

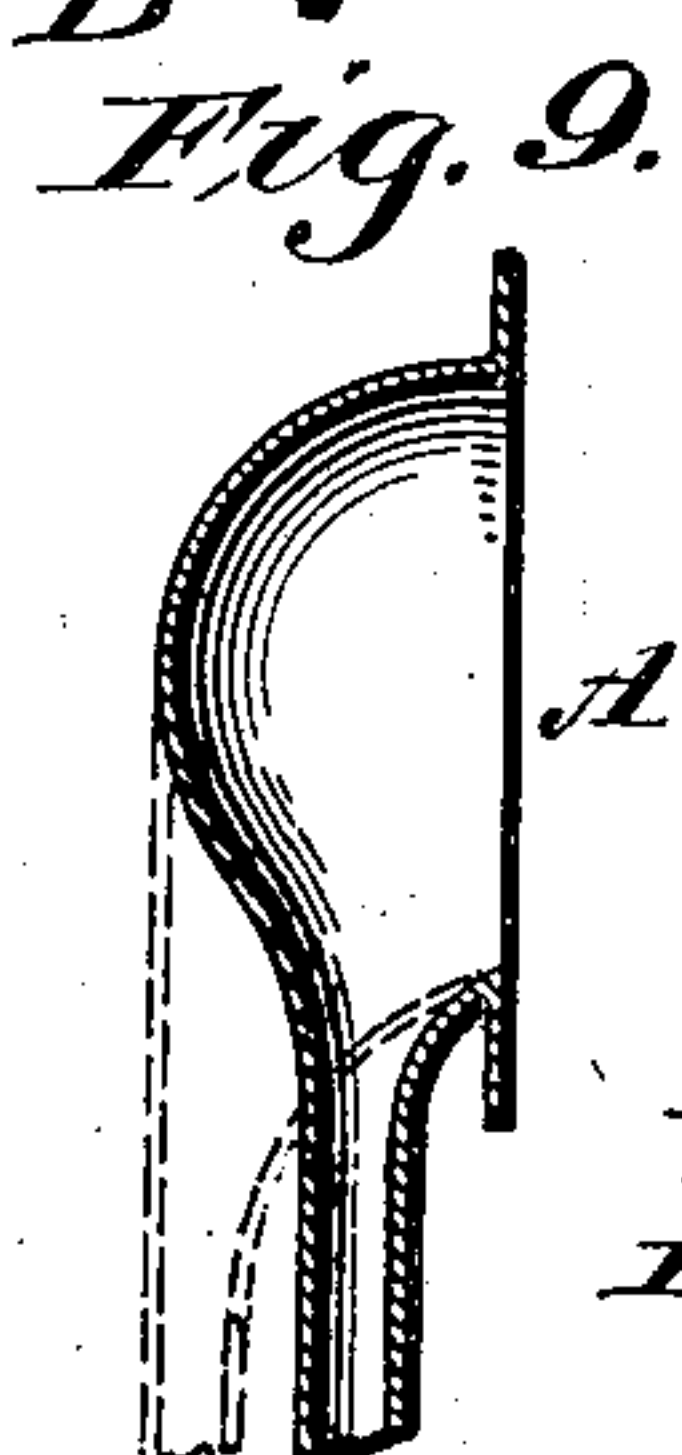
