No. 827,645. PATENTED JULY 31, 1906.

C. W. LEVALLEY.

EAR TRUMPET.

APPLICATION FILED SEPT. 18, 1905.

Fig. 1.

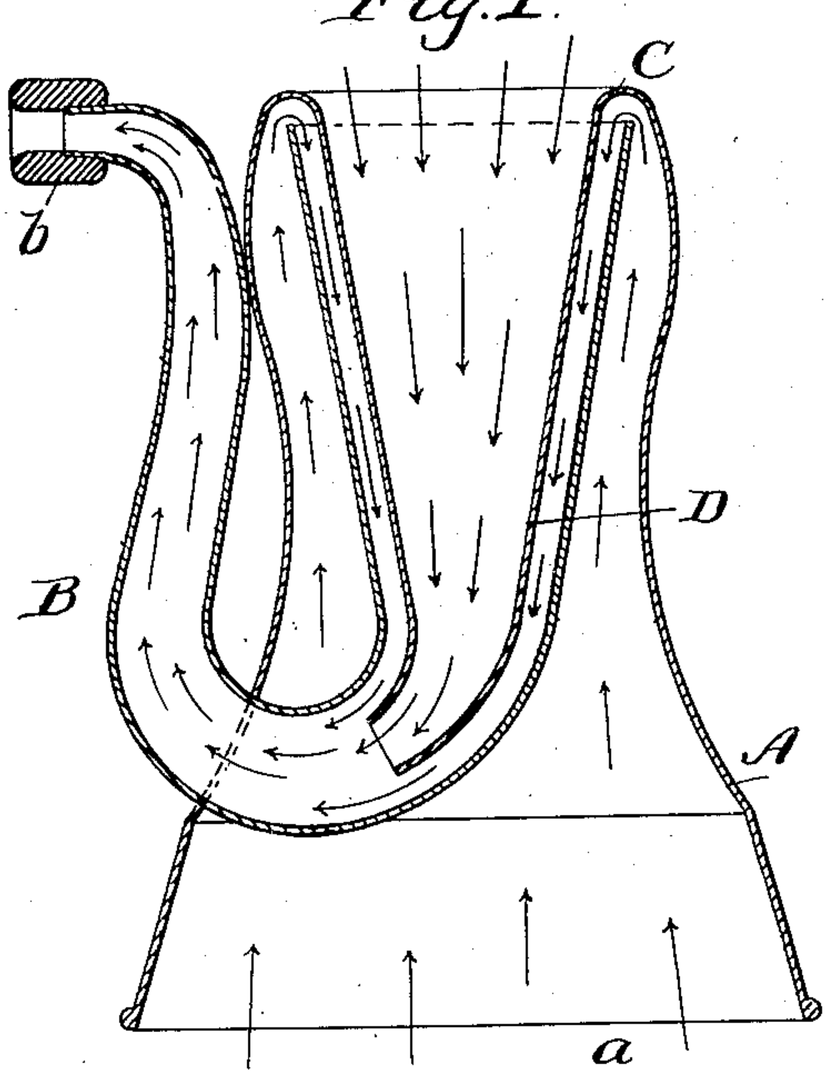


Fig. 3.

