

LA FOREST POTTER.  
ELECTRIC OSTEOPHONE.  
APPLICATION FILED JUNE 15, 1904.

4 SHEETS—SHEET 1.

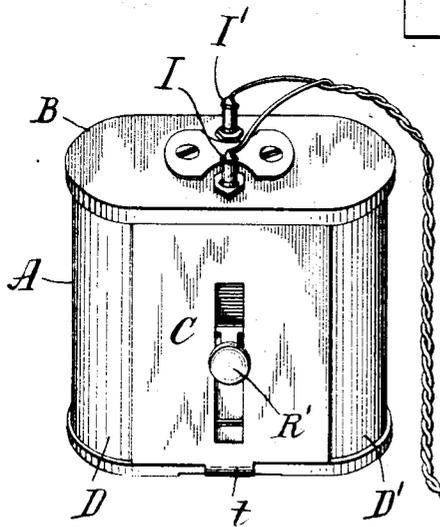
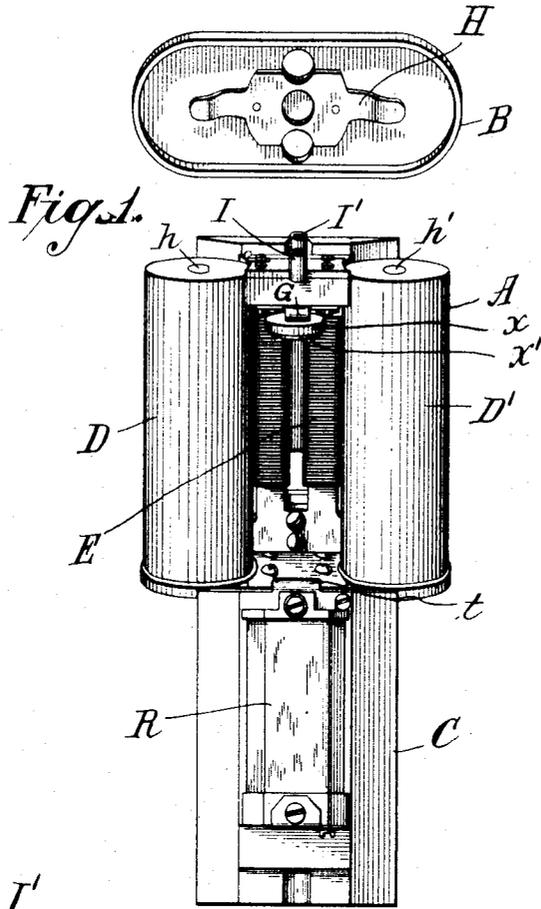
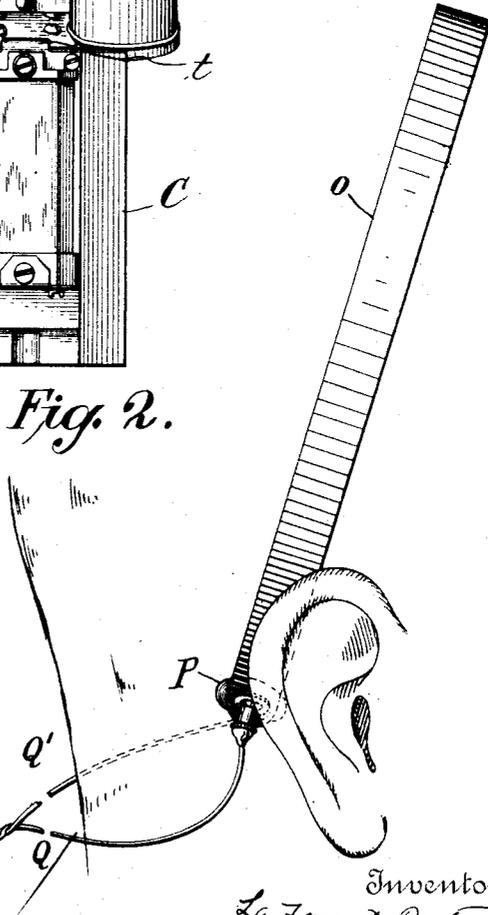


Fig. 2.

