

**D. BAKER.**  
**Mariners' Compass**

No. 163,837.

Patented June 1, 1875.

Fig. 1.

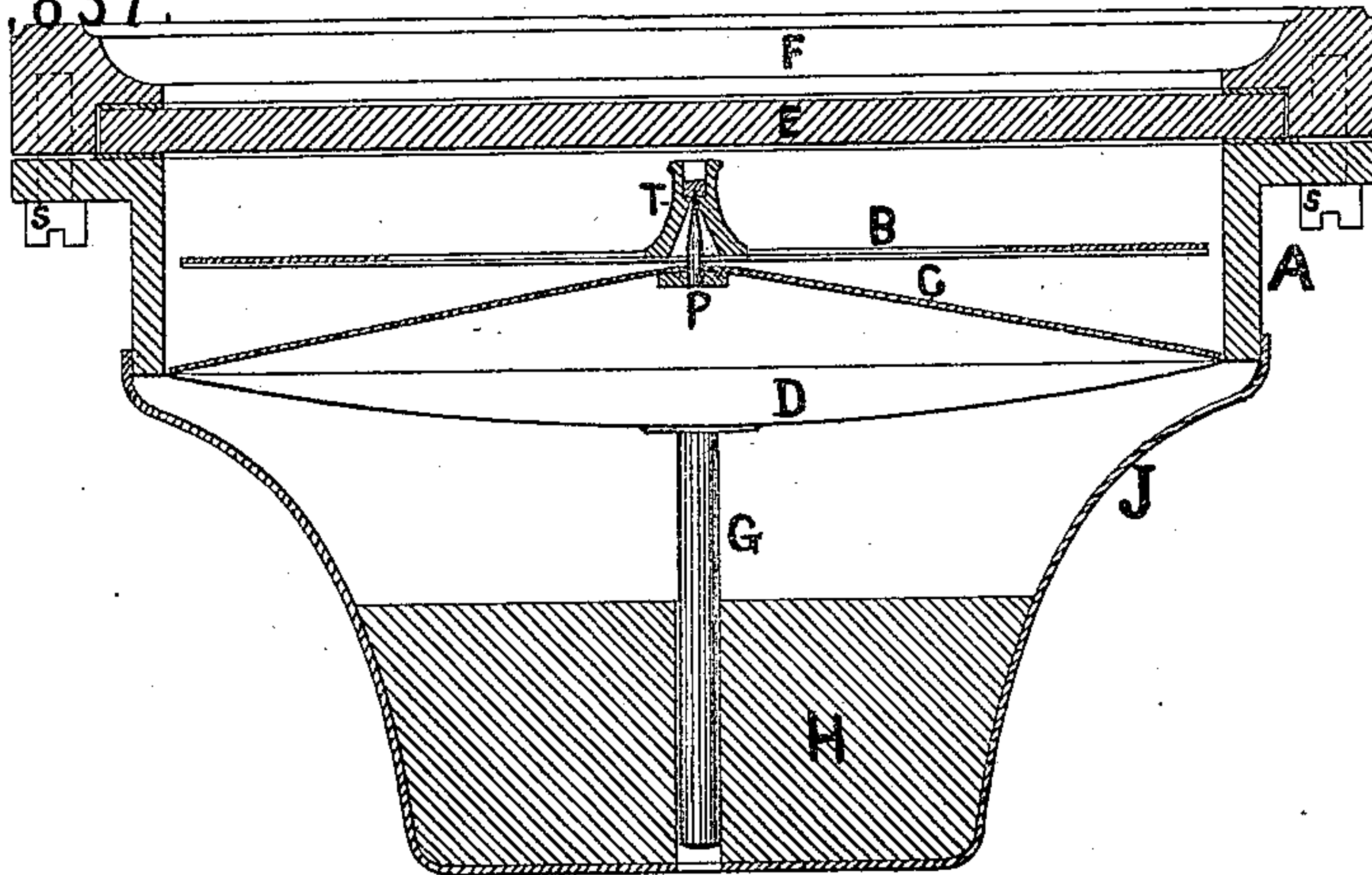


Fig. 2.

