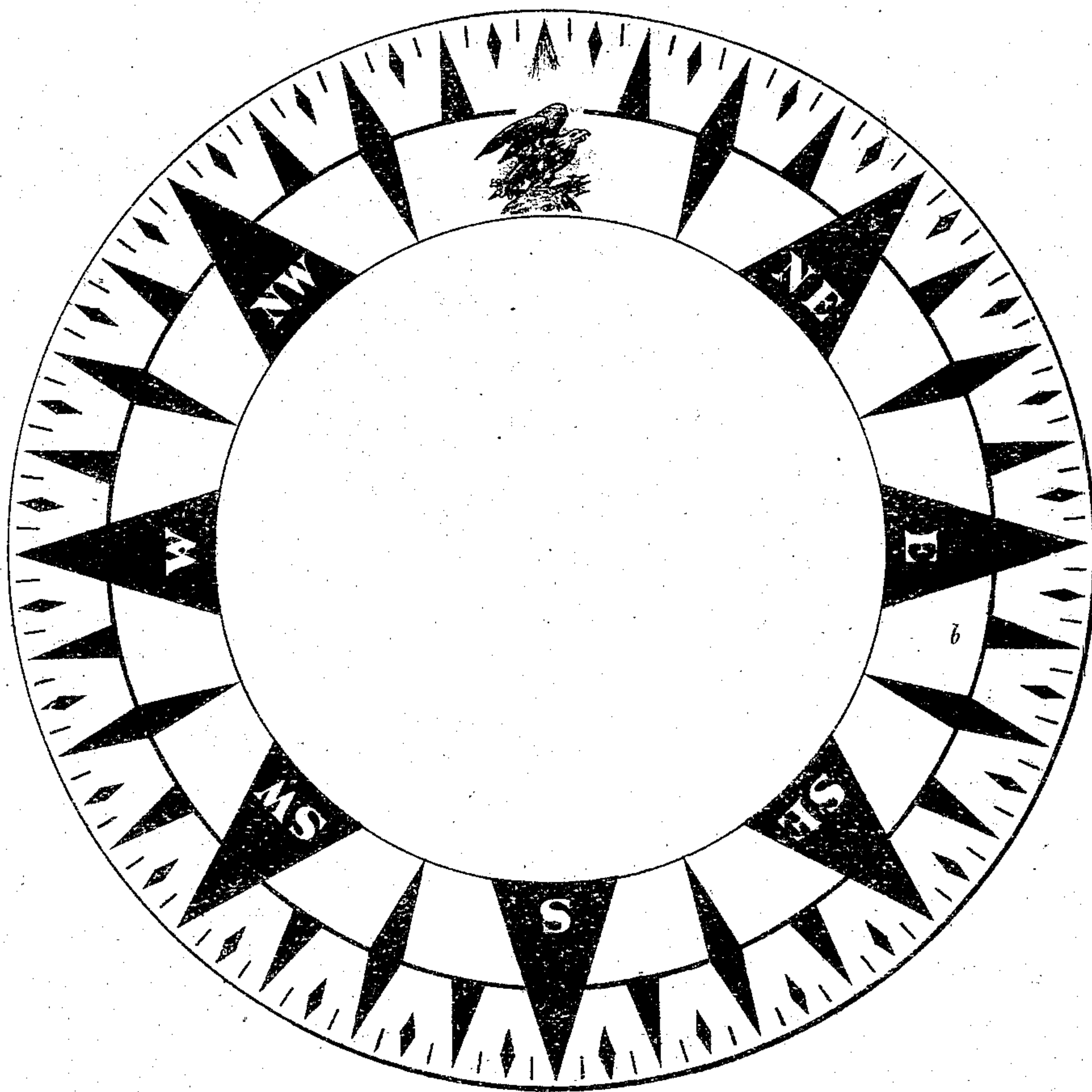


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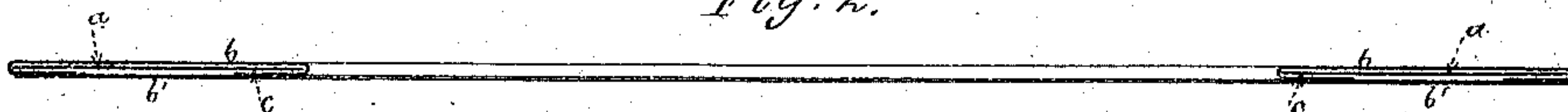
PATENTED JAN. 24, 1871.

