and to the secondary winding $b\ b$ of the transformer 1.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent of the United States of America, is—

1. In a system of simultaneous telegraphy and telephony, the combination of a line-wire, telegraph instruments connected with the line-wire, a central-station receiving-circuit, a conductor suitably interposed between the said receiving-circuit and the line-wire and divided into two branches, a core having the branches wound about it in opposite directions and from which the central receiving-circuit receives its flux, a subscriber's receiving-circuit, a second conductor divided into two branches and suitably interposed between the subscriber's receiving-circuit and the line-wire, a core around which the branches are wound in opposite directions, a shunt around the conductor interposed between the central receiving-circuit and the line, and a shunt around the conductor interposed between the subscriber's receiving-circuit and the line-wire.

2. In a system of simultaneous telegraphy

and telephony, the combination with the line-wire and its telephonic apparatus of a circuit directly connected at one end to the line, and at the other to the earth, divided in two branches each containing condensers and inductances, wound differentially around a core from which a telephone-receiver receives inductively the magnetic flux.

3. In a system of simultaneous telegraphy and telephony, the combination with the line-wire and its telephonic apparatus, of a circuit connected at one end both directly and inductively to the line, and at the other to the earth, divided in two branches each containing condensers and inductances, wound differentially around a core from which a telephone-receiver receives inductively the magnetic flux.

4. In a system of simultaneous telegraphy, the combination with the line-wire, a condenser suitably interposed between the line-wire and a conductor, a central-station receiving-circuit, a conductor suitably interposed between the said receiving-circuit and the line-wire, and divided into two branches, a core having the branches wound about it in opposite directions and from which the central receiving-station receives its flux, a subscriber's receiving-circuit, a second conductor suitably interposed between the subscriber's receiving-circuit and divided into two branches, condensers and inductances inserted in said branches, a core around which the branches are wound in opposite directions, a shunt around the conductor interposed between the receiving-circuit and the line-wire, and a shunt around the conductor interposed between the subscriber's receiving-circuit and the line-wire.

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In presence of—

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