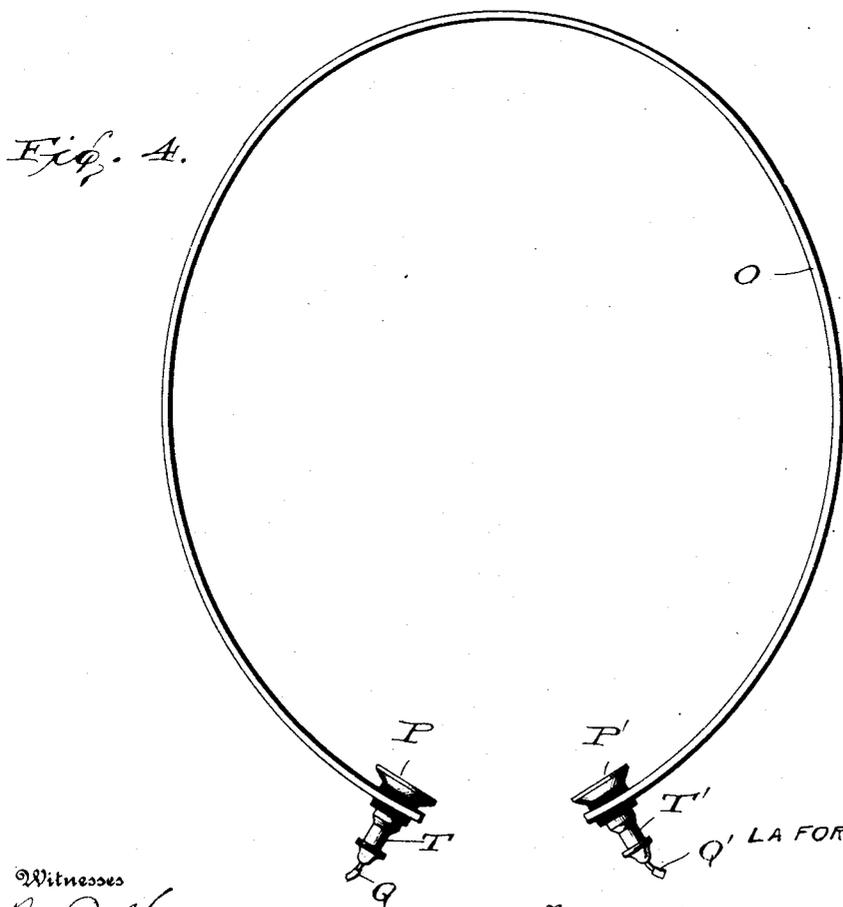
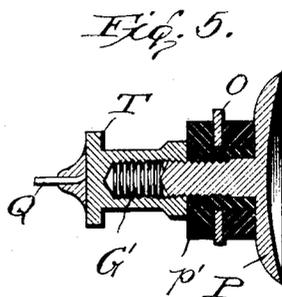
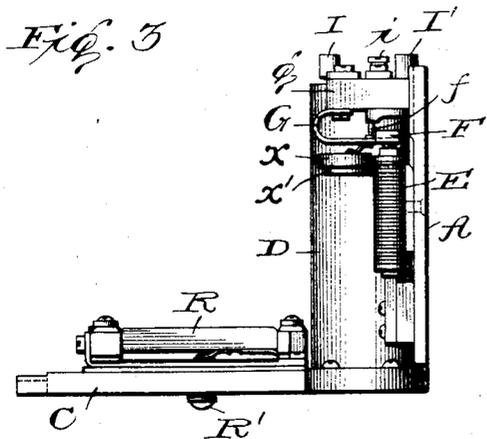


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4 SHEETS—SHEET 2.



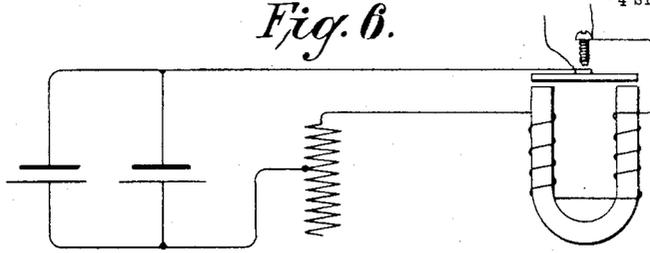
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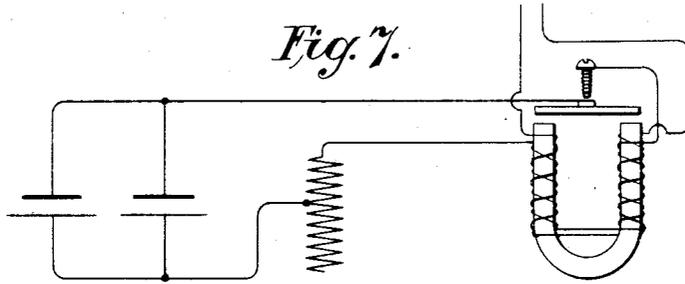
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4 SHEETS—SHEET 3.