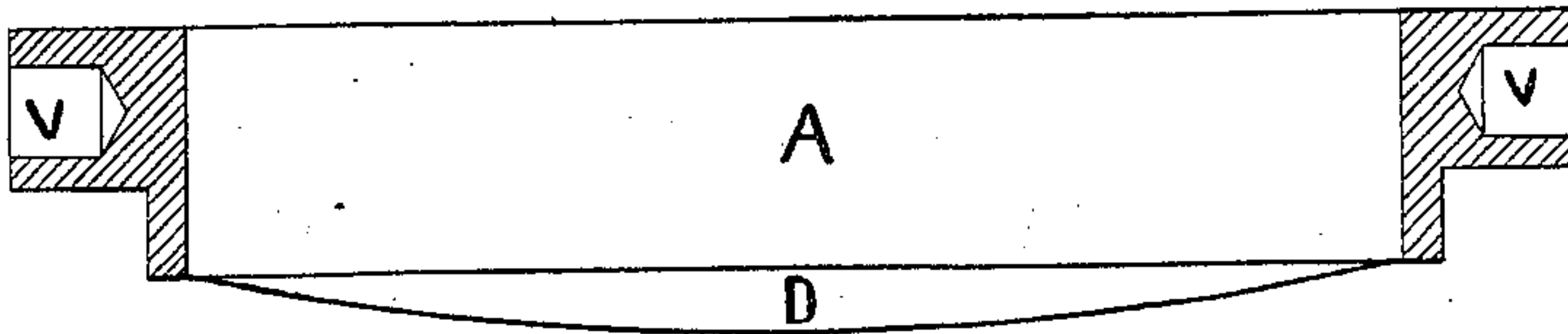


Fig. 3.

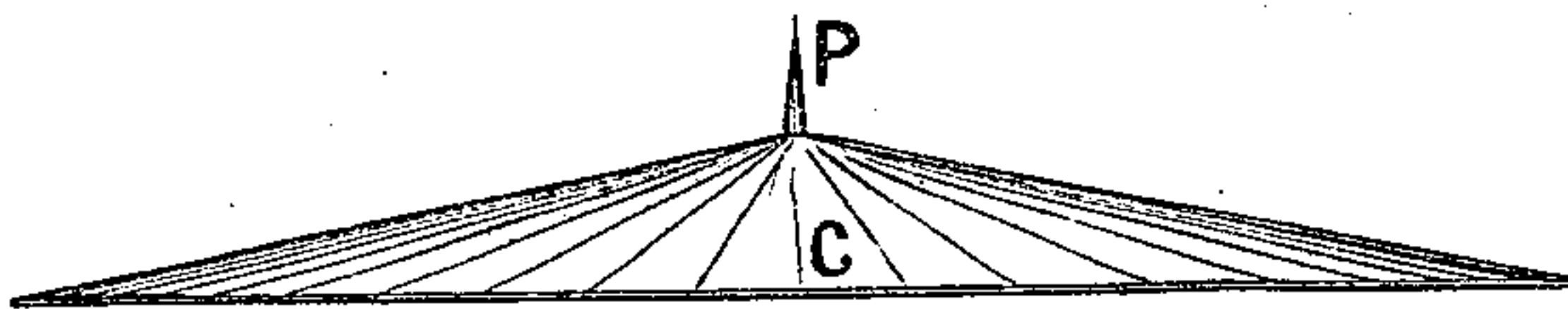


Fig. 4.

