S. LONGFELLOW.

Mariner's Compass.

No. 217,015. Patented July 1, 1879.

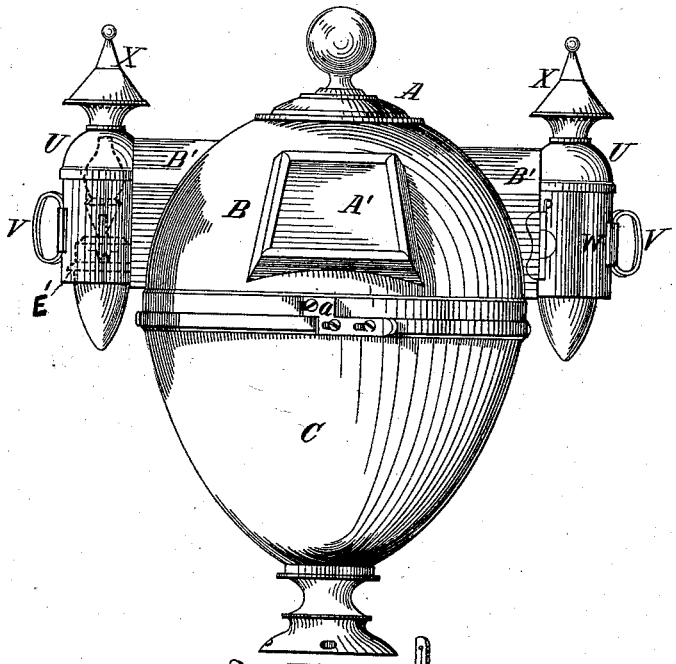

Fig. 1.

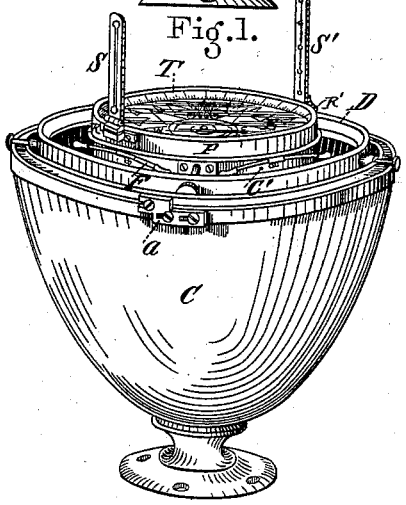

Fig. 2.

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Geo. E. Lagg

Inventor:
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by his attorney
Alby. L. Hayes

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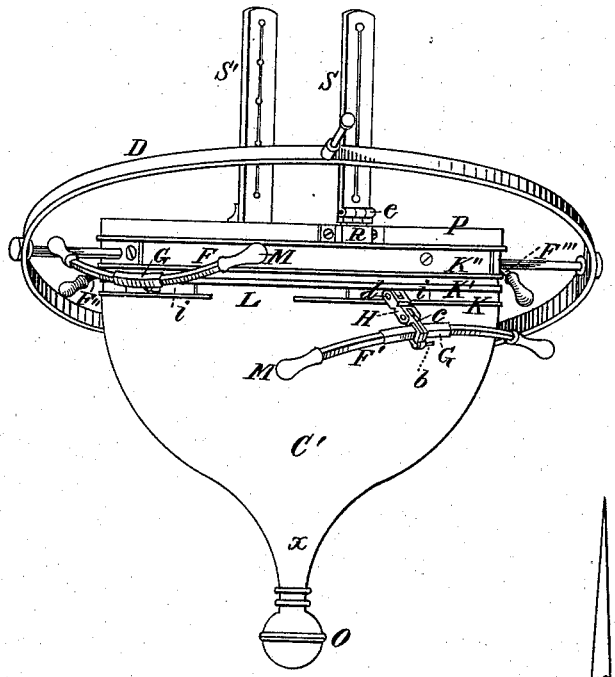

Fig.3.

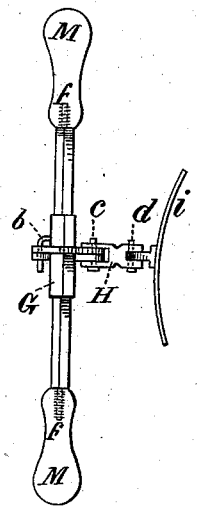

Fig.4.

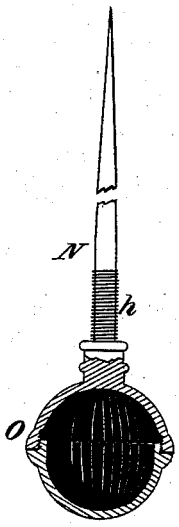

Fig.5.

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UNITED STATES PATENT OFFICE.

STEPHEN LONGFELLOW, OF ST. LOUIS, MISSOURI, ASSIGNOR OF A PART OF HIS RIGHT TO FRANCIS AMORY, OF BEVERLY, AND SAMUEL SNOW, OF CAMBRIDGE, MASSACHUSETTS.

