E. C. HANSON.

TELEPHONE APPARATUS FOR THE DEAF.

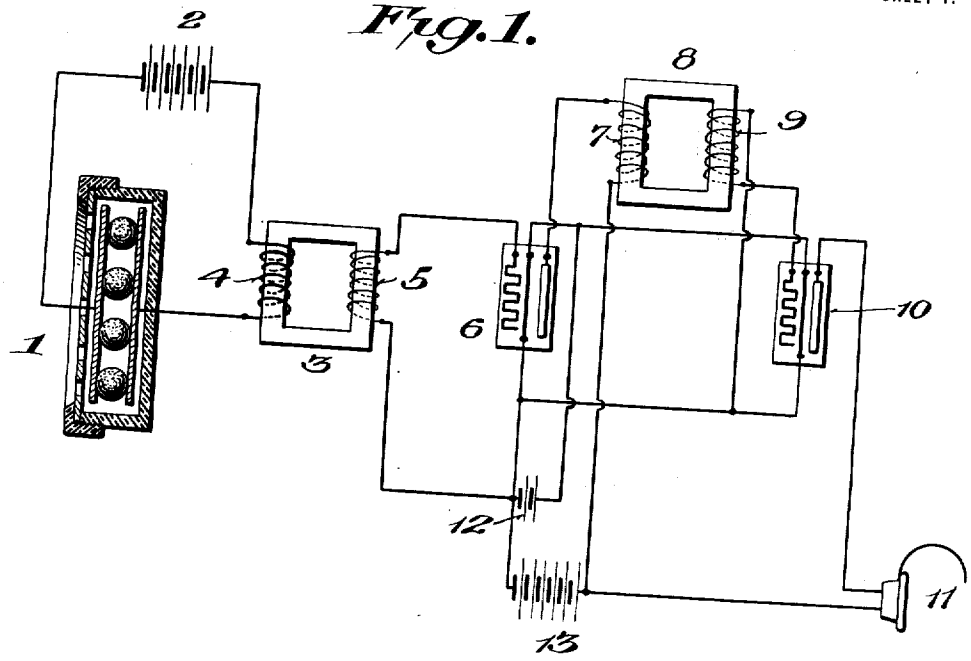
APPLICATION FILED JUNE 11, 1919.

1,343,717.

Patented June 15, 1920.

2 SHEETS—SHEET 1.

Fig. 1.



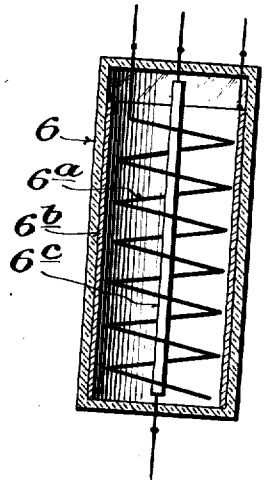


Fig. 2.

Witnesses

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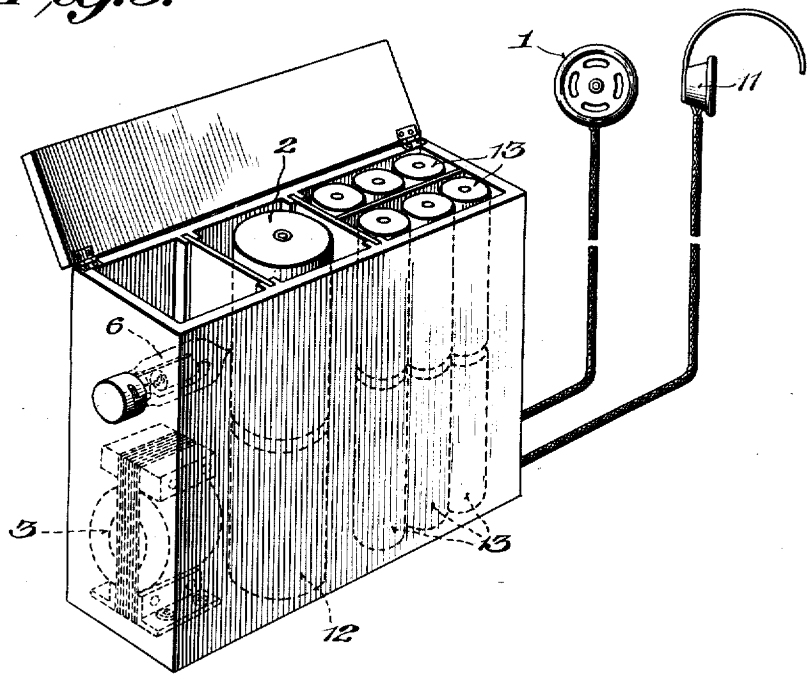
2 SHEETS—SHEET 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

EARL C. HANSON, OF WASHINGTON, DISTRICT OF COLUMBIA.

TELEPHONE APPARATUS FOR THE DEAF.

1,343,717. Specification of Letters Patent. Patented June 15, 1920.

Application filed June 11, 1919. Serial No. 303,285.

To all whom it may concern:

Be it known that I, EARL C. HANSON, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Telephone Apparatus for the Deaf, of which the following is a specification.

My invention relates to an apparatus to aid the hearing of the deaf.

