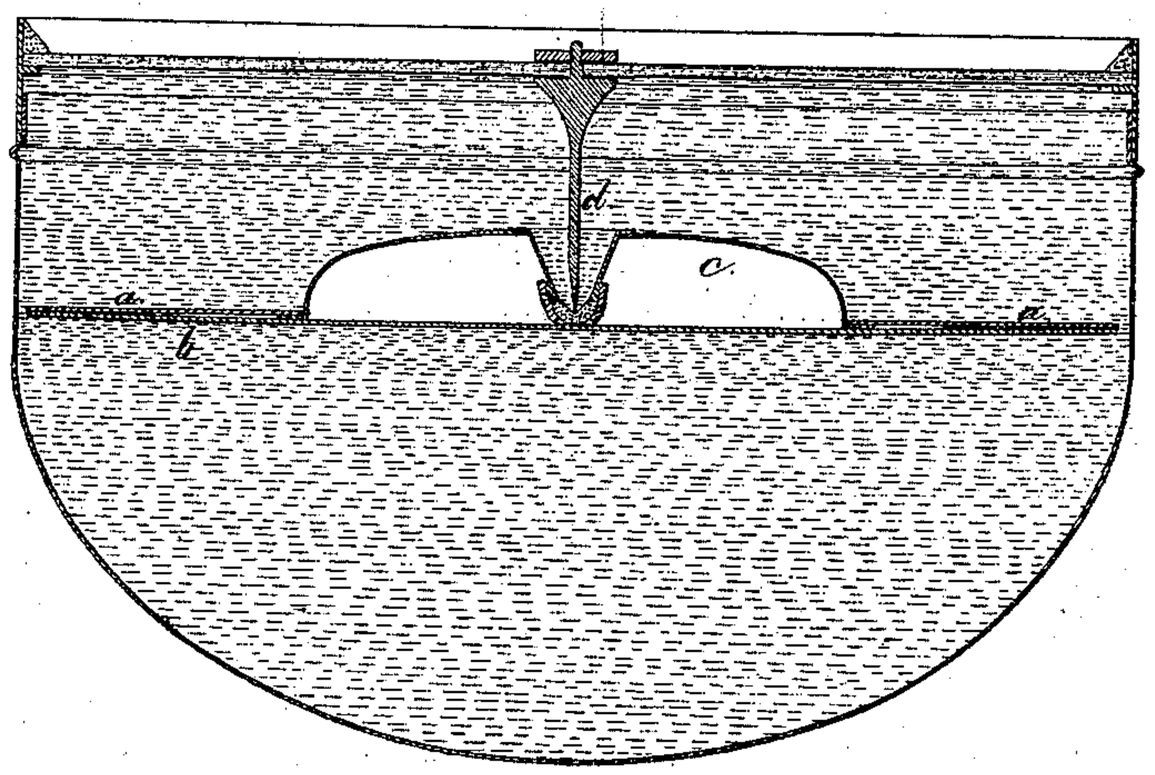
J. & G. H. BLISS.

Liquid Compass.

No. 111,169. Patented Jan. 24, 1871.



Witnesses,

Chas. H. Smith

Geo. D. Wallace

John Bliss

Geo. H. Bliss

Lemuel W. Serrell atty

United States Patent Office.

JOHN BLISS AND GEORGE H. BLISS, OF BROOKLYN, NEW YORK.

Letters Patent No. 111,169, dated January 24, 1871.

IMPROVEMENT IN LIQUID-COMPASSES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that we, JOHN BLISS and GEORGE H. BLISS, of Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Liquid-Compasses; and the following is hereby declared to be a correct description thereof.

Our invention relates—

First, to employing the metal aluminum with a frosted surface, as the material from which to make the compass-card. By the use of this metal for the compass-card, a surface of a pale silvery white color is obtained, upon which the divisions of the compass can be painted, and which will show to as good advantage as though painted upon a white surface, thus avoiding the necessity of first painting the metal plate to receive the compass divisions, or the pasting of a paper card upon said plate, as now usual. The printed card of paper is not adapted to liquid-compasses, and when a painted ground is used the white is liable to be discolored or dissolved by the action of the liquid.

