No. 701,927. Patented June 10, 1902.

J. PAOLI.

BINNACLE COMPASS.

(Application filed Dec. 2, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

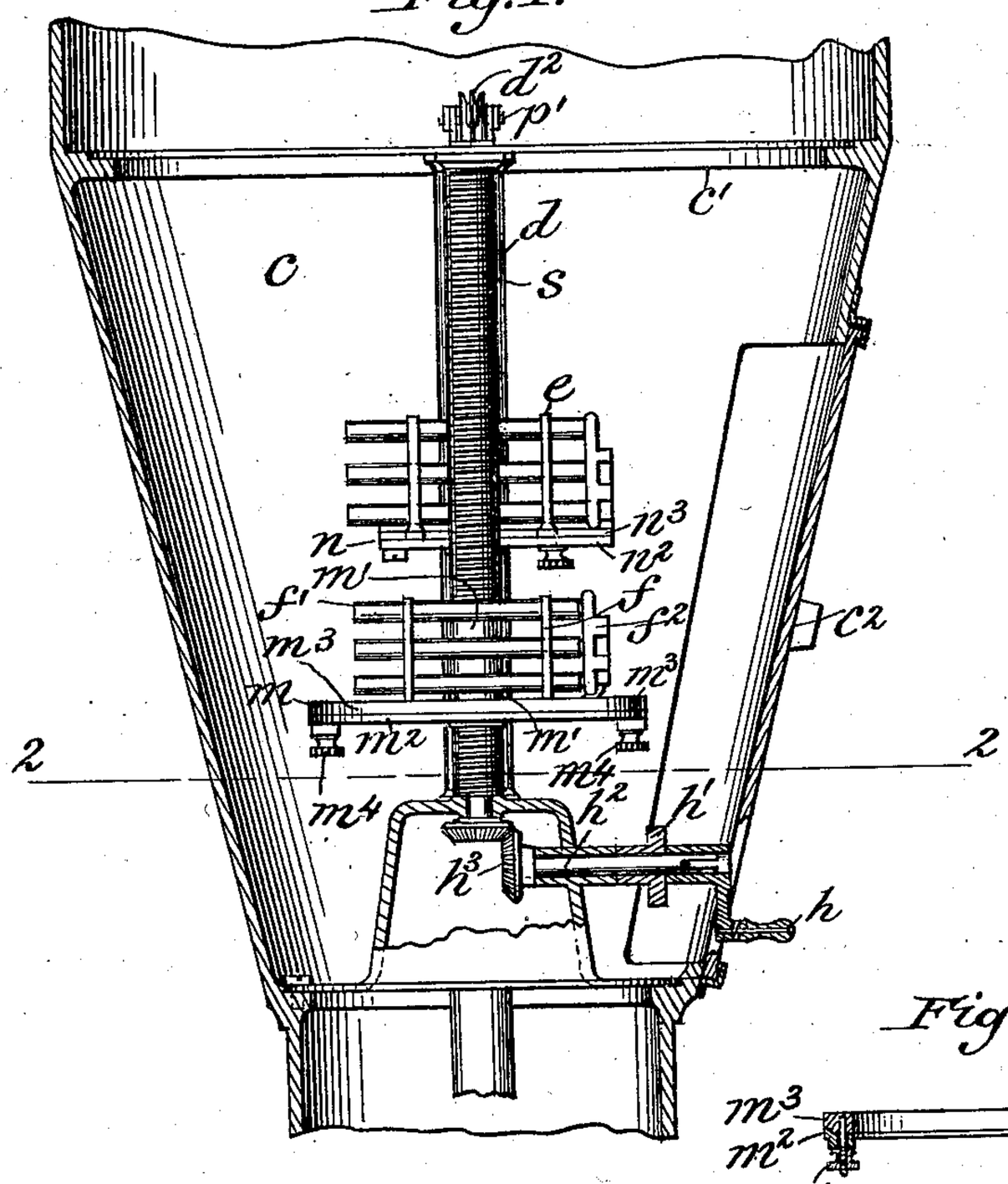


Fig. 1a.