The invention has for its object to provide a telephonic audiphone, or telephone for the deaf, wherein the volume of the speech produced in the receiver is substantially increased, as compared with devices of this character heretofore known and used. To this end, a highly important feature of the invention consists in the provision of a vacuum tube amplifier which is introduced into the system, becoming a part thereof, and by the use of which new and improved results heretofore never considered possible in audiphones, is accomplished.

Preferably, the vacuum tube amplifier and other elements of the apparatus are miniature, and for convenience are inclosed in a suitable case, or casings.

The invention will be more clearly understood by referring to the accompanying drawings in which like characters of reference have been used to designate corresponding parts throughout the several figures.

Figure 1 shows diagrammatically the electric circuits employed in the telephone apparatus and Fig. 2 shows in section one form of miniature vacuum tube used as amplifying elements in the circuit set forth in Fig. 1. Fig. 3 shows the arrangement of the elements of the invention within a small case adapted to be carried by the deaf person.

Referring particularly to Fig. 1 reference character 1 represents in section a carbon ball telephone transmitter connected in circuit with a miniature battery 2 and the primary winding 4 of the iron core transformer 3. The secondary 5 of the transformer is connected to the input circuit of vacuum tube 6 having its output circuit connected through the primary winding 7 of the iron core transformer 8 with a miniature plate circuit battery 13. The filament of the vacuum tube 6 is heated by miniature battery 12. The secondary 9 of transformer 8 is bridged across the input terminals of a second vacuum tube 10 having its filament heated by the common filament battery 12. The output plate circuit of the vacuum tube 10 is connected through a miniature telephone receiver 11, suitably carried on a headband, and the common plate battery 13. The vacuum tubes 6 and 10 are connected in cascade to form a two stage audio frequency amplifier. In carrying out the invention the vacuum tubes are constructed of small dimensions arranged for example as shown in Fig. 2.

The vacuum tube illustrated in Fig. 2 comprises a small evacuated vessel 6 having an interior metal lining 6^b forming a plate and a spiral grid 6^a concentric therewith and wound around a central filament 6^c. The construction is of such character that the tube can be contained with the other apparatus shown in Fig. 1 in a small space. The particular tube shown is for illustrative purposes only and it will be understood that I do not claim the structure of the tube as shown as part of my invention.

In practice the transformers 3 and 8 and vacuum tubes 6 and 10 together with the miniature batteries 2, 12 and 13 are contained in a small case adapted to be conveniently carried by the deaf person. Fig. 3 illustrates one form of the complete telephonic system employing a single stage of amplification. Numeral 14 represents the complete vacuum tube amplifier. The miniature vacuum tube 6 is suitably supported in proximity to transformer 3. The batteries which supply current to the telephone transmitter and the filament and plate circuits of the vacuum tube may be mounted in partition sections within the amplifier such that the individual batteries can be readily renewed when exhausted. Battery 12 supplies current to the telephone transmitter circuit and to the filament circuit of the vacuum tube. Battery 13 is the source of potential supplied to the plate circuit. The apparatus in the case is connected by small flexible wire with the telephonic audiphone transmitter 1 and the telephonic audiphone receiver 11. The apparatus disclosed forms a complete telephonic audiphone system in which the transmitter is connected with the input circuit of a miniature amplifier having its output connected to the telephonic audiphone receiver.

What I claim is:

1. The combination, in a telephonic audiphone having sound collecting and sound reproducing devices, and a pocket case, of a miniature audio-frequency transformer, and

a miniature vacuum tube relay, both inclosed in said case, together with energizing means for the filament and plate circuits of said tube also in said case and electrically associated with said transformer and sound collecting and reproducing devices.

2. The combination, in a telephonic audiphone having sound collecting and sound reproducing devices, of a miniature audio-frequency transformer, and a miniature vacuum tube relay, energizing means for the filament and plate circuits of said tube electrically associated with said transformer and sound collecting and reproducing devices, and suitable inclosing means for said devices.

3. The combination, in a telephonic audiphone, comprising a one-way transmission circuit including sound collecting and reproducing devices, of audio-frequency transforming means, and vacuum tube relay means whose input circuit is connected through said transforming means with said collecting device, and whose output circuit is connected with said reproducing device.

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2. The combination, in a telephonic audiphone having sound collecting and sound reproducing devices, of a miniature audio-frequency transformer, and a miniature vacuum tube relay, energizing means for the filament and plate circuits of said tube electrically associated with said transformer and sound collecting and reproducing devices, and suitable inclosing means for said devices.

3. The combination, in a telephonic audiphone, comprising a one-way transmission circuit including sound collecting and reproducing devices, of audio-frequency transforming means, and vacuum tube relay means whose input circuit is connected through said transforming means with said collecting device, and whose output circuit is connected with said reproducing device.

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DISCLAIMER.

1,343,717.—*Earl C. Hanson*, Washington, D. C. TELEPHONE APPARATUS FOR THE DEAF. Patent dated June 15, 1920. Disclaimer filed September 24, 1923, by the assignee, *Title Insurance & Trust Company*, the patentee consenting.

Hereby enters this disclaimer to claim 3 of said Letters Patent, which is in the following words, to wit:

"The combination, in a telephonic audiphone, comprising a one-way transmission circuit including sound collecting and reproducing devices, of audio-frequency transforming means, and vacuum tube relay means whose input circuit is connected through said transforming means with said collecting device, and whose output circuit is connected with said reproducing device."

[*Official Gazette October 23, 1923.*]

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