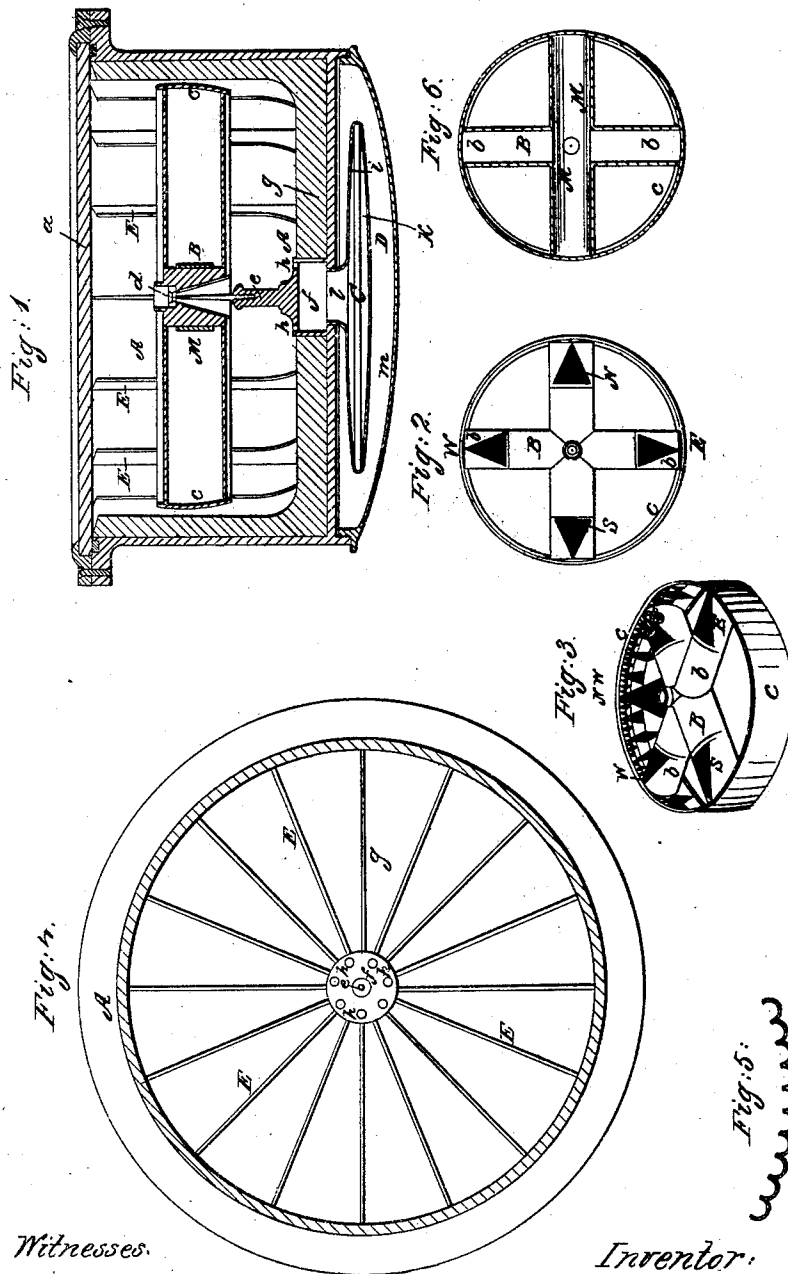


E. S. RITCHIE.
Mariner's Compass.

No. 38,126.

Patented April 7, 1863.



Witnesses.
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IMPROVEMENT IN MARINERS' COMPASSES.

Specification forming part of Letters Patent No. 38,126, dated April 7, 1863.

To all whom it may concern:

Be it known that I, EDWARD S. RITCHIE, a citizen of the United States of America, and a resident of Brookline, in the county of Norfolk and State of Massachusetts, have invented new and useful Improvements in Mariners' Liquid-Compasses; and I do hereby declare the same to be fully described in the following specification and represented in the accompanying drawings, of which—

Figure 1 denotes a transverse and vertical section of a compass provided with my invention. Fig. 2 is a top view of the magnet-float and its divisional ring. Fig. 3 is a perspective top view of such magnet-float and its ring. Fig. 4 is a horizontal section of the bowl or outer case or reservoir of the compass, and represents the arrangement of the radial plates applied to the bottom of such bowl or case.

