

No. 636,488.

Patented Nov. 7, 1899.

GIACOMO CATANZANO & GEROLAMO CATANZANO.

PROPELLER.

(No Model.)

(Application filed July 14, 1899.)

2 Sheets—Sheet 1.

Fig. 1.

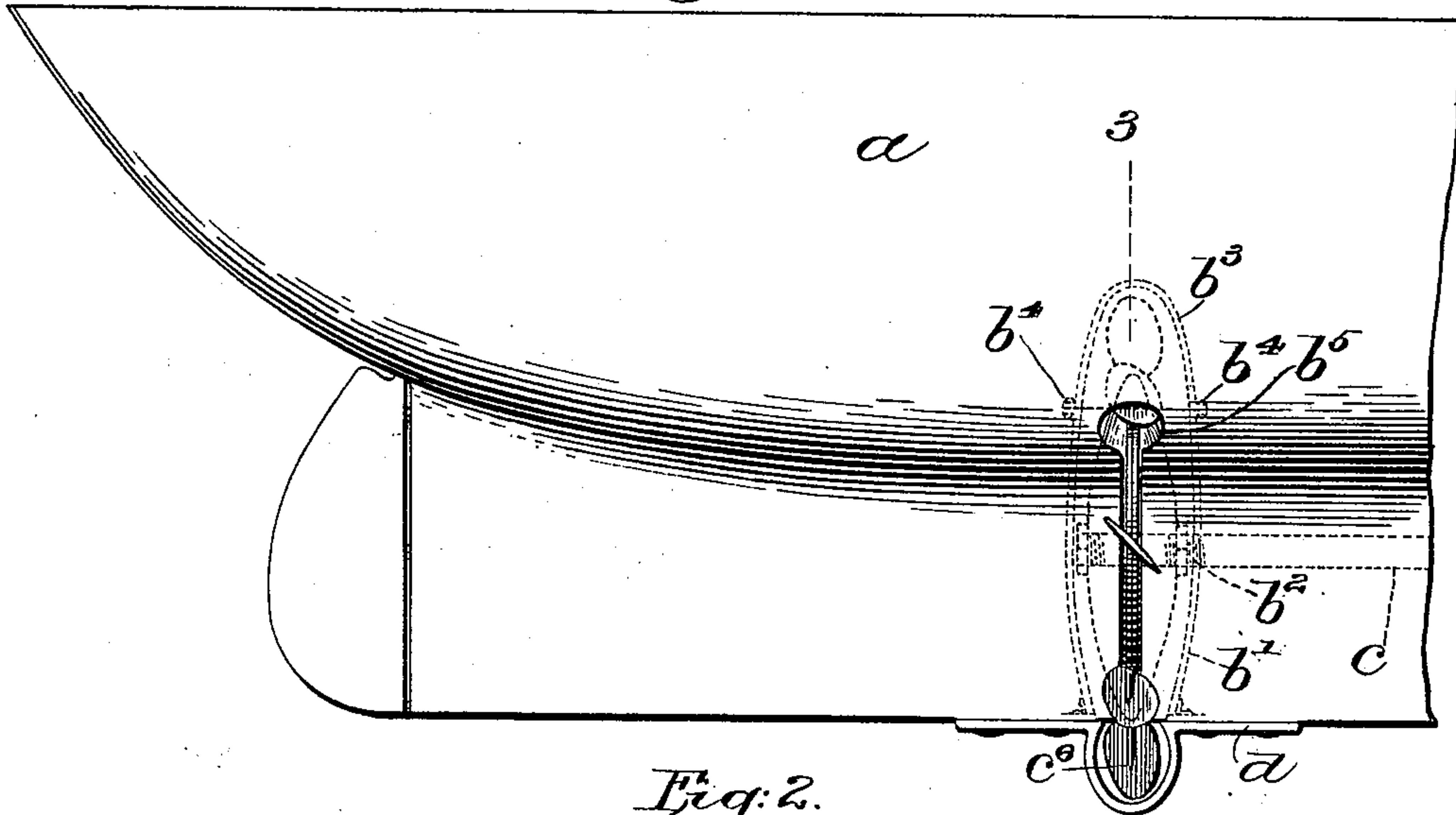


Fig. 2.

