(No Model.) 2 Sheets—Sheet 1.

S. W. B. DIEHL & J. GIBSON.

SHIP'S BINNACLE.

No. 432,962. Patented July 22, 1890.

Fig. 4.

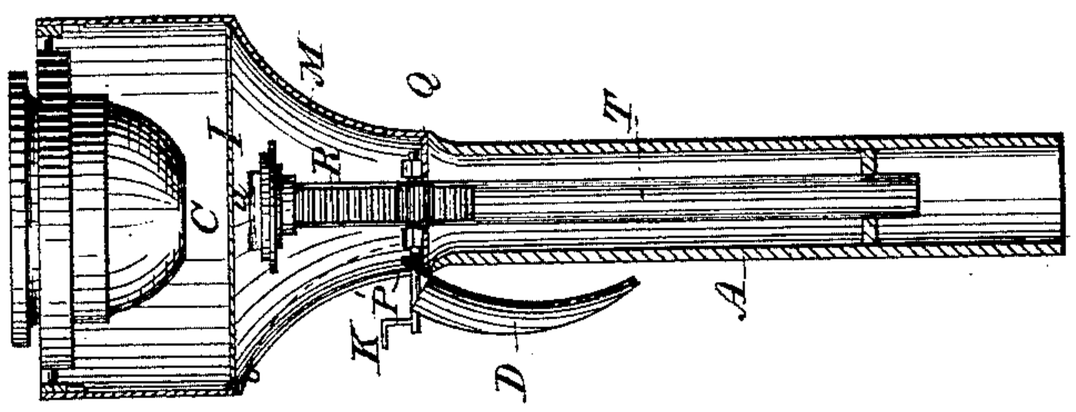


Fig. 3.

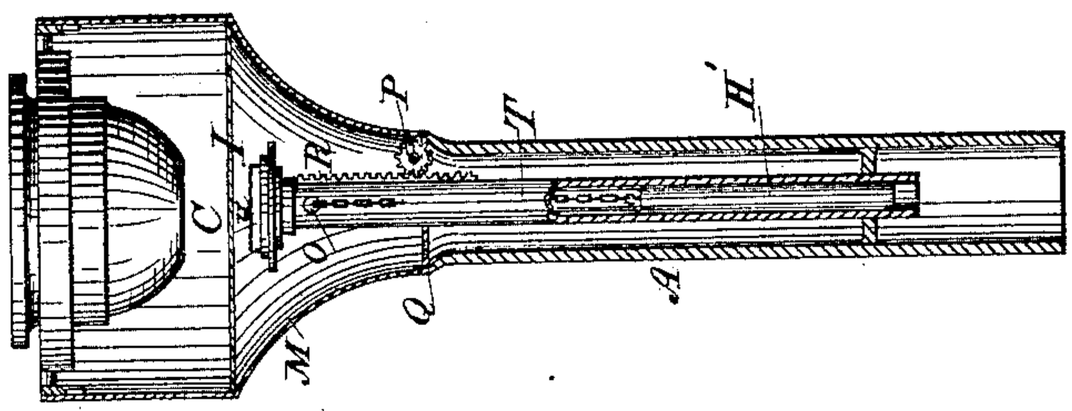


Fig. 2.

