C. G. Page,

Apparatus for Assisting the Hearing,

No. 30,688, Patented Nov. 20, 1860

Fig. 2

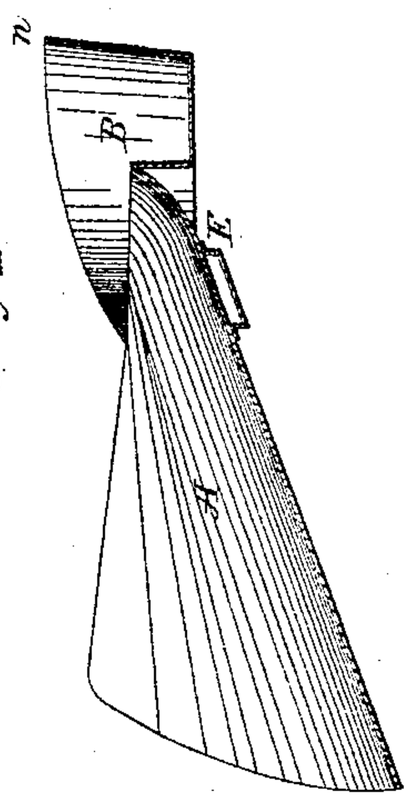


Fig. 1

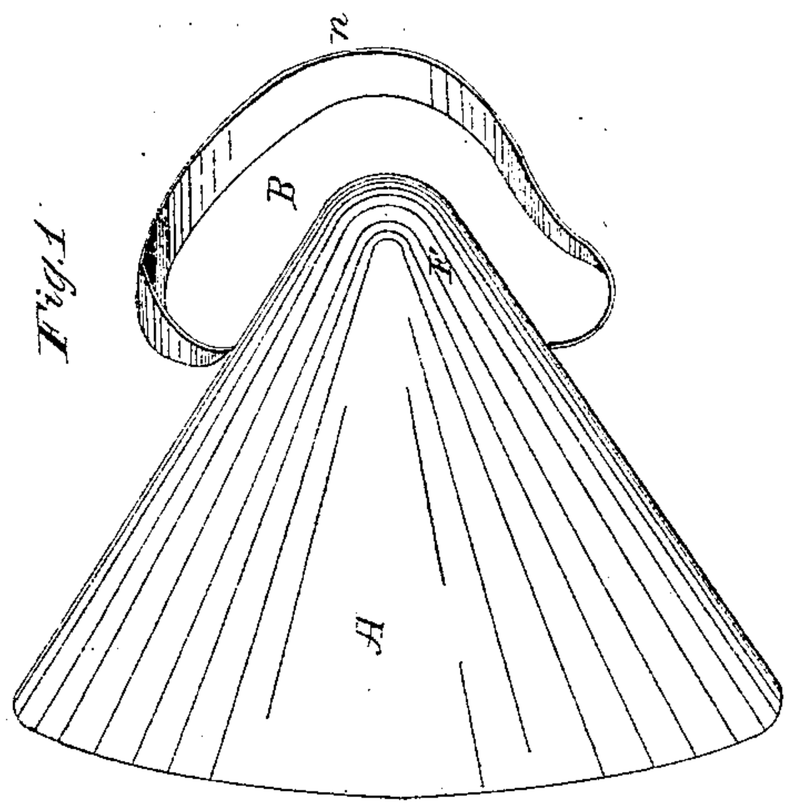


Fig. 5

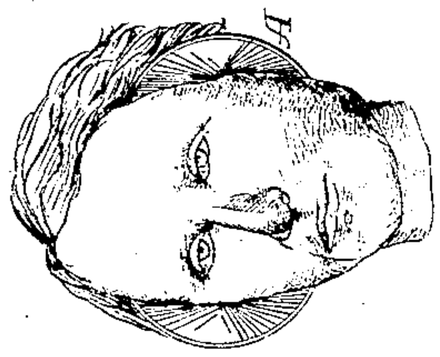


Fig. 3

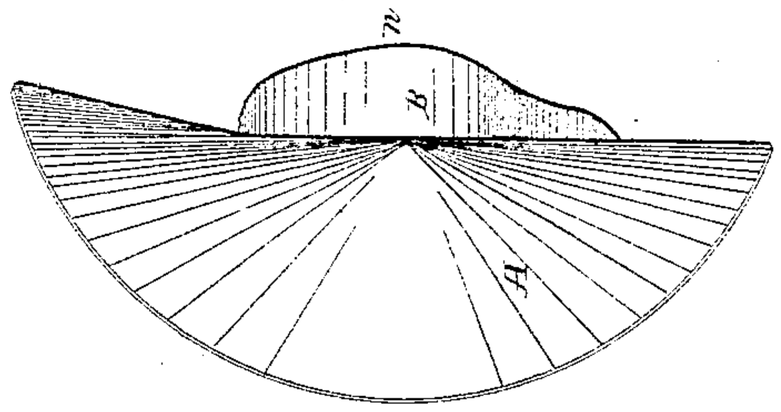
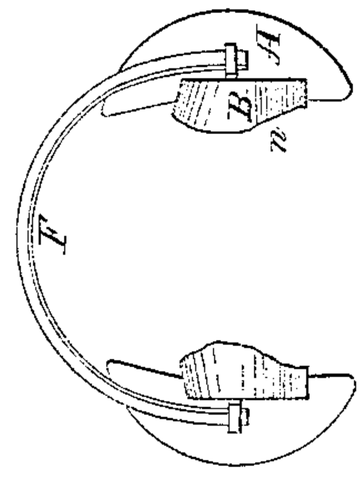


Fig. 4



Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES G. PAGE, OF WASHINGTON, DISTRICT OF COLUMBIA.