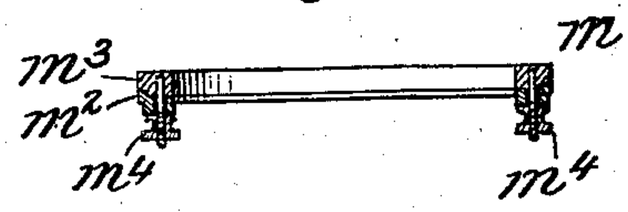
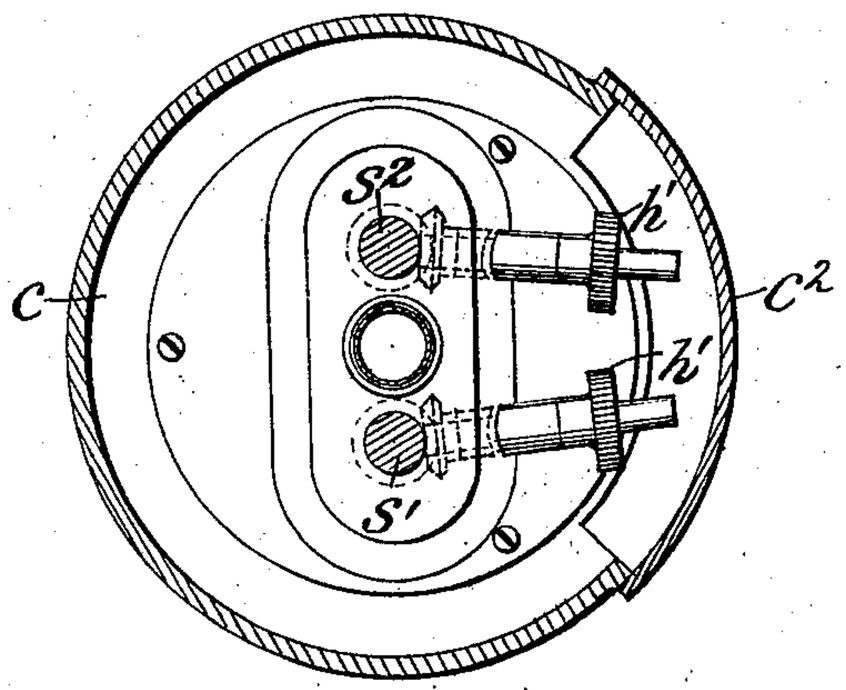


Fig. 2.



Witnesses.

F. H. Schott

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Fig. 3.

