No. 723,016. PATENTED MAR. 17, 1903.

A. L. PARCELLE.

INDUCTION COIL.

APPLICATION FILED AUG. 15, 1901.

NO MODEL.

FIG. 1.

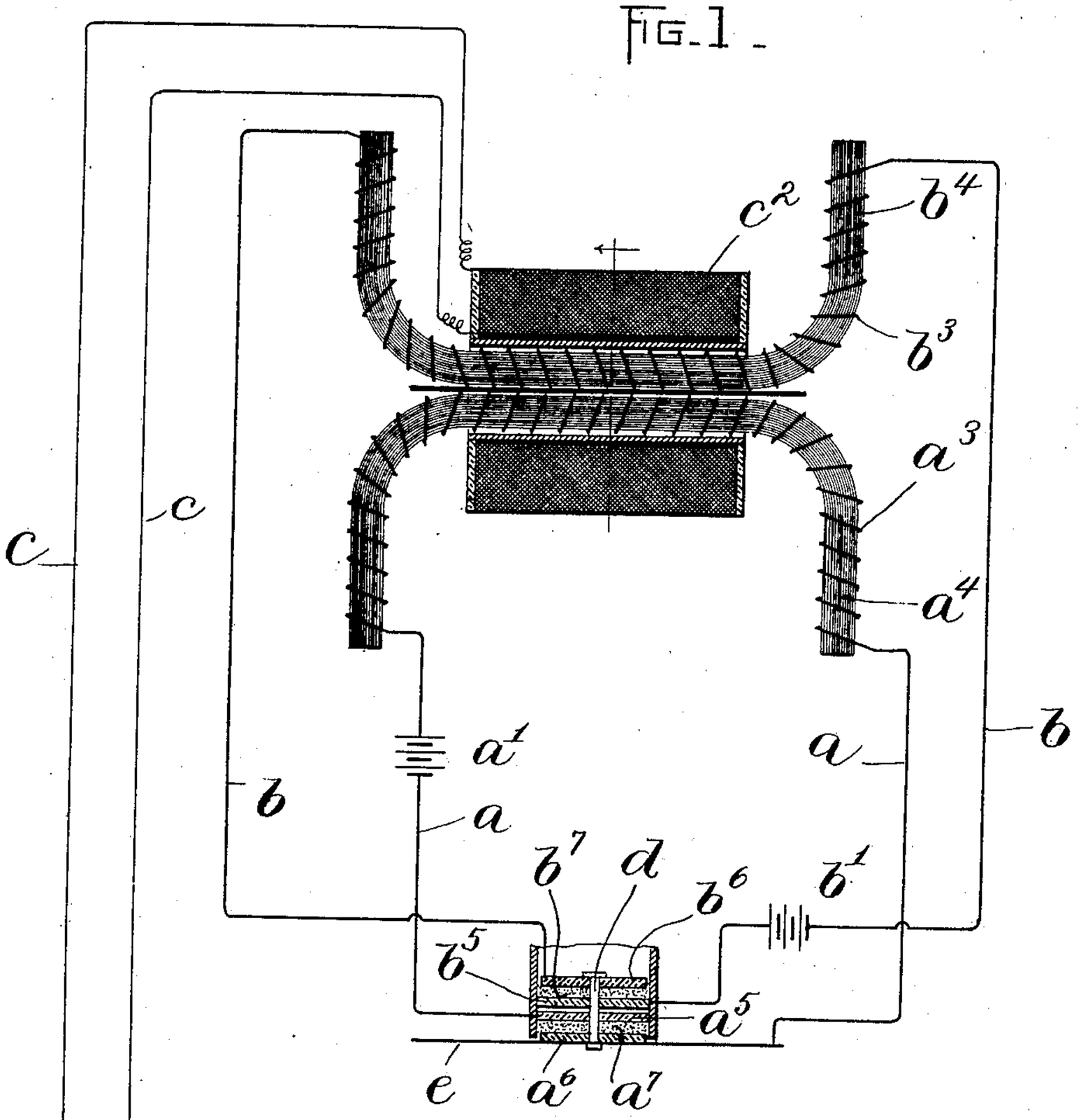
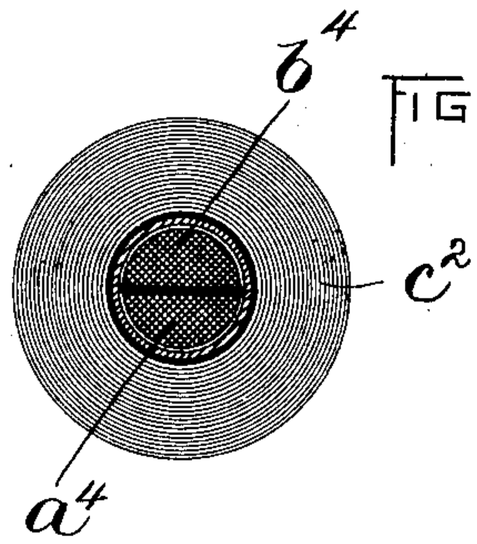


