W. W. DEAN.

TELEPHONE SYSTEM.

APPLICATION FILED JULY 31, 1909.

980,613. Patented Jan. 3, 1911.

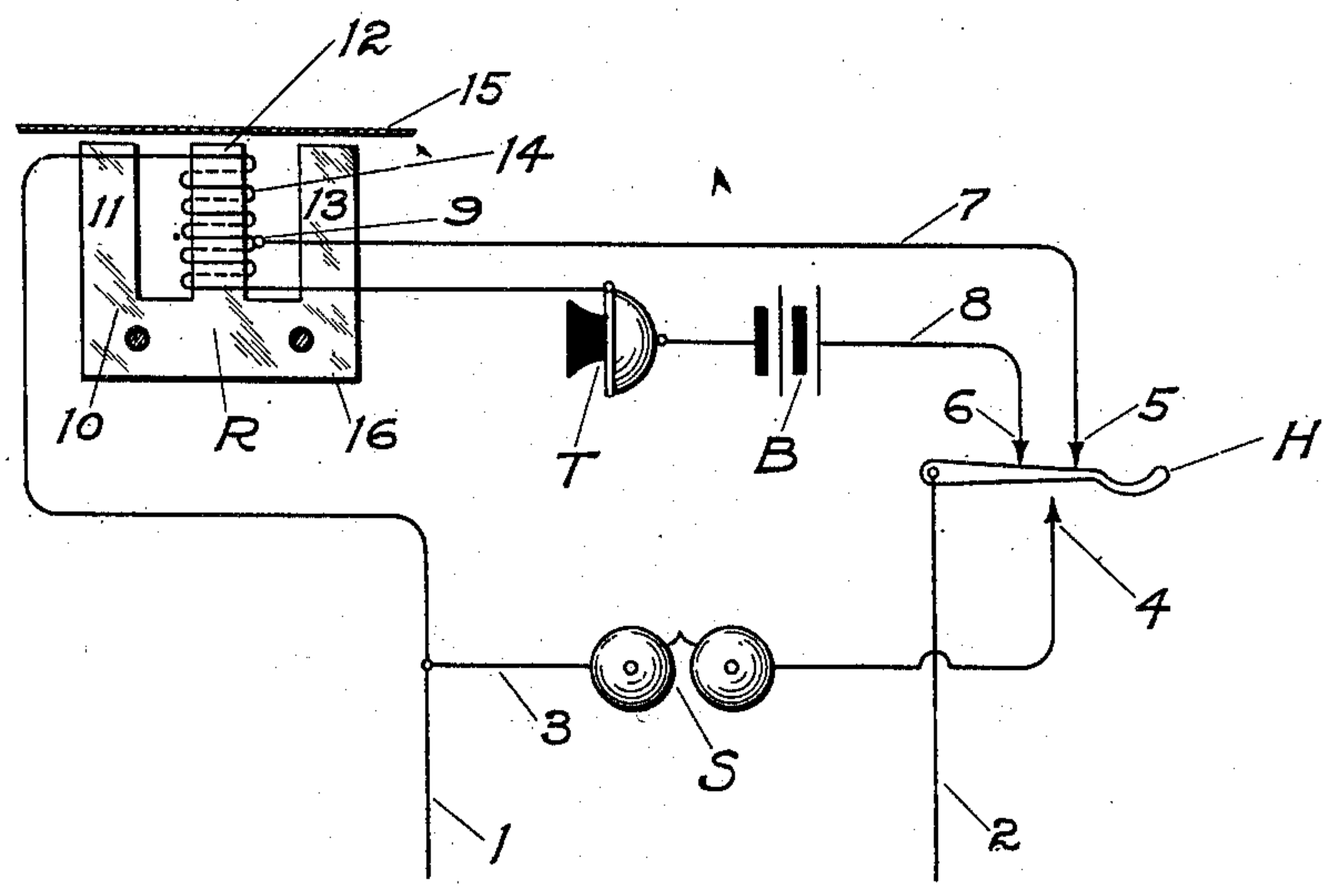

FIG. 1

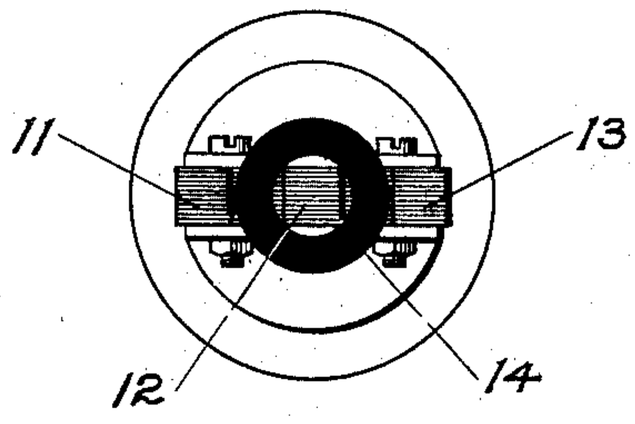

FIG. 2

WITNESSES
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TELEPHONE SYSTEM.

980,613. Specification of Letters Patent. **Patented Jan. 3, 1911.**

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To all whom it may concern:

Be it known that I, WILLIAM W. DEAN, a citizen of the United States, residing at Elyria, in the county of Lorain and State of Ohio, have invented certain new and useful Improvements in 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.