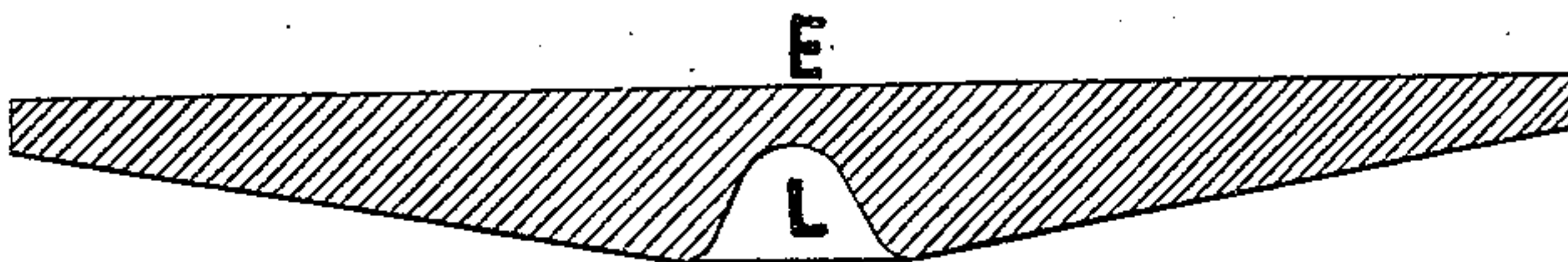
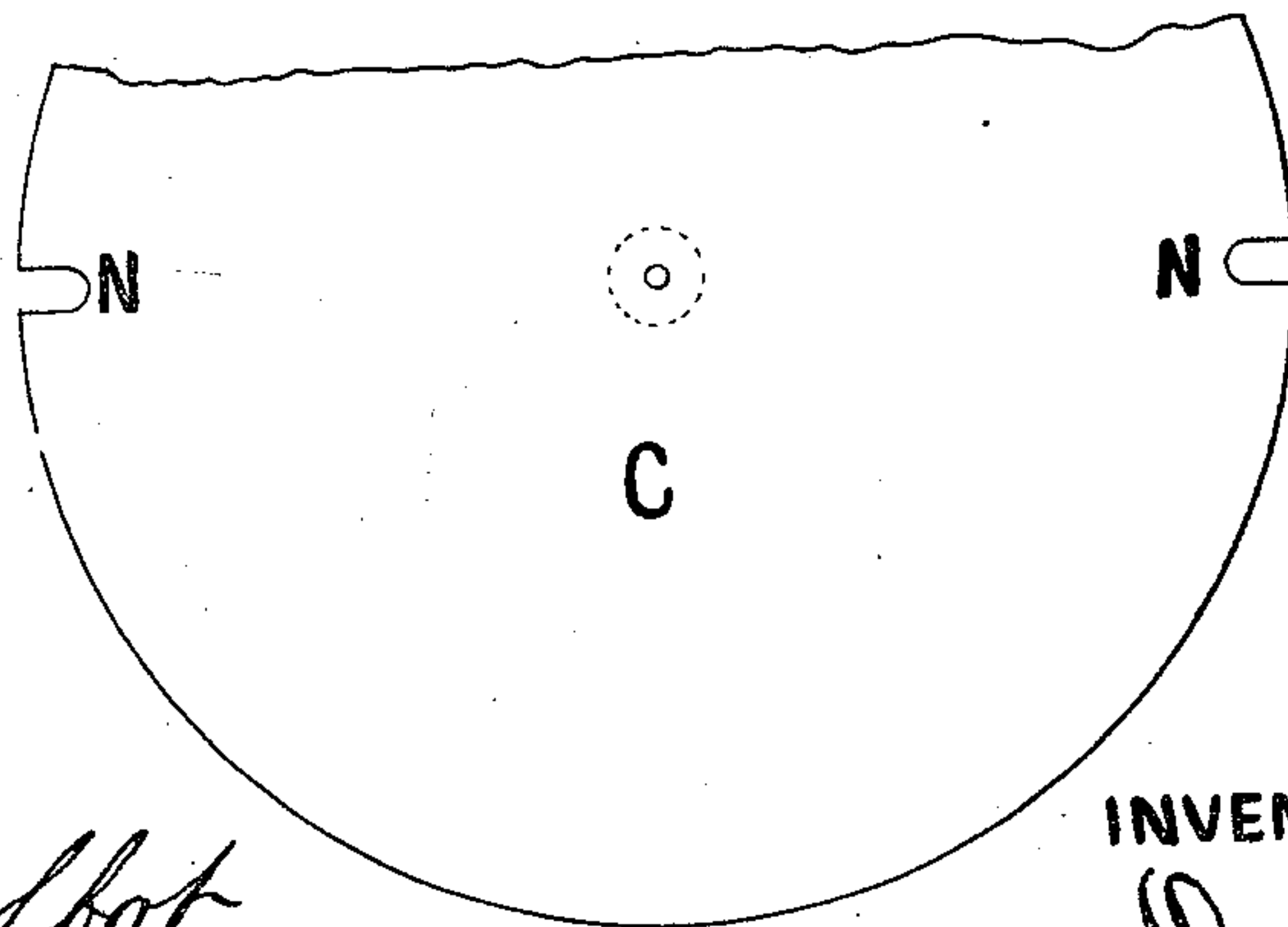


