(No Model.) 2 Sheets—Sheet 1.

W. D. STIVERS.

TURRET JOINT FOR NAVAL VESSELS.

No. 602,374. Patented Apr. 12, 1898.

Fig. 1.

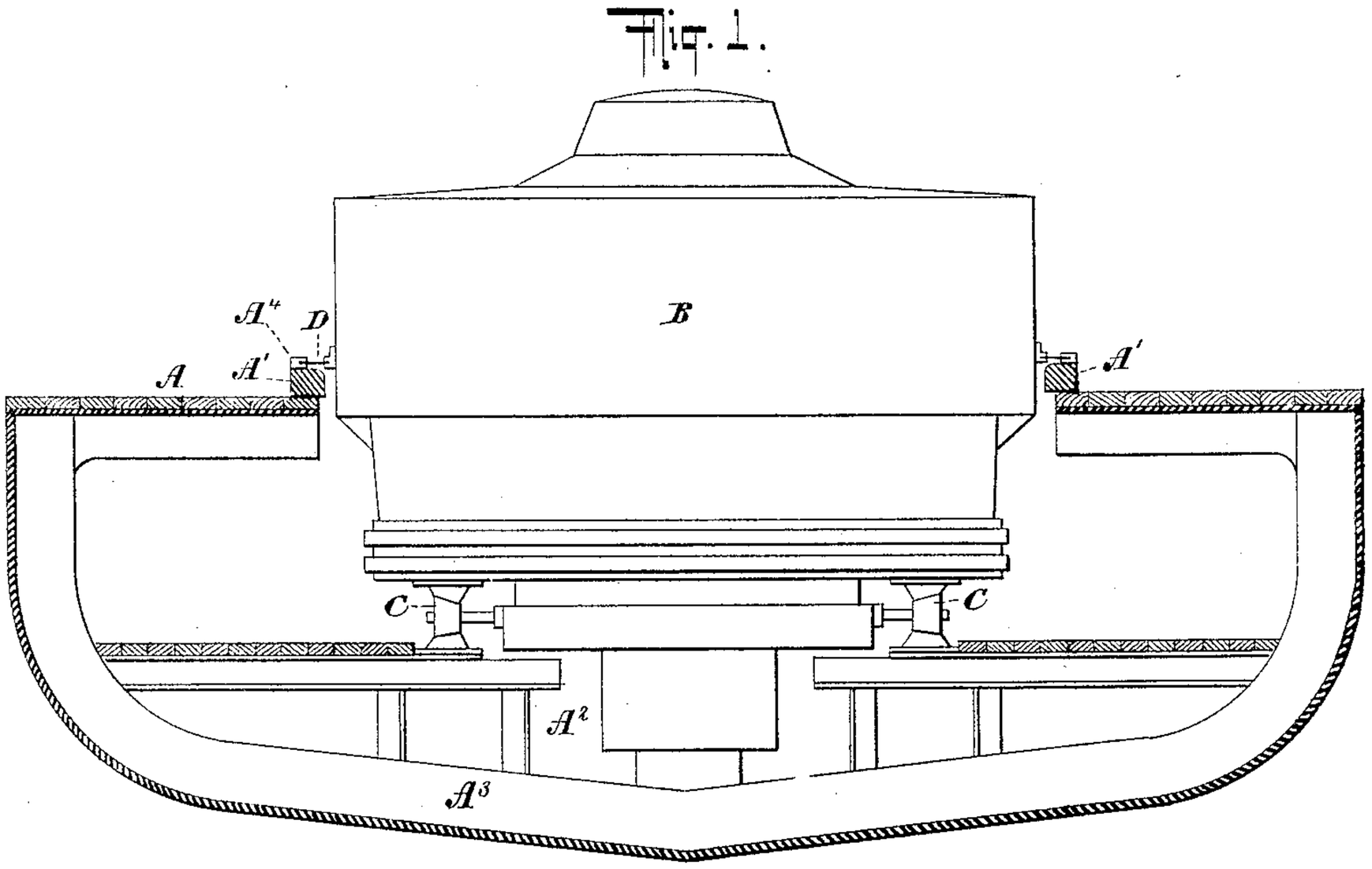

Fig. 2.

