A. C. HUBBARD.
Telephone.

No. 220,839. Patented Oct. 21, 1879.

Fig. 1

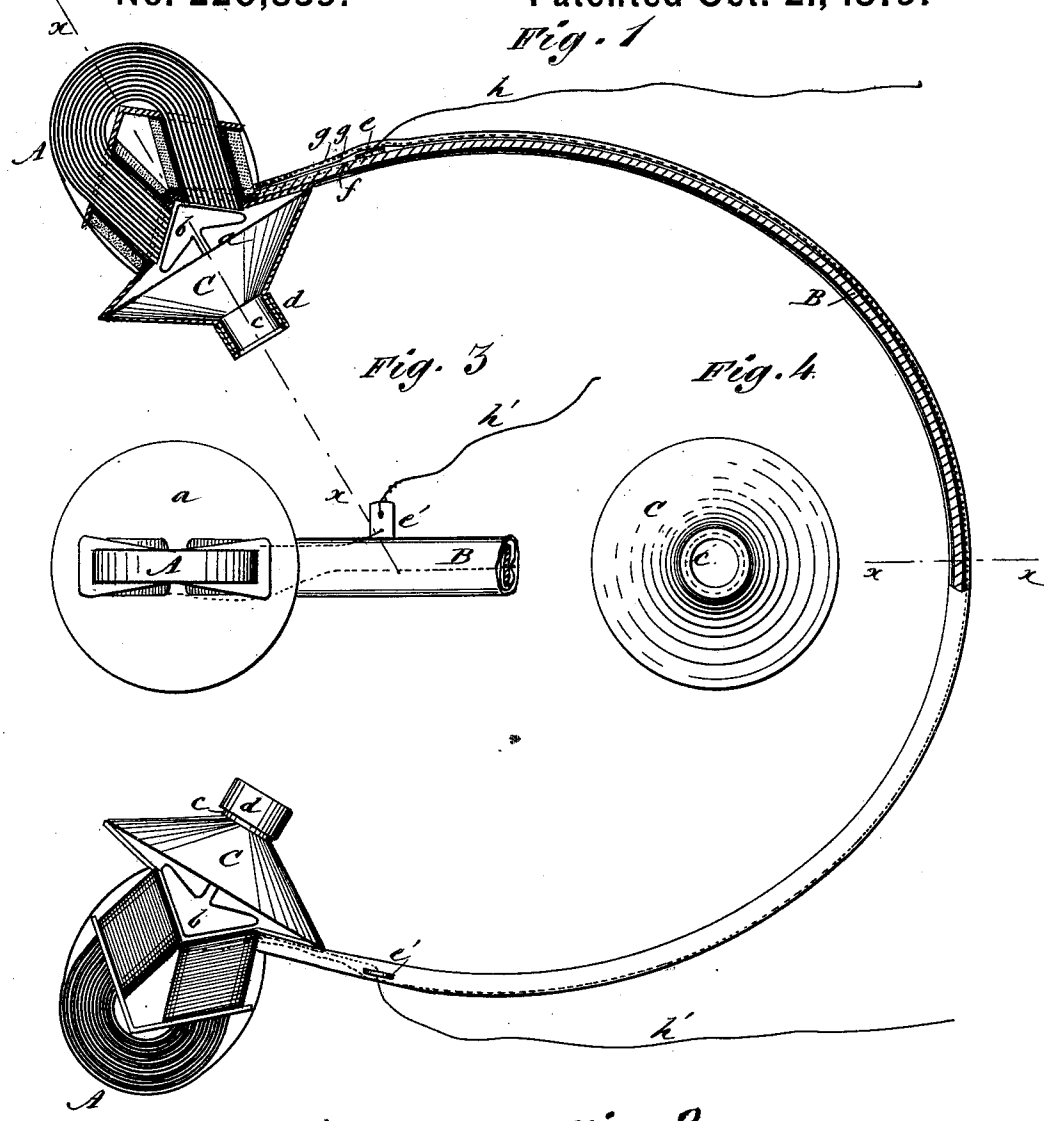



Fig. 3



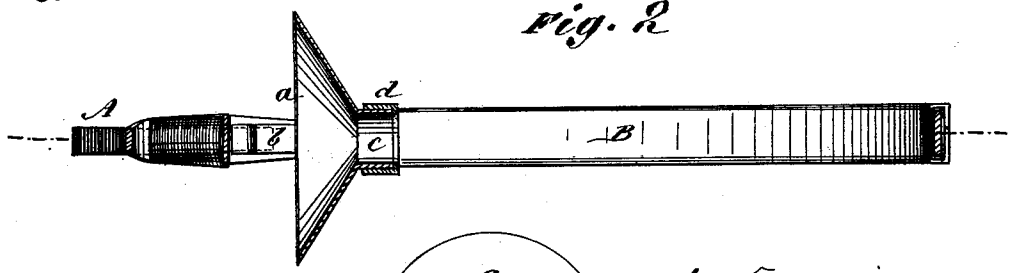

Fig. 4







Fig. 2



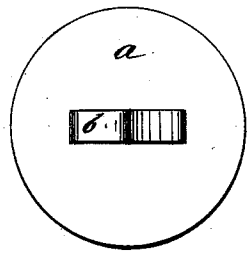




Fig. 5

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# UNITED STATES PATENT OFFICE.