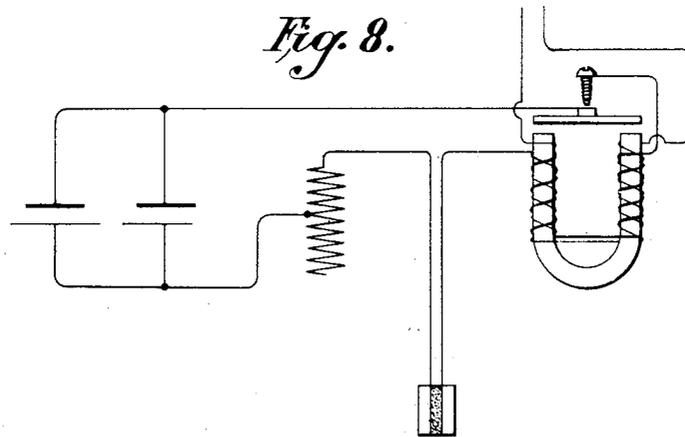
*Fig. 6.*



*Fig. 7.*



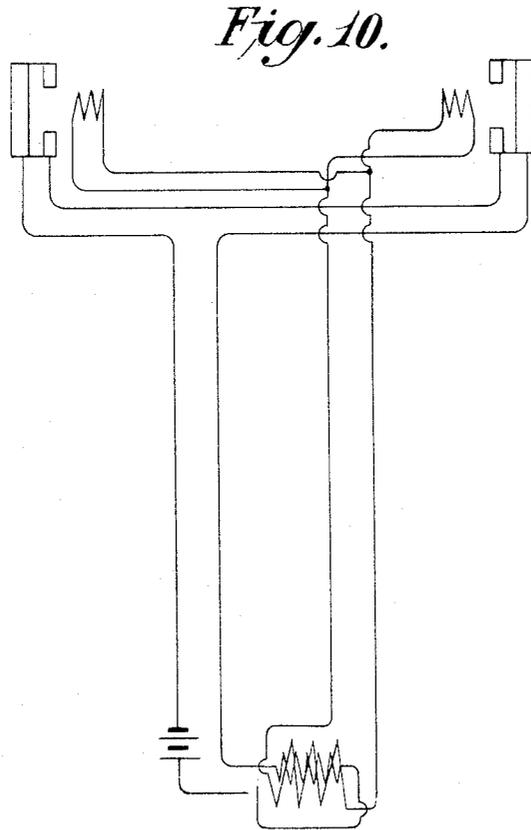
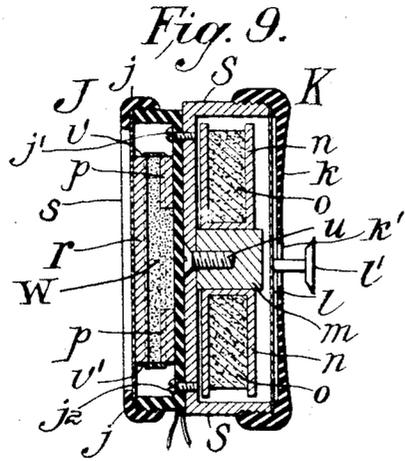
*Fig. 8.*



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# UNITED STATES PATENT OFFICE.

LA FOREST POTTER, OF NEW YORK, N. Y.

## ELECTRIC OSTEOPHONE.

SPECIFICATION forming part of Letters Patent No. 792,162, dated June 13, 1905.

Application filed June 15, 1904. Serial No. 212,664.

*To all whom it may concern:*

Be it known that I, LA FOREST POTTER, a citizen of the United States of America, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Electric Osteophones, of which the following is a specification.

My invention relates, among other things, to improvements in means for passing an electric current through the mastoid bones and through the natural ear-passages of the human head and also of means for transmitting phonetic excitement to such media by the use of an electric current.

The objects of my invention are to convey electrically to the auditory brain-cells of a human being sound sensations, thereby revitalizing old acoustic media through the production of new conducting-paths. It has been found and is now generally understood that when the certain specific functions of the brain have become injured from any cause other brain elements which remain uninjured slowly assume functions which were never exercised before, thereby rearranging paths of cerebral communication.

My invention is primarily designed for deaf persons who have wholly or partially lost the faculty of hearing by means of the ordinary functions of the ear.

The particular novel functions of my invention, among other things, are stimulations to the auditory nerve endings by furnishing a different and safer degree of phonetic excitement than has been hitherto accomplished by any other apparatus.