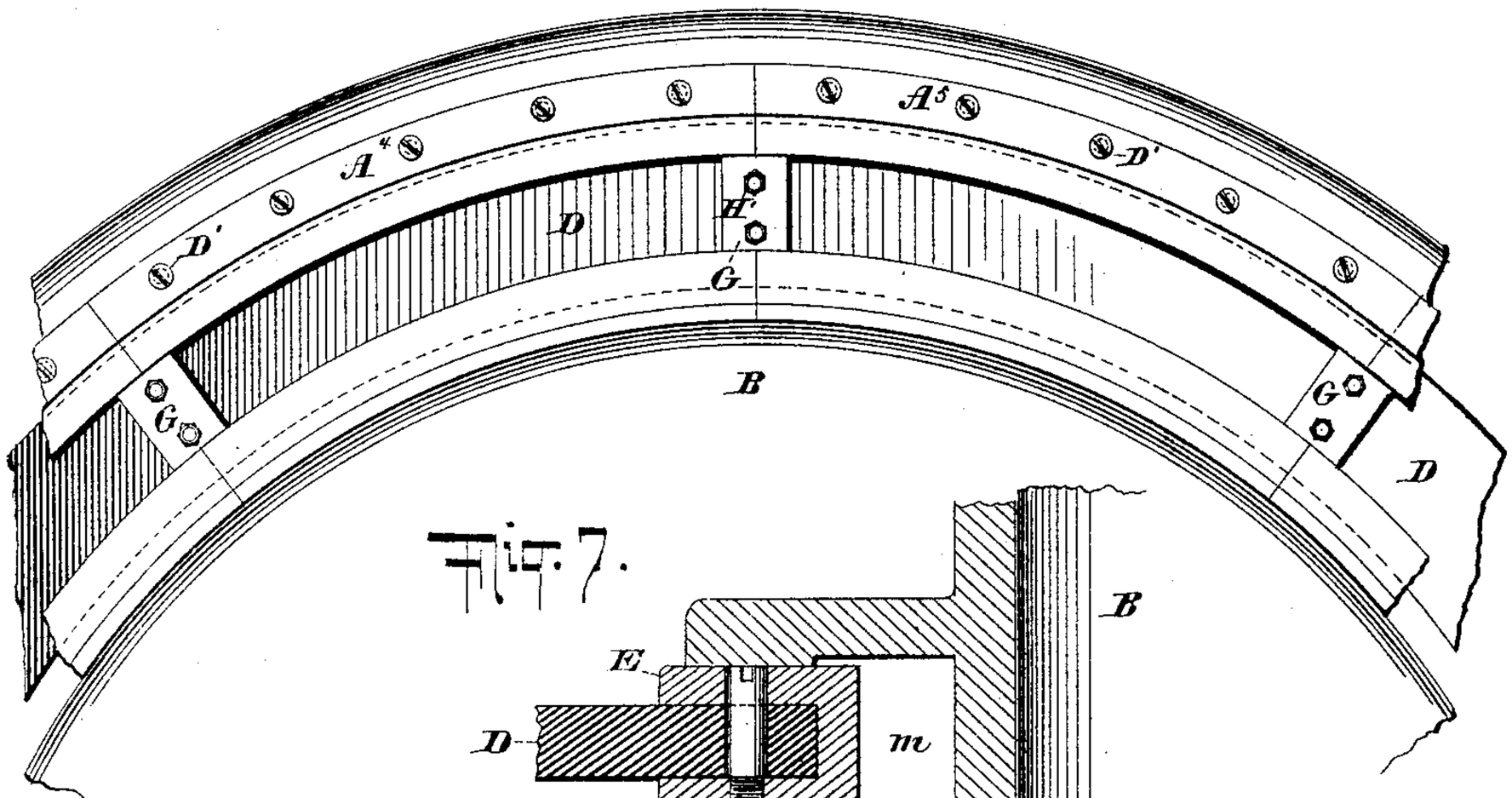

Fig. 7.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