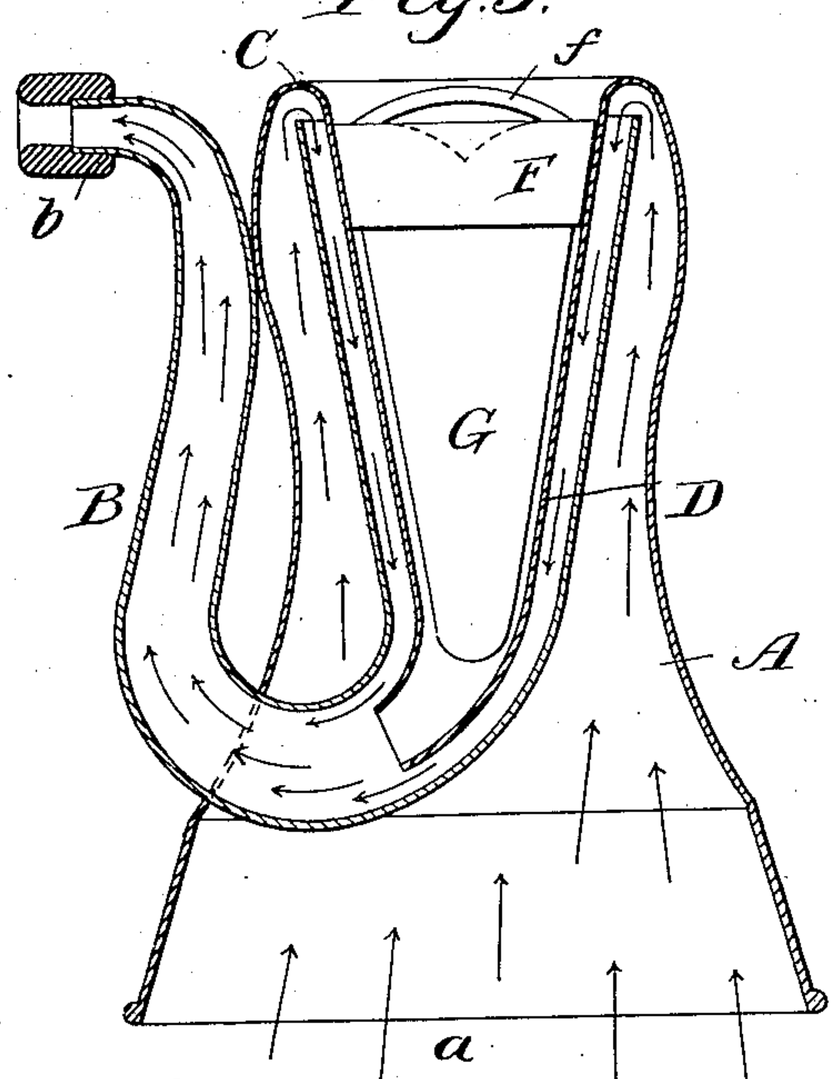
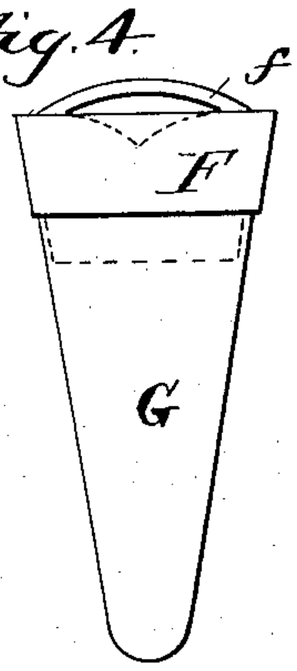


Fig. 4.



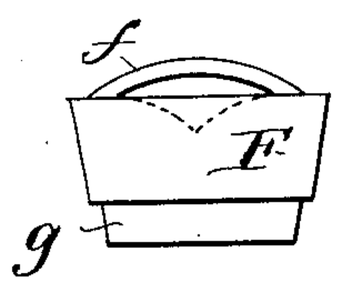


Fig. 2.

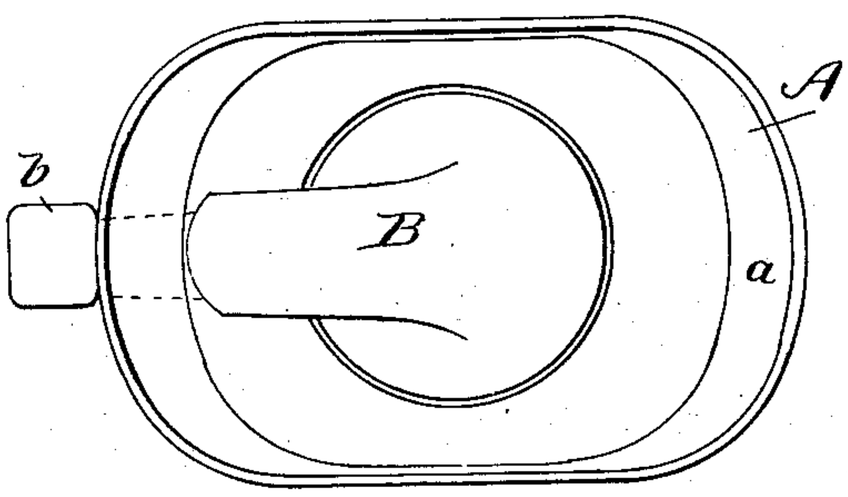
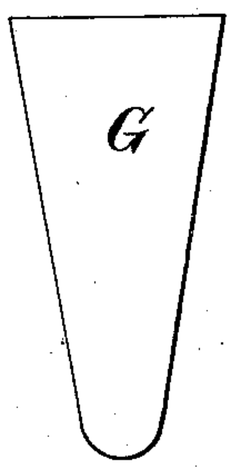


