T. A. EDISON.

Electro Chemical Receiving Telephone.

No. 231,704. Patented Aug. 31, 1880.

Fig. 1.

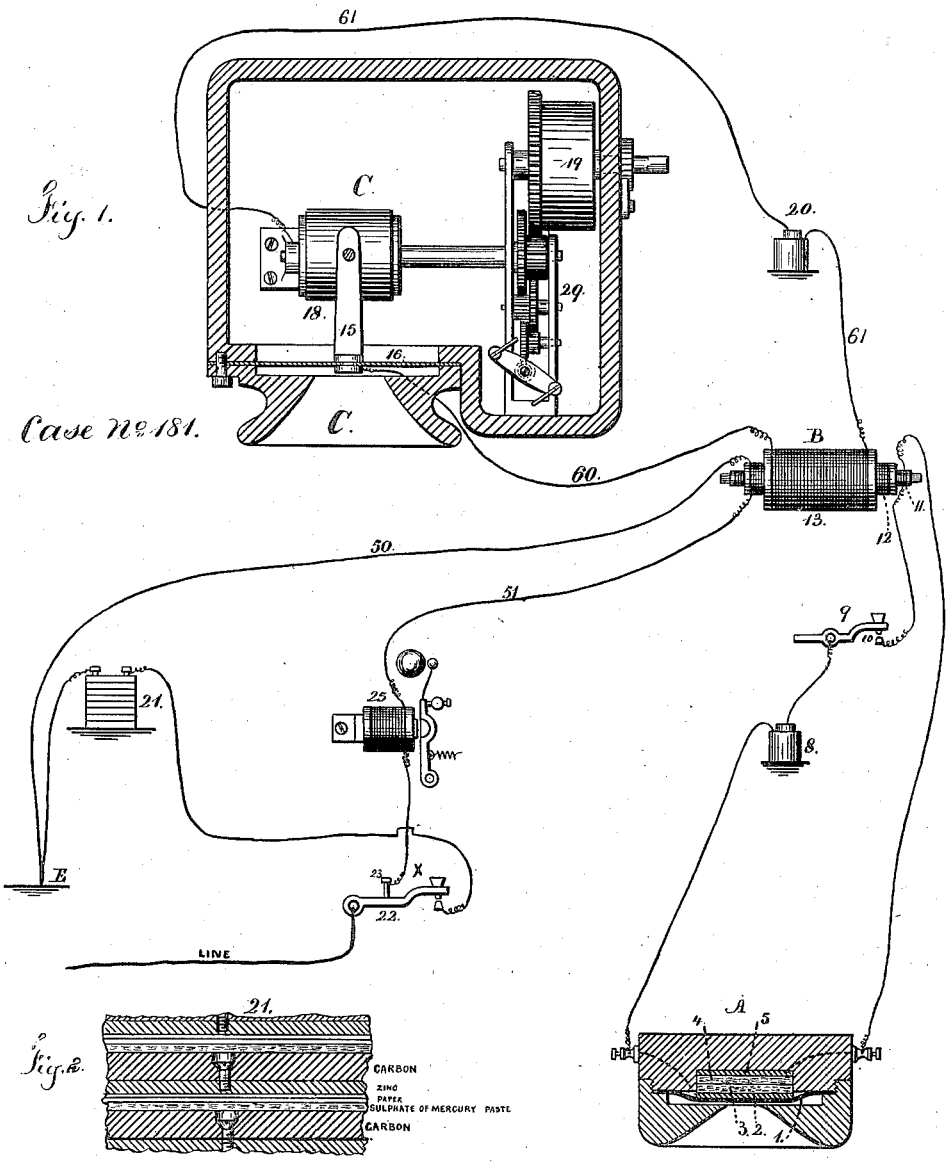

Fig. 2.

Witnesses

Chas. H. Smith

Harold Serrell.

Inventor

Thomas A. Edison.

per Lemuel W. Serrell

Atty.

UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF MENLO PARK, NEW JERSEY.

ELECTRO-CHEMICAL RECEIVING-TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 231,704, dated August 31, 1880.

Application filed July 25, 1879.

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Menlo Park, in the State of New Jersey, have invented a new and useful Improvement in Telephones, of which the following is a specification. (Case No. 181.)