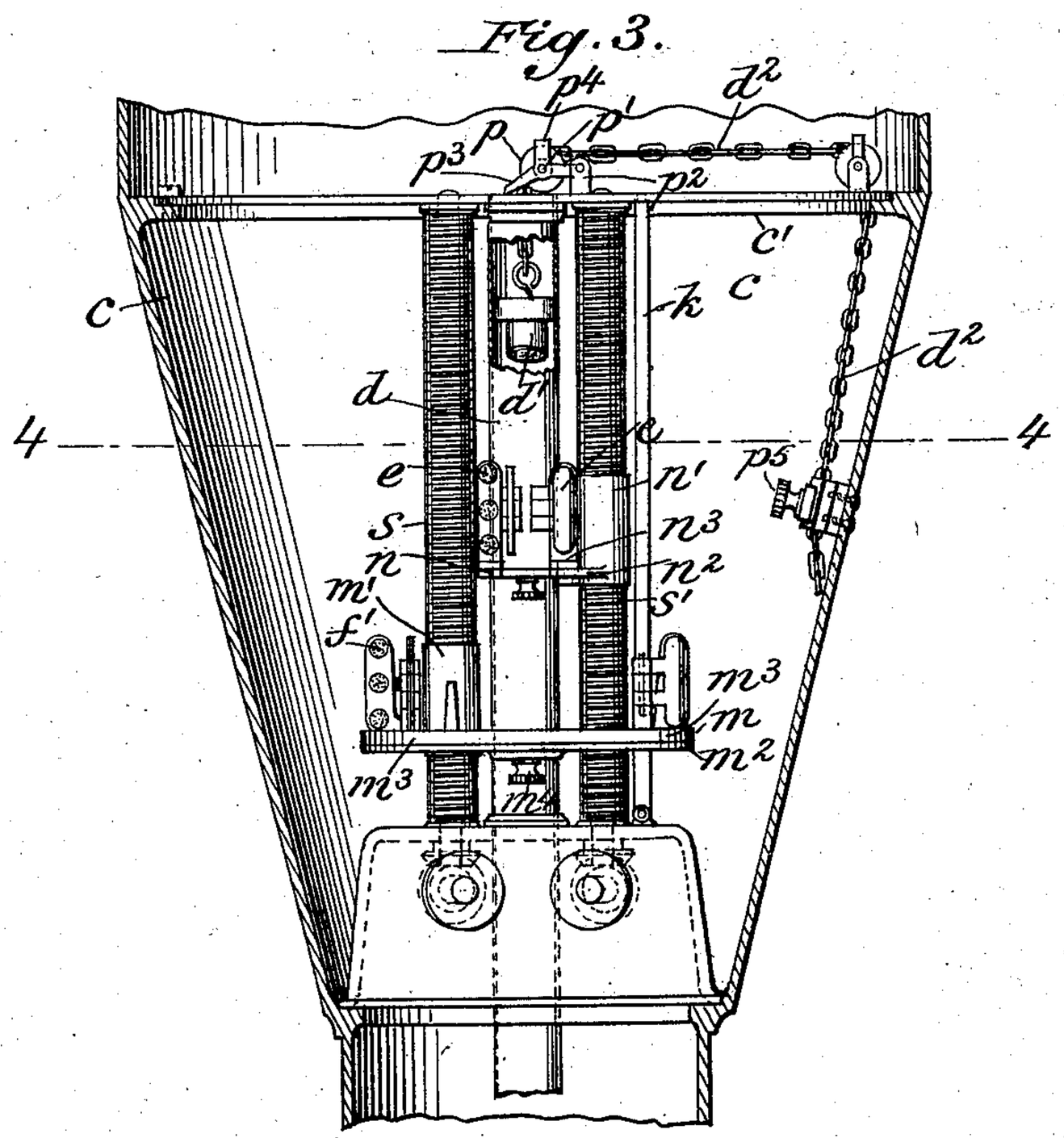
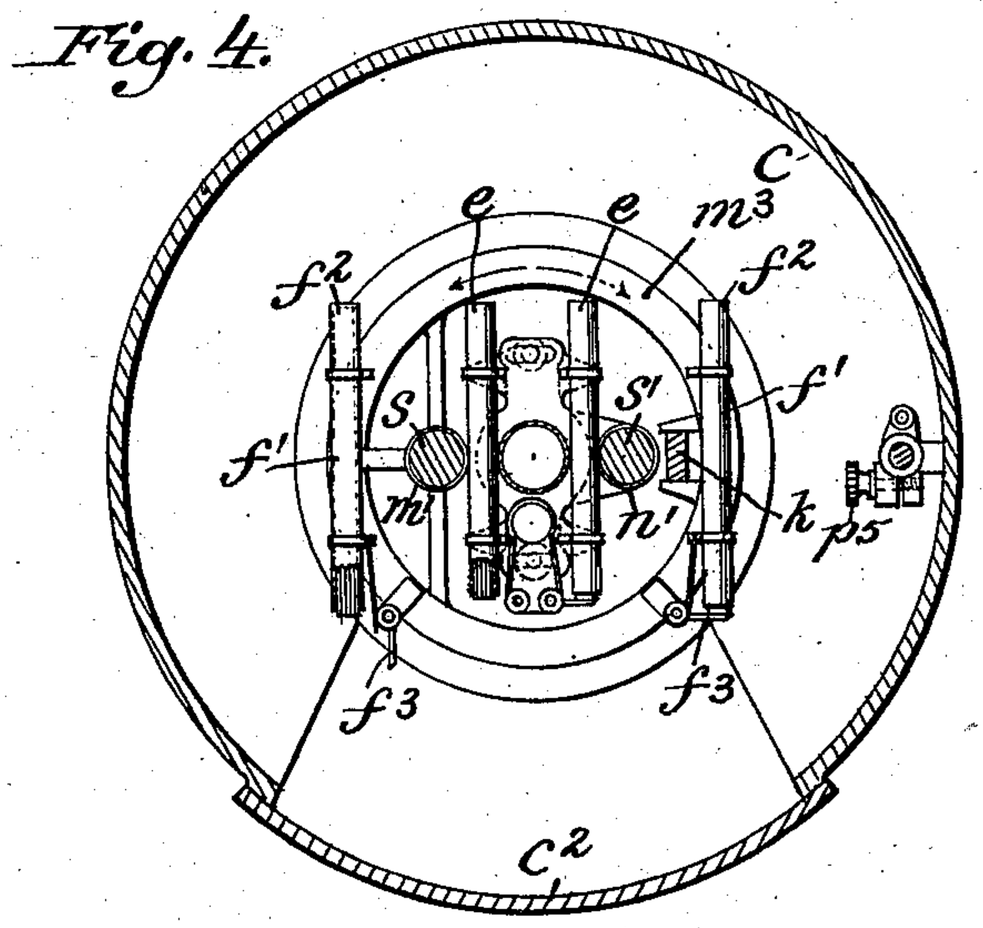