Second, to placing the point of contact of the pivot, upon which the compass-card turns, with its bearing, at or near the surface of said compass-card, and the float above that point; by thus placing the bearing point of the pivot upon the same plane as the surface of the card, the card moves in its inclination or oscillation as though upon a horizontal axis, the center of said axis being on the same plane as the surface of the card; hence, a point upon the surface at the circumference of said card, will travel through a very small arc of circle, because the card will only oscillate upon the point, and its periphery remain equidistant, or nearly so, from the pivot, instead of swinging laterally, as heretofore usual, where the point of motion is either above or below the surface of the card. In this construction of the card, the edge can be allowed to approach nearer to the sides of the bowl on which is placed the lubber's mark, without danger of touching, and the float being above the point of the pivot, no counterpoise is required on the under side of the card, as heretofore.

Third, to employing glycerine as the fluid, wholly or partially, in which to immerse the compass-card, magnet, and float. By using this material alone, or mixed with water or other liquid, a fluid of greater density than spirits or spirits and water is obtained; hence, the compass-card will not be so easily influenced by the motion of the vessel, and will be kept in a more horizontal position than heretofore, besides which the magnet or needle of the compass is more easily protected from rust, and compositions not soluble in said mixture are easily obtained for painting the card, whereas the use of alcohol as the liquid in the compass renders it very difficult to properly prepare the card and mark the divisions thereon.

In the drawing we have represented a vertical section of the compass and its case, with our improvement applied thereto.

The compass-card *a* is made of aluminum, with the divisions marked directly upon the surface of the metal, the contrast of the white frosted surface of the aluminum and the black or other paint of the divisions being sufficiently marked to render the card plainly visible, and the surface of the aluminum is not liable to change its color.

The compass-card aforesaid may be a complete circle or disk, or it may be a ring. We have shown the latter.

The magnet or magnets are to be of proper size and shape; we, however, prefer to use magnets *b*, of strips of sheet-steel, as in our patent, the same being attached to the aluminum-card *a* by rivets or otherwise. By turning or folding over the edge of the aluminum disk to inclose and hold the ends of the strips of steel forming the magnets, they will be reliably secured in place.

The float made use of is to be adapted to the weight of the card. We prefer to have the pivot *d* project downward with a float, *c*, above the surface of the card, so that the card will be floated up against its pivot, and the pivot itself will be at or near the level of the surface of the card, so that the periphery of the card will always be equidistant from the vertical line of the pivot, even though the card may oscillate in use.

The float itself may be made of aluminum, with the edges of the two disks folded over and interlocked to render them perfectly air-tight, and to aid in this operation cement or solder may be used upon the edges.

The liquid we introduce into the compass-case is glycerine, either alone or diluted with alcohol, water, or other liquid.

The consistency of this glycerine is such that the compass-card becomes quiescent with rapidity, and the divisions of the card are not liable to become obliterated nor the needle rusted or injured.

A mixture of glycerine, in proper proportions, is not liable to freeze, even at very low temperatures.

Glycercine and its mixtures undergo a much smaller amount of expansion under increase of temperature than alcoholic mixtures; there is, therefore, very little strain on the compass-bowl due to increase of temperature.

We claim as our invention—

1. A compass-card of aluminum, with a frosted surface, and divisions painted upon that surface, substantially as set forth.

2. The float and compass-card, both constructed of aluminum, and combined together substantially as specified.

3. A liquid-compass, in which the liquid that floats the card is glycerine, or its mixtures, for the purposes specified.

4. A compass-card and float combined, with an inverted pivot, when the pivot projects below the upper portion of the float or floats, substantially as and for the purposes specified.

5. A compass in which the needle or parts within the bowl are protected by a coating that is not soluble in glycerine, when glycerine or its mixtures are employed as the liquid in said compass, as set forth.

Signed by us this 16th day of June, A. D. 1870.

JOHN BLISS.
GEO. H. BLISS.

Witnesses:
HAROLD SERRELL,
GEO. T. PINCKNEY.