The object of this invention is to transmit and reproduce over telegraph-wires speech or other sounds telephonically.

The invention relates to an improved electro-chemical receiving-instrument and the method of working such receiving-instrument by placing the same in a tertiary circuit and translating the electric waves which serve to operate it by induction.

In the drawings, Figure 1 represents the apparatus and circuit-connections at one end of the line, and Fig. 2 is a section of the call-bell battery.

A is the transmitter, which consists of two buttons, 3 and 4, made of finely-divided conducting material, such as carbon, and facing and resting at all times upon each other. 2 and 5 are metallic plates which are permanently secured to these two buttons and serve to connect the conducting-wires to the buttons. These are placed in a recess in an ordinary telephone-case, and a piece of rubber-cloth, 1, serves to keep the buttons in position and keep the moisture from them.

The principle of operation is the same as in my previous applications, in which sound-waves are translated into electrical waves, the device here shown being merely a modification thereof.

This transmitter is connected, in the circuit containing the battery 8 and key 9, with a circuit-closing point, 10, and primary coil of the inductorium B. The key 9 serves to close the circuit in the act of transmitting and to open it when receiving.

11 is the primary coil. 12 is the secondary coil, which is included in the main circuit by wires 50 and 51.

The wire 50 proceeds to the earth E, while 51 passes through the call-bell magnet 25 to point 23, key-lever 22, and to the line. Hence any waves thrown into the secondary wire upon B pass to the distant station.

13 is the tertiary coil. In the circuit of the tertiary coil is the electro-chemical receiver C. The wire 60 passes to the arm 15 of the diaphragm 16, the end of which arm rests upon the moistened cylinder 18.

The cylinder 18 is revolved continuously by means of a spring within the barrel 19 giving motion to the train of gearing at 29. The wire 61 returns to the other end of the tertiary coil.

20 is a battery which serves to keep a constant current in tertiary circuit.

The porous or chalk cylinder is kept moist by an electrolytic solution, such as water or acidulated water, and that part of the arm 15 which rests upon the chalk is tipped either with platina or palladium. I have found by experiment that when the arm is tipped with palladium the battery 20 is not required in the circuit 61 to the tertiary coil 13, but when platinum is used the battery appears to be necessary to obtain the best results.

The operation of the electro-chemical receiver is the same as in my application No. 175, except that the cylinder and arm are placed in a tertiary circuit instead of being placed direct upon the line. The object of placing it in a tertiary circuit is to keep the apparatus free from earth-currents, which cause alterations in the volume of sound, owing to the marvelous delicacy of the apparatus.

The key *x* serves to put the call-battery 21 in circuit and disconnect the bell-magnet 25 and primary 12 from the circuit when calling the distant station.

The battery 21 consists of a cell containing fifteen Marie Davy batteries, formed of disks of carbon and zinc fastened together by screws, as in Fig. 2. After being fastened together they are boiled in paraffine, and the surface of the zinc and carbon scraped. Fourteen of these double disks are used. At the bottom of the cell there is laid a disk of carbon; on this is laid a layer of sulphate of mercury paste; on this two sheets of moistened paper; on this is laid a double disk with the zinc side down; on the carbon side another layer of the mercurial salt is laid, and the same order of laying continued until the cell is finished. These are then sealed in a glass cell provided with a vent, into which water may be poured and be absorbed by the paper.

I do not herein lay any claim to the trans-

mitting-instrument, nor to the battery. I have shown these as adapted to the arrangement of circuit-connections represented.

I claim as my invention—

1. The combination, with a telephonic transmitter, receiver, and line, of a tertiary induction-coil, one coil of which is in the circuit to the receiver, the other in the circuit to the transmitter, and the third in the circuit to the line, substantially as set forth.

2. In combination with the transmitting and receiving instruments and a tertiary induction coil and circuits, substantially as set forth, a call and local battery of the character described.

and the circuit-connections of the same, substantially as set forth.

3. In combination with a diaphragm and a moving surface, an arm extending from the diaphragm to the moving surface and tipped with palladium, for the purposes and substantially as set forth.

Signed by me this 17th day of July, A. D. 1879.

THOS. A. EDISON.

Witnesses:
S. L. GRIFFIN,
FRANCIS R. UPTON.