Fig. 4.



Witnesses

H. H. Schott

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UNITED STATES PATENT OFFICE.

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BINNACLE-COMPASS.

SPECIFICATION forming part of Letters Patent No. 701,927, dated June 10, 1902.

Application filed December 2, 1901. Serial No. 84,406. (No model.)

To all whom it may concern:

Be it known that I, JOHN PAOLI, a citizen of the United States, residing in the city of Hoboken, in the county of Hudson and State of New Jersey, have invented new and useful Improvements in Binnacle-Compasses, of which the following is a specification.

My invention relates to binnacle-compasses; and its novelty consists in the construction and adaptation of the magnet-chamber and its appurtenances, as will more fully hereinafter appear.

Heretofore in binnacle-compasses the correctional magnets have been placed upon trays within the magnet-chamber, which has been provided with an aperture only at or near the bottom, so that the removal or replacement of the magnets and their adjustment within the chamber has been a matter of difficulty and inconvenience. Likewise the heeling-magnet, which should be vertically adjustable along the central axis of the chamber, has been difficult to put into position and move on account of the fact that the chain from which it depends has been passed over fixed bearings above the tube in which it reciprocates, and taking it out has necessitated the removal of a considerable portion of the structure or of a number of its parts.

The object of my invention is to obviate the difficulties above recited, and this I do by the following means: I place the magnets within magnet-tubes, in which they are securely locked by simple means. The tubes are supported on frames which in turn are supported on trays. These trays are circumferentially adjustable and are mounted upon screws, whereby they may be moved vertically at the will of the operator by means of a milled head attached to a beveled gear which serves to actuate the screws. The milled head is reached by a convenient aperture in the side of the magnet-chamber. There is thus provided an internal and an external series of magnets, adapted to pass by each other, the perfect adjustment and detention of which after adjustment are secured. The heeling-magnet chain is hung in the center of the heeling-magnet tube and is caused to be passed over a pulley, the shaft of which is at one side of the axis of the tube. This shaft is supported on a bracket which is adapted to be oscillated in a bearing secured to the wall of the magnet-chamber. The bracket is composed of two pieces, each of which is provided with an ear or stop, so that its rotation beyond the plane of the top of the wall of the magnet-chamber is prevented.