FIG. 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

ALBERT L. PARCELLE, OF BOSTON, MASSACHUSETTS.

INDUCTION-COIL.

SPECIFICATION forming part of Letters Patent No. 723,016, dated March 17, 1903.

Application filed August 15, 1901. Serial No. 72,152. (No model.)

To all whom it may concern:

Be it known that I, ALBERT L. PARCELLE, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Induction-Coils, of which the following is a specification.

This invention has relation to induction-coils and similar appliances, and has for its object the provision of means acted upon by a plurality of circuits for effecting electrical impulses in a single circuit.

In order to illustrate the invention in its simplest form, I have shown it as embodied in a telephone; but it will be understood at the outset that its application is not limited thereto, but may be extended to various other fields of electrical work.

Briefly speaking, the invention consists of an induction-coil comprising two independent primary coils and a secondary coil common thereto, whereby the passage of a current of electricity through either of said primary coils will affect the electrical condition of the secondary coil.

As shown upon the drawings, the invention is embodied in a telephone having a receiver-circuit including a secondary coil and two independent transmitter-circuits each having its primary-coils in inductive relation to the said secondary coil. The transmitter-circuits act to induce an alternating current in the receiver-circuit, the initial direction of the alternations in the current caused by said transmitter-circuits being opposite. This is achieved by employing transmitter-circuits whose currents are of opposite polarity, or in the case of circuits having currents of the same polarity by winding the coils of the primaries in said circuits in different directions. By this construction and arrangement, together with the fact that the transmitters are so arranged that the variable-resistance medium of one is compressed when the other is expanded, an increase in conductivity in one transmitter-circuit is synchronous with the decrease in conductivity of the other transmitter-circuit. It follows, therefore, that the current induced in the secondary coil by the collapse or waning of the current in one transmitter-circuit is strengthened by the simultaneous induction of current in the same direction in said secondary coil by a current or increase in current in the other primary coil. The diaphragm upon which the sound-waves impinge is connected with the movable members of the two transmitters, whereby the compression of the variable-resistance medium in one transmitter will be synchronous with the expansion of said medium in the other transmitter. The effect of this is a much more faithful reproduction of pitch, loudness, and timbre or quality of vocal sounds than has hitherto been possible.

Referring to the accompanying drawings, Figure 1 represents a telephone embodying the invention. Fig. 2 represents a section on the line 2 2 of Fig. 1.

On the drawings, a b indicate two primary circuits, each shown as including a battery a' b', respectively, although a single battery may be used if properly connected. The secondary circuit (indicated at c) includes the telephone-receiver c' and the secondary coil c^2, made of fine wire in the usual way. The primary coils a^3 b^3 are wound upon independent cores a^4 b^4, respectively. Each core consists, preferably, of fine soft-iron wires bunched together in semicircular form, covered with insulating material, the primary coils or windings extending well up to the ends of the cores. The two flat sides of the cores and their inclosing coils when well covered with insulation are placed together, whereby the two cores approximate a cylinder. The ends of the cores project some distance beyond the spool of the secondary coil, and they diverge, as shown in Fig. 1, whereby each core is substantially U-shaped to prevent material magnetic leakage. By virtue of the ends of the cores being widely separated quick action in discharging is promoted, especially when a direct current is employed for exciting them; but it will be apparent that where the current in the primaries is alternating then the ends of the cores may be brought together to form a closed magnetic circuit. A double transmitter or two oppositely-acting microphones are employed, as indicated somewhat conventionally. Two stationary members a^5 b^5, properly insulated from each other, are used in conjunction with two movable members a^6 b^6, rigidly connected together, as by the pin or screw d. The said members may be made of

