

I. HUMPHREY.  
Surveying-Instruments.

No. 215,749.

Patented May 27, 1879.

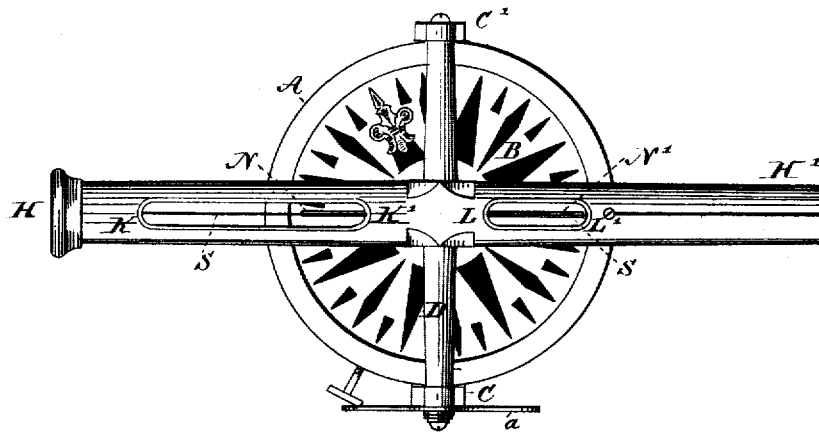


Fig. 1.

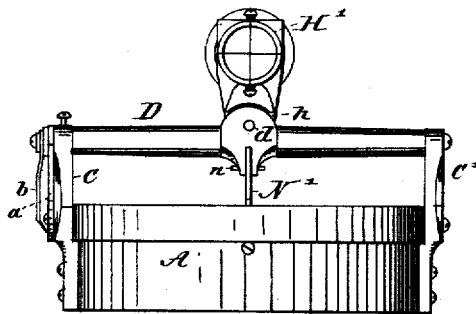


Fig. 3.

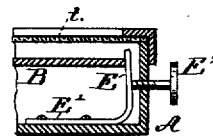


Fig. 4.

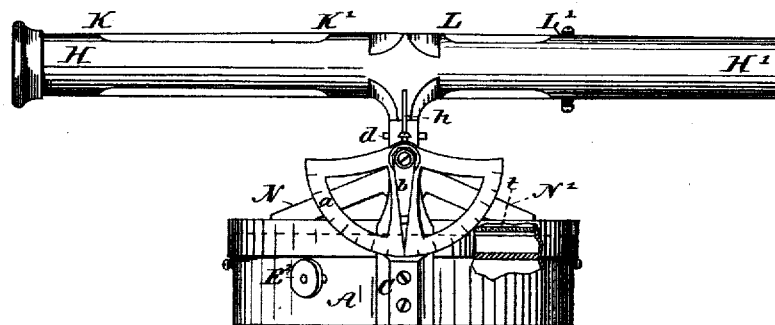


Fig. 2.

WITNESSES.

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INVENTOR.

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# UNITED STATES PATENT OFFICE.

IRA HUMPHREY, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF  
HIS RIGHT TO JOHN L. GARDINER, OF SAME PLACE.

## IMPROVEMENT IN SURVEYING-INSTRUMENTS.

Specification forming part of Letters Patent No. **215,749**, dated May 27, 1879; application filed  
January 27, 1879.

### *To all whom it may concern:*

Be it known that I, IRA HUMPHREY, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Azimuth-Instruments, of which the following is a specification.

My invention relates to that class of magnetic compasses which are used in connection with "sights" or "sight-vanes;" and consists in suspending the compass from the sighting device in such a manner that although the sight device may be held at any desired angle, the compass-box will find its own level, and allow the needle to indicate the meridian and course.

Referring to the drawings, Figure 1 is a plan of my invention. Fig. 2 is an elevation looking across the line of the sight device. Fig. 3 is an elevation on the line of sight. Fig. 4 shows the card-clamping device in detail.

A represents the compass-box, which is provided with a needle-card, B, hung on a central point, in the usual manner. E E', Fig. 4, is a flat metal spring, which may be made to press against the edge of the needle-card B and check its movement, or hold it at any point. This spring is operated by means of the thumb-screw E<sup>2</sup>, Figs. 1 and 4.

To the sides of the box A, I attach the standards C C', Figs. 1, 2, and 3. In the upper ends of these standards I hang the rocker-shaft D, which is free to turn on its axis. Above this rocker-shaft D the sight-tube H H' is placed, it being attached by a thin metal plate, *h*, and pin *d*, Figs. 2 and 3, so that when the instrument is lifted, by taking hold of the sight-tube H H', the box may swing freely on the pin *d*, as well as on the axis of the rocker-shaft D; in other words, the sight-tube H H' is attached to the box A by an equivalent to what is called a "binnacle-joint."

The sight-tube H H' has a small sight-hole at the end H and cross-wires at the end H'. It also has lateral openings at K K' and L L', that extend through both the upper and lower sides of the tube, the lower openings being

provided with sight-wires S S, parallel to the line of sight and to the indicator N N', Figs. 1 and 2.

The indicator N N' is a flat strip of metal made like an inverted V, and is suspended at its apex by a pin, *n*, to the rocker-shaft D, Fig. 3, in such a manner that it may swing freely in the plane of collimation, so that the user may, by observing the points of the card that are directly under this indicator, ascertain the exact course. To further assist the eye in making an observation, I stretch a fine wire across the top of the compass-box, immediately beneath the glass *t*, Fig. 2. This wire is also parallel with the plane of sight *a*.

To obtain the vertical angle, I attach an arc, *a*, Fig. 2, to the side standard, C. This arc *a* is graduated to degrees and minutes, and is traversed by a pointer, *b*, which is attached to the rocker-shaft D. (See Fig. 3.)

For convenience in using my instrument I have a device (shown at Fig. 4) by which I can clamp the needle-card B. This device consists of a flat metal spring, E E', the lower end of which is made fast to the bottom of the box, as shown in Fig. 4. The other end, E, of the spring E E' is bent upwardly, and rests against the end of the adjusting-screw E<sup>2</sup>, so that when the screw E<sup>2</sup> is turned inwardly it will press the spring E E' against the card B, and thus prevent it (the card) from swinging; but if the screw E<sup>2</sup> is turned outwardly, then the spring will move outwardly, and leave the needle-card free to move on its center, and thus indicate the true course.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

The combination of the sight-tube H H' and the sight-wires S S with the binnacle-joint and the compass A B, substantially as described, and for the purposes set forth.

IRA HUMPHREY.

Witnesses:

FRANK H. HILLS,  
JOHN L. GARDINER.