In the drawings, Figure 1 is a central vertical section of a binnacle-compass magnet-chamber provided with my improved devices. Fig. 1ª is a detail view in cross-section through one of the magnet-trays, showing a suitable relative construction of the two parts thereof by which the magnet-carrying part may be adjusted circumferentially upon the other part and be held fixedly in its adjusted position. Fig. 2 is a top plan view and partial section of the same on the plane of the line 2 2 in Fig. 1. Fig. 3 is a central vertical section in a plane at right angles to the sectional plane of Fig. 1, and Fig. 4 is a top plan view and partial section on the plane of the line 4 4 in Fig. 3.

In the drawings, c is the magnet-chamber, of the usual inverted conical form and provided with an upper horizontal wall c' and a suitable lateral aperture closed with a door c^2. Placed vertically within this aperture are two screws s and s', rotating in suitable bearings and each actuated, preferably, by a handle h or milled head h', secured to the shaft h^2 of the bevel-gear h^3.

There are two magnet-trays, one, m, provided with a threaded sleeve m' and adapted to be moved vertically upon the screw s and the other, n, provided with a similar threaded sleeve n' and adapted to be moved vertically upon the screw s'. The tray m consists of two annular pieces—a bottom piece m^2 and an adjustable upper piece m^3, held within a flange upon the bottom piece m^2, upon which it is adapted to rotate, set-screws m^4 serving to keep these pieces in their positions after adjustment in spite of any ordinary means of displacement. Similarly the tray n consists of a bottom piece n^2 and an adjustable upper piece n^3. Fig. 1ª shows a suitable construction of the tray m by which its upper part may be adjusted circumferentially on its lower part, and the means for this purpose of the tray n may be similar to that of said tray

m, for which reason it is not deemed necessary to show both of said trays in detail. The invention is not restricted to the particular construction of tray shown in the drawings, as any suitable construction thereof capable of accomplishing the purpose stated may be employed without departing from the spirit of the invention. Upon the adjustable upper piece m^3 is mounted a frame f, adapted to carry three or more horizontally-placed hollow tubes f', which are permanently closed at one end f^2 and temporarily closed at the other end by means of a door f^3, Fig. 4, swung on a jack-knife hinge. These tubes contain the magnets, made of fine rods of suitable metal, and are mounted in two parallel series. Similarly upon the adjustable upper pieces n^3 is mounted a frame e, adapted to carry two parallel series of horizontally-placed hollow tubes permanently closed at one end and temporarily closed at the other and adapted to hold the magnets. The series of tubes mounted upon the tray n are closer to the center than those mounted upon the tray m, and as the trays are moved up and down they pass each other, the tray n passing through the aperture in the tray m provided for the purpose. The tray n is vertically guided by the walls of the heeling-magnet chamber. The tray m is similarly vertically guided by the upright rod k, which may, if deemed desirable, be graduated.

The rotation of the proper milled head will cause the corresponding rotation of either the screw s or the screw s' and the resulting elevation or depression of the tray m or n. The proper number of magnets having been put into position, they can thus be independently adjusted by the operator vertically and stopped at any desired point, said adjustments of the magnets and their trays being relative to each other and to the tube d, which contains the heeling-magnet. They can also be adjusted centrally by turning the trays until they are both opposite the door of the magnet-chamber, and the plates m^2 and m^3 or n^2 and n^3 can be put in the desired position by hand and fixed by the set-screws.

I believe I am the first who has devised any means whereby the magnet-trays within a magnet-chamber could be placed in the same horizontal plane. This adjustment has long been sought for, but until my present device has not been secured.