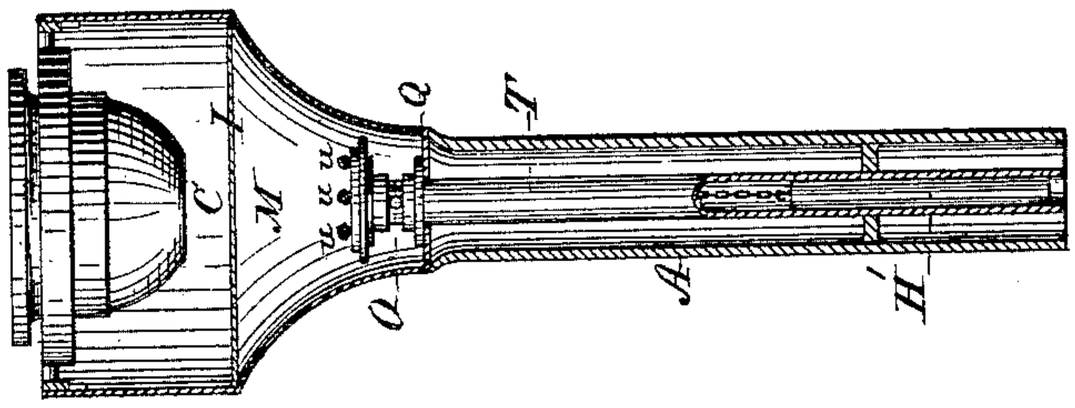
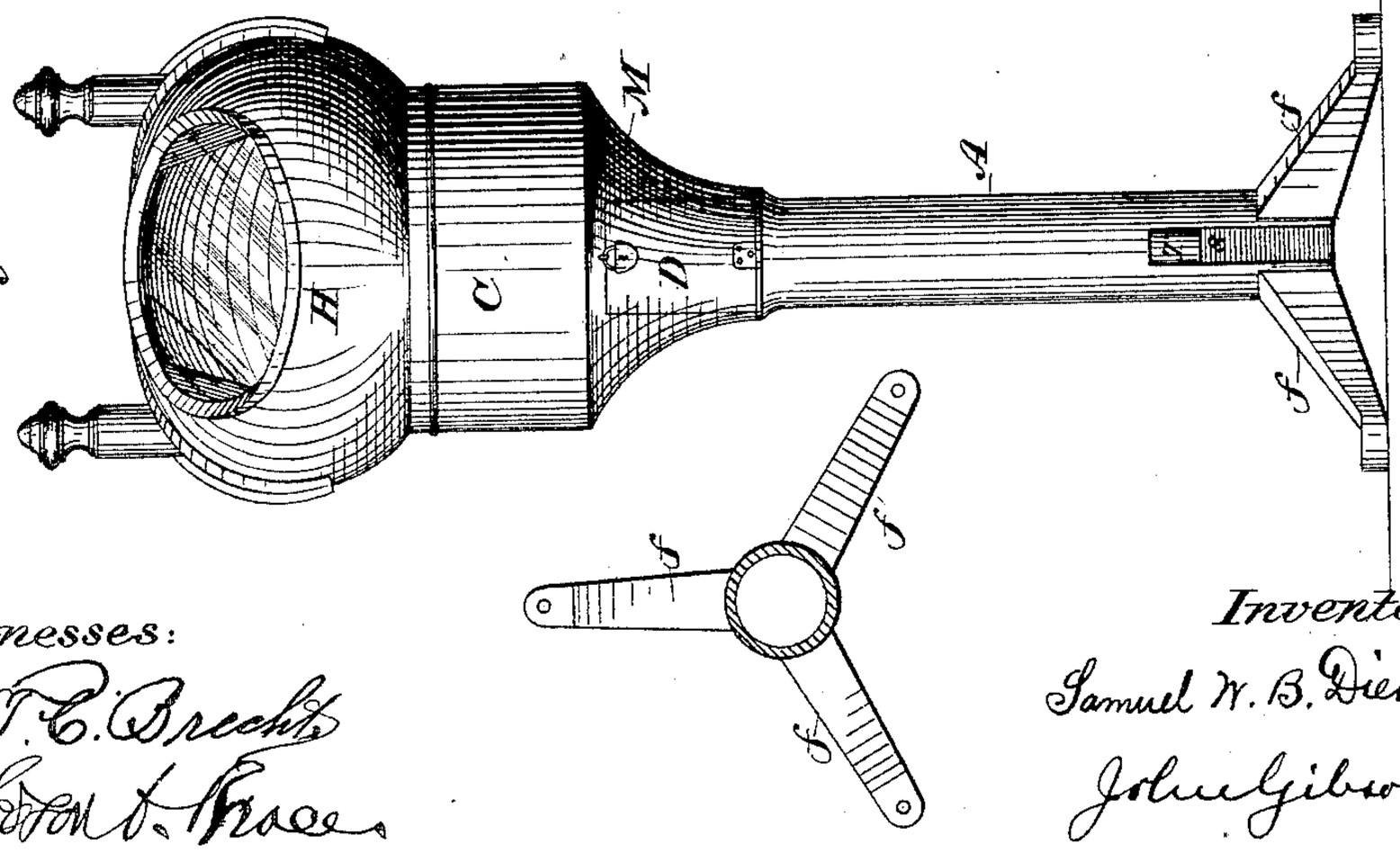


Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

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SHIP'S BINNACLE.

