No. 711,884. Patented Oct. 21, 1902.

V. SJÖSTRÖM.

STEERING PROPELLER.

(Application filed Aug. 14, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

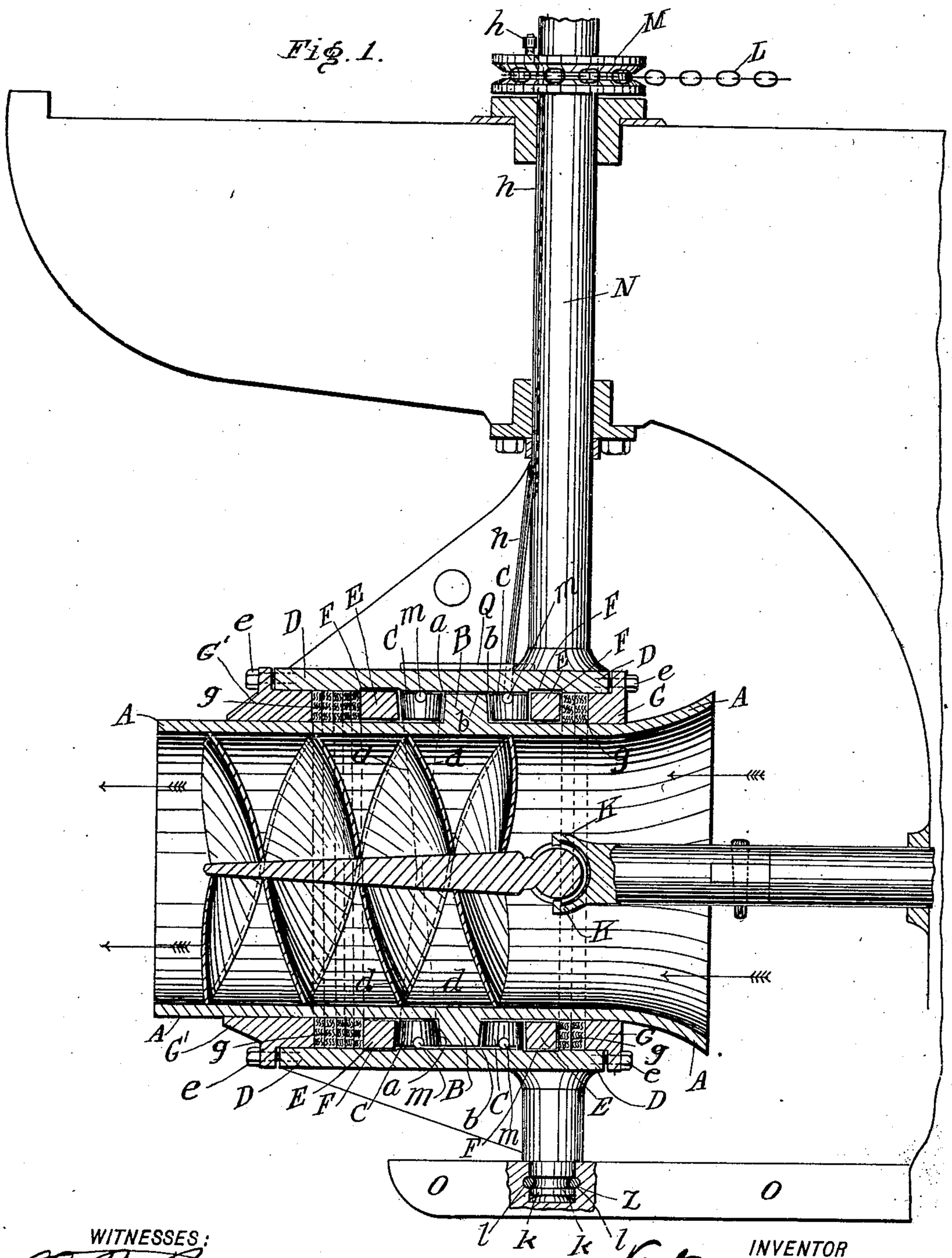

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Fig. 2.