Fig. 5.



WITNESSES.

*H. S. Talbot*  
*Edward Edmunds*

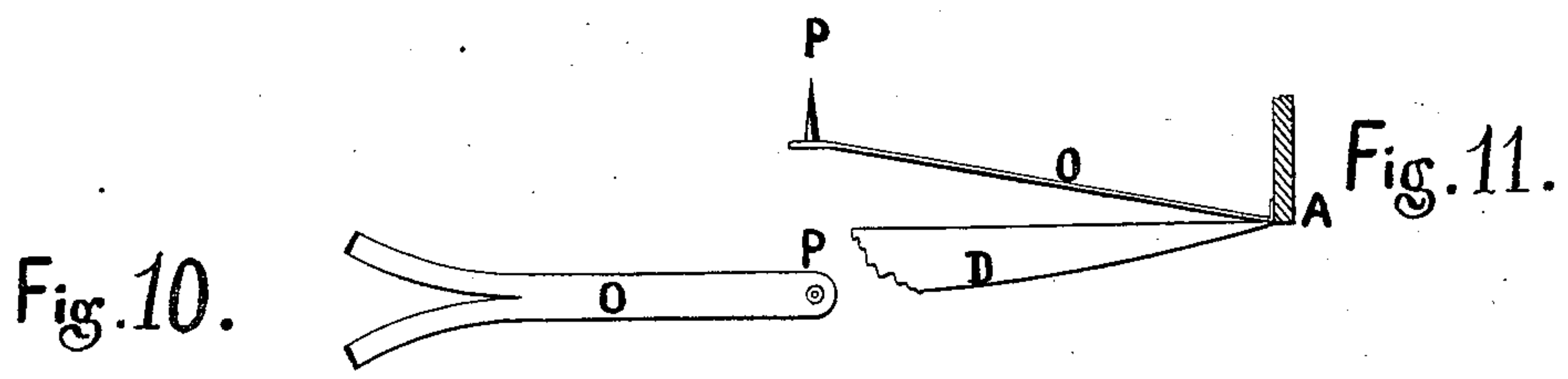
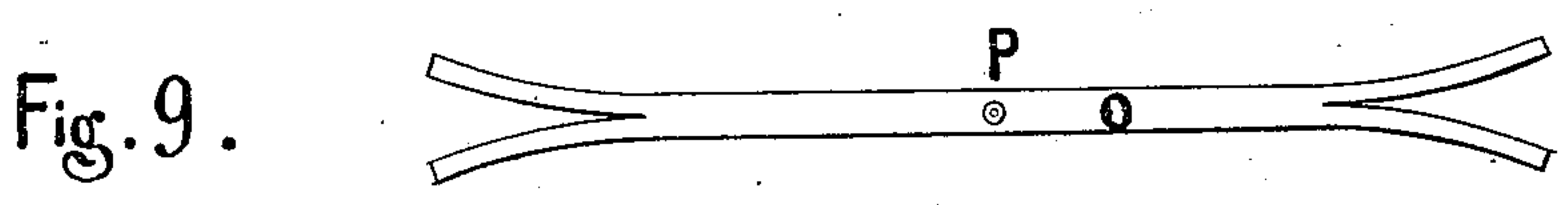