AURAL INSTRUMENT.

Specification of Letters Patent No. 30,688, dated November 20, 1860.

To all whom it may concern:

Be it known that I, CHARLES G. PAGE, of Washington, in the District of Columbia, have invented an Improvement in Instruments for Assisting the Sense of Hearing; and I do hereby declare that the following is a full, clear, and exact description of the principle or character which distinguishes it from all other things before known and of the usual manner of making, modifying, and using the same, reference being had to the accompanying drawings, of which—

Figure 1 is a perspective view of the instrument. Fig. 2 a longitudinal section. Fig. 3 an end view from front. Fig. 4 back view of the instruments, attached to the bow, and Fig. 5 a view of the instruments as applied to the ear.

My invention consists in an instrument for assisting the sense of hearing described and represented as follows:

Several instruments have been hitherto essayed and used for assisting deaf persons, their functions being chiefly the concentration of vibrations and their direction to the external ear passage or what is known in anatomy as the meatus auditorius externus, and most of these convey the vibrations of sounding bodies to this passage by means of a small pipe or tube. There are two important defects in all such instruments. They are attended with a continual "roar" or what is sometimes called the "conch-shell murmur," which is the sound observed on placing certain varieties of sea shells before the ear. This unpleasant roar produces confusion of sounds and prevents distinctness of hearing. The insertion of the tube in the ear is often attended with pain and in some instances has occasioned disease of the external meatus.

My improvement consists in the employment of simple deflectors of sound and dispensing with all reverberating cavities and conducting pipes or tubes.

A, B, E, Figs. 1, 2 and 3, represent the general form of the instrument and Fig. 5 the application of the same to use.

The drawings—Figs. 1, 2, and 3—are made of the full size of the instruments as used and show the shape and configuration which I have found to be advantageous. It is not certain that the form of the deflector A is required to be after any rigidly mathematical rule of construction, for the reasons that vibrations producing sounds are in all directions and are conveyed ordinarily to the ear through several media. First, directly by the air through the external meatus; secondly, through the Eustachian tube and thirdly through the solid media of the head and other parts of the body. The principle of construction, however, is the conic section and such as to prevent as much as possible repeated reflections in the instrument itself or between it and the head and parts of the ear. The roar before mentioned as objectionable in other devices is due to repeated reflections or reyerberation. A variety of forms will suffice to deflect vibrations in such manner as to augment sound, but there are certain characteristics essential to the best effects, to obviate the roar so as to enable the ear to discriminate sounds and one which may be best understood by common phrase, is the "open flare" which avoids double reflection or reverberation. It is also of importance that the deflecting surface be terminated in conformity with the line of the cartilaginous ridge which circumscribes the central opening of the ear so as to prevent the passage or escape of aerial vibrations beyond that line for that in fact is the natural limit of the sound gathering function of the external ear. It is also important that all aerial vibrations from behind should be intercepted and that the instrument should be so constructed as to close well upon the ear behind so as to intercept interfering sounds and insure the reflection of vibrations from before and deflect them to the external meatus.

The main portion A of the deflector is represented by a conic section but for the purpose of complete reflection to the external meatus the deflector takes a curvilinear form at or about the point E, as seen in the drawings. A plane surface in place of the curved surface would have a good effect but not so great as that of the curved surface at this point.

The chamber B is of the general outline form of the external ear and designed to cover it completely when the instrument is in use, it being also adapted on the edge *n* to the form of the head at that part. The part B may be dispensed with and the deflector fitted to cover the ear from behind, thus simplifying the construction but at some little sacrifice of the efficiency of the instrument. The deflector may, (especially under the latter form) be worn in almost any

position with its open or flaring portion in front, up, down or directly backward, which latter position gives a good effect. The deflectors are held in their places on the head by the spring bow F and this bow may be adjustable so as to fit different heads, and also to adapt the deflectors to their proper position. They can be so adapted to the form of the ear as to keep their places without the aid of the bow, but the bow is preferable as a means of keeping them steady. They can also be attached to a hat or cap or bonnet, or the rim of the hat or cap may be made of suitable form and material to answer the purpose of the deflectors, or plates of metal or other material may be worked into or concealed in the sides of a bonnet and so adjusted as to act like the deflectors above described care being only necessary to give them their proper position. These deflectors may be made of any firm material and for the sake of lightness and strength the material known as hard-rubber is very serviceable. They can be made of metal, glass, horn, shell, papier-mâché, wood, or of any material suitably firm, and can be ornamental to suit the fancy. They augment the sounds of bodies to a great degree and will be of great service to the deaf and also to persons of good hearing as enabling them to hear sounds otherwise inaudible. A few instances in which they may be useful may be mentioned as follows: They can be used with marked effect by persons listening to distant speakers in or out of doors and in churches, concert rooms, theaters and in public halls their use will render the most remote or back seats as good in respect to hearing as the nearest or "front seats" and so in case of out door speeches. They will be of special service to reporters of the proceedings of legislative bodies, to sentinels to rail road conductors and engineers and in fact in all positions where it is desirable to catch and discriminate remote or feeble sounds.

What I claim as my invention is—

1. The deflector A, B E to be applied to the ear substantially as described said deflector consisting of a simple reflecting surface applicable to the ear and conveying vibrations to the external meatus directly without the aid of a pipe or tube and being constructed without the aid of a pipe or tube and being constructed without reverberating cavities, and also so constructed as to intercept all aerial vibrations except those coming in one direction viz, those which enter the open space at its expanded portion all substantially in the manner and for the purposes herein set forth.

2. The combination of the deflecting instrument with hats, caps, or bonnets in the manner set forth.

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