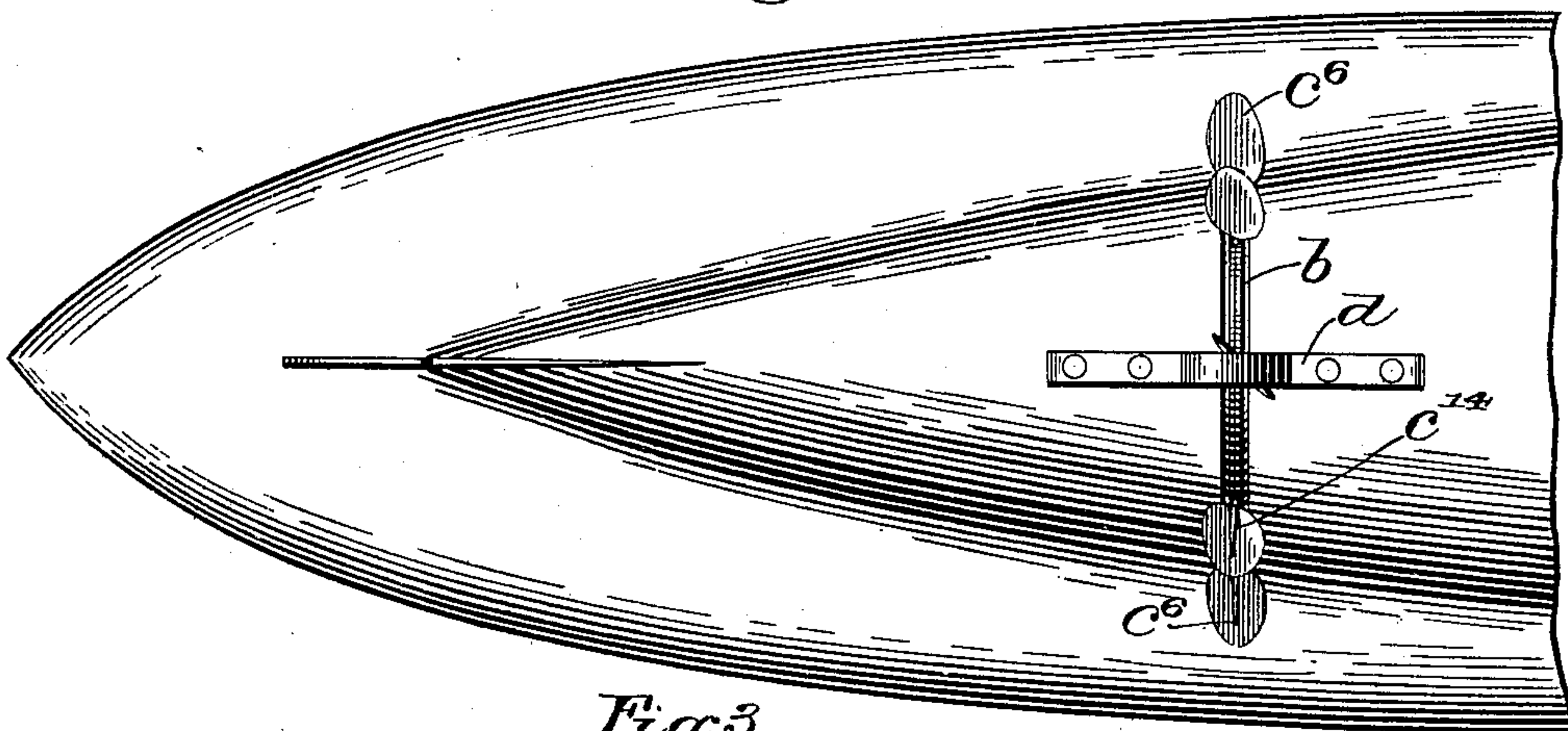