I attain these objects by mechanisms illustrated in the accompanying drawings, in which—

Figure 1 is a view of a portable battery of two cells with the case open. Fig. 2 is a view of the same battery with the casing closed, showing the connections with the ear-passages. Fig. 3 is an end view of a portable battery. Fig. 4 is a view showing the spring head-gear for holding the disks or telephones in position. Fig. 5 is a sectional view showing the metallic disks in detail. Figs. 6, 7, and 8 are diagrammatic views showing, re-

spectively, the arrangement of wiring employed for sending a current of electricity through the ear-passage, the wiring shown in Fig. 7 being adapted for use with an electric current through the head-bones or with a telephone or telephones in contact with the ear-passage of the head, and the wiring in Fig. 8 showing the use of a microphone as an adjunct when the telephonic communication with the bones of the head is used. Fig. 9 is a sectional view of a transmitter and receiver of a telephone to be used in place of the metallic disks shown in Fig. 2. Fig. 10 is a diagrammatic view of the wiring when the device shown in Fig. 9 is employed.

Similar letters refer to similar parts throughout the several views.

A is a portable casing of suitable size and shape to hold the cells D D' of the battery. The cover B fits on the top of the case, as shown in Figs. 1 and 2, and has secured to its inner surface a metallic conductor connection H, so shaped as to contact with the poles h h' of the cells D D'. An electromagnet E is suitably supported within the casing A—for example, as shown in Fig. 1—between the cells D and D'. A door C, hinged to the bottom of the casing at z, may be provided, to which is attached an ordinary rheostatic and controlling device R, (shown in Figs. 1 and 3,) with a regulating-button R'. (Shown in Figs. 2 and 3.)

An armature F is superimposed above the poles of the electromagnet E and is held in intermittent connection between the poles of the electromagnet E and the contacting pin f, electrically connected with the pole I' by the spring G, as shown in Fig. 3. The contacting pin f is regulated by the screw i, as shown.

Attached to and suitably supported on spring X' within the casing A is a microphone X, as shown in Fig. 3.

Figs. 4 and 5 show the head-gearing and the means for pressing the connecting-pieces or metallic disks to the ear-passage of the head.

The flat spring gear-head O is suitably shaped so as to fit about the head, as shown in Fig. 2. The earpieces P P' are of metal

and are attached to the ends of the head-gear O, as shown in Fig. 4.

Fig. 5 shows a sectional view of the ear-piece. P is a substance of suitable electrical conductivity, so shaped as to press snugly against the surface of the head. The piece P is insulated from the head-gear O by the part  $p'$ . T and T' is a container for the coil of wire  $g$ , connected with P and P', respectively, and leading away from the metallic disks P and P' to the battery contained in portable casing A by the wires Q and Q', respectively, and illustrated in Fig. 2. X is an ordinary microphone supported within the casing A on spring X'.

Fig. 9 shows a sectional view of a telephone transmitter and receiver J and K. S is a case for the transmitter, made of suitable magnetic metal and adapted to contain the necessary parts of the transmitter. A hard-rubber screw-cap  $k$  is affixed to the case with an opening at  $k'$ , within which is the diaphragm  $l$ .  $m$  is the core of the inner magnet, attached to the case S by the screw  $u$ .  $o$  is the spool of the magnet, incased in  $n$  about the core  $m$ .  $j$  is a hard-rubber screw-cap attached to the case S by the screws  $j'$  and  $j''$ , as shown.  $p$  is a flat carbon ring secured to  $j$ , as shown.  $r$  is a carbon disk fastened to  $p$  at the edges  $v$  and  $v'$ . At W is placed some fine carbon dust, held within the disks  $r$  and  $p$ , as shown.  $s$  is a soft-rubber disk stretched across  $j$  at a high tension, as shown.  $z$  is a stud for conveying the vibrations of diaphragm  $l$ .

The operation of my novel mechanism is as follows: The head-gear O is affixed to the head and ear pieces. P and P' are held in place by the spring action in the elliptical head-gear O. The current of electricity flows from the poles of battery-cells D and D' and through the rheostat R and then through the coils of the electromagnet, thereby causing the armature to contact with the poles of the electromagnet. This action breaks the circuit at the point of the pin  $f$ , and the armature is retracted by the spring G, as is well understood. A buzzing sound is thereby produced which is conducted to the earpieces or metallic disks P and P', and auditory excitement is produced through the ear-passages into the brain-cells, thereby exciting new media to auditory action. The operation is that of the ordinary annunciator and is clearly illustrated in diagrammatic form in Fig. 6.

