



# UNITED STATES PATENT OFFICE.

GEORGE M. PHELPS, OF BROOKLYN, NEW YORK.

## IMPROVEMENT IN MAGNETO-ELECTRIC SPEAKING-TELEPHONES.

Specification forming part of Letters Patent No. **218,684**, dated August 19, 1879; application filed June 4, 1879.

*To all whom it may concern:*

Be it known that I, GEORGE MAY PHELPS, electrician, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Magneto-Electric Speaking-Telephones, of which the following is a specification.

My present invention relates to that class of speaking-telephones adapted for operation either as transmitters or as receivers; and my improvement more especially relates to the shape of the permanent magnet, the method of combining it with the electro-magnet, case, diaphragm, and mouth-piece, and with the conducting-wires.

The subject-matter claimed hereinafter specifically will be designated.

In the accompanying drawings, Figure 1 represents a vertical central section through my improved telephone on the line 1 1 of Fig. 3. Fig. 2 represents a similar section at right angles thereto on the line 2 2 of Fig. 3, which latter figure represents a bottom or inverted plan view of the apparatus with a portion of the permanent magnet broken away.

The permanent steel magnet A is shown as made of a substantially horseshoe shape with one pole flattened and bent inward, so as to extend nearly across the open part of the horseshoe. This form is convenient for handling and for the attachment of the parts.

An electro-magnet, B, of suitable well-known construction is mounted upon this inwardly-bent pole of the permanent magnet, and provided with well-known means for adjusting it relatively to the diaphragm C, which is in-

closed within a case, D, provided with the usual mouth-piece or speaking-tube.

The other pole of the magnet is perforated for the passage of the conducting-wires *e*, which are coated with insulating material, each wire being connected with the respective binding-post E E'.

The casing is made of non-conducting material, and it is desirable that the substance employed should be one inexpandible by variations of temperature.

The operation of this apparatus being similar to that of other instruments of this class will be well understood without further description.

I claim as of my own invention—

1. The permanent magnet constructed substantially as hereinbefore set forth, of a horseshoe shape with one pole bent inwardly from the attachment of the electro-magnet, casing, and diaphragm, and with the other pole perforated for the passage of the conducting-wires.

2. The speaking-telephone herein described, consisting of the combination of the horseshoe-shaped permanent magnet with its inwardly-bent pole and the electro-magnet, case, diaphragm, and mouth-piece mounted on said pole.

In testimony whereof I have hereunto subscribed my name.

GEORGE MAY PHELPS.

Witnesses:

ENOS M. BARTON,  
FRANK L. POPE.