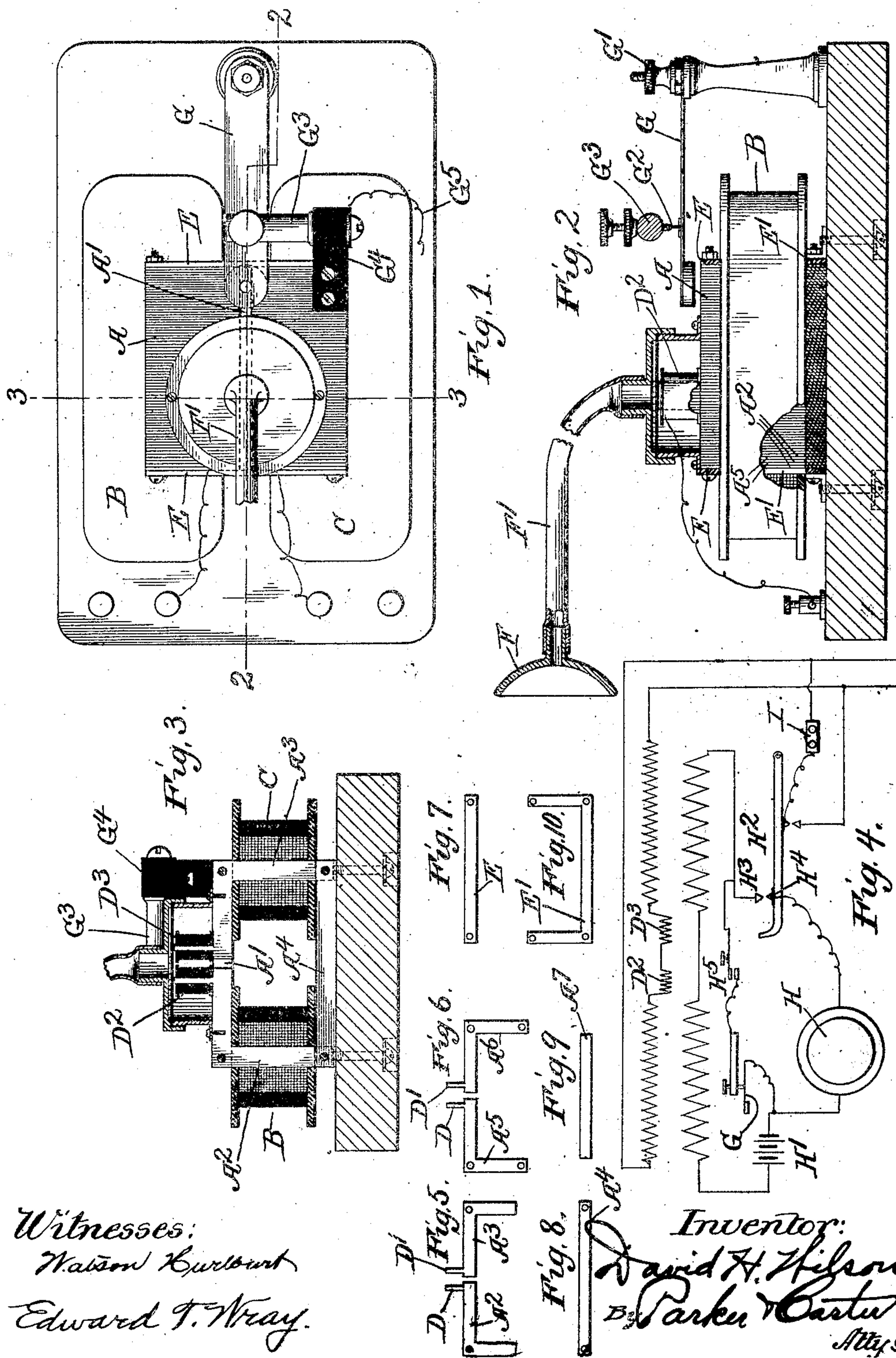


No. 836,848.

PATENTED NOV. 27, 1906.

D. H. WILSON.  
TELEPHONE APPARATUS.  
APPLICATION FILED DEC. 8, 1902.





# UNITED STATES PATENT OFFICE.

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## TELEPHONE APPARATUS.

No. 836,848.

Specification of Letters Patent.

Patented Nov. 27, 1903.

Application filed December 8, 1902. Serial No. 134,261.

*To all whom it may concern:*

Be it known that I, DAVID H. WILSON, a 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 Telephone Apparatus, of which the following is a specification.

My invention relates to telephone apparatus, and has for its object to provide a new and improved construction of this description.

My invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a plan view of a combined induction-coil and receiver embodying my invention. Fig. 2 is a section on line 2 2 of Fig. 1. Fig. 3 is a section on line 3 3 of Fig. 1. Fig. 4 is a diagrammatic view showing the circuits of one instrument. Figs. 5, 6, 7, 8, 9, and 10 are details of the core of the induction-coil.

Like letters refer to like parts throughout the several figures.

In carrying out my invention I provide an induction-coil, which acts also as a telephone-receiver and a circuit-breaker. As illustrated in the drawings, this coil consists of a core A, preferably laminated and shaped so that the two ends are brought into proximity to each other, said ends being separated by the space A'. (See Figs. 1 and 3.) This core is provided with suitable coils B and C of any suitable description. As herein shown, each of these coils has a primary winding and a secondary winding. The core of the induction-coil when laminated may be made up in any desired manner. As herein shown, it is made up of alternate layers, each consisting of three pieces, one layer, for example, consisting of the three pieces A<sup>2</sup>, A<sup>3</sup>, and A<sup>4</sup>. (Shown in Figs. 5 and 8.) The lower ends of the pieces A<sup>2</sup> and A<sup>3</sup> rest upon the top edge of A<sup>4</sup>. The next layer will be made up of the pieces A<sup>5</sup>, A<sup>6</sup>, and A<sup>7</sup>, (shown in Figs. 6 and 9,) the piece A<sup>7</sup> fitting in between the lower ends of the pieces A<sup>5</sup> and A<sup>6</sup>. Each of the pieces A<sup>2</sup>, A<sup>3</sup>, A<sup>5</sup>, and A<sup>6</sup> have the projecting pole-pieces D and D'. When the coil is entirely pulled up with the coils in position and it is made in these separable pieces, so that the coils can be properly placed, a combined frame consisting of the pieces E and E', Figs. 7 and 10, is fastened to each side of the core, the whole

being bound together by bolts or rods or the like passing through the holes at the corners. The parts E and E' are of non-magnetic material, and they of course might be dispensed with. A telephone-receiver is associated with the pole-pieces D and D', as shown in Fig. 3, so that the diaphragm thereof is actuated by these pole-pieces. The pole-pieces may be used alone, or they may be provided with the coils D<sup>2</sup> and D<sup>3</sup>, connected in circuit with the secondary coil of the transformer. The receiver may be of any of the ordinary constructions and may be provided with an earpiece F, connected thereto in any suitable manner, as by a flexible tube F'. Associated with the induction-coil is a spring-contact G, which extends over the opening formed between the opposed ends of the core, said contact being connected with a binding-post G', by means of which it is connected in circuit. A cooperating contact G<sup>2</sup> is associated therewith and connected with an arm G<sup>3</sup>, attached to the core by the insulating-piece G<sup>4</sup>, said arm being connected in circuit, as by means of the conductor G<sup>5</sup>.

In Fig. 4 I have shown a primary coil connected in circuit with the transmitter H and a source of electric supply H', there being a circuit-controlling switch H<sup>2</sup> for cutting the transmitter in and out of circuit. There is also a ringing-switch H<sup>5</sup>. When it is desired to ring up, the ringing-switch H<sup>5</sup> is closed. This completes the circuit through the primary coil, so as to energize its core. The spring-contact G is then attracted, so as to break the circuit at the contact G<sup>2</sup>. The core is then demagnetized and the spring-contact released, so as to again complete the circuit. The impulse is thus sent out over the line through the secondary coil, so as to ring the bell or signal device at the other end, corresponding to the signaling device I. (Illustrated in Fig. 4.) This signaling device is connected across the main line, and the circuit therethrough is controlled by contacts associated with the controlling-switch H<sup>2</sup>, so that when the receiver is in position the circuit is completed and when the receiver is removed the controlling-switch is moved so as to open the circuit. The various contacts connected with the controlling-switch H<sup>2</sup> are insulated from each other in any suitable manner. This continues until the switch H<sup>5</sup> is opened.



When the part  $H^2$  is moved up, so that the contacts  $H^3$  and  $H^4$  are together, the transmitter is in circuit. The ringing-switch  $H^5$  and the spring-contact or circuit-breaker  $G$  are connected in parallel with the transmitter.

It will be seen that I have here a construction wherein an induction-coil, a telephone-receiver, and a signaling circuit making and breaking device is combined in a single instrument and actuated from the construction necessary for the induction-coil alone. It will also be seen that I have here a complete instrument adapted to be placed in the circuit and to perform all these various functions when in proper position.

I have described in detail a particular construction; but it is of course evident that the parts may be greatly varied in form, construction, and arrangement and that some of the parts may be omitted and others used with parts not herein shown without departing from the spirit of my invention. I therefore do not limit myself to the particular construction and arrangement shown.