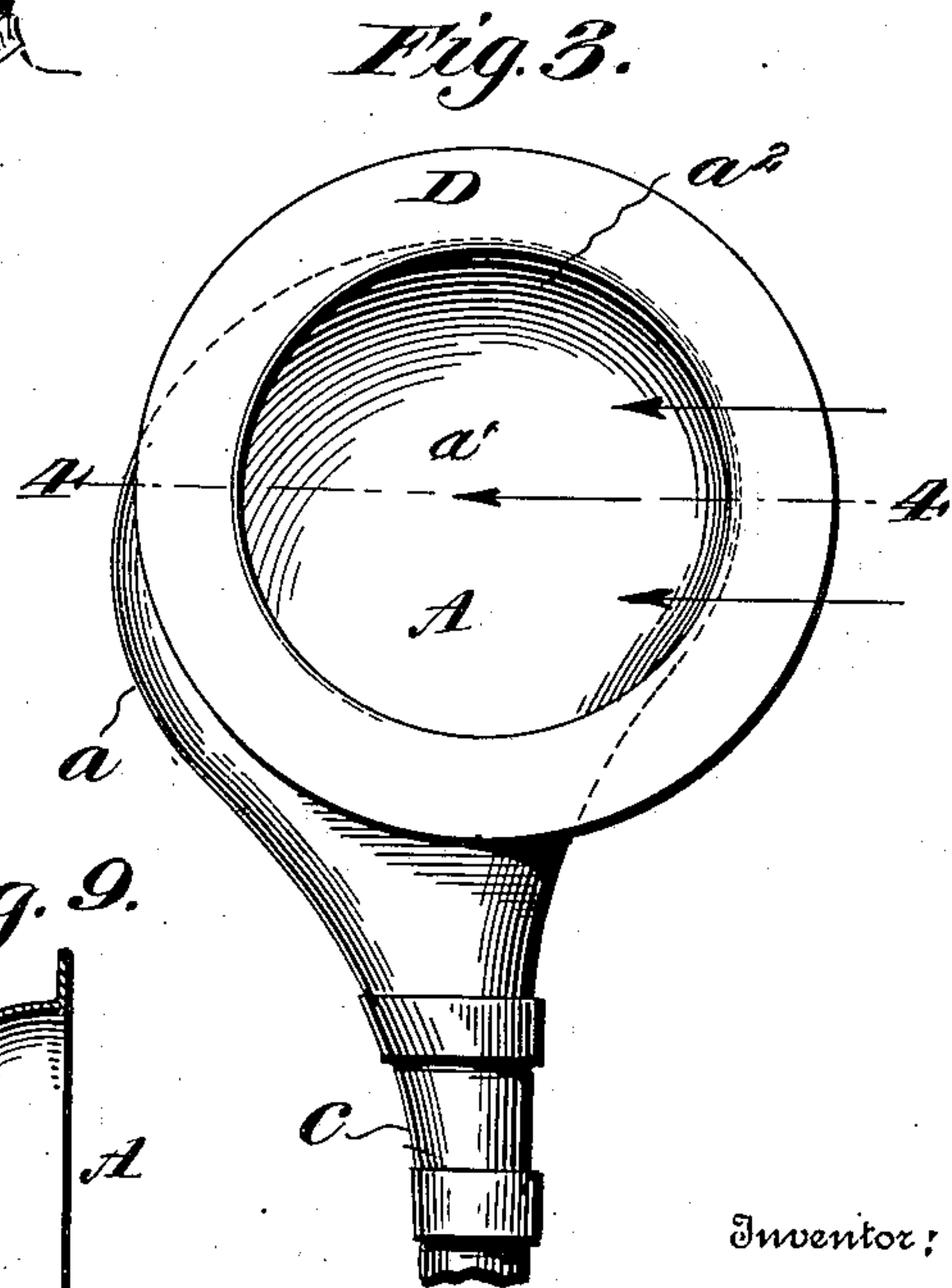
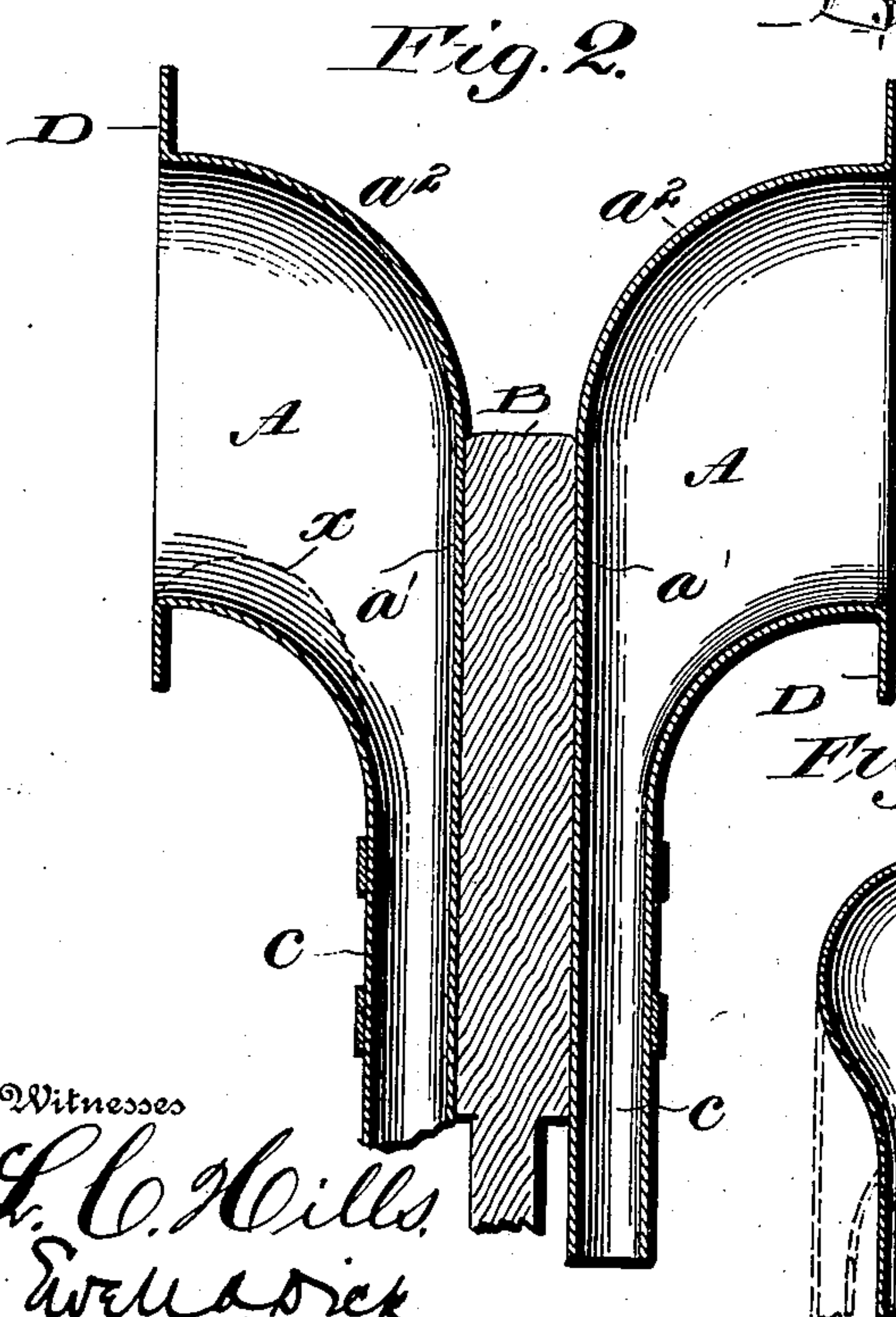