No. 432,962. *Fig. 5.* Patented July 22, 1890.

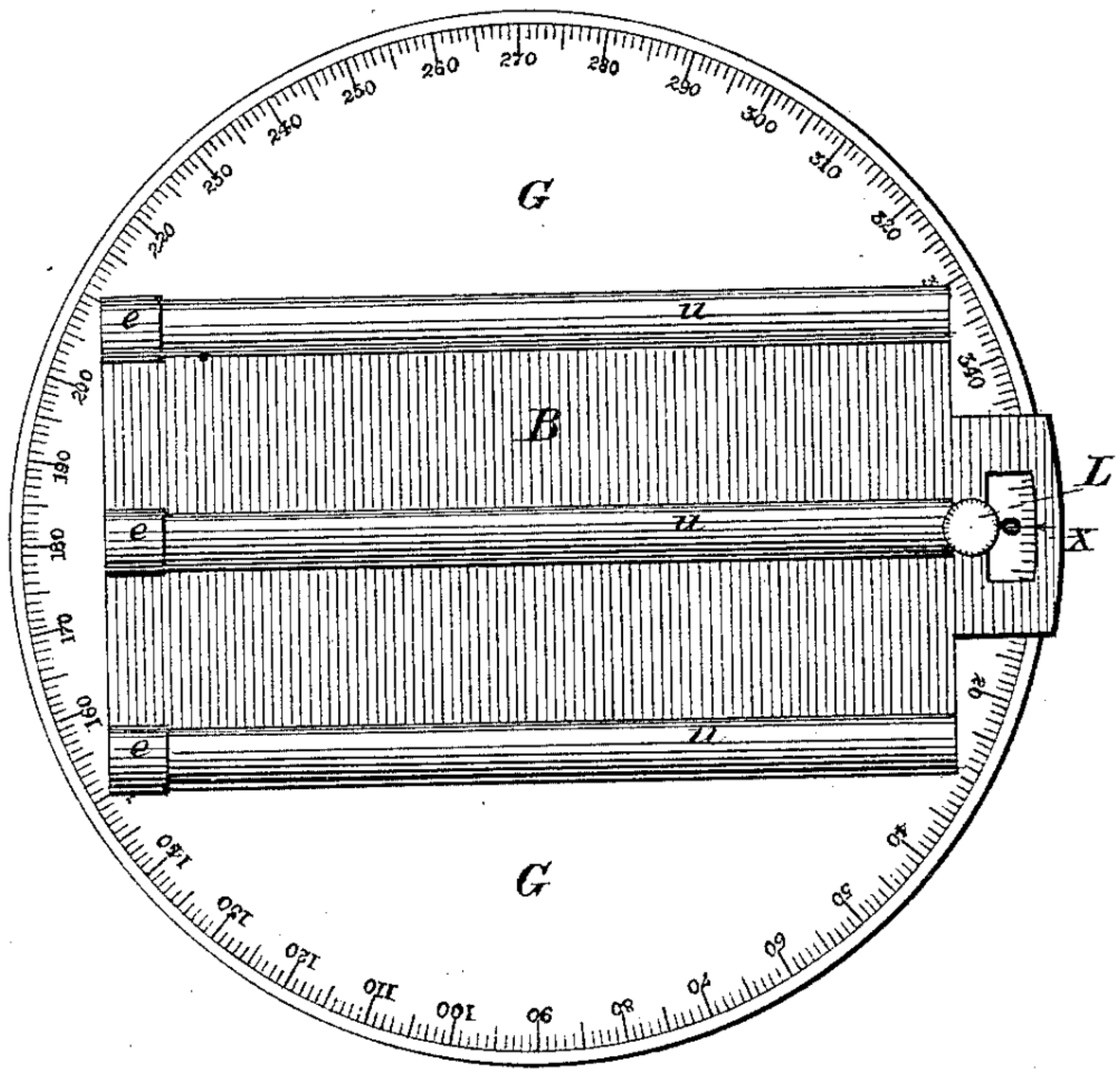


Fig. 6.