The use and operation of my invention are as follows: When it is desired to call up, the ringing-switch  $H^5$  is pressed so as to complete the circuit through the battery  $H'$  and the primary coil of the induction-coil. The core of said coil is then energized and attracts the spring-contact  $C$ , so as to break the circuit at  $G^2$ . The core of the induction-coil then becomes deenergized and the spring-contact returns to its normal condition. The circuit is then again completed, and this operation is continued. The impulses in the secondary coil are then sent out upon the line and set in operation the signaling device  $I$  at the other end thereof. The controlling-switch  $H^2$  is then moved so as to connect the contacts  $H^3$  and  $H^4$  and disconnect the contacts in the circuit of the signaling device. The circuit through the transmitter is then completed, such circuit being as follows: From the source of supply  $H'$  through the primary coil of the induction-coil, thence to contact  $H^3$ , thence to contact  $H^4$ , thence to the transmitter  $T$ , and back to the source of supply  $H'$ . The variations in the current in the transmitter-circuit, due to the movement of the diaphragm, set up an induced current in the secondary coil of the induction-coil, and this current passes out on the line to the receiver at the other end. It will be noted that at a given station there is but one induction-coil, such induction-coil being associated both with the transmitter and the receiver at that station. In other words, the induction-coil at the station, which must necessarily be used in connection with the transmitter, is arranged so that it acts to actuate the receiver when the transmitter at the other end of the line is being used. Under ordinary conditions this induction-coil is excited while the talking is going on

and a different coil is used for the receiver, and hence there is a loss, which is thus saved by this construction.

I claim—

1. A telephone apparatus comprising a main induction-coil mounted upon a suitable base and having its pole-pieces brought into proximity to each other, a telephone-receiver diaphragm mounted upon said induction-coil and opposite the said pole-pieces, the induction-coil acting as the basic element, said receiver being carried and actuated by said induction-coil.

2. A telephone apparatus comprising an induction-coil having its pole-pieces brought into proximity to each other, a telephone receiving-diaphragm associated with the opposed pole-pieces so as to be actuated thereby, said diaphragm mounted in an inclosing device smaller than and supported upon the induction-coil and an electromagnetic circuit making and breaking device adapted to be connected with the primary circuit and associated with the opposed pole-pieces of the core of the induction-coil.

3. An induction-coil comprising a core formed so as to have separated, opposed poles, an angularly-projecting pole-piece on each of said poles and a telephone receiving-diaphragm associated with said pole-pieces so as to be actuated thereby, a supporting part for said diaphragm carried by the core of the induction-coil.

4. An induction-coil comprising a core formed so as to have separated, opposed poles, a primary and secondary coil on said core, a projecting pole-piece on each of said poles and a telephone receiving-diaphragm associated with said pole-pieces so as to be actuated thereby, said projecting pole-pieces provided with coils connected in the secondary circuit of the induction-coil.

5. An induction-coil comprising a core formed so as to have separated, opposed poles, a projecting pole-piece on each of said poles and a telephone receiving-diaphragm associated with said pole-pieces so as to be actuated thereby, and a circuit making and breaking device having a movable member extending over the space between the opposed poles of the induction-coil core.

6. An induction-coil comprising a core having pole-pieces which project toward each other but are separated by a space, a secondary coil thereon connected in the main line, a primary coil thereon, a transmitter connected in circuit with the primary coil, a receiver mounted upon and inclosing a part of said induction-coil, said induction-coil acting as a base therefor, said receiver formed in part by the said opposed poles.

7. An induction-coil comprising a laminated core having separated opposed poles, said core formed of a series of layers of material, the parts which form the opposed poles



being right-angled pieces, said pieces having each an angular projecting pole which acts as a part of a telephone-receiver, said right-angled pieces each having a coil wound thereon.

8. A telephone apparatus comprising a main induction-coil, a core therefor bent around so that its ends are in proximity to each other, a primary coil on the core thereof, a transmitter connected in circuit with said primary coil, a secondary coil on the core of said induction-coil, a receiver having its diaphragm associated with the core on said induction-coil so as to be actuated thereby, said induction-coil projecting laterally beyond said diaphragm whereby the main induction-coil acts both with the transmitter and the receiver at a given station.

9. A telephone apparatus comprising a main induction-coil, a transmitter associated

therewith, a receiver provided with a diaphragm, a supporting part therefor mounted upon the core of said main induction-coil so as to be supported thereby, the diaphragm being actuated by the core of the main induction-coil.

10. A telephone apparatus comprising a main induction-coil having a core bent around so that its ends are in proximity to each other, said ends being bent substantially at right angles to the core, a receiver-diaphragm mounted opposite said ends, a casing inclosing said right-angled ends and resting upon said core so as to be supported thereby, said casing supporting said diaphragm.

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Witnesses:

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HOMER L. KRAFT.