Fig. 6.



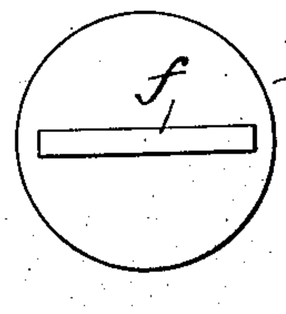


Fig. 5.

Witnesses

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EAR-TRUMPET.

No. 827,645. Specification of Letters Patent. Patented July 31, 1906.

Application filed September 18, 1905. Serial No. 278,998.

To all whom it may concern:

Be it known that I, CHRISTOPHER W. LEVALLEY, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee, Wisconsin, have invented a new and useful Ear-Trumpet, of which the following is a specification.

Figure 1 is a vertical longitudinal section of an ear-trumpet embodying my improvements. Fig. 2 is a top plan view of the same. Fig. 3 is a view similar to Fig. 1, the reëntrant tube of the instrument having inserted therein a stopper. Fig. 4 is a side view of the stopper removed. Fig. 5 is a plan view of the same, and Fig. 6 is a view in elevation of the two parts of the stopper separated.

The ear-trumpet to which I have applied my improvements is in its general construction of a type well known. It consists of a sound-receiving shell A of bell shape and a conducting-tube B, leading from the shell and provided at its end with an ear-tip *b*. The flaring end of the shell is left open to receive sound-waves, while the opposite end curves inward and forms a sort of crown C for deflecting the sound-waves that enter through the open end *a* of the shell. The tube B extends through the side of the shell into the same and has its inner open end arranged opposite the crown C, so that the sound-waves deflected thereby will pass into the conducting-tube. In ear-trumpets of this class as heretofore constructed the rearward or crown end of the shell has been closed and serves merely as a sound-deflector. An instrument thus constructed can receive the sound-waves from one direction only—that is, from the front or from the direction toward which the open end of the trumpet is pointed. I have discovered that very improved results are attained by forming the shell with an opening for the admission of sound-waves from the crown or rear end thereof. I prefer that to this end of the shell there should be attached a reëntrant conducting-tube D, extending a greater or less distance into the portion of the tube B that is situated within the shell A. The best results are attained by so uniting the larger or flaring end of the tube D with the edge of the crown C of the shell that the tube is a practical continuation of the shell, though I do not wish to be limited to this particular method of attachment or connection. The walls of the tubes B and D are preferably parallel, and the tube B is sufficiently larger than the tube D to leave between the tubes an annular space of ample size to conduct the sound-waves that, entering the shell at the end *a*, are deflected by the crown into the tube. As shown in the drawings, the end of the tube D is extended into the part of the tube B where it curves to pass out through the wall of the shell; but the length of the inner reëntrant tube is not of the essence of my invention.

It will be understood that an instrument such as I have described is adapted to freely receive the sound-waves from its opposite ends, and it has been demonstrated that not only does this increase the volume of sound conducted to the ear, but it gives to such sound a much purer and more natural tone than that resulting from the use of the ordinary ear-trumpet having an opening at the front only.