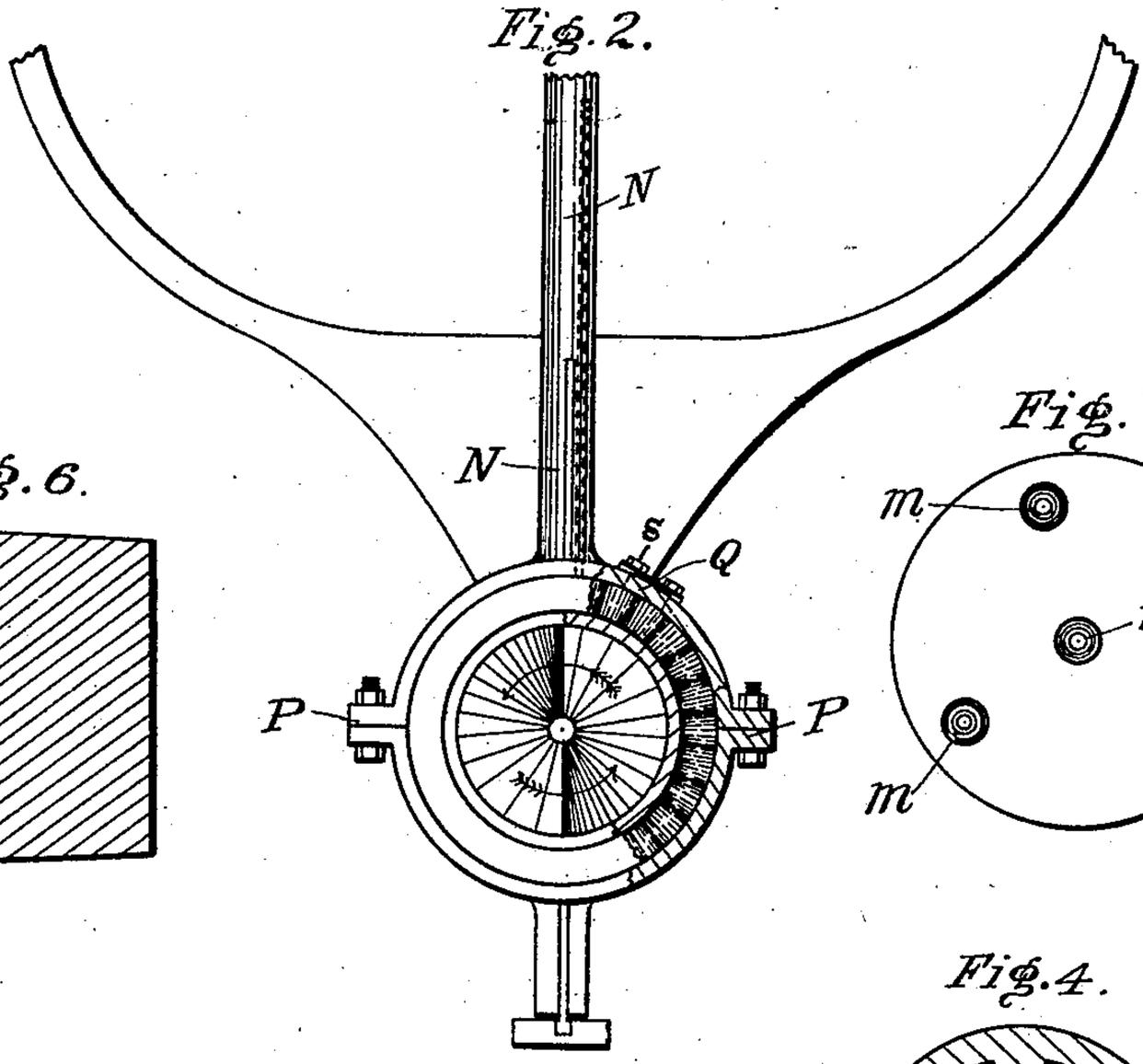

Fig. 6.

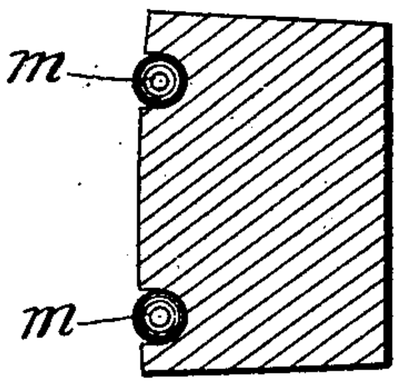

Fig. 7.

Fig. 4.

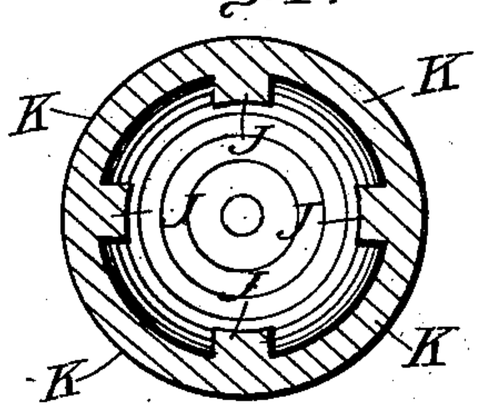

Fig. 3.

Fig. 5.

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UNITED STATES PATENT OFFICE.

VICTOR SJOSTROM, OF LOS ANGELES, CALIFORNIA.

STEERING-PROPELLER.