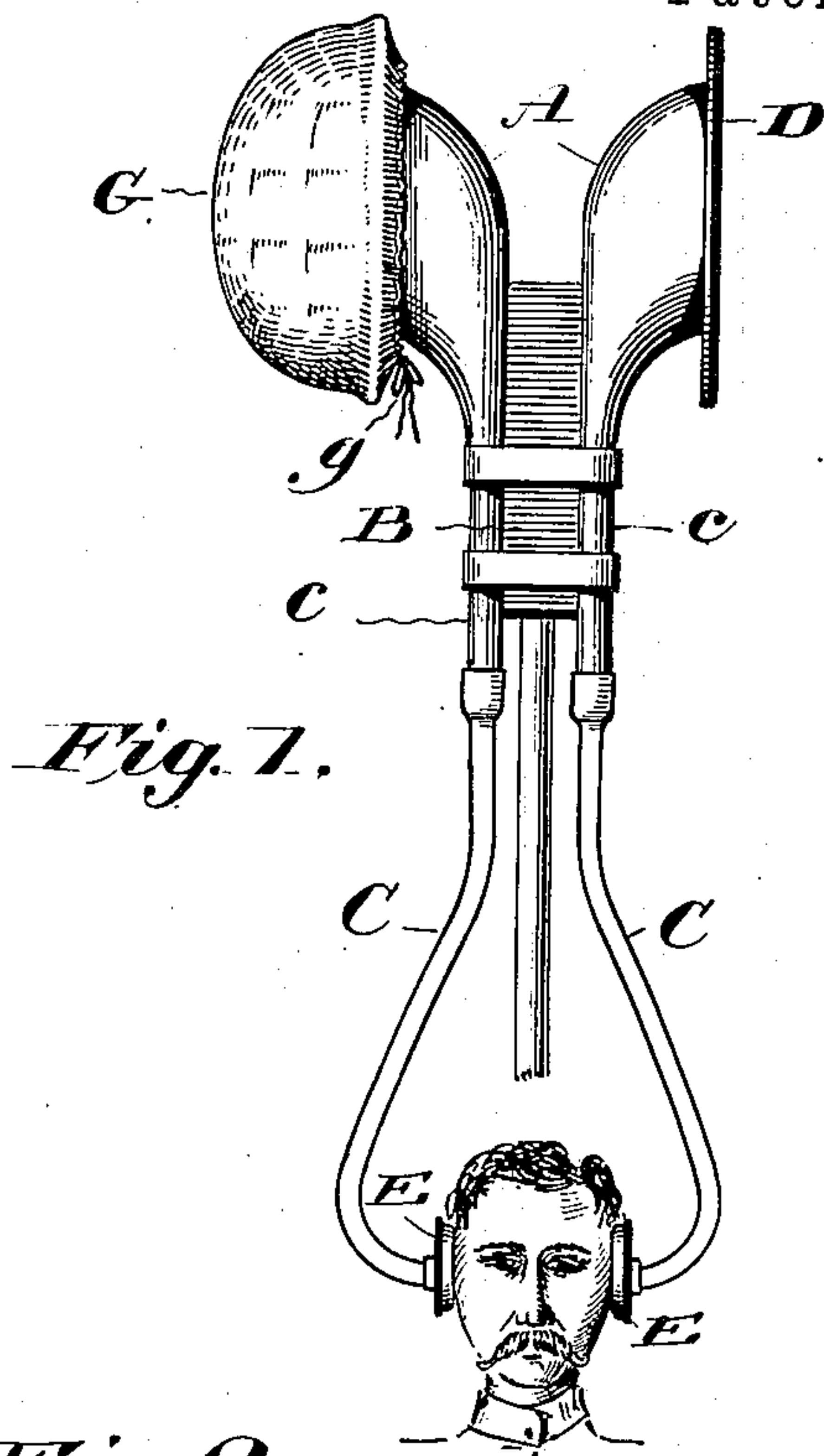
(No Model.)