ANDREW C. HUBBARD, OF DANBURY, CONNECTICUT.

## IMPROVEMENT IN TELEPHONES.

Specification forming part of Letters Patent No. **220,839**, dated October 21, 1879; application filed July 8, 1879.

*To all whom it may concern:*

Be it known that I, ANDREW COOMBS HUBBARD, of Danbury, in the county of Fairfield and State of Connecticut, have invented a new and Improved Telephone, of which the following is a specification.

The object of my invention is to provide a compact telephone of light weight, adapted to be held to the ears without the hands, to make it especially valuable to the partially deaf, and to physicians and others who are obliged to employ their hands while attending to the messages and sounds communicated through the telephone.

The invention consists in the combination of funnel-shaped receivers with diaphragms, ear-pieces, and triangular armatures with the electro-magnets made of thin sheets of electro-magnetic steel bent into the form of a horseshoe, and in an elastic hoop covered with silk, and provided with ears having a surrounding helix-wire insulated by two folds of silk, and terminating at ears to connect the magnet with circuit-wires, in combination with two receivers and magnets fixed to its ends, all as hereinafter described.

In the accompanying drawings, Figure 1 represents my improved telephone with a part of the covering of the hoop cut away to expose the manner of insulating the wires and one of the receivers likewise in section. Fig. 2 is a section on line *x x* of Fig. 1, taken through the magnet and receiver. Fig. 3 is a rear view of the magnet and receiver. Fig. 4 is a front view of the ear-piece of the receiver, and Fig. 5 is an outside view of the diaphragm and armature.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A A are the magnets, composed of any number of thin sheets of polarized steel laid together and bent around to form a compound horseshoe-magnet of great power, small size, and little weight. Over each arm is placed a spool, around which is wrapped the wire in the usual way of electro-magnets. The poles, it will be observed, are of a V shape, whereby a greater surface is obtained and a larger armature can be used. These magnets are secured to the ends of the elliptical hoop B on the outside. On the inside of the same hoop, immediately opposite the poles of the magnet, are fixed the funnel-shaped receivers C C, provided with diaphragms *a a*, fastened at the edges to the rim of the funnel.

To the center of the diaphragms are attached the triangular armatures *b b* in such a way as to place the apex of the triangle in line with the division of the two poles of the magnets, while the sides of the triangle are exactly parallel with the planes of the poles.

At the small ends of the funnels are attached short tubes *c c*, cased with rubber thimbles *d*. These form the ear-pieces.

On either side of the hoop B, near the receivers, are metal ears *e e'*, to which the circuit-wires are attached.

The hoop B is made of wood, metal, rubber, or any other suitably-elastic material. If made of a conducting substance it is necessary to wrap it with an insulating material, such as silk. The one shown in the drawings is supposed to be of wood and is incased in silk, and the connecting-wires are incased in it and arranged in the following manner:

From ear *e* one wire, *f*, leads to the electro-magnet on that side, thence back between the folds of silk *g g*, (which insulate it from the ear,) around the hoop past the ear *e'* to the magnet on that side, and, returning, is joined to ear *e'*. The circuit-wires *h h'* are joined, respectively, to ears *e e'*, and by this means the electro-magnets are brought into the circuit.

This instrument is designed especially for partially-deaf persons to enable them to hear music, sermons, lectures, &c., and also for physicians and others who make auscultatory examinations where it is required that the hands shall be free.

The ear-pieces are inserted in the ears, the hoop running around the head, and by its elasticity holding the receivers in place.

It is my purpose to connect the instrument with a small microphonic transmitter placed on a pedestal in which is a small constant battery.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of the funnel-shaped re-

ceiver C, with diaphragms *a*, ear-pieces *c d*, and triangular armatures *b* with the electro-magnets A, made of thin sheets of magnetized steel bent into the form of a horseshoe, so as to bring the two poles opposite the armature and diaphragm and parallel to the sides of the armature, substantially as described.

2. The elastic hoop B, covered with silk, and provided with ears *e e'* for the attachment of the circuit-wires, and having the helix-wire *f* run around the same, and insulated by the two folds of silk *g g*, and terminating at the ears *e e'*, to connect the magnet with the circuit-wires *h h'*, in combination with the two receivers and their magnets fixed to its ends, whereby an instrument is provided adapted to be placed over the head and in connection with the ears, as and for the purpose substantially as described.

ANDREW COOMBS HUBBARD.

Witnesses:
C. H. CROFUT,
J. ANSBURY.