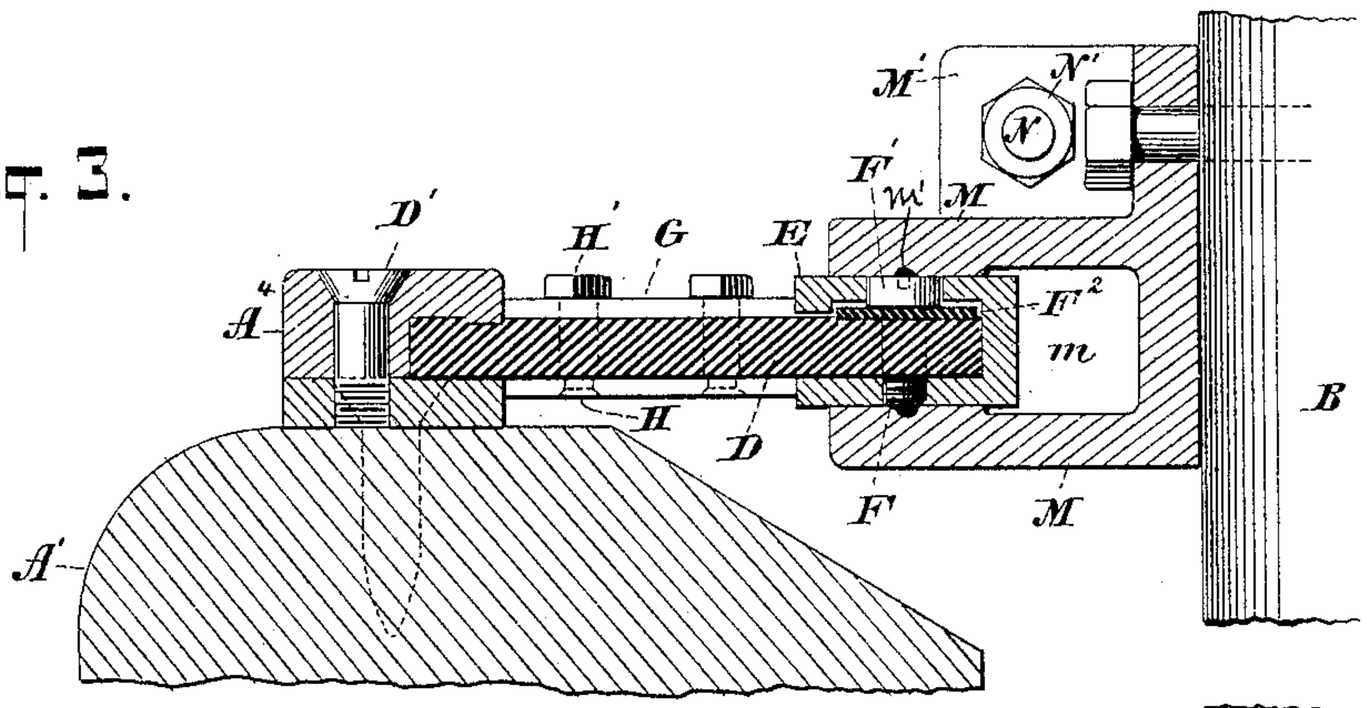


Fig. 4.

