

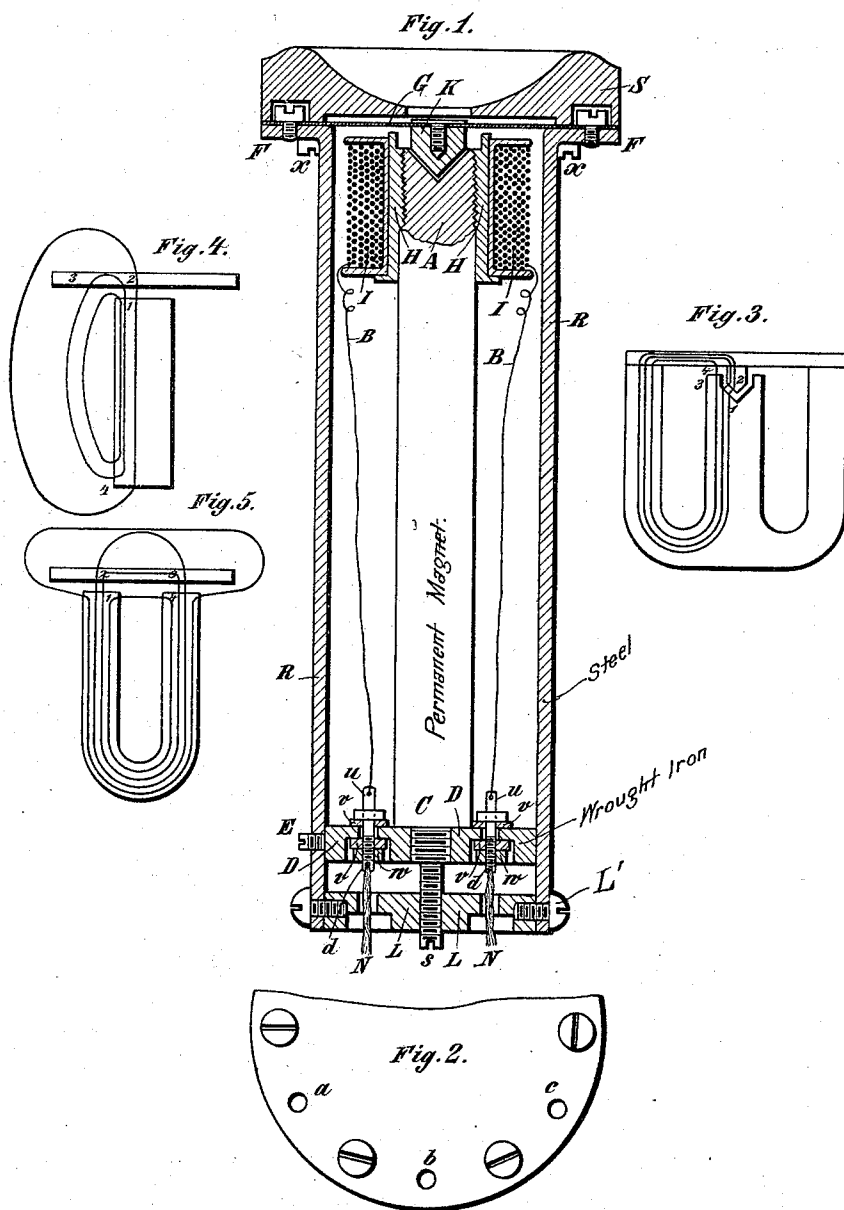
(No Model.)

M. FRANK.

MAGNETO ELECTRICAL TELEPHONE.

No. 544,890.

Patented Aug. 20, 1895.



Witnesses.

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UNITED STATES PATENT OFFICE.

MAX FRANK, OF MUNICH, GERMANY.

MAGNETO-ELECTRICAL TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 544,890, dated August 20, 1895.

Application filed June 30, 1894. Serial No. 516,161. (No model.)

To all whom it may concern:

Be it known that I, MAX FRANK, student of mechanics, of 581 Hessesstrasse, Munich, Bavaria, in the Empire of Germany, have invented new and useful Improvements in or in Connection with Magneto-Electrical Telephones, of which the following is a specification, reference being had therein to the accompanying drawings.

The present invention relates to telephones, and has for its object to arrange the magnetic circuit therein in such a manner as to prevent as much as possible loss of energy or magnetic dissipation and to reduce resistance in the magnetic circuit. This is designed in such a manner that the telephone membrane (diaphragm) shall follow the variations of the magnetic field as accurately and closely as possible, and thereby obviate crackling in the telephone and combine intensity of sound with great clearness in the transmission.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section, and Fig. 2 a separate view, of the membrane, (diaphragm.) Fig. 3 shows the course of the lines of force in the improved instrument, and Figs. 4 and 5 show the course of the same in apparatus as heretofore constructed.