2 Sheets—Sheet 1.

L. E. THORNE.  
SOUND LOCATING INSTRUMENT.

No. 605,031.

Patented May 31, 1898.



Witnesses  
*L. C. Hills*  
*Wm. A. Dick*

Inventor:  
*Levi E. Thorne*  
By *Wm. A. Dick* Attorney

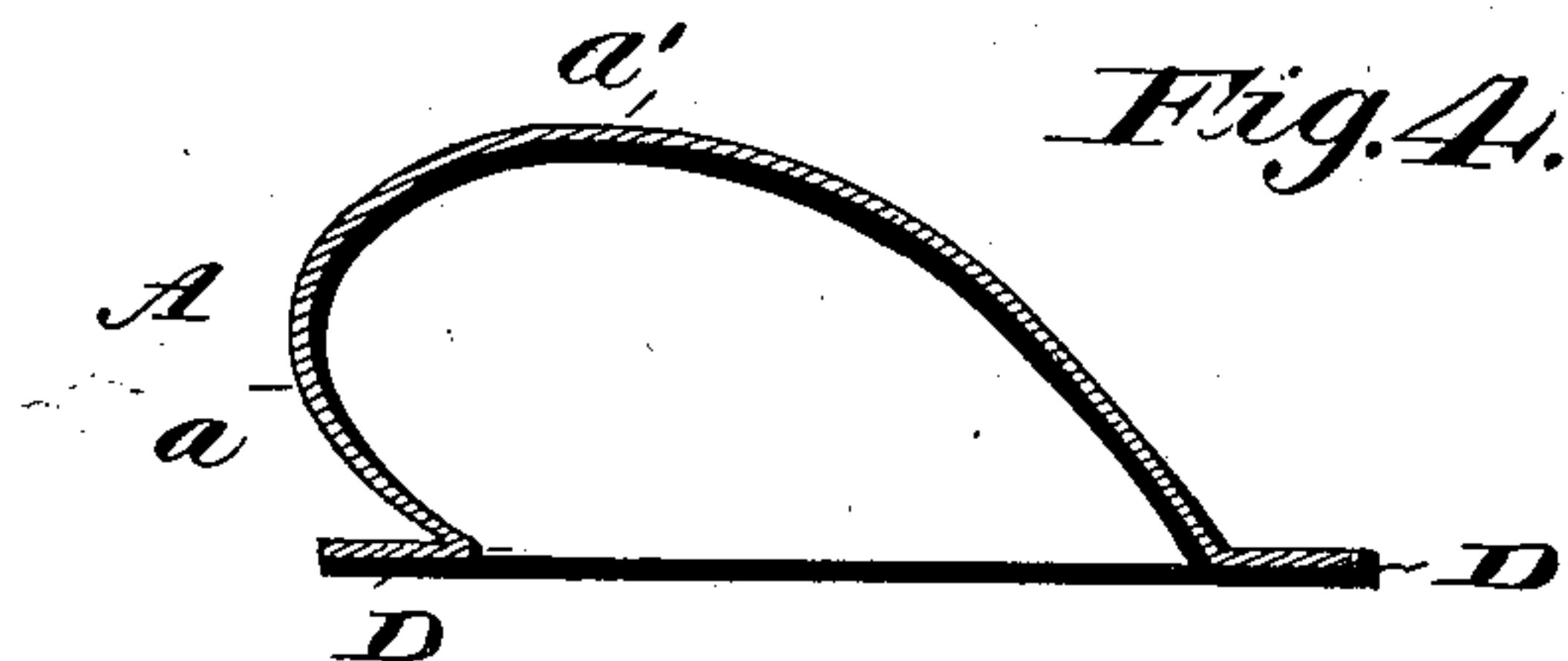
(No Model.)

2 Sheets—Sheet 2.

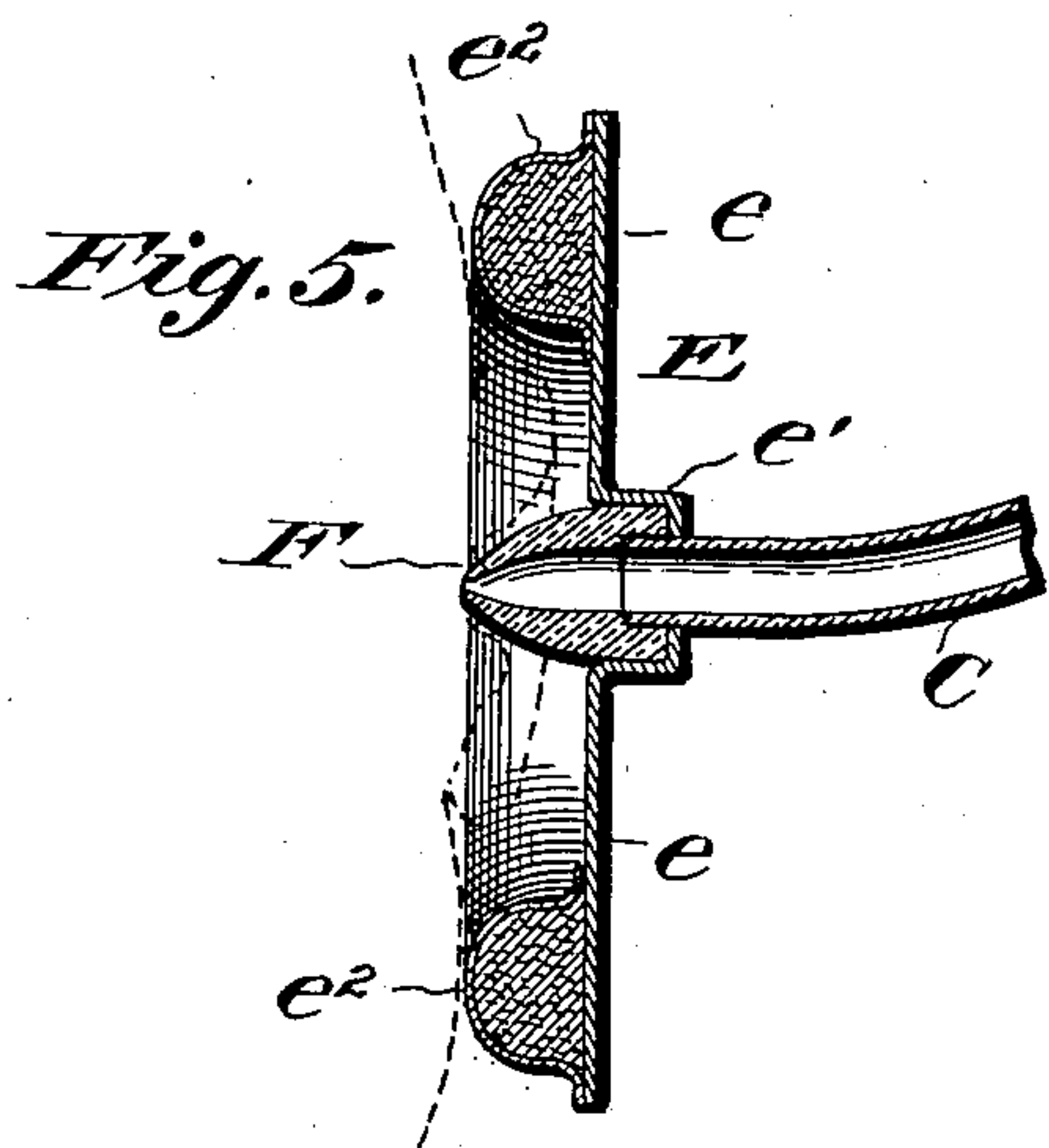
L. E. THORNE.  
SOUND LOCATING INSTRUMENT.