It is a well-known fact that deaf persons can hear better under certain conditions than others and that the acuteness of their hearing varies at different times. I therefore provide the instrument which I have described with a stopper that is arranged to close the tube D, such a stopper being represented detached in Fig. 4 and in place in the instrument in Fig. 3. This enables the user of the hearing instrument such as I have described to largely adapt it to the circumstances under which it is used. For instance, for ordinary conversation where the person conversing with the user of the instrument is in front of him it might be desirable to employ the stopper in order that disturbing sounds coming from other directions than that of the converser should be very largely cut off. On the other hand, for concerts, especially those taking place in a closed hall, the better effect is experienced with the stopper removed. The stopper is preferably of the shape and construction indicated in the drawings. It consists of a plug or stopper proper, F, adapted to fit closely within the outer end of the tube D. It is preferably held therein by friction and is provided with a handle *f*.

I prefer to combine with the stopper a cone G, adapted to extend into the tube D near its lower end. This cone G is adapted to fit by friction over the shouldered end *g* of the stopper F.

The open end *a* of the shell is preferably provided with a foraminous screen, such as

is usually employed in instruments of this character.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. An ear-trumpet having its opposite ends open for the direct entrance of sound-waves, and a conducting-tube opening in the interior of the shell and arranged to receive the sound-waves entering both ends of the shell, substantially as set forth.

2. An ear-trumpet comprising a shell having one end open and the opposite end shaped to deflect the sound-waves entering the open end and having the deflecting end also open to permit the direct entrance of sound-waves, and a conducting-tube having its open end arranged opposite to the deflecting end of the shell, substantially as set forth.

3. An ear-trumpet comprising a shell having one end open and its opposite end formed into a deflecting-crown, the crown end of the shell being also open for the direct passage of sound-waves, and a sound-conducting tube extending into the shell and having its open end arranged opposite to the deflecting-crown of the shell and also the opening in the crown end thereof, substantially as set forth.

4. An ear-trumpet comprising a shell, a sound-conducting tube extending into the interior of the shell, and an open reëntrant tube leading from one end of the shell into the said sound-conducting tube, substantially as set forth.

5. An ear-trumpet comprising a shell having one end open and its opposite end formed into a deflecting-crown, a reëntrant open-ended tube attached to the crown end of the shell, and a sound-conducting tube extending into the shell its inner portion surrounding and being substantially concentric with the said reëntrant tube, and having its open end arranged to receive the sound-waves deflected by the crown portion of the shell, substantially as set forth.

6. In an ear-trumpet comprising a shell open at both ends for the direct entrance of the sound-waves, a sound-conducting tube extending into the shell and having its inner open end arranged to receive the sound-waves entering through either end of the shell, and a stopper for closing one of the said openings, substantially as set forth.

7. In an ear-trumpet comprising a shell having one end open and its opposite end formed into a sound-deflecting crown an open reëntrant tube connected with said crown, a sound-conducting tube extending into the shell and having its inner open end arranged to receive the sound-waves deflected by the crown portion of the shell and those entering through the reëntrant tube, and a stopper arranged to close the reëntrant tube, substantially as set forth.

8. An ear-trumpet comprising a shell open at one end and having its opposite end formed to produce a sound-deflecting crown, an open reëntrant tube connected with the said crown end of the shell and extending thereinto, a sound-conducting tube the inner end of which enters the shell and is arranged to receive both the sound-waves that are deflected by the crown and those that enter through the reëntrant tube, and a stopper for the reëntrant tube comprising a plug F and a cone G attached thereto, substantially as set forth.

9. An ear-trumpet comprising a shell having an open receiving end for the sound-waves and the opposite end shaped to deflect the sound-waves and a closed reëntrant shell passing into a sound-conducting tube to conduct the sound-waves to the ear, substantially as set forth.

10. An ear-trumpet comprising a shell having one end open and its opposite end formed into a deflecting-crown; a reëntrant part attached to the crown end of the shell and a sound-conducting tube extending into the shell, its inner portion surrounding and being substantially concentric with the said reëntrant part of the shell and having the open end of the sound-conducting tube arranged to receive the sound-waves deflected by the crown portion of the shell, substantially as set forth.

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Witnesses:
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VLASTA I. KLOFANDA.