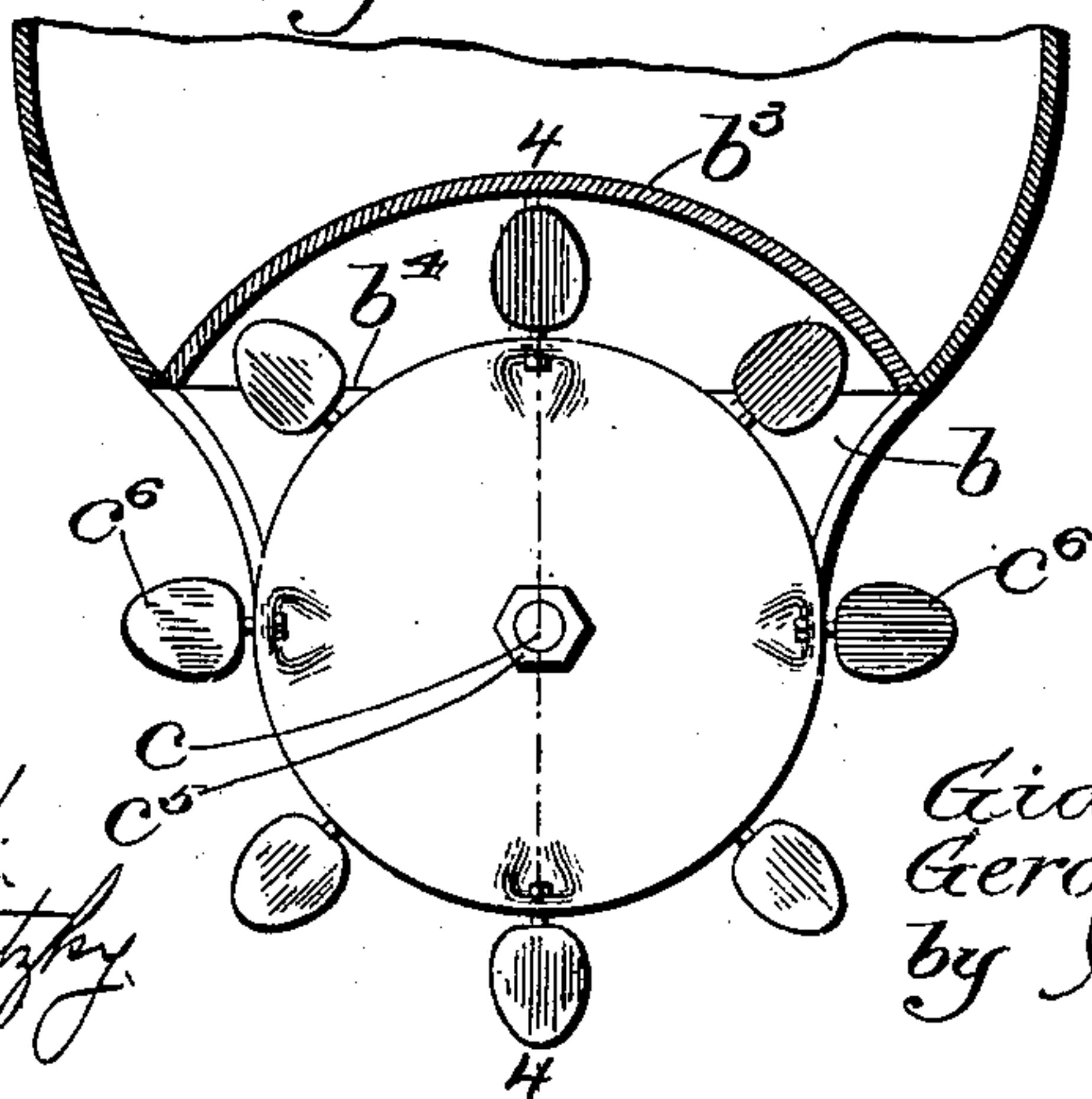