No. 605,031.

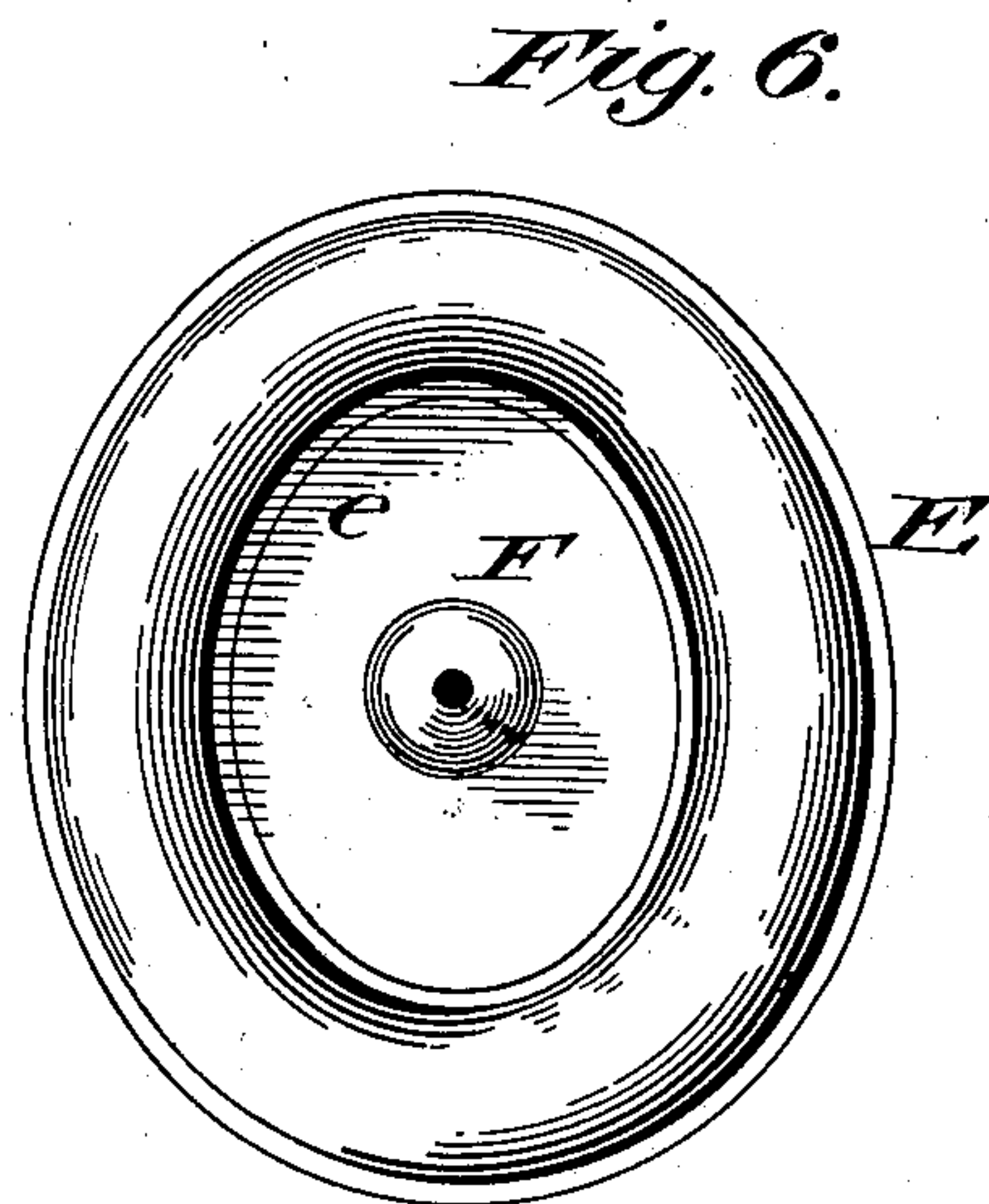
Patented May 31, 1898.