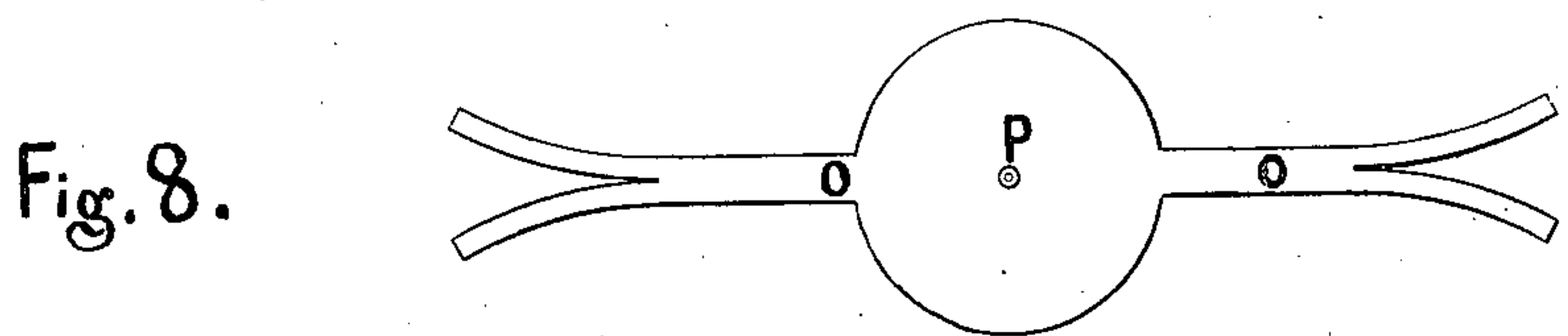
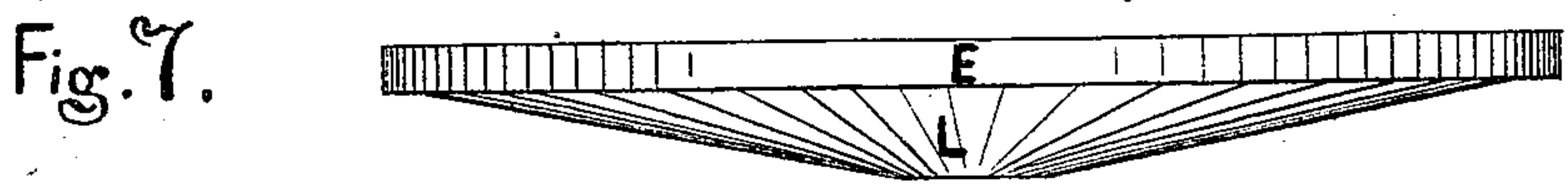
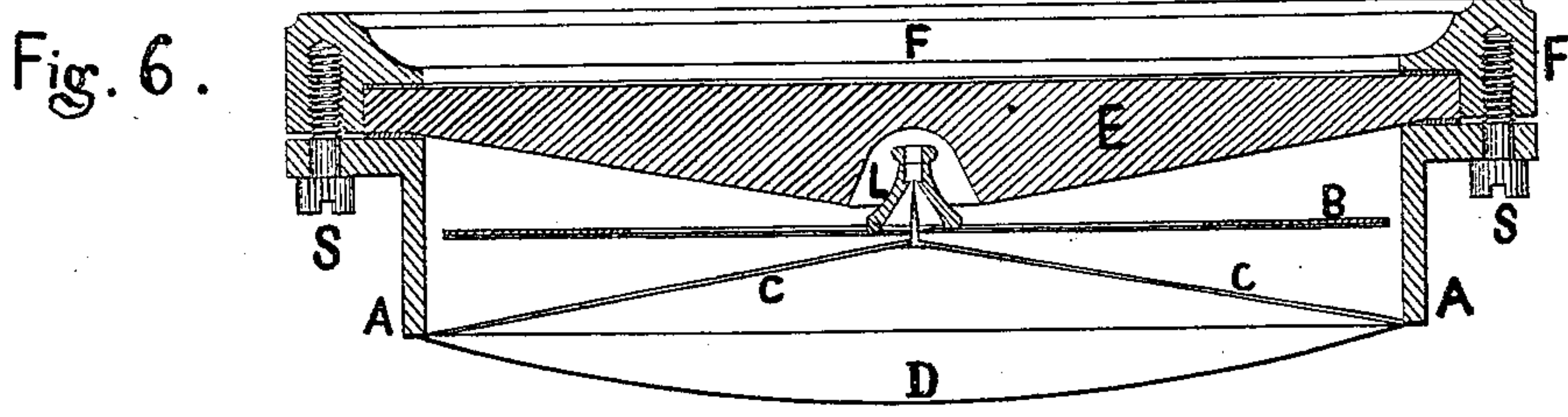
INVENTOR.