E. S. RITCHIE.  
CARD FOR MARINERS' LIQUID COMPASSES.

*Fig. 1.*



*Fig. 2.*



*Witnesses*  
*J. N. Piper*  
*L. N. Höller*

*Edward S. Ritchie*  
*by his attorney*  
*R. W. Eddy*



# United States Patent Office.

EDWARD S. RITCHIE, OF BROOKLINE, MASSACHUSETTS.

Letters Patent No. 111,254, dated January 24, 1871.

## IMPROVEMENT IN CARDS FOR MARINERS' LIQUID-COMPASSSES.

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

*To all persons to whom these presents may come:*

Be it known that I, EDWARD S. RITCHIE, of Brookline, in the county of Norfolk and State of Massachusetts, have made a new and useful invention having reference to the Cards of Mariners' Compasses; and do hereby declare the same to be fully described in the following specification and represented in the accompanying drawing, of which—

Figure 1 denotes a top view, and

Figure 2, a transverse section of a compass-card as made in my improved manner.

The common method heretofore practiced for making the cards of the mariner's compass has been by pasting upon a disk of mica a sheet of paper having the cardinal divisions made or fixed on it.

Such cards, however, would not be used in the bowls of what are termed "liquid-compasses," such bowls being filled with water or a mixture of such and alcohol, for the liquid will dissolve the paste or cement and loosen the paper from the mica.

In consequence of this, it has been necessary to make the cards of porcelain, metal, or mica, with the divisions and lettering painted on them.

On May 12, 1868, a patent was granted to me for a paint for, or a mode of, painting such cards by the use of albumen or casein mixed with one or more pigments, and rendered insoluble by coagulation.

I have since discovered that the pigment or pigments may be dispensed with, and the albumen or other like coagulative substance may be used alone and coagulated, such enabling me to make of paper or cloth, or other like absorbent material, a compass-card, either in whole or in part, for use in a compass-bowl containing a liquid.

Therefore, in carrying out my present invention, I protect the card, when of paper or an absorbent material, by covering or saturating with albumen or a like coagulative substance the part or parts to be protected, and coagulate such by heat or other well-known means.

When the card is composed of two or more strata they are to be cemented together with the albumen, which at the time, or afterward, should be coagulated.

In this case the outer coagulative covering may be of the coagulative material alone, or of such in mixture with one or more pigments.

Generally, in carrying out my present invention, I cement, by means of albumen or an equivalent coagulative material, the stratum or backing *a*, (see

fig. 2,) of mica or thin metal, to the stratum *b*, of paper, cloth, or other material bearing the cardinal divisions, (the cement being shown at *c* in the drawing,) and subsequently, or in the meantime, I coagulate the albumen by heat or by plunging the card into alcohol, or by any other chemical means whereby the albumen may be rendered insoluble in the liquid used in the compass-bowl.

A stratum of paper or cloth, as shown at *b'*, may also be applied to the back of the backing of mica and be cemented thereto by albumen coagulated, as set forth.

Generally, in making the card, I prefer to apply to the mica a stratum of thin cloth, covering both sides and the outer (and if the card has an open middle portion the inner) edges by means of albumen, and afterward covering the upper surface with a composition of albumen and a pigment and effect coagulation, and subsequently have the divisions printed upon it.

By this means there will be prevented any distortion of the divisions, such as might result by shrinking or stretching of the paper or cloth, provided the divisions were applied to it before its fixation to the mica.

In consequence of the elasticity of the paper or cloth, and the stronger adhesion of the paint or albuminous covering upon it than upon a metal surface, the divisions of the card may readily be printed or lithographed upon the card, which it has not been found practicable to do when the card was made of metal or mica, painted with a composition of albumen and a pigment.

I claim—

1. A mariner's compass-card, as composed of a sheet of paper, cloth, or other proper material, protected by albumen or other coagulative substitute alone, coagulated, as described.

2. A mariner's liquid compass-card, as composed of two or more strata cemented together by albumen or other like coagulative substance, coagulated, as set forth.

3. A mariner's liquid compass-card, as composed of strata covered or saturated with albumen or other like coagulative substance, coagulated and cemented together with albumen, coagulated as described, whether the outer covering of the card be of albumen or other coagulative material alone, or of such mixture with one or more pigments.

Witnesses:

R. H. EDDY,  
J. R. SNOW.

EDW. S. RITCHIE.