Fig. 3.



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Fig. 4.

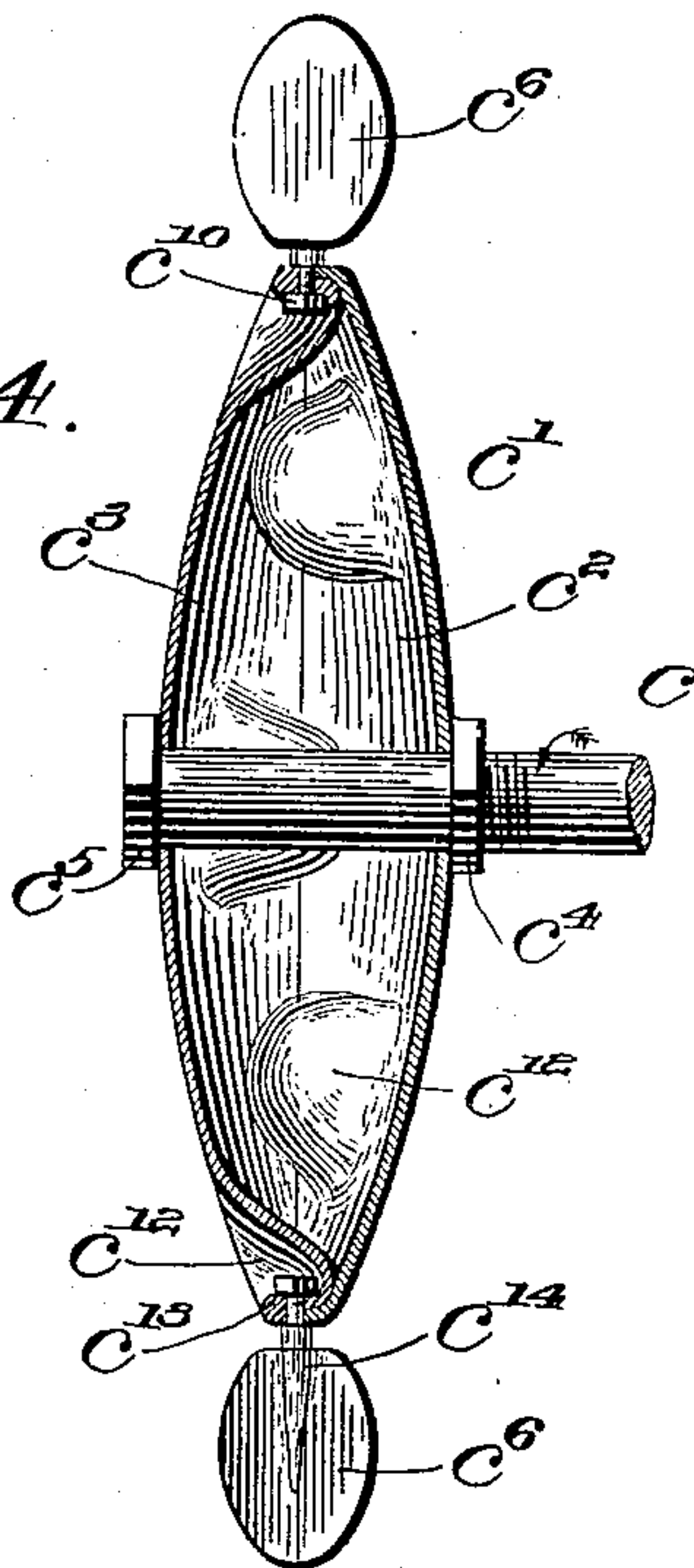
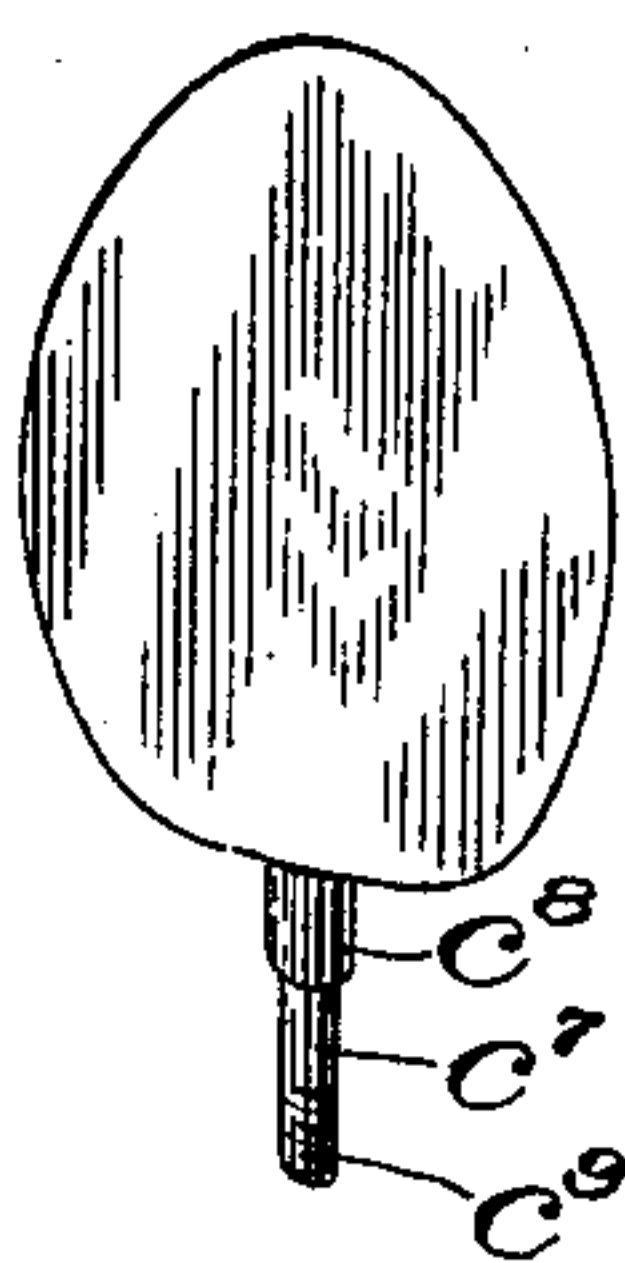