The improved telephone comprises a bar-magnet A C, screw-threaded at its upper end, on which is screwed a piece of iron tube H. The latter may be replaced by partially turning down the magnet. The piece of tube H carries the induction-coil I, through which pass the induction-currents coming from the transmitting-station.

B indicates the leading-in wires or conductors.

The bar-magnet A C is fixed at its lower end in a wrought-iron plate D, which, while it is a good fit in the steel tube R, is capable of shifting therein. A set-screw E serves to fix the plate D in a definite position pressed firmly against the tube R. A finer adjustment of the plate D, and through it of the bar-magnet, may be effected by means of the screw s, which works in the plate L, which latter is fixed by screws L' to the tube R and presses against the plate D. The diaphragm G is fixed by screws to the flange F of the tube R and carries at its center an iron core K, which

is fastened by a screw and which projects into a hollow or recess formed in the bar-magnet A C in any suitable manner—for instance, by boring or by screwing a piece of tube thereon.

The core K has for its objects, first, to prevent as far as possible the magnetic dissipation at the passage of the lines of force into the air; second, to impart the desired direction to the lines of force—that is to say, at right angles to the diaphragm, and, third, to expose the membrane as much as possible to the action of the undulating magnetic current, and consequently to subject it to the undulations of the electric current and to obviate crackling noise in the telephone, and consequently to combine intensity of sound with clearness in transmission.

On the flange F there is screwed the mouth-piece S, which is fastened by means of screws x, passing from underneath through the flange and the diaphragm.

In order to fasten the leading-in wires B to the wrought-iron plate D, but so as to be insulated from the latter, the wires B are led to studs u u, which pass through holes in the plate, that have a greater diameter than the studs, the space thus formed being filled up with washers v of leather or rubber or other suitable material, so as to insulate the wires from the plate. The screws d, with the nuts w, serve to fasten the pins u u, to which the leading-in main wires or conductors N are attached. The holes a b c, Fig. 2, serve for the reception of the screws x.

Throughout the apparatus the magnetic flow is conveyed by iron parts, with the exception of the air-space between K and A. This air-space offers the main resistance to the magnetic flow in the whole magnetic circuit and its variations produce variations in the magnetic flow.

Figs. 4 and 5 show diagrammatically the magnetic circuit of telephones as usually employed heretofore. The lines of force effective for the purposes of the apparatus traverse an air-space between 1 and 2 and 3 and 4. The remaining lines which traverse an air-space are lines of dissipation.

Fig. 3 shows a diagrammatic view of the course of the lines of force in the improved arrangement.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In combination in a telephone and for the purposes described, the magnetic core A C, magnetic shell or tube R, the magnetic plate D secured to or formed with the said magnetic core and making contact with the interior surface of the said tube, a screw or other adjustment for the said plate D and a set-screw E for fixing it in position, substantially as set forth.

2. In combination in a telephone and for the purposes described, the magnetic core A C, magnetic shell or tube R, and the magnetic plate D for the said magnetic core and sliding and adjustable within the said shell or tube, substantially as set forth.

3. In combination in a telephone, the magnetic core A C, magnetic shell or tube R, the magnetic plate D secured or formed with the said magnetic core and making contact with the interior surface of the said tube, a plate L in the end of the said tube and an adjusting screw extending through the said plate L for adjusting the said magnetic core and causing the said plate D to be adjusted within the said tube R but without disturbing its magnetic contact therewith, substantially as set forth.

4. In combination in a telephone, the magnetic core, the surrounding magnetic tube or shell R, provided with the integral flange F, and the diaphragm G laid flat upon the said flange F and secured thereto, the said core

being magnetically connected (as by plate D) with the said shell or tube R, substantially as set forth.

5. In combination in a telephone, the magnetic core and surrounding magnetic shell magnetically connected, the diaphragm G magnetically connected with the said shell and the diaphragm armature or core extending into a recess within the said magnetic core, substantially as set forth.

6. In combination in a telephone, the magnetic core and surrounding magnetic shell magnetically connected, the diaphragm G magnetically connected with the said shell and the diaphragm armature or core K, the opposing surfaces of the said magnetic core and said core K being parallel and having a very small interval or air space between, substantially as set forth.

7. In combination in a telephone, the magnetic core provided with the conducting disk or plate D, the bare electric conductors *u* extending through perforations in the said plate D but separated therefrom by insulating washers or sleeves, and the leading-in wires B and circuit wires N secured to the said bare conductors *u*, substantially as set forth.

Munich, June 13, 1894.

MAX FRANK.

Witnesses:

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