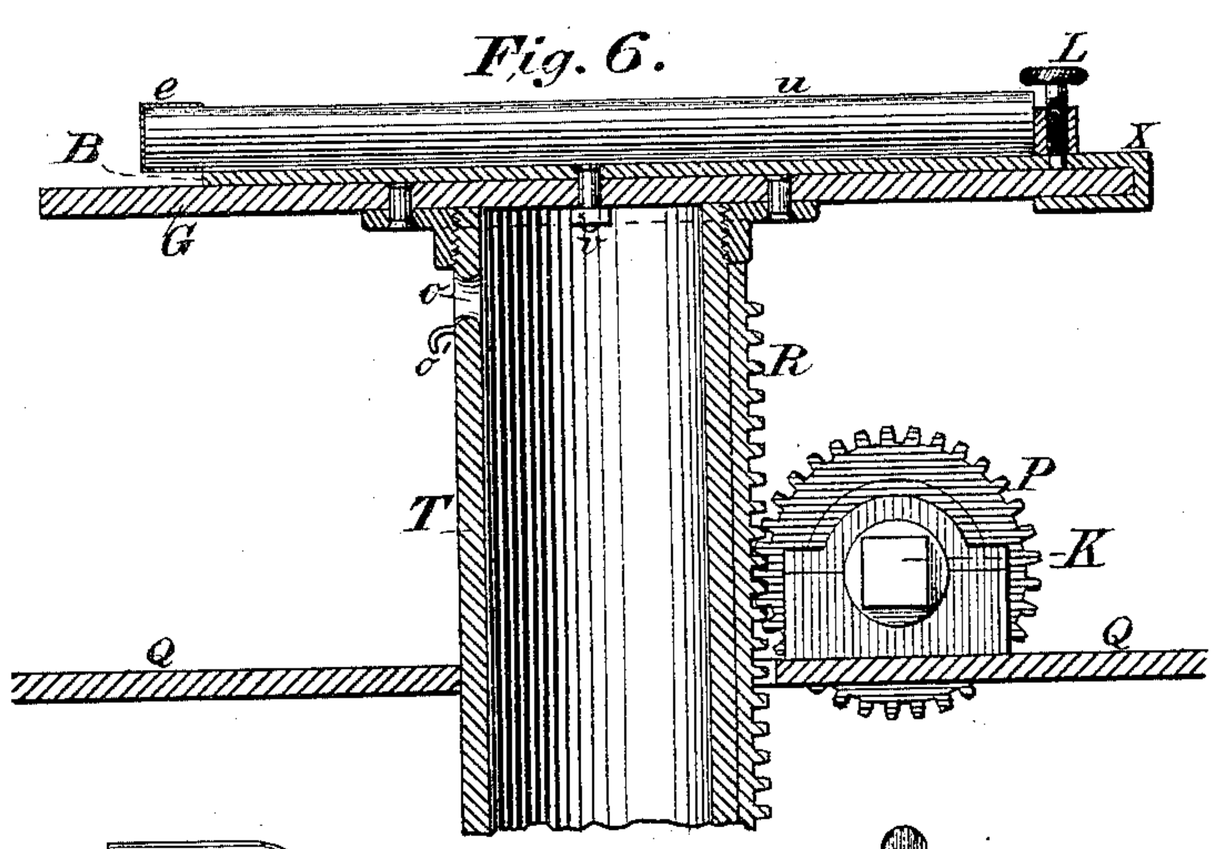
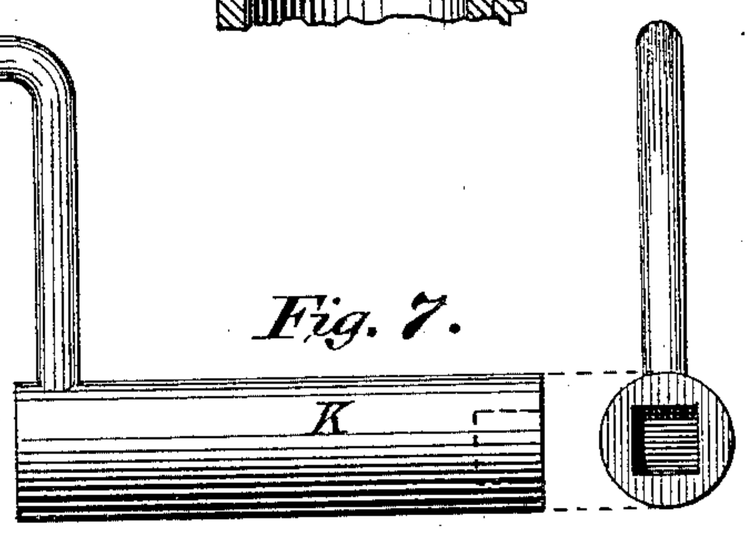


Fig. 7.



