F. M. LEAVITT.

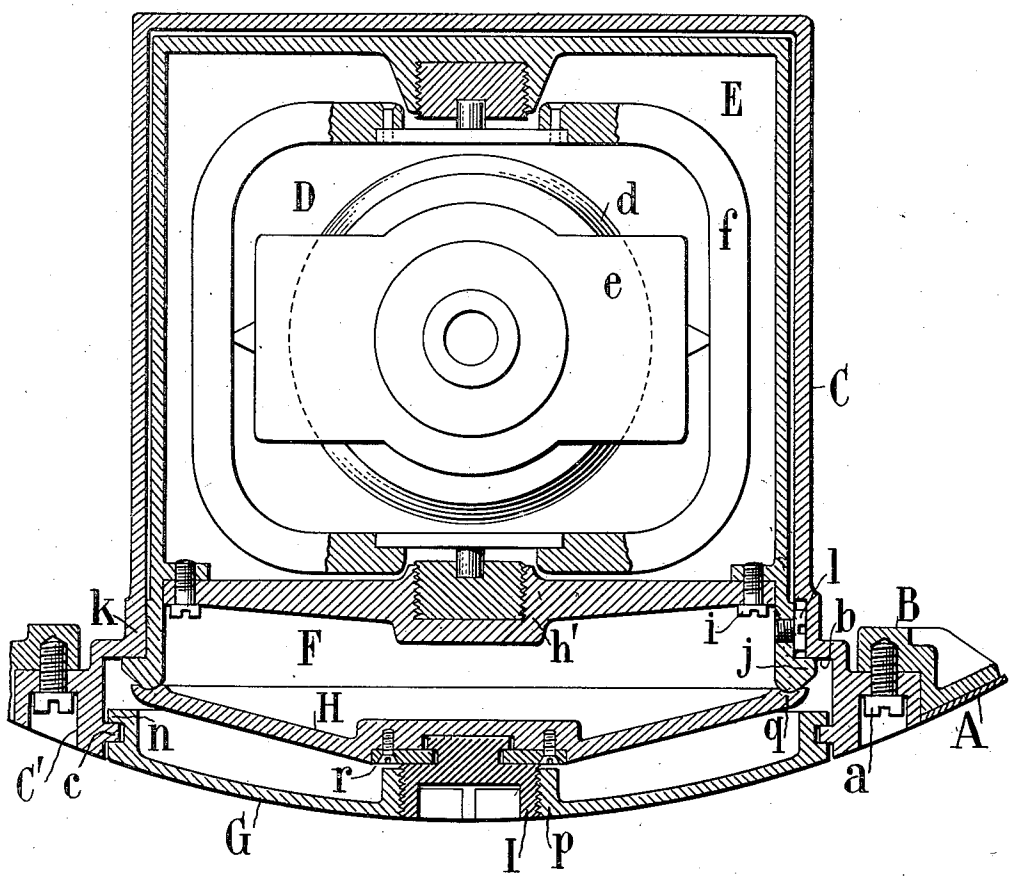
GYROSCOPIC STEERING GEAR.

APPLICATION FILED APR. 30, 1907.

925,709. **Patented June 22, 1909.**

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

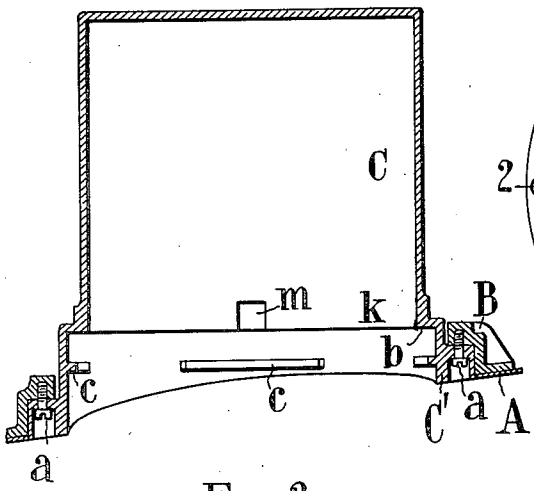


Fig. 5.

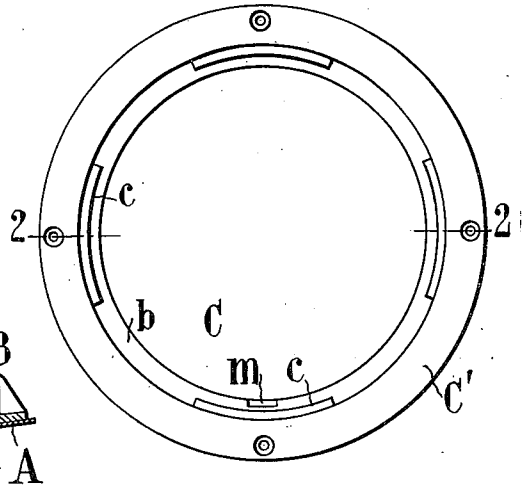


Fig. 3.