Fig. 5



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UNITED STATES PATENT OFFICE.

GIACOMO CATANZANO AND GEROLAMO CATANZANO, OF NEWTON,
MASSACHUSETTS.

PROPELLER.

SPECIFICATION forming part of Letters Patent No. 636,488, dated November 7, 1899.

Application filed July 14, 1899. Serial No. 723,767. (No model.)

To all whom it may concern:

Be it known that we, GIACOMO CATANZANO, a subject of the King of Italy, and GEROLAMO CATANZANO, a citizen of the United States, both residing at West Newton, county of Middlesex, State of Massachusetts, have invented an Improvement in Propellers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

Our invention is an improvement in the propelling apparatus of vessels, and is particularly adapted for and intended to be applied to torpedo-boats.

As is well known, vessels provided with screw-propellers are frequently and greatly endangered by the vessel rolling or plunging to such an extent as to lift the propeller from the water, and under such conditions if the propeller is running at full speed it is very likely to twist or break the propeller-shaft or injure the engine, due to the suddenly-decreased resistance offered by the propeller because of its free running out of the water.

Accordingly we have invented a propeller or propelling apparatus which will always maintain the propelling-wheel under water and in the use of which there can be no danger whatever in the respects mentioned above and which can be run at full speed in bad weather.

Our invention provides means whereby any of the propelling-blades which may become broken may be renewed or repaired in mid-ocean without any inconvenience, and by our invention the whole propeller, if desired, may be removed in mid-ocean.

The details of our invention will appear more fully in the course of the following description, reference being had to the accompanying drawings, in which we have shown a preferred embodiment of our invention, and the invention will be more particularly defined in the appended claims.