*David Baker*  
Per *Sylvanus Walker*  
*Atty*

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*Per Sylvester Walker*  
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# UNITED STATES PATENT OFFICE.

DAVID BAKER, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF HIS  
RIGHT TO WILLARD I. HUMPHREY, OF SAME PLACE.

## IMPROVEMENT IN MARINERS' COMPASSES.

Specification forming part of Letters Patent No. **163,837**, dated June 1, 1875; application filed  
October 21, 1874.

### CASE A.

*To all whom it may concern:*

Be it known that I, DAVID BAKER, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Liquid Magnetic Compasses, of which the following is a specification:

The object of my invention is to provide a cheap, simple, and efficient means to allow for the expansion and contraction of the liquid within the compass-bowl, caused by the varying temperature of the same; also, a means for steadying the liquid in the bowl against motion tending to disturb the card, and a convenient means for packing and confining the glass to the top of the bowl; and it consists, first, in constructing the compass-bowl in such a manner as to greatly reduce its depth and still allow the card to tilt freely; second, in providing a pivot-support extending obliquely upward to near the center of the bowl, where it is provided with a short pivot upon which the card rests and turns; also, further, in constructing the bowl with a part or the whole of its bottom of a disk of thin sheet metal, slightly curved and sufficiently yielding to allow the liquid to expand and contract under the varying temperature of the same.

By constructing the pivot-support on an incline I am enabled to place the flexible bottom much nearer to the same, as thereby sufficient space beneath the same in the center of the bowl is secured to allow the contraction of the liquid within the said bowl to draw up the flexible bottom thereof, and thus bring the operative parts much nearer together, consequently, the space to be filled with liquid is thereby diminished, thus reducing the variations of the same, caused by changes of temperature.

A simple arm is sufficient to support the pivot on which the card turns, but I prefer to use for this support a conical disk placed within the bowl, with its apex near the center of the same, as by this means the liquid which surrounds the card is thus confined to a thin sheet or body, which is but very slightly acted upon by motions of the compass-bowl, thus causing

the card to remain near its true position at all times. To accomplish this end more fully I sometimes construct the under side of the glass plate forming the top of the compass-bowl in the form of a cone with the apex downward. The glass plate I secure to the top of the bowl by a cap-ring formed with a rabbet on its under side, for receiving the edge of the glass, and suitable packing when it is secured to the top of the bowl, which has a flange projecting outwardly, through which the confining-screws pass upward into the under side of the cap-ring, so as to leave the top of the cap-ring smooth, and thus obviate the obstructions to cleaning the same, as heretofore caused by the projecting bolt or screw heads. By passing the screws upward into the cap-ring the water drops off, instead of being conducted down around the thread and corroding the same.