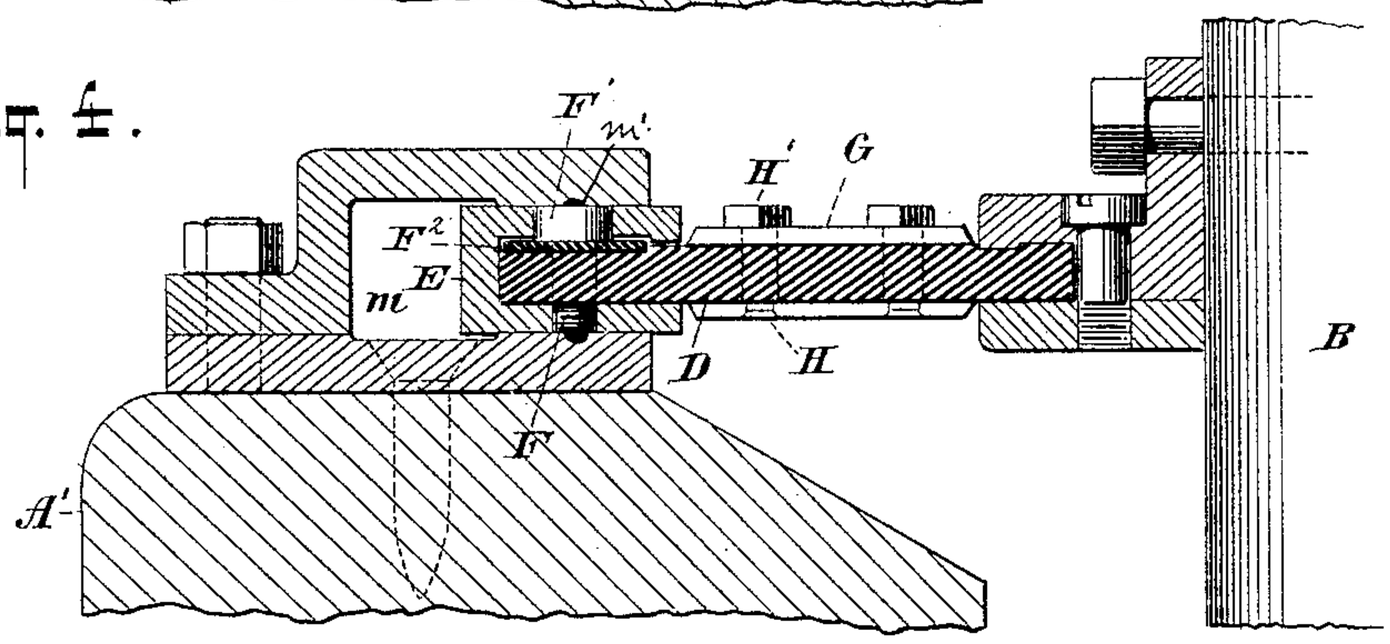


Fig. 5.