The nature of my invention or improvements consists as follows, viz: in the combination and arrangement of a series of divisional plates or their mechanical equivalents with the bowl or water-case and the magnet, or the same and its supporting card or float, the purpose of such plates being to prevent improper movements of the magnet or its card or float; also, in the combination of one or more flexible or elastic chambers or vessels with the bowl or water-case, such flexible or elastic chamber or chambers being constructed and applied in manner and for the purpose substantially as hereinafter specified; also, in the combination of an open divisional ring, with its magnet and its float or elongated case, either provided or not with radial arms, as explained; also, in the arrangement of the cardinal divisions on the interior of the divisional ring, or on the same and the magnet-case, or the latter and the radial arms thereof.

It has been found that when the motions of a ship or navigable vessel cause the mast-head to describe either a circular or elliptical figure, or an approximation thereto, the bowl of the compass will be so moved as to produce within the bowl more or less of rotary motion of the liquid contained therein, and that this rotary motion of the liquid will so operate on the magnet case or card as to cause more or less deviation of the magnet from its meridional direction. I have discovered that by means of radial plates or their mechanical equivalents arranged within the bowl, as hereinafter speci-

fied, the said rotary motion of the liquid will be nearly, if not entirely, prevented. I have also found by trial that the magnet float or buoy best adapted to a compass under such circumstances is that of an elongated prism or cylinder provided with radial arms of such character and a divisional ring circumscribing the whole.

In order to prevent breakage or injury to the bowl by expansion of the liquid induced by a rise in temperature, as well as to maintain the bowl full of liquid, I have found it advisable to combine with such bowl a hollow chamber made, either in part or in whole, of a flexible or yielding material or materials, such as will not only expand or bend under the increasing pressure of the water, due to its expansion by such increase of temperature, but preserve the water from escaping.

In the drawings, A denotes the compass case or bowl, which is to be made water-tight, and is to be provided with a glass in either or both its top or bottom, through which the magnet card or float may be seen when the compass may be in use, the said glass being shown at *a* in Fig. 1.

The magnet case or float is shown at B, it being an elongated cylinder or prism and having the magnet or magnets arranged within and lengthwise of it, as shown at M in Fig. 6, which is a horizontal section of the magnets and their float. It may be furnished with radial arms *b b* and a circumscribing-ring, *c*, the cardinal divisions being arranged on the inner periphery or surface of such ring, either in whole or in part, as shown in Fig. 3; or they may be partly on the float and its arms. This arrangement of the cardinal divisions enables them to be observed to the best advantage while a person may be looking through the glass *a*.

The supporting-pivot of the magnet-case is shown at *d* in Fig. 1 as projecting upward from a post, *e*, which is sustained at its base on a tubular projection or standard, *f*, which is elevated on the bottom *g* of the bowl A and opens into it by one or more holes or passages, *h*.

The expansion chamber or vessel is shown at C as composed of two thin flexible concavo-convex disks, *i k*, arranged as shown in the drawings and joined together at their two peripheries. By means of a tubular neck, *l*, the vessel C is joined to the bottom *g* and opens

into the part *f*, above mentioned. Thus it will be seen that there will be a free communication between the interiors of the said vessel C and the bowl A. For the protection of the expansion-vessel C, I arrange it within a chamber or case, D, affixed or applied to the bottom of the bowl, such protection-chamber being provided with a cap or cover, *m*, connected with the sides or rim of the chamber by screws or other suitable means.

The radial plates above referred to are shown at E E E, in Figs. 1 and 4, as arranged along the upper surface of the bottom of the bowl and extending up and projecting from the inner periphery of its sides. The side plates or projections may be formed as represented in Fig. 5; or they may be otherwise made and still be caused to operate to advantage. In some cases I also extend them along the inner surface of the top of the bowl, and particularly in those liquid-compasses wherein the bowl is elevated on a hollow column extending up from and opening out of another bowl to contain an indicator to be connected with the magnet-case by a shaft or rod and gimbals.

It is not essential to my invention that the expansion-vessel C should be applied directly to the bottom of the bowl, as it may be attached to the side or other convenient part of

such bowl, and instead of one expansion-vessel there may be two or more of them to the bowl.

Having thus described my invention, what I claim as constituting the same is as follows:

1. The combination and arrangement of a series of divisional plates, E E, or their mechanical equivalent or equivalents, with the bowl or liquid-case A and the magnet, or with it and its supporting card or float B, the purpose of the said plates being as described.

2. The combination of one or more either flexible or elastic expansion chambers or vessels, C, with the bowl or water-case A, containing a magnet and float or card, as specified.

3. The combination and arrangement of an open divisional ring, *c*, with the magnet M, its float B, or with the same and the radial arms *b b*, the whole being substantially as specified.

4. The arrangement of the cardinal divisions—viz., on the inner face of the divisional ring *c*, or on the same and the magnet-case B, or the latter and the radial arms *b b*, as specified.

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Witnesses:

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