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UNITED STATES PATENT OFFICE.

SAMUEL W. B. DIEHL AND JOHN GIBSON, OF THE UNITED STATES NAVY.

SHIP'S BINNACLE.

SPECIFICATION forming part of Letters Patent No. 432,962, dated July 22, 1890.

Application filed May 27, 1890. Serial No. 353,339. (No model.)

To all whom it may concern:

Be it known that we, SAMUEL W. B. DIEHL, lieutenant, United States Navy, and JOHN GIBSON, ensign, United States Navy, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Ships' Binnacles; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improved method or means for correcting the semicircular and heeling errors of compasses on board ships.

The object of this invention is the introduction of new mechanical devices for regulating and holding securely in the desired position the horizontal and vertical compensating magnets which counteract the disturbance of the compass-needles caused by the magnetic properties of the iron or steel used in the construction of the ship.

The binnacle consists of a hollow column or base made of cast-brass; receptacles containing the mechanism, horizontal magnets, and compass, made of cast-brass, and the hood with lamps. The base can be made in any desired form; but we, by preference, make it cylindrical, with three projecting feet, having at the bottom a slot for the insertion of the heeling-corrector. The top receptacle, which is firmly secured to the base by means of brass bolts, has a hinged door to give egress to the mechanism, a brass plate separating the compass-chamber from the magnet-chamber, bearings for supporting the compass in its gimbal-rings, and means for supporting the hood. Centrally in the base is a vertical tube extending into the magnet-chamber, which acts as a guide for the heeling-corrector. On top of the tube are two horizontal plates, one circular in form, fixed, and graduated to degrees, the zero corresponding to the keel-line of the ship, the other movable in azimuth on a central pivot. The movable plate has secured to it a number of tubes for holding the correcting-magnets, one being immediately over the pivot and the others parallel to it at equal distances on each side. The movable plate carrying the magnets can be set in any desired position in azimuth to correspond with the direction of the ship's disturbing force and secured by means of a clamp-screw, an index attached to this plate pointing to the angle on the graduated circle. The central tube can be stationary and secured to the bottom plate of the magnet-chamber, and the compensation effected by placing the requisite number of magnets in the tubes when set in the desired azimuth; but we prefer to give the tube vertical motion by means of a rack and pinion. As the magnet-plates are secured to the top of the vertical tube, the distance of the correcting-magnets from the compass-needle can be regulated, thereby presenting to act on the compass a constant number of magnets whose force may be increased or diminished, as desired, by the above vertical motion. To insure the tube being vertical, a diaphragm is cast in the base of the binnacle near the bottom, which is bored to allow the tube to work freely and also to guide it, and a similar guide is made in the bottom-plate of the magnet-chamber.

The heeling-corrector is a magnet having a hook in the end for the purpose of attaching a chain which holds the magnet. The chain passes through the vertical tube, through a hole near the top, and is held by means of a hook on the tube in the magnet-chamber.

That our invention may be better understood, reference is had to the accompanying drawings, in which—

Figure 1 represents a front elevation of the binnacle; Fig. 2, a sectional elevation showing the arrangements of the parts in the interior, in which the vertical tube is fixed; Fig. 3, a sectional elevation showing the arrangement of the interior parts, in which the tube is given vertical motion by means of a pinion and rack; Fig. 4, a sectional elevation through the keel-line of the binnacle, showing the arrangement of the parts in the interior, the crank and hinged door. Fig. 5 represents a plan of the horizontal plates, showing the graduations, the movable plate, and the magnet-tubes; Fig. 6, a sectional elevation of the elevating-gear, showing the method of securing the horizontal plates; and Fig. 7, a plan of the crank by which motion is given to the elevating-gear.