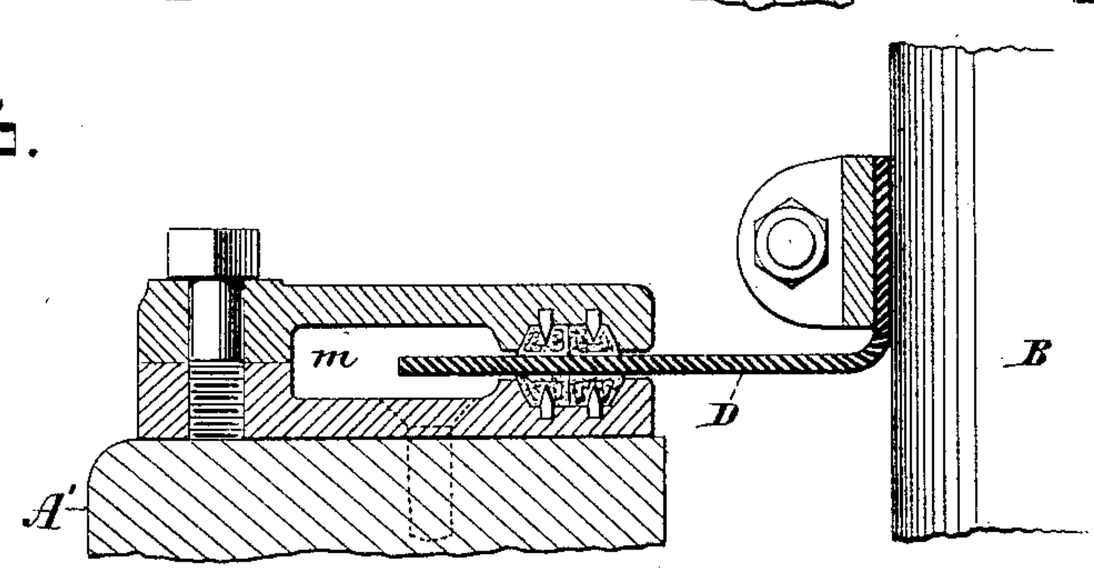
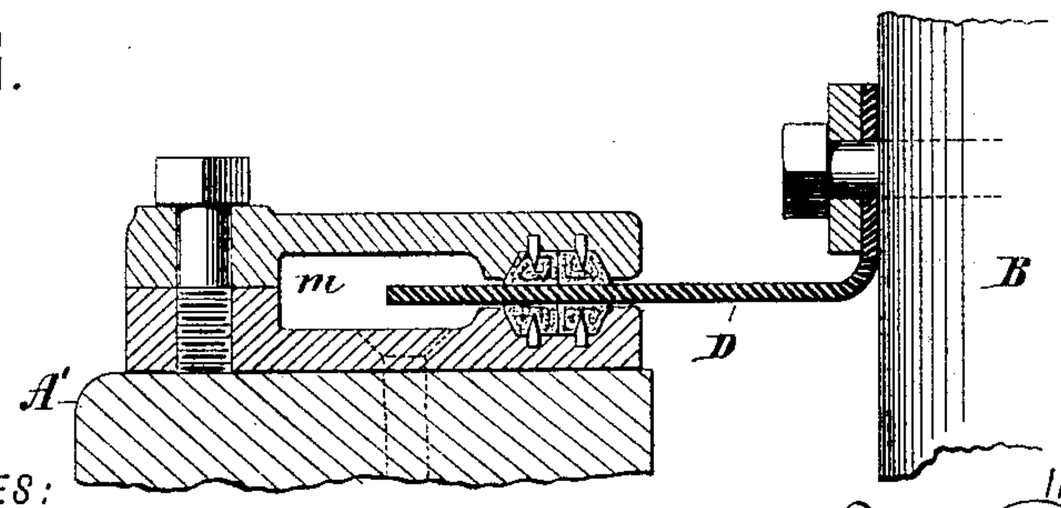


Fig. 6.



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WILLIAM DURELL STIVERS, OF JERSEY CITY, NEW JERSEY.

TURRET-JOINT FOR NAVAL VESSELS.

SPECIFICATION forming part of Letters Patent No. 602,374, dated April 12, 1898.

Application filed June 4, 1896. Renewed March 15, 1898. Serial No. 673,981. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM DURELL STIVERS, a citizen of the United States, residing in Jersey City, in the county of Hudson and State of New Jersey, have invented a certain new and useful Improvement in the Construction of Turret-Joints for Naval Vessels, of which the following is a specification.

It is necessary in the construction of war vessels having revolving turrets to allow a considerable space between the exterior of the turret and the adjacent edge of the deck. This is done to prevent the turret from being jammed in any position due to a slight deformation of the turret or ship from the effects of shot or to any irregularities in first construction or springing of the ship, turret, or supports from the strain in a seaway. It is especially important in providing for displacement of the turret induced by the severe strain imposed by the recoil produced by the firing of the guns with heavy projectiles. It is common to allow a few inches of opening around the turret. The low free-board of many vessels of this type exposes them to the frequent washing of the seas across the deck, and it is necessary before venturing to sea to batten the joints with canvas or other yielding material secured to the deck and to the turret by detachable fasteners. It is obviously impracticable to revolve the turret under such conditions, and there is no way by which such provision for keeping out the water at sea can be removed without much labor and loss of time. If such battening is left to lie loosely on the deck, it is liable to be lifted by the seas and to admit much water, with possibly serious results. It has been considered impracticable to work the guns of any vessel of the monitor class at sea.