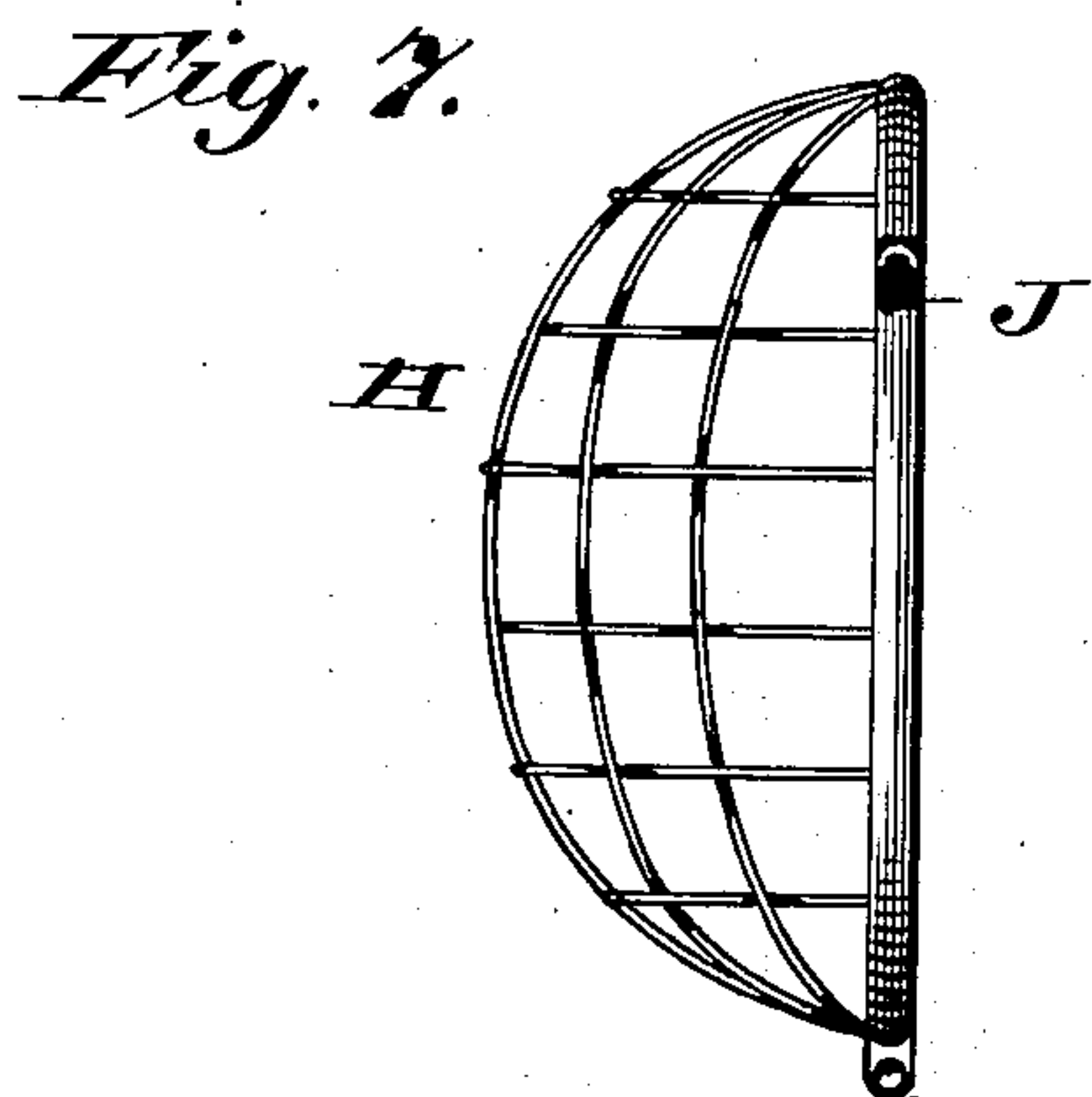
*Fig. 4.*



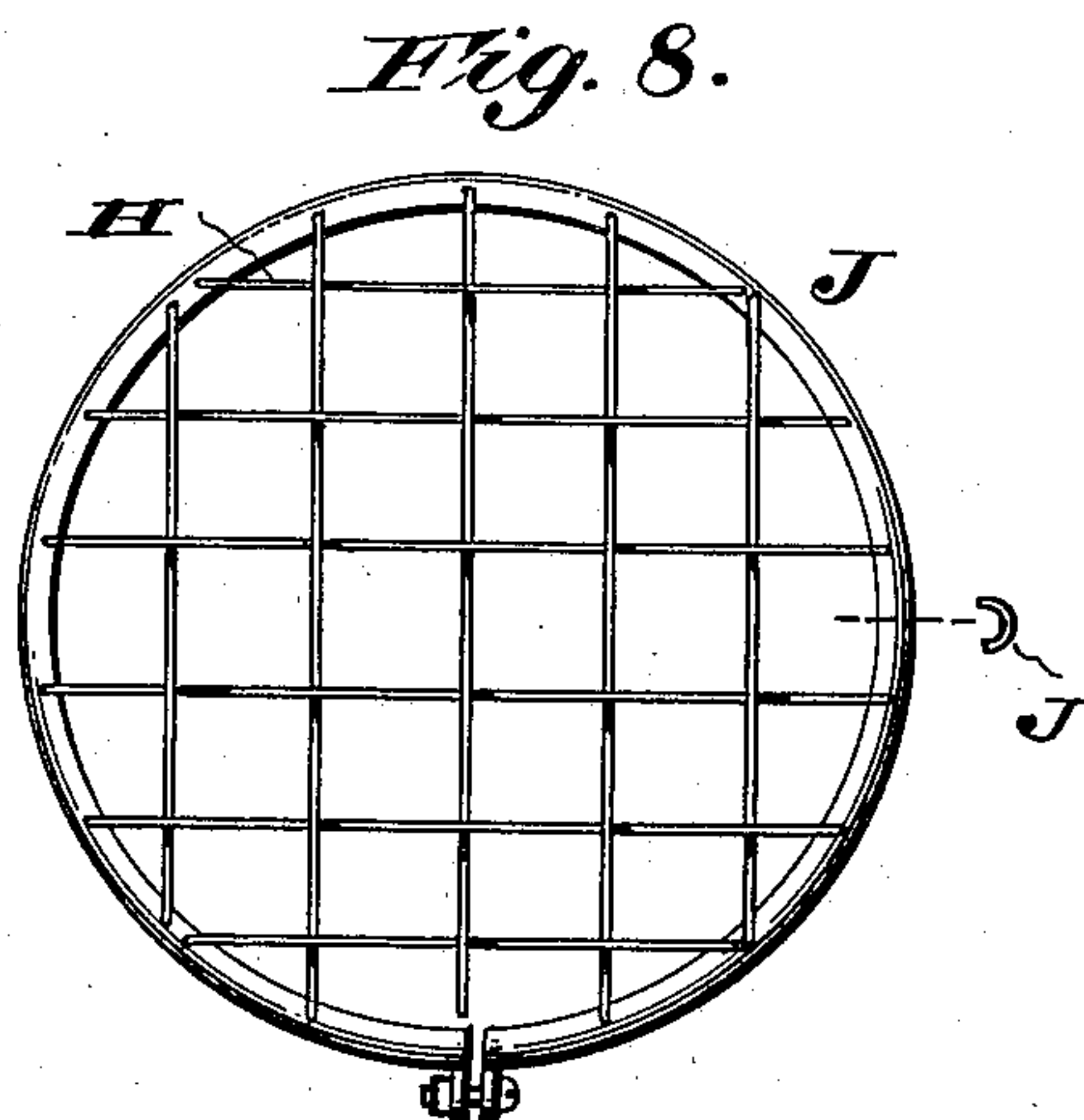
*Fig. 5.*



*Fig. 6.*



*Fig. 7.*



*Fig. 8.*

Witnesses

*L. C. Hills.*  
*Wm. A. Dick*

Inventor:

*Levi E. Thorne,*

*By Marshall Bailey*  
Attorney



# UNITED STATES PATENT OFFICE.

LEVI E. THORNE, OF NEW YORK, N. Y.

## SOUND-LOCATING INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 605,031, dated May 31, 1898.

Application filed September 23, 1897. Serial No. 652,719. (No model.)

*To all whom it may concern:*

Be it known that I, LEVI E. THORNE, a citizen of the United States, and a resident of New York city, county and State of New York, have invented a new and useful Improvement in Sound-Locating Instruments, of which the following is a specification.

My invention has for its object to improve that class of sound - locating instruments known in the art by various names, such as "eophones" and "topophones," whereby its sensitiveness as a sound collecting and locating instrument is increased, whereby the device as a whole is rendered more simple in construction and lighter in weight than any devices of a similar character now in vogue, and whereby other improvements are attained, all of which will be hereinafter pointed out.

In order that the invention may be the better understood, I have in the accompanying drawings illustrated a preferred embodiment thereof, without, however, thereby intending to restrict my invention in its useful applications to such forms thereof as I have for the purpose of illustration delineated.

In the drawings, Figure 1 is an elevation of a device embodying my improvements, one of the receivers having applied to it the screen. Fig. 2 is a central vertical section of the receivers. Fig. 3 is a face view of one of the receivers. Fig. 4 is a horizontal section on line 4 4, Fig. 3. Fig. 5 is a conical section of one of the earpieces. Fig. 6 is a face view of the same. Figs. 7 and 8 are respectively a side and front view of the supporting-frame for the screen. Fig. 9 is a detail sectional view of a form of receiver hereinafter referred to.

In the drawings, A A represent the two funnel or trumpet shaped sound-receivers. They are preferably arranged upon a rotatable support B, so that their mouths or flaring open ends point in opposite or substantially opposite directions. Their tapering ends c, to which are attached flexible tubes C or other sound-conduits, preferably extend downward, though the shape of the receivers may be changed so that they extend rearward or at an angle, as may be found most desirable.

