A. G. BELL.
Speaking Telephone.

No. 201,488. Patented March 19, 1878.

Fig. 1

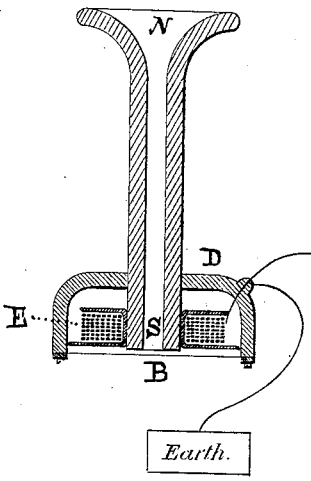


Fig. 2

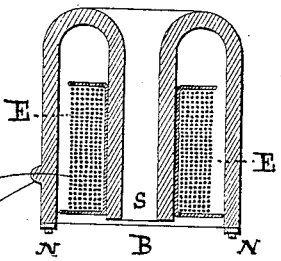


Fig. 3

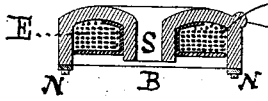


Fig. 4

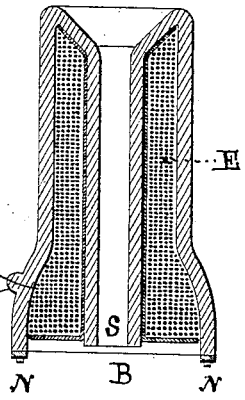
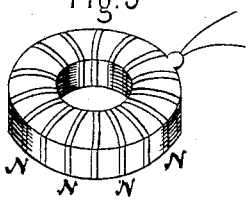


Fig. 5



Earth.

WITNESSES

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INVENTOR

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UNITED STATES PATENT OFFICE.

ALEXANDER GRAHAM BELL, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN SPEAKING-TELEPHONES.

Specification forming part of Letters Patent No. **201,488**, dated March 19, 1878; application filed February 8, 1878.

To all whom it may concern:

Be it known that I, ALEXANDER GRAHAM BELL, of Boston, Massachusetts, United States of America, now temporarily residing in Kensington, England, have invented a new and useful Improvement in Telephonic Apparatus, which invention is fully set forth in the following specification.

In Letters Patent of the United States granted to me on the 7th day of March, 1876, No. 174,465, and in other Letters Patent of the United States, dated the 30th day of January, 1877, No. 186,787, I have shown and described methods of producing sound at a distance by means of undulatory currents of electricity, whereby a number of telegraphic messages can be transmitted simultaneously in either or in both directions along a single circuit, and whereby articulate speech can be electrically produced.

In illustration of my system of electric telephony I have shown in my patent aforesaid, (No. 186,787,) as one form of electric telephone, a straight rod of iron or steel with a coil of wire around one end, which extremity is placed very near to, but not in contact with, a plate of iron or steel. The rod is either a permanent magnet, or is rendered magnetical by means of a battery-current. In this form of apparatus the plate is attached to a block of wood, and a speaking or hearing tube is employed for the purpose of conveying sounds to or from the plate. The speaker's voice is directed against that side of the plate which is turned away from the magnet, and one pole of the magnet remains unutilized.

My present improvement consists in the employment of a tubular magnet in place of the solid rod heretofore employed, and in attaching the plate to that pole of the magnet which has formerly been unused.

Figure 1 shows a vertical section of one form of tubular-magnet telephone, in which N S is the tubular magnet, which can be used in place of the hearing or speaking tube previously employed, and which also serves as a handle by means of which the telephone can be lifted to the mouth or ear, as required. B is the plate of iron, which can be vibrated in front of the pole S of the magnet. D is a wooden support, to which the plate B is affixed, and E a coil of insulated wire.

Fig. 2 shows another form of tubular-magnet telephone, in which the plate B is attached to the pole N of the tubular magnet N S, and is free to vibrate in the neighborhood of the pole S.

The tubular magnets may be constructed of iron or steel, or of any substance capable of forming a magnet, and may be either permanently magnetized, or magnetized by the influence of a battery-current.

It will be understood, also, that the shape of the magnet may be varied in a variety of ways. For instance, the tubular magnet may be flattened, as in Fig. 3, or lengthened, as in Fig. 4.

Fig. 3 represents a portable form of telephone, somewhat similar in shape to a watch, which can be carried in the pocket for testing purposes.

Fig. 5 is a perspective view of the same form of apparatus, composed of a compound tubular magnet, made in sections.

The coil E may also be varied in construction. For instance, it may be flat and short, as in Fig. 1, or it may be lengthened, as in Fig. 2; or it may fill up the whole interior of the telephone, as in Figs. 3, 4, and 5.

Having described my invention, what I claim, and desire to protect by Letters Patent, is as follows:

1. In an electric telephone, the combination of a tubular magnet with a plate of iron or steel, or other material capable of inductive action, substantially as set forth.

2. In an electric telephone, the combination of a plate of iron, or other material capable of inductive action, with a tubular magnet, so that the plate of iron is in contact with one pole of the tubular magnet, and is free to vibrate in the neighborhood of the other pole, the whole for operation substantially as herein shown and described.

3. In an electric telephone, substantially as herein shown and described, a tubular magnet for use as a speaking or hearing tube, for the purpose of conveying sounds to or from the plate.

4. In an electric telephone, substantially as herein shown and described, the tubular mag-

net constructed as a handle, whereby the telephone can be lifted to the mouth or ear, as required.

5. In an electric telephone, the combination, with a tubular magnet and metal plate, of a coil of insulated wire completely filling the interior of the telephone, substantially as herein shown and described.

6. In an electric telephone, a compound tubular magnet, substantially as herein shown and described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ALEXANDER GRAHAM BELL.

Witnesses:

GERALD C. HOPPER,

C. HAMMOND.