My invention by excluding the water without interfering with rotation of the turret will allow the efficient use of the latter under any condition of wind and wave. I employ a diaphragm which extends outward from the turret and is received in a corresponding but deeper circular recess provided in the deck, or the diaphragm may be held firmly to the deck, and the inner edge may be received in the corresponding but deeper circular recess on the exterior of the turret. With either form the turret may be revolved with only the slightly-increased resistance due to the friction of the diaphragm in the recess, and the recess being made sufficiently deep in a horizontal direction the horizontal motion of the turret and of the deck relatively to each other is perfectly allowed for by the sliding of the diaphragm horizontally inward and outward in the recess. By making the diaphragm of an elastic material I also allow for the slight vertical movement of the parts.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a cross-section of the parts, with an outline of the adjacent parts of the cross-section of a ship of the low-free-board or monitor class. Fig. 2 is a partial plan view. Fig. 3 is a vertical section of a portion on a much larger scale. Figs. 4 to 7, inclusive, are enlarged vertical sections through the joint proper and illustrating modifications.

Similar letters of reference indicate corresponding parts in all the figures where they appear.

A is the deck of a ship of the monitor class, and A′ the ordinary coaming close to the edge of the hole or "well" for the turret.

B is the turret, mounted in any ordinary manner on a stout supporting-frame A^2, planted firmly on the keelsons A^3 and provided with the ordinary conical rollers C, which allow the turret to be revolved to any required extent at will. The operating mechanism of the ordinary character need not be described.

A^4 and A^5 are segments, of composition or other suitable strong material, secured on the coaming by stout bolts and holding tightly between them the outer edge of the diaphragm D, which extends inward toward the turret in a substantially horizontal direction. This diaphragm may be made in segments, each of such length that twenty-four or some other number will complete the circuit around the turret. The segments may be of pure gum, rubber, or of a compound of which rubber or other elastic waterproof material forms a part. The edges may be either butted, scarfed, or tongued-and-grooved and matched. I propose in some cases to unite the segments per-

manently by the use of rubber cement. The outer edge of this diaphragm D and the confining segments A^4 and A^5 are secured to the deck and its attachments by the aid of bolts D′. The inner edge of the diaphragm is peculiarly equipped as follows:

E is a shoe adapted to receive the inner edge of the elastic diaphragm. Its upper and lower faces are smoothly finished and exactly parallel. This portion of the mechanism (the shoe) may, like the diaphragm which it is to protect, be formed in segments and scarfed together or otherwise conveniently united, so as to form, in effect, a continuous ring of metal extending around the turret B. Bolts F, applied in the position indicated in Fig. 3, engage the shoe reliably with the inner edge of the diaphragm. The head of the screw F′ is of considerable area and is received in a corresponding hole on the upper face of the shoe, being sunk flush, or a little lower than flush, with the upper face of the shoe. The screw-head presses on the rubber through the medium of a bearing-plate F^2.

G G are strips of metal extending radially across the exposed portion of the diaphragm and covering and clamping the joints therein. They are held together by bolts H and nuts H′. These parts are so thin that when the motion of the turret and of the deck relatively to each other requires it they may move inward and outward within the deep groove in the segments, which are carried on the turret and which I will now describe.

M M are segments, of brass or other suitable material, with their inner faces hollowed and fitted to the smooth round surface of the turret. M′ are lugs formed thereon, (see Fig. 3,) arranged to be bound tightly together by bolts N and nuts N′. These parts are fitted together with a little space between each segment and the next, and the nuts are set up with great force, so as to draw the ends of the segments M together and to hold them reliably in place hoopwise on the turret.

A deep recess *m* is formed in the middle height of the segments M, and the upper and lower faces are smoothly finished exactly parallel. This recess *m* is of a little greater height than the thickness of the shoe E, so that the latter may be received therein and may move around and move outward and inward with freedom, and as the parts are fitted with a system of lubrication with heavy grease it will be seen that under such conditions no water will be received through the joint however deeply the seas may wash over the deck and immerse this portion of the structure.

As the turret is revolved, the segments M, which fit together so as to form a continuous double ring around the turret, receive the shoe, and consequently the inner edge of the diaphragm D, and maintain a tight contact therewith in all positions. The revolving of the turret may be effected in all respects in the ordinary manner the same as if my invention were not applied.