In the drawings, Figure 1 shows in side elevation the rear part of a vessel provided with our invention. Fig. 2 is a bottom plan view thereof. Fig. 3 is a vertical cross-section on the line 3, Fig. 1. Fig. 4 is an enlarged vertical transverse section taken on the

line 4, Fig. 3. Fig. 5 is an enlarged detail of one of the propelling-blades.

The body or hull *a* of the vessel may be of any desired or preferred construction, being herein shown as of the type commonly employed in naval gunboats.

In carrying out our invention the bottom of the vessel adjacent the stern is provided with a slit or transverse recess *b*, extending part way up the sides, as clearly shown in Figs. 1 and 3, said recess being open to the outside water and provided on the interior of the vessel with a housing *b'*, (indicated in dotted lines in Fig. 1,) said housing being securely fastened at its edges to the inside of the hull of the vessel and packed against the entrance of water and provided at its forward side with a journal-opening *b²*, through which the propeller-shaft *c* enters. The upper portion *b³* of the housing *b'* is made removable, as indicated at *b⁴*, the means therefor being herein shown as opposite flanges bolted together; but it will be understood that we are not limited in any way to this construction, inasmuch as the top of the housing may be hinged or secured in any other manner desired, the object thereof being to provide convenient means for gaining access to the propeller for the purpose of repairing or inspecting the same, as may be required.

On the inner end of the propeller-shaft *c* is secured the propeller *c'*, said propeller being shown in enlarged cross-section in Fig. 4 and in end elevation in Fig. 3, where it will be seen that it comprises in the preferred form, as herein shown, two opposite plates or shells *c² c³*, which are respectively concave on their inner sides or dish-like in shape and turned with their concavities toward each other, as clearly shown in Fig. 4. These two shells, which constitute the frame or body of the propeller, are secured together and held firmly on the propeller-shaft by opposite flanges, nuts, or other securing means *c⁴ c⁵* and carry at their periphery a plurality of propeller-blades *c⁶*, said blades being in number and size such as are demanded according to the vessel's requirements. These blades are somewhat fan shape, being slightly longer than they are wide, as shown in Fig. 5, and each has a stem *c⁷* and a shoulder *c⁸*, the end of the

stem being threaded at c^9 to receive a nut or other retaining means c^{10} .

In the preferred manner of construction of our propeller we provide the shells or plates $c^2 c^3$ with depressions or cavities c^{12} , alternating in the respective shells, as clearly shown in Fig. 4, so that each propeller-blade is held on the overhanging periphery c^{13} and the securing means c^{10} is contained within the cavity c^{12} . This construction gives rigid support and great strength to the propeller, and also the cavities not only serve as pockets to contain the securing means of the blades, so that the latter may be easily and quickly removed, but they also act as strengthening-flanges.

The opening b is enlarged at its upper end, as indicated at b^5 , to permit of the passage of the propeller-blades.

A plate or heavy strap d is secured along the keel as a protector to the propeller-blades against catching on a snag or obstruction.

Viewing Fig. 3, it will be seen that the keel or lower part of the hull of the vessel is so shaped that the propeller-blades project into the water for the greater portion of the cycle of their movement. From this it will readily be understood that because of the relatively long distance of travel had by each propeller-blade in completing its circuit the blades get a considerably-increased power over the ordinary propellers, in which the blades are at a relatively short radial distance from their axial center. By reason of this fact and also by reason of the possibility of employing a large number of the blades secured to the relatively large hub or frame c' enormous speed may be gained and it is not necessary to run the propeller-shaft with as high revolutions as in the ordinary propellers. Moreover, the breakage of a propeller-blade is not a serious matter in our invention, for the reason that there are a number of the blades left, and the long radial distance of each blade from the center of the propeller acts to preserve to a sufficient degree the proper balance of the propeller even though one blade should become disabled.

We prefer to have the blades pivotally held, as shown, in order that their inclination or pitch relatively to the propeller-shaft may be adjusted to the best advantage.