IMPROVEMENT IN MARINERS' COMPASSES.

Specification forming part of Letters Patent No. **217,015**, dated July 1, 1879; application filed November 16, 1877.

To all whom it may concern:

Be it known that I, STEPHEN LONGFELLOW, of the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Mariners' Compasses, of which the following is a full, clear, and exact description, which will enable those skilled in the art to which the invention appertains to make and use the same, reference being had to the drawings accompanying and forming part of this specification.

For the purpose of preventing the deviation of the compass-needle from its proper direction when on board ship, caused by the attraction of the iron parts of the vessel, such as rods, davits, and other appendages in near proximity to the binnacle, or of steel or iron forming part of the cargo, and also caused when the vessel is near the land, in certain localities, by the attractive influence due to iron-mines or large masses of iron ore upon the shore, curved bar-magnets capable of adjustment have been placed around the compass-bowl, and so arranged that their attractive influence upon the needle shall neutralize the effects of the local attraction referred to.

My first improvement relates to magnetic bars of this description; and consists, in the manner hereinafter to be more fully set forth, of arranging these bars in relation to each other and to the compass-bowl, and of attaching them thereto by devices which render them capable of adjustment in various directions to meet the various forms of local attraction, by which manner of arrangement and method of attachment, besides overcoming and neutralizing the effects of local attraction, they also exercise a direct influence in correcting the dip of the needle and maintaining the compass-card in a horizontal position—a result which will be found of advantage in high latitudes.

A further improvement relates to the manner of weighting or ballasting the compass-bowl; and consists in the use for this purpose of a hollow globe, which is attached to the bottom of the compass-bowl, and contains fine shot, the quantity of which can be varied at pleasure, so that the weight of the bowl can be perfectly regulated as necessity requires, thereby rendering the same compass equally serviceable in light or in heavy weather, and obviating the necessity of having two compasses, one heavy and the other light, as is now often the case.

Another improvement relates to the manner of illuminating the compass-card; and consists in effecting this by lamps attached on each side of the cover of the bowl, and by providing the interior of this cover with a reflecting-surface, in the manner described hereinafter.

In the accompanying drawings, Figure 1 is a view in elevation of the case containing the compass, showing the top or cover of the case in position. Fig. 2 is a view of the case, in perspective, with the top removed, and shows the compass-bowl contained in the case and the azimuth-circle and sight-vanes attached to the compass-bowl. Fig. 3 is a view of the compass-bowl detached from the case, and shows the form of the bowl and the arrangement of and manner of attaching the magnetic bars. Fig. 4 is a detached view of one of the magnetic bars; and Fig. 5 is a detached view, in section, of the spindle and weight.

In these drawings the same letters in the several figures refer to the same parts.

A is the case or shell containing the compass, which case may be of ovoid form, as shown, or of spherical form, if preferred, and is made in two parts, B and C, removable one from the other, but capable of being closely connected together by any suitable fastening device, as shown at *a*, Figs. 1 and 2, so that a complete protection from the weather is afforded for the compass contained therein. This case may be mounted upon a suitable standard, and is then designed to take the place of the present standard-compass, or of the old wooden binnacle; or, by dispensing with the upper half, B, it can be placed in a box and used in the old binnacle, as preferred.

C′, Figs. 2 and 3, is the compass-bowl, which is suspended within the case by gimbals, in the usual manner, D being a gimbal-ring, which, in Fig. 3, is shown out of position, in order that the magnetic bars may be clearly shown.

E is the compass-card. F F′ F″ F‴ are the magnetic bars arranged around the bowl. These bars are four in number, as shown in Fig. 3, and are made of square iron one-quarter of an inch on each face, hardened and highly finished, and thoroughly magnetized. They are in shape the segment of a circle, and of a length equal to one-sixth the circumference of the bowl.

Each bar is inserted in a sleeve or socket, (shown at G) which is capable of being opened longitudinally to admit of the easy removal of the bar, and when closed is fastened by a pin, *b*. Attached to this sleeve by a joint, *c*, is a short arm, H, at right angles to the sleeve, and this arm is hinged at *d* to an oblong curved plate, *i*. By means of these plates the magnets are secured to the compass-bowl in the following manner: Around the compass-bowl, and just below the gimbals, are three parallel bands, K K′ K″, separated from each other by a distance just equal to the width of the plate, and by these bands grooves are formed for the reception of the plate. The curve given to the plate is such that when it is applied to the surface of the bowl it fits closely, and is kept against the surface by the bands, but can slide in the grooves formed by the bands, so that the bars can be placed in any position in the groove, as may be desired, according to the force of the local attraction which is to be overcome.

The upper and lower bands, K″ K, do not extend entirely around the compass-bowl by the length of the plate *i*, as shown at L, Fig. 3, which space permits of the insertion and removal of the plates.