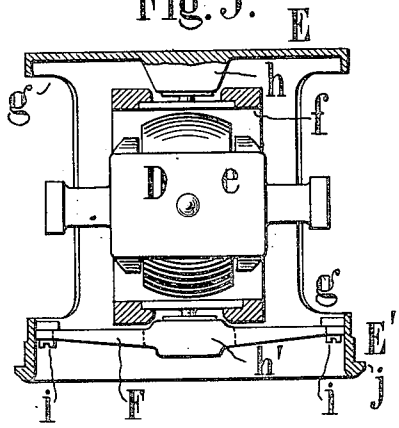


Fig. 6.

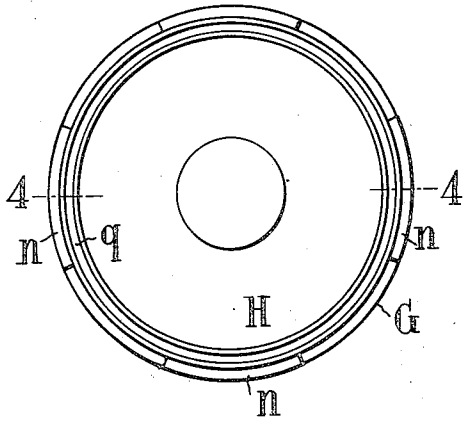
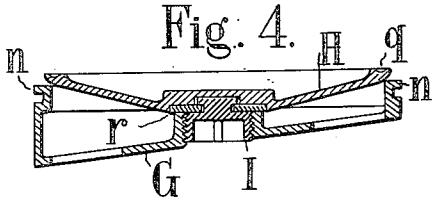


Fig. 4.



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UNITED STATES PATENT OFFICE.

FRANK M. LEAVITT, OF NEW YORK, N. Y., ASSIGNOR TO E. W. BLISS COMPANY, OF BROOKLYN, NEW YORK, A CORPORATION OF WEST VIRGINIA.

GYROSCOPIC STEERING-GEAR.

No. 925,709. Specification of Letters Patent. Patented June 22, 1909.

Application filed April 30, 1907. Serial No. 371,118.

To all whom it may concern:

Be it known that I, FRANK M. LEAVITT, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Gyroscopic Steering-Gear, of which the following is a specificaton.

This invention relates to gyroscopic steering gear for automobile torpedoes or the like.

The invention relates particularly to the means for carrying a housing for the gyroscope to facilitate its removal from the hull of the torpedo. To this end the hull is constructed with a box or casing fixed within it forming a chamber, the interior of which communicates through an opening with the exterior of the hull; the gyroscope is mounted in a supporting frame which fits within such box or casing; a hand-hole plate is provided for closing the said opening, and in connection therewith is a means for tightening the engagement between the gyroscope support and the inclosing box.

Figure 1 of the accompanying drawings is a vertical section of the assembled parts in a plane transverse to the axis of the torpedo, showing the gyroscope principally in elevation. Fig. 2 is a vertical longitudinal section showing the permanent box or casing with the gyroscope removed. Fig. 3 is a vertical section of the gyroscope support removed from the inclosing box or casing. Fig. 4 is a similar section of the hand-hole cover and tightening device. Fig. 5 is an inverted plan of the part shown in Fig. 2. Fig. 6 is a plan of the parts shown in Fig. 4.

Referring to the drawings, let A designate a part of the hull or shell of the automobile torpedo, submarine boat, or other vessel. This hull is formed with an opening in one side, for example, the under side as shown, around which opening is placed a ring B. Within the opening thus formed is inserted an inclosing box or casing C shown best in Fig. 2. This casing thus projects within the body of the torpedo, and is or may be imperforate and connected with the hull in a water-tight manner, so as to serve as a means for excluding water from the air spaces within the hull. The lower part of this casing C is formed as an annular frame C′ which fits within the ring B and is united to it by screws *a a*. The connection thus made is designed as a substantially permanent connection, the casing C not being intended to be removed in the ordinary use of the torpedo. The annular portion C′ is of larger diameter than the body of the casing C, thereby forming a ledge or shoulder *b*. The annular portion C′ has within it an intermittent rib or ribs *c c*.

The gyroscope D is mounted in a suitable support E, as shown in Fig. 3. The gyroscope may be of any known or suitable construction; as shown it comprises a fly-wheel *d*, an inner ring *e* and an outer ring *f*, the latter pivoted on a vertical axis in the support E. The support E is essentially cup-shaped, being shown, however, as cut away at *g g* on opposite sides for lightness and accessibility. Its closed top has a downward projection *h* for receiving the upper pivot of the ring *f*, the corresponding pivotal support *h′* of the lower pivot being formed as a central hub on a detachable head or spider F which is fastened in place by screws *i i*, engaging lugs in the support E. The lower part of the support is formed as an annular portion E′ having a flange *j*, the neck above this flange being adapted to fit within the lower portion *k* of the casing C, and the flange *j* being adapted to abut against the shoulder *b*, the parts being shown thus assembled in Fig. 1. To insure the proper location of the support E within the casing C, the support is formed with a projection *l* (Fig. 1) which enters a recess *m* (Figs. 2 and 5) in the portion *k* of the casing.