My invention relates more particularly to talking circuits and receivers therefor; one of the objects being to combine the receiver coil and the inductorium. The advantages realized by such an arrangement will be apparent to those skilled in this art. Among them are the reduction of cost, the compactness of the apparatus, and the reduction of the impedance in the talking circuit. For a long time efforts have been made to accomplish this in a successfully operative substation circuit, but heretofore such efforts have been only partially realized. I have combined their use with a receiver core, having a very low reluctance, and a highly efficient magnetic circuit. To do this I have used a flux conductor constructed of soft iron E-shaped laminations fastened together. After long and exhaustive tests I find that such an arrangement effects the purpose desired. By soft iron I intend to include those irons and steels which have a high magnetic permeability. As a matter of fact, a soft steel is generally used, though in magnetic parlance, soft iron is generally used to indicate a metal having a high permeability. By constructing this core of such material and by laminating it, I so lower the reluctance and hysteresis that I may greatly reduce the number of turns in the receiver coil without deducting from the effect upon the diaphragm. The reduction in the number of turns on the receiver lowers the resistance thereof so that a larger flow of current for the same voltage will traverse the circuit. This current will initially magnetize the receiver, serving the purposes of a permanent or biased magnet, thus obviating the necessity for high reluctance hard iron cores. As a result of this larger flow of current, I may greatly reduce the turns of the coils of the inductorium. Soft iron cores of the prior art have not been of such low reluctance as to realize these advantages, while the hard iron cores used for this purpose, have been of such high reluctance as to make them impractical for the cores of inductoriums. I have thus produced a receiver which, among other things, realizes the good points of a permanent magnet receiver and at the same time employs a core which is practical for the same use in an inductorium enabling me to combine these coils.

My invention will be best understood by reference to the following description when taken in connection with the accompanying illustrations showing one specific embodiment thereof, while its scope will be more particularly pointed out in the appended claims.

Figure 1 is a diagrammatic illustration of a substation circuit showing my invention. Fig. 2 is an end elevation of the combined receiver and inductorium with the diaphragm removed.

1 and 2 are the leads of the line entering the substation. A bridge 3 containing the signaling device S terminates in the contact 4 which coöperates with the switch hook H to complete the bridge. If signals of sufficiently high resistance are used, a permanent signal bridge is employed. When the hook is in the depressed or normal position, the signal bridge is completed. The receiver is shown at R in a second line bridge. A soft iron laminated receiver core is shown at 10. This core is built of insulated laminations, and in the form illustrated, consists of substantially E-shaped punchings fastened together to form a base 16 and three limbs 11, 12 and 13 perpendicular thereto. On one of these limbs, as at 12, a coil 14 is wound which operates both as a receiver coil and as the inductorium. The second line bridge contains this coil, the transmitter T, and a local battery B. From a point 9 of the coil 14 a conductor 7 leads to the upper contact 5 of the hook H. The hook H also controls the second bridge at the upper contact 6. The receiver diaphragm is shown at 15. When the hook H is down, the talking instrument is disconnected and the signal circuit completed. The local transmitter circuit is traced through 1—3—8—6—H—5—7—14 to T.

The operation of the device will be readily understood by those skilled in the art and I will not make a detailed description thereof.

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I have shown this particular form of core which is my preferred form, but it will be apparent to those skilled in the art that I may use any form which will accomplish my purpose. It will also be apparent that numerous and extensive departures from the form and details of the apparatus may be made without departing from the spirit of the invention, the same being herein shown solely for the purpose of clearly illustrating one specific embodiment thereof.

Claims.

1. In a telephone system, a telephone line, a bridge of said line, an inductorium in said bridge, a laminated soft iron core, a plurality of laminated flux conductors integral with said core, a coil in said line bridge wound on said core, said coil serving as a receiver winding, a connection dividing said coil, a portion of said coil serving as one winding of an inductorium in one of said branches, a second portion of said coil serving as the other winding of said inductorium in a second branch of said bridge, and a transmitter and source of current in one of said branches in series with one of said windings.

2. In a telephone system the combination of a telephone line, a bridge of said line, an inductorium in said bridge, an E-shaped flux conductor constructed of a plurality of soft iron punchings, a coil mounted upon one of the limbs of said flux conductor and connected in said bridge, said coil serving as a receiver winding, a connection dividing said coil, the part of the coil on one side of the connection serving as one winding of the inductorium, the second part serving as the other winding and a transmitter and source of current in series with one of said windings.

3. In a telephone system, the combination of a telephone line, a divided bridge of said line at a substation, a receiver coil divided into two parts, said divided bridge being united at the point of division of the coil, one of said parts serving as one winding of an inductorium, a second winding of the inductorium, a source of current and a telephone transmitter connected in series in one of the divisions of the bridge and a flux conductor upon which said coil is mounted, built up of a plurality of soft iron E-shaped members.

4. In a telephone system, the combination of a telephone line, a divided bridge of said line at a substation, an inductorium in said bridge, a laminated soft iron core, a plurality of laminated flux conductors integral with said core, a coil in said line bridge wound on said core, said coil serving as a receiver winding, a connection dividing said coil, a portion of said coil serving as one winding of an inductorium in one of said branches, a second portion of said coil serving as the other winding of said inductorium in a second branch of said bridge and a transmitter and source of current in said bridge in circuit with said inductorium.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM W. DEAN.

Witnesses:
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C. A. SEVERCOOL.