carbon or other conducting material. Between each stationary member and its coacting movable member is placed a variable-resistance medium a^7 or b^7, as the case may be, such as granular carbon. The vibratory diaphragm e is connected rigidly to the member a^6 or the pin or screw d.

Operation: Assuming that the diaphragm be moving inward, the variable-resistance medium a^7 will be compressed and that at b^7 expanded. The conductivity in circuit a will be increased and a current flow from battery a' through primary coil a^3 around core a^4. This induces a current in the secondary circuit c in the opposite direction by reason of the magnetic lines set up in core a^4. As the diaphragm springs back by its inherent resiliency the current in circuit a is weakened and the collapse of the magnetic lines of force in core a^4 induces a change of current in the secondary c^2 oppositely to the initial direction. Synchronously with the collapse of said magnetic lines the granules b^7 are compressed, whereby a current flows from battery b' through primary coil b^3 in a direction opposite to the direction of the first-mentioned current through primary a^3. Thereupon a current is induced in secondary coil c of the same direction and phase as that induced by the collapse of magnetic lines in core a^4, so that the full strength and benefit of both batteries are obtained at the time most desirable. This operation is repeated for each vibration of the diaphragm. The two sources of electricity do not injure the microphones or double transmitter, their effect and influence being on the secondary only of the induction-coil. As they are both controlled by a single diaphragm they are always in proper phase relation to each other, so that at the impingement of each sound-wave upon the diaphragm the batteries are thrown upon the line in succession, so as not to interfere with or counteract each other.

It is a matter of common knowledge that it has been proposed to use an alternating current in conjunction with a single primary winding and also to employ two primary coils on a single core; but these contrivances do not accomplish the results achieved by my invention and are foreign thereto, as will be appreciated by those skilled in the art.

I do not herein claim the method of transmitting sounds which has been described in detail, nor do I herein claim the telephone system which includes independent transmitter-circuits each including a primary coil and the core therefor in operative relation to a single secondary coil, a variable-resistance medium for each transmitter-circuit adapted to be controlled by a diaphragm, and a receiver in the secondary circuit.

Having thus explained the nature of the invention and a simple way of constructing and using the same, without, however, attempting to set forth all of its embodiments or all the forms in which it may be made, what I claim is—

1. In combination, a plurality of independent cores, and a common secondary coil in inductive relation thereto.

2. In combination, a secondary coil, a plurality of independent primary coils in operative relation thereto, and an independent core for each primary coil.

3. In combination, a plurality of independent cores, primary coils on said cores, a common secondary coil, and means for effecting successive variations in current in said primary coils.

4. In combination, a secondary coil, two independent primary circuits having their coils in operative relation to said secondary coil, an independent core for each primary coil and means whereby said primary circuits induce currents in said secondary coil with the electrical impulse of one primary circuit synchronous with the wane or decline of the current in the other primary circuit, so that one inductive impulse is superimposed upon another in the secondary circuit.

5. In combination, a secondary coil, a plurality of diverging cores in said coil, and a plurality of independent circuits including primary coils on said cores.

6. An induction-coil comprising independent primary coils, a common secondary coil in inductive relation thereto, and independent cores for said primary coils constructed and arranged to prevent material magnetic leakage from one to the other.

7. A transformer with multiple cores, each core having a primary winding and acting independently of the other cores.

8. In a transformer, a secondary coil in inductive relation to two or more primary coils, each having its own core, and each acting independently on said secondary coil.

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

ALBERT L. PARCELLE.

Witnesses:
M. B. MAY,
C. F. BROWN.