For closing the opening into the casing C a hand-hole cover G is provided which fits within the annular portion C′ and has ribs *n n* which engage the ribs *c c* after the manner of a bayonet joint, and thereby hold the hand-hole cover in place. To put it into place it is turned sufficiently to bring its ribs *n* into coincidence with the spaces between the ribs *c c*, so that the respective ribs can pass each other as the cover is lifted into place; it is then turned sufficiently to bring the respective ribs into coincidence. The cover G might be constructed to directly engage and uphold the support E; but it is preferable to provide separate means for this purpose whereby the parts may be tightened after the hand-hole cover is put in place. For this purpose a movable cover H is provided which is adapted to close the open end of the support E, making preferably a water-tight joint therewith; and means are pro-

vided for forcing this cover H up into tight connection with the bottom of the support. This tightening means consists preferably of a screw connection between the cover H and the cover G. This screw connection as shown consists of a screw plug I screwing into a socket *p* in the cover G and adapted at its upper portion to engage the cover H. Before applying the parts the plug I is screwed down. After the parts are in place the plug I is engaged by any suitable wrench or key, and screwed upwardly, thereby forcing up the cover H so that its peripheral portion engages the support E and pushes it up firmly into place. To facilitate the making of a tight joint the peripheral portion of the cover H is preferably grooved as shown as *q*. To prevent accidental separation of the parts it is preferable to swivel the plug I to the cover H, for which purpose the plug is formed with a neck which is entered by a divided disk *r*. It will be understood that the act of screwing up the plug I not only presses the cover H upwardly, but to an equal extent presses the cover G downwardly, thereby tightening the connection between the ribs *n* and *c* and preventing accidental rotative displacement of the cover G.

To remove the gyroscope it is only necessary to apply a key to the plug I, unscrewing it a turn or two, sufficient to slacken the parts, then to turn the cover G sufficiently to clear the respective ribs, whereupon the covers G and H may be removed downwardly; the support E will either come out with them by gravity, or may be drawn out subsequently. In replacing the parts it is impossible to wrongly connect them. The operations of removal and replacement are performed very quickly and conveniently.

What I claim is:—

1. The combination with the shell or hull of a torpedo having an opening, of a hollow casing fixed therein with its interior chamber communicating with said opening, a gyroscope, and its support, adapted to enter said chamber, and a separate cover adapted to close said opening.

2. The combination with the shell or hull of a torpedo having an opening, of a hollow casing fixed therein with its interior chamber communicating with said opening, a gyroscope, a cup-shaped support therefor fitting into said chamber, means for fastening said support in place and a separate cover for closing said opening.

3. The combination with the shell or hull of a torpedo having an opening, a gyroscope, and a cup-shaped support therefor fitting into said opening, with its open side coinciding therewith, means for fastening said support in place and a separable cover for closing said opening.

4. The combination with the shell or hull of a torpedo having an opening, a hollow casing fixed therein with its interior chamber communicating with said opening, a gyroscope and its support, adapted to enter said chamber, a separable hand-hole cover for closing said opening, and means for fastening said support in place.

5. The combination with the shell or hull of a torpedo having an opening, a casing fixed therein with its interior chamber communicating with said opening, a gyroscope, and its support adapted to enter said chamber, a hand-hole cover for closing said opening, a movable part for holding said support in place, and a screw-connection between it and the hand-hole cover.

6. The combination with the shell or hull of a torpedo having an opening, a frame encircling said opening, a gyroscope and its support entering through said opening, a cover closing said opening, and a screw reacting against said cover to press said support into place.

7. The combination with the shell or hull of a torpedo having an opening, a frame encircling said opening, a gyroscope and its support entering through said opening, a cover closing against the support, and tightening means for pressing said cover to place reacting against said frame.

8. The combination with the shell or hull of a torpedo having an opening, a frame encircling said opening, a gyroscope support entering through said opening and having an annular portion fitting said frame, a cover closing said opening and a cover closing against the support to make a tight connection therewith.

9. The combination with the shell or hull of a torpedo having an opening, a frame encircling said opening, a gyroscope support entering through said opening and having an annular portion fitting said frame, a projection on the one part and an engaging recess in the other adapted to determine the position of the support, and means for fastening the support in place.

10. The combination with the shell or hull of a torpedo having an opening, a frame encircling said opening, a gyroscope and its support entering through said opening, a cover closing said opening having lugs engaging the encircling frame, a cover closing against the support, and a tightening screw engaging one cover and reacting against the other.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

FRANK M. LEAVITT.

Witnesses:
C. S. SNIFFEN,
B. W. STONE.