Each blade is supported at its rear side by a supporting enlargement or rib c^{14} , thereby enabling the blade proper to be made lighter and thinner than would otherwise be the case.

In use the propeller-shaft is rotated in the direction of the arrow, Fig. 4, and the blades thereof, because of their shape, inclination, and position, get a wide sweep through the water to the best advantage, and because of the position of the propeller and the construction thereof the propeller may be fearlessly run at top speed without the slightest danger of its rising in rough weather above the surface of the water, and thereby disabling the engine or breaking the propeller-shaft, but, on

the contrary, it will at all times, irrespective of the conditions of weather and use, be in proper operative position beneath the surface of the water. This is of special advantage in such vessels as gunboats.

If a propeller-blade c^6 should become bent or broken or lost, it is unnecessary to place the vessel in dry-dock in order to repair the propeller, all that is necessary being to simply stop the propeller, remove the cover b^3 , and repair or replace the propeller-blade, mounting a new one, if necessary, in the frame c' ; or if the whole propeller should become injured in any way it can be removed bodily through the opening in the top of the housing b' , first having unscrewed enough of the propeller-blades from the frame or body c' thereof so as to permit the latter to be raised within the vessel.

It will be understood that in large vessels two propellers will be used, one at either side, the general construction and operation thereof being the same as already explained.

While we have herein shown and described our invention in its preferred embodiment, we wish it understood that we are not limited in all respects thereto, but that many changes may be made without departing from our invention.

Having described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination with the hull of a vessel, having a transverse narrow opening or slit therein adjacent the stern, said slit having enlarged upper ends, of a water-tight housing secured within the vessel at said opening, whereby the entrance of water through said opening into the vessel is prevented, a propeller mounted in said housing and comprising a central hub or frame rotating in said housing and having thin or narrow peripheral edges fitting said narrow slit and extending at its periphery adjacent the said opening or slit, and a plurality of propeller-blades extending from the periphery of said hub, said blades having small stems at said hub and passing out through said slit as the propeller rotates and the blades having a size substantially corresponding to the enlarged upper ends of the slit, the blades being external to the vessel except when passing therethrough from one enlarged end to the other, substantially as described.

2. The combination with the hull of a vessel, having a transverse opening or slit therein adjacent the stern, of a water-tight housing secured within the vessel at said opening, whereby the entrance of water through said opening into the vessel is prevented, the upper portion of said housing being removable, a propeller mounted in said housing and comprising a central hub or frame rotating in said housing and extending at its periphery adjacent the said opening or slit, and a plurality of propeller-blades extending from the periphery of said hub, and passing out through

said slit as the propeller rotates, substantially as described.

3. The combination with the hull of a vessel having a transverse narrow opening or slit therein, said slit having enlarged upper ends, of a water-tight housing secured within the vessel at said opening whereby the entrance of water through said opening is prevented, a propeller mounted in said housing and comprising a shell or frame composed of two opposite shallow dish-like plates held together edge to edge and having a plurality of fan-shaped propeller-blades removably mounted in said shell at the meeting edges thereof, the blades being external to the vessel except when passing through from one enlarged end of said slit to the other, the said enlargements of the slit being provided to accommodate the fan-shaped blades, substantially as described.

4. The combination with the hull of a vessel having a transverse narrow opening or slit therein, of a water-tight housing secured within the vessel at said opening whereby the entrance of water through said opening into the

vessel is prevented, a propeller mounted in said housing and comprising a shell or frame composed of two opposite shallow dish-like plates held together edge to edge, each plate being provided with a plurality of depressions or pockets adjacent its periphery, said depressions being arranged alternately or in staggered order in said respective plates, and a plurality of propeller-blades respectively mounted in said depressions or pockets at the meeting edges of the shell or frame, said blades being external to the vessel except when passing through from one enlarged end of the said slit to the other, substantially as described.

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

GIACOMO CATANZANO.
GEROLAMO CATANZANO.

Witnesses:

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FREDERICK L. EMERY.