In Fig. 7 a secondary coil is wound about the poles of the electromagnet, the ends of which may be connected with either miniature receivers of a telephone attached to the head-gear O as earpieces or directly to the earpieces P and P'. The operation in this case is the same as in Fig. 6, and in Fig. 8 is shown the operation of my novel mechanism when the microphone is directly connected with the electric circuit.

In Fig. 10 is shown the operation of my im-

proved mechanism when the combined transmitter and receiver of a telephone J and K are used as earpieces contacting with the mastoid bones of the head and will be readily understood, the primary object of my novel mechanism being the transmission of phonetic excitement to the auditory media of the brain by means of electricity.

It will thus be seen that in all forms of the invention the same object is preserved—namely, to pass an electric current directly through the mastoid bones of the head and also through the natural ear-passages, whereby the auditory nerve endings are stimulated and the brain-cells excited to auditory action.

I do not wish to limit myself to the precise forms of the mechanism shown or to the portable character thereof, for many changes may be made in the means I have illustrated and described by those skilled in the art without departing from the spirit of my invention.

What I claim as new, and desire to secure by Letters Patent is the following, viz:

1. An electric osteophone consisting of a source of electrical energy, an electromagnetic vibrator in circuit therewith, head-contacts electrically connected with the make-and-break members of the vibrator, and means for arranging said contacts in position for directing the electric current through the head.

2. An electric osteophone consisting of the combination of an electromagnet, an electric battery connected therewith, an armature, means for holding said armature in intermittent connection with the poles of said electromagnet, a pin so disposed relatively to said armature as to contact intermittently therewith, a secondary coil about said electromagnet, and means for electrically connecting the said secondary coil with the head, substantially as described.

3. An electric osteophone consisting of the combination of an electromagnet, an electric battery and microphone connected therewith, an armature, means for holding said armature in intermittent connection with the poles of said electromagnet, a pin so disposed relatively to said armature as to contact intermittently therewith, a secondary coil about said electromagnet, telephones in electrical connection with said secondary coil and contacting with the head, substantially as described.

4. An electric osteophone consisting of the combination of an electromagnet, an electric battery and microphone connected therewith, an armature, means for holding said armature in intermittent connection with the poles of said electromagnet, a pin so disposed relatively to said armature as to contact intermittently therewith, a rheostat with means for regulating same connected with said electric battery, a secondary coil about said electromagnet, telephones in electrical connection with said secondary coil and contacting with the head, substantially as described.

5. An electric osteophone consisting of the combination of an electromagnet, an electric battery connected therewith, an armature, means for holding said armature in intermittent connection with the poles of said electromagnet, a pin so disposed relatively to said armature as to contact intermittently therewith, a microphonic transmitter, one pole of which is directly connected with the electric battery and the other with the primary coil about said electromagnet, a secondary coil about said electromagnet, and means for electrically connecting said secondary coil with the head, substantially as described.

6. An electric osteophone consisting of the combination of an electromagnet, an electric battery connected therewith, an armature, means for holding said armature in intermittent connection with the poles of said electromagnet, a pin so disposed relatively to said armature as to contact intermittently therewith, a microphonic transmitter, one pole of which is directly connected with electric battery and the other with the primary coil about said electromagnet, a secondary coil about said electromagnet and telephones in electrical connection with said secondary coil and contacting with the head, substantially as described.

7. An electric osteophone consisting of the combination of an electromagnet, an electric battery connected therewith, an armature, means for holding said armature in intermittent connection with the poles of said electro-

magnet, a pin so disposed relatively to said armature as to contact intermittently therewith, a rheostat with means for regulating same connected with said electric battery, a microphonic transmitter one pole of which is directly connected with the electric battery and the other with the primary coil about said electromagnet, a secondary coil about said electromagnet, and means for electrically connecting said secondary coil with the head, substantially as described.

8. An electric osteophone consisting of the combination of an electromagnet, an electric battery connected therewith, an armature, means for holding said armature in intermittent connection with the poles of said electromagnet, a pin so disposed relatively to said armature as to contact intermittently therewith, a rheostat with means for regulating same connected with said electric battery, a microphonic transmitter one pole of which is directly connected with electric battery and the other with the primary coil about said electromagnet, a secondary coil about said electromagnet, and telephones in electrical connection with said secondary coil and contacting with the head, substantially as described.

In witness whereof I have hereunto set my hand this 8th day of June, 1904.

LA FOREST POTTER.

Witnesses:

H. V. N. PHILIP,  
J. F. BOUDREAU.