W. W. DEAN.

MAGNETIC TELEPHONE,

APPLICATION FILED MAR. 29, 1909.

998,161.

Patented July 18, 1911.

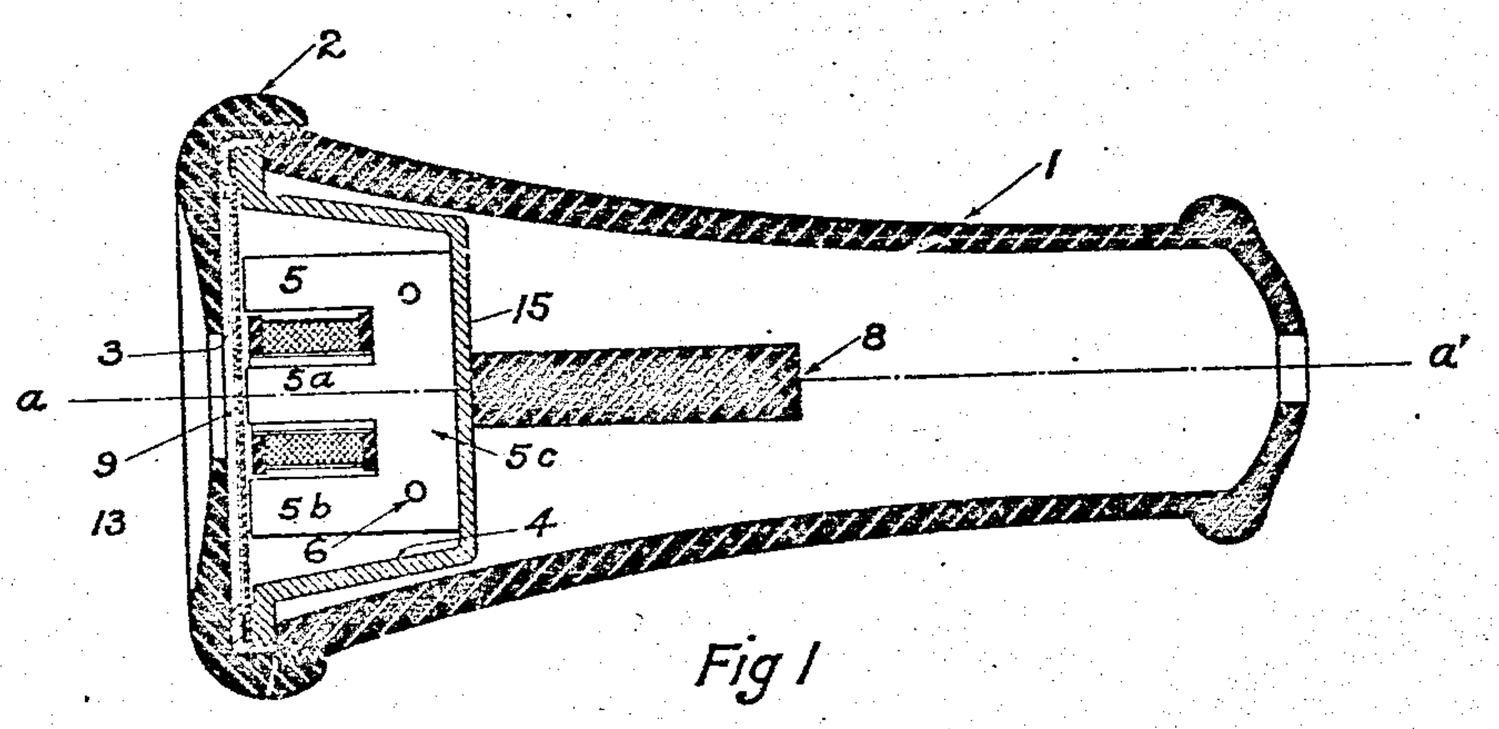

Fig 1

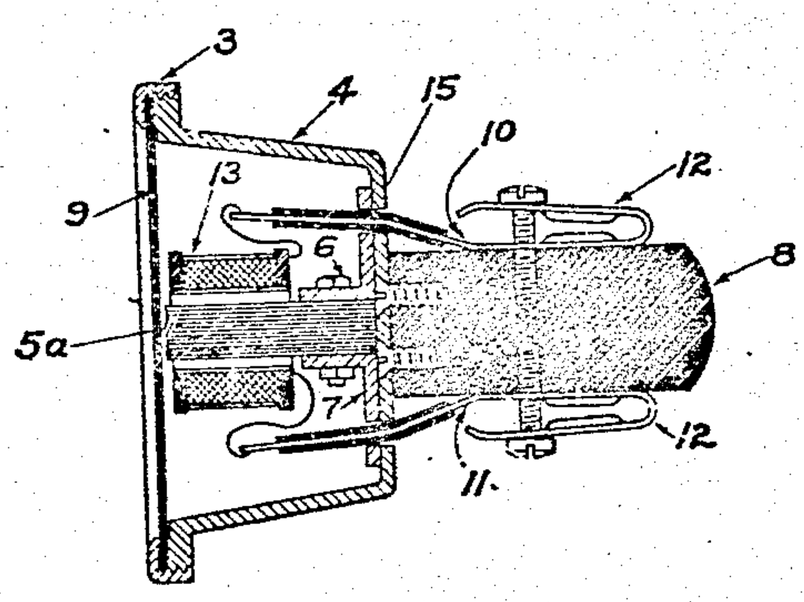

Fig 2

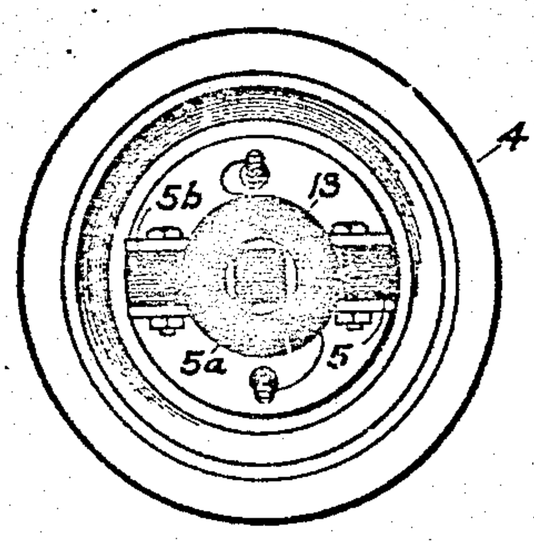

Fig 3

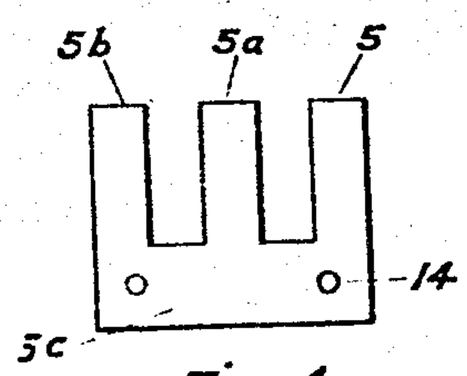

Fig 4

Witnesses

Geo Martin

F. A. Ritter

Inventor

William W Dean

F. C. Richey

His Attorney

UNITED STATES PATENT OFFICE.

WILLIAM W. DEAN, OF ELYRIA, OHIO, ASSIGNOR TO THE DEAN ELECTRIC COMPANY, OF ELYRIA, OHIO, A CORPORATION OF OHIO.

MAGNETIC TELEPHONE.

998,161. Specification of Letters Patent. Patented July 18, 1911.

Application filed March 23, 1909. Serial No. 486,495.

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 a new and useful Improvement in Magnetic Telephones, of which the following is a specification.

This invention relates to improvements in telephone receivers, and has for its object an improved and simplified receiver which combines the advantages of cheapness in construction and greater efficiency, being more particularly intended to furnish a magnetic circuit with a low reluctance by which a greater influence is exerted on the diaphragm. By this means the same influence may be exerted on the diaphragm as is exerted in the older forms, with a smaller receiver coil, thus placing a smaller resistance in the line circuit and offering less impedance to the voice currents, which greatly increases the clearness of speech and the efficiency of the instrument.

Another object of my invention is to so construct the core of the electromagnet and the other flux conductors that they may be easily and cheaply manufactured, preferably of thin punchings, making a laminated path for the flux. Each of these punchings is shaped like the letter E, and when joined together they form a circuit for the magnetic flux which is without other air gap than those existing between the core, the limbs of the conductor and the receiver diaphragm, thus decreasing the magnetic reluctance and increasing the efficiency.

Another advantage of my improved telephone results from the concentration of the principal magnetic efforts on the center of the diaphragm. The amplitude of the diaphragm's vibrations is then a function of the total radius, or the distance from the center to the edge of the diaphragm.

By making the core and the return conductors integral, I am enabled to join the laminations with few connectors, thus avoiding the use of nonconductors of flux and the reduction of the area available for that purpose. The laminations are detachably clamped together and rigidly mounted to a base in the receiver shell. Thus the cores may be removed and defective coils taken off without disturbing the other parts. These parts are not easily disarranged by rough usage, being firmly secured together by tough connecting means. Obviously I may make the laminations of other shapes and designs within the scope of the claims.

Although I may provide more return circuits for the magnetic flux, thus distributing the flux over a larger area, preferably but two are used. I may also place the conductor carrying the electric current on any one or more of the limbs, as I see expedient, but I prefer the form illustrated in the drawing.

In the drawings:—Figure 1 is a cross section of the receiver taken through and parallel to the E-shaped member. Fig. 2 is a cross section of the receiver cup taken along the lines *a*—*a'* of Fig. 1. Fig. 3 is an end elevation of the cup and contents with the diaphragm and retaining ring removed. Fig. 4 is an elevation of one of the E-shaped punchings.