In apparatus of the kind to which mine belongs the trumpet-shaped sound-receivers

have heretofore always, so far as I am aware, been so shaped that a portion of the rear or aft part of the inside wall of the mouth of the receiver is convex, as indicated by the dotted lines *x* in Fig. 2. This shape of the receiver-wall tends to reflect such sound-waves as may enter the receiver's mouth and strike such convex part. As the only sound-waves which directly enter the receiver's mouth when the instrument is faced close to the direction from which the sound comes strike this convex portion and are more or less reflected thereby, and for that reason are partially lost to the sense of the observer, it follows that the instrument thus made loses a certain degree of its efficiency and is not so sensitive as it would be were all the sound collected and conducted to the ear of the observer. One feature of my invention consists in a receiver so shaped as to better collect the sound and to prevent the loss by reflection in the manner just pointed out. To this end I make the end of the sound-collecting receiver adjacent to the mouth or open end to belly outward on its rear or aft side, as indicated at *a*. It will be readily seen that when thus constructed any sound which enters the mouth of the receiver is caught and directed toward its conveying portion, and the liability of loss by reason of the reflection of the sound is reduced to a minimum. I also prefer to make the inner wall *a'* of the receiver—that is, that part which is opposite to the open mouth—substantially flat from a line about opposite to the center of the mouth-opening of the receiver to the contracted portion *c*. (See Figs. 1 and 2.) The upper part *a''* of the inner wall or that portion which is farthest from the contracted part *c* is curved so as to be convex on its inner side till it joins or merges into the flat portion *a'* of the wall, as represented in Fig. 2. I find that this way of shaping the rear wall of the receiver is preferable to that represented in Fig. 9, where the rear wall extends first backward or away from the mouth in its upper portion and then forward or toward the mouth in its lower portion.

I prefer to surround the mouth of each receiver by a flat flange D, which extends outward in a plane that is transverse to the axis of the receiver at its mouth or open end. These flanges operate to increase the sensi-



tiveness of the instrument, cutting off in a very perfect manner the sound from that receiver which is turned away from the direction of the sound and directing into the receiver which is operating a greater amount of sound than it would otherwise receive. While in practice I shall probably employ a flange which extends continuously around the mouth of the receiver, yet this is not essential, as a flange extending only part way around the receiver's mouth would be operative and effective.

At the ends of the tubes C, I arrange earpieces of novel construction and represented as a whole by E. Each earpiece consists of a plate or disk *e*, preferably of metal, and provided with a central perforated hollow projection *e'*, to the outer side of which is secured the tube C from the receiver. F is an earpiece, preferably of hollow conical shape, fitted into the inner side of the projection *e'*. This earpiece F is preferably formed of vulcanized rubber, its smaller end being soft and adapted to enter the ear-orifice. Supported upon the plate *e* and outside of the earpiece F is a sort of cushion *e''*, preferably formed of felt and adapted to rest against the head around the ear when the earpiece is being used and to operate to intercept and cut off all local sounds.

I have heretofore patented a screen to be used in combination with sound-locating instruments to prevent the rush of air around and into the instrument, my patent being dated August 10, 1897, and numbered 588,034. I have improved upon the screen shown in such patent, and instead of supporting it entirely independently of the instrument I now combine it directly therewith, supporting it upon the receiver.

The screen is represented at G and consists, preferably, of silk or a similar close-woven material, which while not materially interfering with the free transmission of sound will yet oppose the entrance of air. This screen is supported by the sound-receiver and is stretched over the open mouth thereof, the edges of which it covers, so that it operates to prevent the whistling of the wind across such edges. I prefer that there should be combined with the screen a light convex frame H, over which it may be stretched, as thereby all liability of the screen fluttering may be avoided. The frame H may be secured to the flaring end of the receiver in any preferred way. I prefer that this screen-frame should be of woven wire of two or three inch mesh, and as a means for attaching it to the receiver the wire frame may be attached to a split ring J, half-cylindrical in cross-section, and made of some elastic or spring metal, such as brass. This ring with the frame attached may be easily slipped onto or off the

flange D of the receiver by slightly springing it open. When upon the receiver, it may be held in place by a screw or other suitable means. The screen may be stretched by any suitable means—as, for example, a draw-string *g*—the edge of the material of which the screen is composed being drawn over the edge of the mouth of the receiver or the flange D when that is used until the screen is taut, when it is secured by the draw-string. Other means might of course be used for the same purpose. A screen of this character is very light and adds but little to the size of the instrument.

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

1. A sound-locating instrument comprising a sound-receiver of funnel or trumpet shape, the mouth of which is provided with a flat flange projecting outward in a plane substantially transverse to the axis of the receiver at its mouth, substantially as and for the purposes hereinbefore set forth.

2. A sound-locating instrument, comprising two receivers of funnel or trumpet shape whose mouths point in substantially opposite directions, the mouth of the receivers being provided with flat flanges extending outward in planes substantially transverse to the axes of the receivers at their mouths, substantially as and for the purposes hereinbefore set forth.

3. In a sound-locating instrument, a receiver for collecting the sound, the outer flaring portion of which is bellied on its rear part adjacent to the mouth, substantially as and for the purposes hereinbefore set forth.

4. The combination with the receiver of a sound-locating instrument, of a wind-screen supported across and covering the edges of the mouth of the receiver, substantially as and for the purposes hereinbefore set forth.

5. The combination with the receiver of a sound-locating instrument, of a frame supported directly by the receiver and arranged over the mouth thereof, and a wind-screen drawn over the frame, substantially as and for the purposes hereinbefore set forth.

6. In combination with a receiver of a sound-locating instrument, of a funnel or trumpet shape, of a wind-screen of flexible material, and means for stretching the screen across the open end or mouth of the receiver, and over the edges thereof and for securing it directly thereto, substantially as and for the purposes hereinbefore set forth.

In testimony whereof I have hereunto set my hand this 17th day of September, 1897.

LEVI E. THORNE.

Witnesses:

E. HUME TALBERT,  
EWELL A. DICK.