The heeling-magnet tube d passes centrally down through the axis of the chamber c. Within it is the heeling-magnet d', suspended from a chain d^2. This chain is adapted to pass over a pulley or sheave p, so that the axis of the chain coincides with the vertical axis of the chamber c. The pulley or sheave p is provided with a horizontal shaft p', supported in a bracket which is adapted to oscillate in a bearing p^2 in the upper wall c' of the magnet-chamber and are provided with stops p^3 and p^4, which prevent its oscillation in a downward direction farther than to such a position that the chain is in the proper place. The position of the chain at its outer end is fixed by a set-screw p^5. This device affords an easy access to the heeling-magnet and its tube, secures the proper position for the magnet when in place, and is simple and economical in construction.

I do not limit myself to this precise method of securing the chain in place. It will of course be understood that equivalent means—such as, for instance, winding the chain on a reel provided with a brake—may be employed without departing from the principle of my invention.

What I claim as new is—

1. In a binnacle-compass, the combination with a chamber, of a magnet-tray in said chamber composed of a plurality of parts one of which parts is mounted to be adjusted circumferentially on and relatively to another, a frame mounted on said adjustable part and provided with a plurality of tubes having means by which one end of each of the same may be opened and closed, magnets in said tubes, a threaded adjusting-rod extending through said tray, and means for adjusting said tray relatively to said rod, comprehending a sleeve carried by the tray and threaded upon said rod and an actuating means for said rod extending to an easily-accessible place.

2. In a binnacle-compass, the combination with a tube and a heeling-magnet therein, of a magnet-tray, composed of a plurality of parts of which one is mounted to be adjusted circumferentially with respect to another, magnets carried by said adjustable part and means for adjusting said tray and the latter magnets vertically, said adjusting means being independent of the tube of the heeling-magnet.

3. In a binnacle-compass, the combination with a tube and a heeling-magnet therein, of a magnet-tray; means for adjusting said tray relative to said tube, said adjusting means comprehending a threaded rod, means for rotating the same and a sleeve extending from the tray and threaded upon said rod; said tray being composed of a plurality of parts of which one is adjustable circumferentially relative to another; and magnets carried by the latter part.

4. In combination with a heeling-magnet, a suspending means therefor embracing chain-pulley mounted upon a rotatable bracket on the wall of the magnet-chamber, the bracket being provided with ears or stops whereby its rotation in a downward direction beyond a predetermined horizontal plane is prevented.

5. In a binnacle-compass, the combination of two magnet-carrying trays one of which has an opening into or through which the other may pass, and means for adjusting said magnet-carrying trays relative to each other.

6. In a binnacle-compass, the combination of two magnet-carrying trays each composed of two parts of which the magnet-carrying

part of each is adjustable circumferentially on its companion part, one of said trays having an opening into or through which the other tray may pass and means for adjusting said trays relative to each other.

7. In a binnacle-compass, a casing having an opening in its wall; two trays in said casing, each of which is composed of two parts of which one is adjustable circumferentially on the other and one of said trays having an opening into or through which the other tray may pass, magnets carried by the adjustable parts of the trays, devices for securing said adjustable parts in their adjusted positions on their companion parts of the respective trays, and means for adjusting said trays relative to each other.

8. In a binnacle-compass, a casing having an opening in its wall, two trays in said casing, each of which is composed of two parts of which one is adjustable circumferentially on the other, and one of said trays having an opening into or through which the other may pass, devices for securing said adjustable parts in their adjusted position on their companion parts of the trays, a frame mounted on said adjustable part of each tray and each provided with a plurality of tubes having means by which one end of each of the same may be opened and closed, magnets removably mounted in said tubes, and means for adjusting said trays relative to each other.

9. In a binnacle-compass, a casing having an opening in its wall, a tube in said casing, a heeling-magnet in said tube, two trays in said casing, each of which is composed of two parts of which one is adjustable circumferentially on the other and one of said trays having an opening into which the other tray may pass, devices for securing said adjustable parts in their adjusted position on their companion parts of the trays, magnets mounted on said adjustable parts of the trays, and means for adjusting said trays vertically relative to each other and to said tube.