Similar letters represent corresponding parts in all the views.

In the drawings, A indicates the base of the binnacle of cast brass with three projecting feet *f f f*, having a slot *s* near the bottom for the insertion of the heeling-corrector H′; M, the magnet-chamber which contains all the mechanism and the tubes *u u u* for the horizontal magnets; D, the hinged door for obtaining egress to the mechanism and magnet-chamber, and C the compass-chamber, which contains the compass with the means for supporting it.

H indicates the hood with lamps and a glass front, which is supported on top of the compass-chamber. The magnet and compass chambers are cast in one piece of brass with a separate plate of brass I, to divide the two chambers.

T indicates the vertical tube of brass which acts as a guide for the heeling-magnet H′. The magnet is held by a brass chain C′, which passes through the hole O near the top of the tube and secures to the hook O′ on the outside of the tube, thus regulating the distance of the magnet below the compass-needles.

G indicates the horizontal plate of brass, which is fixed and secured to the top of the vertical tube T by means of a flanged ring and brass bolt. It is graduated to degrees from zero to three hundred and sixty degrees, the zero being in the keel-line of the binnacle.

B is the movable plate of brass, to which are secured the brass tubes *u u u* for holding the horizontal magnets. It is secured to the center of the fixed plate G by means of the pivot *v* and is capable of motion in azimuth, the index X showing on the graduated plate the position in azimuth. The centers of the two plates lie in the center of the binnacle in its vertical axis. The plate B, carrying the magnet-tubes *u u u*, can be secured in any desired position in azimuth by means of the clamp-screw L. The magnet-tubes are arranged to have removable caps *e e e*, in order to hold the magnets in the tubes when once inserted.

P indicates the pinion of brass, which rests on bearings secured to the bottom plate Q of the magnet-chamber by means of brass screws. The pinion P works into a rack R of brass bolted to the vertical tube T. The gearing is given motion by means of the removable crank K, and when not in use the pinion is prevented from revolving by means of a brass pin P′, passing through holes in the axis of the pinion and into a hole in the plate Q, to which the pinion-bearings are secured. The door D can be locked by means of a staple and padlock, thus preventing any tampering with the magnets and mechanism.

In connection with this binnacle there can be used any of the known methods of compensating the quadrantal deviation, either soft-iron shells, chains, or plates, and this we do not claim.

What we do claim as new and useful and of our own invention, and desire to secure by Letters Patent, is—

1. In a ship's binnacle, the combination of a compass-chamber, a magnet-chamber of decreasing dimensions underneath the same, a hinged door to admit access to the same, a base or column of decreased dimensions under said magnet-chamber, projecting feet, to which said base or column is secured, and compensating devices carried within said chamber.

2. In a ship's binnacle, a central movable tube T, the heeling-corrector carried in said tube, to the top of which tube are secured fixed and movable horizontal plates, and compensating magnets carried by said plates, substantially as and for the purposes designed.

3. In a ship's binnacle, a rack and pinion, a central tube capable of vertical motion, having plates secured to the top of it, and compensating magnets carried by said plates, substantially as and for the purposes set forth.

4. In a ship's binnacle, a horizontal plate G, graduated to degrees, firmly fixed to a vertical tube, a heeling-corrector carried by said tube, in combination with the plate B, capable of motion in azimuth, and a set of magnet-tubes *u u u*, carried by said plate, substantially as and for the purposes set forth.

5. In a ship's binnacle, a combination of a fixed plate G, graduated to degrees, and a plate carrying magnets capable of motion in azimuth, a vertical tube, and a heeling-corrector carried by said tube, the whole arrangement capable of vertical motion, substantially as and for the purposes set forth.

6. In a ship's binnacle, the combination of a compass-chamber, a magnet-chamber of decreasing dimensions underneath the same, a hinged door to admit access to the same, a diaphragm separating the two chambers, a base or column of decreased dimensions under said magnet-chamber, projecting feet, to which said base or column is secured, and compensating devices carried within said magnet-chamber.

In witness whereof we have signed our names to this specification in the presence of two subscribing witnesses.

SAMUEL W. B. DIEHL.
JOHN GIBSON.

Witnesses:
T. C. BRECHT,
EDSON A. BRACE.