Referring to the drawings and to the embodiment of my invention there shown, I have used the same reference letters on the various parts in the several figures.

1 is the main part of the receiver shell on which is screwed the ear piece 2. The cup 4 having a base 15 upon which is screwed a retaining ring 3, is placed within the shell. The diaphragm is clamped between the cup and the ring as shown. The member 5 which, is preferably built up of E-shaped members punched out of suitable metal and illustrated in Fig. 4, consists of a base member 5^c and three perpendicular limbs 5, 5^a, and 5^b, one designed to form a part of the core and the other two, the return circuit. These punchings are covered with shellac, or otherwise insulated, and a number clamped together between non-magnetic brackets 7, better shown in Fig. 2. Insulated or non-magnetic bolts 6 or other fasteners, are then passed through the holes 14 in the laminations and corresponding holes in the brackets, clamping them together and to the brackets. The brackets are fastened to the base 15 of the cup and the coil of the electromagnet 13 placed on the central limb. Conductors 10 and 11 lead from the terminals of this coil to the line terminals 12 and 12', fastened upon a non-conducting portion 8 which is attached to the bottom of the cup. It will then be seen that I have provided a receiver having two return circuits for the magnetic flux, which is constructed of metal so shaped that it may be

easily and cheaply manufactured, and furnishes a circuit of low reluctance and which may readily and securely be fastened to the body of the receiver. I have found by actual experiment that, owing to the high magnetic conductivity of this circuit, I can, while realizing the same efficiency, greatly reduce the number of turns of the receiver winding, thus reducing the resistance and impedance in the line circuit. This gives me an advantage readily apparent to those versed in this art. This is particularly true where the voice currents are already weakened by long transmission or the curve thereof has already been distorted.

While I have shown this particular form of mounting it will be understood that I may employ other arrangements without departing from the invention as defined by the claims. It will also be obvious to those skilled in the art, that numerous and extensive departures from the form and details of the apparatus here shown, may be made without departing from the spirit of this invention, the same being therein shown solely for the purpose of clearly illustrating one specific embodiment thereof.

Having thus illustrated and described my invention, I claim:

1. In a telephone receiver, the combination of a base, a plurality of E shaped laminations, capable of conducting magnetic flux mounted on said base, and rigid fastening means for clamping said laminations together and attaching them to the base, said clamping means detachably connecting said laminations to said base.

2. In a telephone receiver, a shell, an ear piece upon said shell, a cup within said shell, an insulation member attached to the bottom of said cup, line conductors terminating upon said insulation member, angular brackets upon the base of said cup, an E-shaped flux conducting member clamped between said brackets, a coil connected to said line terminals and wound upon a limb of said E-shaped member, and a diaphragm completing a magnetic circuit.

3. In a telephone receiver, the combination of a base, a plurality of E shaped flux conductors mounted on said base, supporting means rigidly clamping said flux conductors to said base, said supporting means mechanically coupled to said base and means for detachably connecting said conductors to said supporting means.

4. In a magnetic telephone, the combination of a receiver shell and cap, a receiver cup held in place by said cap and shell, an E-shaped flux conductor mounted in said cup, a coil in said cup, igid supporting means for said flux conductor attached to said cup, and connectors detachably connecting said flux conductor to said means.

5. In a magnetic telephone, the combination of a receiver shell and cap, a receiver cup held in place by said cap and shell, a plurality of flux conductible laminations, rigid fastening means clamping said laminations together and attaching them to said cup, and connectors detachably connecting said laminations to said fastening means.

6. In a magnetic telephone, the combination of a base, a plurality of flux conductible laminations consisting of punchings having a body member and three limbs of substantially uniform cross section throughout their length, rigid supporting means therefor tightly clamping said laminations together and detachably connecting them to the base.

7. In a magnetic telephone, the combination of a base, a plurality of E-shaped flux conductors detachably connected together and rigidly mounted to said base, a receiver coil mounted thereon and a vibratile diaphragm controlled thereby.

8. In a telephone receiver, a receiver shell, an ear piece adapted to be mounted on said shell, a receiver cup clamped in position in said shell by the receiver cap, angular brackets mounted within said cup, a plurality of E shaped laminations clamped in position in said cup by said brackets and forming a core and return flux conductors for the receiver magnet, a coil mounted on said laminations and a vibratile diaphragm controlled by said coil.

9. In a telephone receiver, a receiver shell, an ear piece adapted to be mounted on said shell, a receiver cup, having a portion folded over and adapted to be clamped between the shell and ear piece to position the cup in the receiver shell, angular brackets mounted in said cup, a plurality of E shaped laminations clamped between said brackets and forming portions of a magnetic circuit, a coil wound upon said laminations and a vibratile diaphragm completing the magnetic circuit of said coil.

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

WILLIAM W. DEAN.

Witnesses:
H. L. HARRIS,
R. Y. SANDS.