It will be seen that by constructing the bowl very shallow, and providing it with a flexible bottom and conical disk to support the card, the several parts can be located very near each other, thus reducing the quantity of liquid, amount of expansion, and momentum of the same, all of which, when combined, result in producing a mariner's compass that is better adapted to withstand the many disturbing tendencies acting upon the card than those heretofore constructed.

Figure 1 is a vertical section of a compass constructed according to my invention. Fig. 2 is a similar view of the compass-bowl, showing the flexible metal bottom attached. Fig. 3 is a side elevation of a conical disk removed from the bowl. Fig. 4 is a vertical section of modification of top glass plate, showing conical bottom. Fig. 5 is a top-plan view of portion of conical disk, showing openings in edge of same.

A represents the sides of the compass-bowl, which may be constructed of cast metal, and provided with a flange upon its top, to which the cap-ring F is secured by screw-bolts S S, which pass up through the flange, and are screwed into the under side of the cap-ring F, for securing the glass plate E in its position, as shown in Fig. 1. D represents a thin sheet-



metal disk, forming a flexible bottom to the compass-bowl, being secured to the lower edge of the sides A with solder, or otherwise. C represents a conical disk, provided with a pivot, P, in its center, upon which the card-cap T rests, being provided with a bearing for the pivot, as usual. B represents the card and magnets, of usual construction. G represents a guide-rod, secured to the under side of the flexible bottom D in its center, which slides up and down in a hole in the lead or other metal weight H, and by this means secures the true movement of the flexible bottom D, up or down, by contraction or expansion of the liquid contained in the compass-bowl. J represents a casing or outer shield, into which the weight H is cast or placed, to keep the bowl in an upright position. V V represent the usual bearings for the pivots for suspending the compass-bowl in the usual gimbal-ring. N N, Fig. 5, represent openings through the edge of the conical disk C, to allow the liquid to pass beneath the same. This disk may be secured to the lower corner of the sides A of the bowl, where they meet with the flexible bottom D, or an arm or arms, O, may be secured therein for supporting the pivot P; but the disk serves a further purpose. L, Fig. 4, represents the conical under surface of the glass plate E.

Fig. 6 is a vertical section of the compass-bowl, with conical glass plate and oblique arms. Fig. 7 is a view of glass plate. Figs. 8, 9, and 10 are plan views of modifications of the oblique arms for supporting the card. Fig. 11 is an end view of Fig. 10 as in position.

Instead of the cone C, an arm or arms, O, may be substituted for supporting the pivot P, as shown in Figs. 8, 9, 10, and 11, the latter

one being a single oblique arm, its lower end to be fixed at or near the side of the bowl A. These arms O are provided with the pivot P, upon which the card B swings or tilts. These oblique arms allow the flexible bottom D to rise up in its center as freely as the conical disk or cone C, and, when used, the liquid within the bowl is confined to a shallow space by the conical under side L of the glass plate E, as shown in Figs. 4, 6, and 7, which may be used instead of the ordinary flat plate shown in Fig. 1.

Having thus described my invention, what I claim is—

1. The compass-bowl as constructed, consisting of two parts, the sides A and flexible bottom D, united together, substantially as and for the purposes set forth.

2. The conical disk C, for confining the liquid within a compass-bowl to a shallow space, substantially as and for the purposes set forth.

3. The glass plate E, with conical under surface L, substantially as and for the purposes set forth.

4. The combination of a compass-bowl with the cone C or an arm, O, provided with a short pivot, P, substantially as and for the purposes set forth.

5. The combination of the top, the frame, and suitable intermediate packing, secured together by screws S S passing upwardly from the under side of a ledge or lugs upon the frame, substantially as and for the purposes set forth.

DAVID BAKER.

Witnesses:

SYLVENUS WALKER,  
GEO. A. BAKER.