10. In a binnacle-compass, a casing having an opening in its wall, a tube in said casing, a heeling-magnet in said tube, two trays in said casing each of which is composed of two parts of which one is adjustable circumferentially on the other, and one of said trays having an opening into which the other tray may pass, devices for securing said adjustable parts in their adjusted positions on their companion parts of the trays, a frame mounted on said adjustable part of each tray and each provided with a plurality of tubes having means by which one end of each of the same may be opened and closed, magnets removably mounted in said tubes, and means for adjusting said trays relative to each other and to the tube containing the heeling-magnet.

11. In a binnacle-compass, the combination with a casing having an opening, two trays mounted in said casing and each composed of two parts of which one is adjustable circumferentially on the other, one of said trays having an opening into which the other tray may be adjusted, magnets removably mounted on the adjustable part of each of said trays, devices for securing said adjustable parts in their adjusted positions on their companion parts of the trays, threaded adjusting-rods upon which said trays are sleeved, and means for rotating said rods to adjust said trays relative to each other on said rods.

12. In a binnacle-compass, a casing having an opening in its wall, a tube in said casing, a heeling-magnet in said tube, two trays in said casing, each composed of two parts of which one is adjustable circumferentially on the other, one of said trays having an opening into which the other tray may be adjusted, magnets removably mounted on the adjustable part of each of said trays, devices for securing said adjustable parts in their adjusted position on their companion parts of the trays, threaded adjusting-rods upon which said trays are sleeved, and means for rotating said threaded rods to thereby adjust said trays thereon relative to each other and to said tube.

13. A binnacle-compass having an internal and an external series of magnets mounted in its casing, each of said series of magnets being carried by a tray relatively constructed to permit one of the trays to pass the other in a vertical adjustment of said trays relative to each other, means for adjusting said trays vertically, and means by which each series of magnets may be adjusted horizontally on its tray and secured in its horizontal adjustment.

14. In a binnacle-compass, the combination of a casing, two series of magnets one of which series is mounted nearer the vertical axis of the casing than the other of said series, trays carrying said series of magnets, respectively, each of said trays having means by which it is adjusted vertically and one of said trays being constructed to permit the other to pass it in the relative vertical adjustment of the trays and series of magnets, each of said trays being composed of two parts of which the magnet-carrying part is adjustable circumferentially on the other, devices for securing said magnet-carrying parts in their adjustable positions on their companion parts of the trays.

15. In a binnacle-compass, the combination of a casing, a tube mounted in said casing, a heeling-magnet in said tube, a tray guided by said tube and adjustable thereon, a second tray having a means for guiding it and constructed to permit the first tray to pass it in a relative vertical adjustment thereof, each of said trays being composed of two parts of which one is adjustable circumferentially on the other and each tray having means for securing said adjustable part thereof in its adjusted position, a series of magnets carried by each of said circumferentially-adjustable parts, one of said series of magnets being mounted nearer the vertical axis of the casing than the other of said series, and means

for adjusting said trays relatively to each other and to said tube.

16. In a binnacle-compass, the combination of a casing having an opening and a door to close said opening, a tube mounted in said casing, a heeling-magnet in said tube, a tray guided by said tube and adjustable thereon, a second tray having a means for guiding it and constructed to permit the first tray to pass it in a relative vertical adjustment thereof, each of said trays being composed of two parts, of which one is adjustable circumferentially on the other and each tray having means for securing said adjustable part thereof in its adjusted position, a frame carried by each of said circumferentially-adjustable parts, each of said frames having a series of tubes provided with means for opening and closing one end of each of the same, the series of tubes of one of said frames being mounted nearer the vertical axis of the casing than the series of tubes on the other of said frames, magnets removably placed in said series of tubes, a threaded adjusting-rod for each of said trays, sleeves extending from said trays and threaded upon the respective adjusting-rods, and actuating devices for said adjusting-rods.

Witness my hand this 15th day of November, 1901, in the presence of two subscribing witnesses.

JOHN PAOLI.

Witnesses:
GEO. F. SEYMOUR,
LOUIS MESSINA.