In all positions the turret is free to yield laterally to the fullest extent ever required in practice, the shoe on the adjacent portion of the diaphragm being received deeper into the recess *m* or being drawn partially out of such recess, according as the springing of the ship and of the supports of the turret due to the recoil produced by the firing of the guns or to other cause in one direction or the other shall require. The small vertical motion of these parts relatively to each other is accommodated by the elastic bending of the diaphragm downward or upward, as required.

To facilitate lubrication, I provide a groove *m*′, extending around in the upper face of the recess *m*, and a similar groove extending around on the lower face. Oil being admitted to these grooves through an ordinary oil-hole (not shown) at one point in each will travel around and lubricate the whole of the bearing-surfaces.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. Parts of the invention can be used without the whole. I can drill and tap holes in the turret and bolt the segments M upon the turret instead of holding them hoopwise, as above described. I can attach the diaphragm rigidily to the segments of the turret and allow the diaphragm to slide in a suitable double ring supported on the deck. Fig. 4 shows such a modification.

Instead of using rubber for the diaphragm and protecting its rubbing-surface by a metallic shoe, as described, I can make the diaphragm entirely of metal, selecting hard brass or other suitable elastic metal.

I propose that all the metal-work in and connected with my invention shall be brass or copper.

It is important that the diaphragm be sufficiently thick and strong to receive all the ordinary and extraordinary strains to which it is exposed in practice.

I can provide packing in the double ring, in which the diaphragm slides. Fig. 5 shows such a modification with the segments which hold the diaphragm to the turret arranged to embrace the same hoopwise, like Fig. 3. Fig. 6 shows the same adapted to hold the segments and also the diaphragm to the turret by bolts, like Fig. 4.

Although I have described the invention as applied to "large turrets," ordinarily so called, it will serve also for those turrets that are set in barbettes. I use the term "deck" to apply also to the base of a barbette.

I claim as my invention—

1. In a war vessel having a turret arranged to turn horizontally, a diaphragm extending across the otherwise open space between it and the deck and held loosely between horizontal faces above and below on one of the parts so that such diaphragm bridges the space and is securely defended against displacement downward or upward, while allowing

both a revolving and a bodily horizontal movement and maintaining a water-tight joint, as herein specified.

2. In a war vessel having a turret arranged to turn horizontally, a diaphragm extending across the otherwise open space between it and the deck and held loosely between horizontal faces above and below on one of the parts so that such diaphragm bridges the space and is securely defended against displacement downward or upward, which allows both a revolving and a bodily horizontal movement, with provisions for the parts to also yield vertically, all combined and arranged for joint operation, and maintaining a water-tight joint, substantially as herein specified.

3. In a war vessel having a turret arranged to turn horizontally, an annular diaphragm comprising a body D of rubber or analogous elastic waterproof material, and a metal shoe E fixed on the edge thereof and having its upper and lower faces plane and parallel, in combination with rigid parts A^4, A^5, fitting loosely to such faces both above and below, all arranged to serve substantially as herein specified.

4. In a war vessel having a turret arranged to turn horizontally, a series of segments M and bolts N, properly formed to fit together and apply around and tightly embrace the turret so as to hold reliably, and a diaphragm D connecting such segments with the deck of the ship and maintain a water-tight joint with liberty for the turret to turn and to move bodily, all substantially as herein specified.

5. In a war vessel, having a turret arranged to turn horizontally, an annular diaphragm comprising a body D of rubber or analogous elastic waterproof material made in segments firmly united, one edge of such diaphragm being faced above and below and received loosely between parallel annular parts so that the turret may revolve and be moved bodily horizontally by the sliding of such parts, and that liberty is afforded by the elasticity of the diaphragm for vertical movements relatively to each other and a water-tight joint be maintained, all substantially as herein specified.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

WILLIAM DURELL STIVERS.

Witnesses:
J. B. CLANTICE,
M. F. BOYLE.