For the purpose of affording a more secure attachment of these plates, their edges may be beveled off and the bands cut in, so that the plates will dovetail between the bands.

I have adopted this manner of attaching the bars to the bowl as a convenient manner of obtaining the facility of circumferential adjustment; but other methods of attachment which will secure the same result may be adopted.

By means of the joints in the arms H each of these magnetic bars can be elevated to the plane of the card or depressed below that plane, and the distance of each from the bowl can also be varied. These different positions of the bars are shown at F and F′ in Fig. 3. By the simple device above described each bar is rendered adjustable in three directions—viz., circumferentially, horizontally, and vertically—and consequently a perfect adjustment of the needle to the true north and of the compass-card to a horizontal position can be obtained for every form and degree of local attraction and in any latitude.

The magnetic bars have their poles arranged as indicated in Fig. 3; and to prevent them from coming in contact with each other at their extremities, pear-shaped pieces of glass or porcelain, about one inch in length and three-quarters of an inch in diameter, (shown at M,) are screwed onto each end of each of the bars.

Another series of magnetic bars, similar to those hereinbefore described, may be attached to the compass-bowl above the first series by the groove formed by the bands K′ K″. When this is done, two magnets can be brought together, thereby doubling the power at any given point, and by the removal of one or more magnets from the series the power can be concentrated at will. This magnetic attachment may be applied to any form of compass now in use.

By means of this arrangement of magnets the shipmaster will, before leaving port, be enabled to determine by experiment the exact amount of local deviation for each point of the compass, and, by means of a false card, which will be furnished with each compass sold, will be enabled to shape his course with absolute certainty.

As shown in Fig. 3, the compass-bowl C′, instead of being of the usual hemispherical form, terminates in an elongated neck, *x*, by which form increased steadiness is obtained, and into the apex of the bowl is screwed a spindle, N, to which spindle the weight used for ballasting the compass is attached. This weight consists of a hollow brass globe, O, constructed in two parts, connected by a screw, and contains a quantity of fine shot, the amount of which may be varied at pleasure, according to the amount of ballast which it is necessary for the compass-bowl to have, and thus the compass can be kept perfectly ballasted and is rendered equally serviceable, both in light and in heavy weather, thereby obviating the necessity of providing the vessel with two compasses, one heavy and the other light, as is now often the case.

P is the azimuth-circle, which consists of a removable band encircling the bowl just above the gimbals. It has attached to it two suitable sockets, R R′, opposite to each other, for the reception of the sight-vanes S S′, one of which vanes, S, is jointed, as shown at *e*, so that the ray of light can be thrown directly across the face of the compass, giving the exact bearing of the sun upon a circle, T, on the inner edge of the bowl, just above the card graduated to degrees and minutes. This band P fits the bowl loosely, so that the vanes are capable of being moved around the bowl for the purpose of obtaining correct bearings of any object, which bearings are determined upon the graduated circle T.

The cover B of the compass is hemispherical and has tubular projections B′ B′, Fig. 1, on each side, in which projections are fitted the lamp-cases U U. The lamp-cases are provided with ventilators X X, doors W W, and handles V V.

The lamps, one of which is shown in dotted lines at E′, Fig. 1, are fitted with kerosene-burners and adapted to burn heavy oil. Each

is secured in its case by the insertion of its oil-receptacle into a hole in the bottom of the case.

The whole interior surface of the cover is nickel-plated, so that when the lamps are lighted a strong light is reflected upon all parts of the compass-card and it is perfectly illuminated.

In the after side of the cover is a square pane of glass, A′, of a width equal to one-sixth the circumference of the cover, through which glass the compass-card can be observed at night, or when, in bad weather, it is necessary to keep the compass-card covered.

Having thus described my improvements, I do not claim the combination of sights and graduations, as this may form the subject of a separate application for Letters Patent; but

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

1. In mariners' compasses, one or more series of removable curved bar-magnets attached to the outside of the compass-bowl, and capable of adjustment circumferentially, vertically, and horizontally, substantially as and for the purpose set forth.

2. The combination of the magnetic bar F, the sleeve G, the double-jointed arm H, and curved plate *i*, substantially as and for the purpose set forth.

3. The combination, with the bar-magnets, of the insulators M M, substantially as and for the purpose set forth.

4. The combination, with the compass-bowl, of the bands K K′ K″ on the outside of the bowl, as and for the purpose set forth, a part of each of the bands K and K′ being cut away to admit of the insertion and removal of the plate *i*, as set forth.

5. The combination, with the compass-bowl, of the adjustable hollow receptacle O, containing removable weights, as specified.

6. The combination, with a compass, of a concave reflector, forming a casing above the card, and side lamps arranged to throw the light both on the card and on the reflector, as set forth.

In witness whereof I have hereunto set my hand on this 13th day of November, A. D. 1877.

STEPHEN LONGFELLOW.

Witnesses:

R. S. VOORHIS,

T. P. KENNEY.