SPECIFICATION forming part of Letters Patent No. 711,884, dated October 21, 1902.

Application filed August 14, 1901. Serial No. 72,054. (No model.)

To all whom it may concern:

Be it known that I, VICTOR SJOSTROM, a subject of the King of Sweden and Norway, (but having declared my intention of becoming a citizen of the United States of America,) residing at the city of Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Steering-Propellers, of which the following is a full, clear, and exact description or specification, reference being had to the annexed sheets of drawings and to the letters marked thereon.

My said invention, which relates to a propeller for propelling a ship at sea, may also be used for steering a ship at sea, and when used for the combined operations of steering and propelling a ship the mechanism or apparatus constituting my invention enables the ordinary rudder used for steering ships to be dispensed with.

In carrying my invention into practical effect I mount an Archimedean-screw propeller in a cylindrical casing carried at the stern of a ship, and when used for propelling purposes alone the shaft of the propeller is or may be a rigid continuation of the shaft which is driven directly by the engines or other motor mechanism of the ship, but when the mechanism or apparatus constituting my invention is used for steering a ship in addition to propelling it then my mechanism or apparatus is mounted upon and within a cylindrical casing carried upon or by a pivotal shaft so arranged that my mechanism or apparatus can be swiveled to any angle necessary for producing steering action upon the ship itself, and when my mechanism or apparatus is used for steering as well as for propelling a ship then the connection between the driving-shaft of the ship and the propeller itself is so constructed, as hereinafter described, as to enable the propeller and its connections to be turned to any angle required for steering the ship.

Upon the annexed drawings, Figure 1 is a view of a portion of the stern end of a ship in outline and showing my new or improved propelling mechanism or apparatus applied thereto and otherwise mounted in the stern end of a ship, so that my mechanism or apparatus may be used at the same time for steering such ship. Fig. 2 also shows in outline or diagram a portion of the stern end of a ship with my new or improved propelling and steering appliance adapted thereto, part of this propelling or steering appliance being shown in section and the rest in elevation; but this figure is on a much smaller scale than Fig. 1. Fig. 3 is a horizontal section, partly in plan, showing the joint whereby I connect the propeller with the driving-shaft of a ship when the propeller is used for steering a ship also. Fig. 4 is a transverse section of the driving-shaft end of the joint wherewith the driving-shaft and propeller are connected together, as shown in plan at Fig. 3, and taken upon the line 4 4, Fig. 3. Fig. 5 is a section of the end of the propeller-joint on the line 5 5, Fig. 3, where this part of the joint is shown as entered in operative connection with the driving-shaft end of the joint. (Also shown in section at Fig. 4.) Fig. 6 is a transverse section of one of the antifriction-rollers hereinafter described. Fig. 7 is an end elevation of the same antifriction-rollers shown at Fig. 6.

On reference to Fig. 1 of the annexed drawings it will be seen that the propeller itself consists of a hollow cylindrical casing A, in the interior of which two continuous spiral screw-blades *d d* are applied after the manner of what is sometimes known as the "Archimedean screw," and that while the after part of this casing is cylindrical the forward part thereof is by preference made flaring, so as to admit of the flow of water more easily into the cylindrical casing A A and to be discharged therefrom in a practically solid stream of water flowing aft from the propeller itself. The propeller-casing A A is constructed with a strong circular projecting ring B B, which is turned in a lathe, so as to present oppositely-inclined surfaces *a* and *b* at opposite sides thereof, as shown at Fig. 1, the inclination of these surfaces corresponding to the inclination of the circumferential edges of the antifriction-rollers C C. The antifriction-rollers C C are so formed, as shown in Fig. 1, that they each represent the frustum of a cone whose point coincides with the axis of the propeller itself, and therefore these rollers C C rotate within the races provided for them with a minimum of friction. In order that the rollers C C may be kept in

operative position in their races between the exterior of the cylindrical casing A A and the interior of the outer casing D D, two metallic rings E E are inserted within the casing D D and in such position therein as to inclose the antifriction-rollers C C between their inner faces and the opposite faces of the ring B B on the propeller-casing A A, and to insure that the rings E E shall find at all times their correct position relatively with the operative function of the antifriction-rollers C C a slight recess F F is formed for receiving the outer face of each of these rings in the outer casing D D, more especially as shown in transverse section at Fig. 1, and for the purpose of insuring that these roller-bearing parts of the mechanism shall at all times be kept free from water, which would tend to corrode the same, each end of the casing D D is fitted with a gland G and G′, respectively, which glands when tightened by means of the screw nuts and studs *e e* compress the packing-rings *g g* into the space between the inner and outer casing A A and D D, so as to prevent water obtaining passage thereinto, while by reason of the rings F F being held in recesses, as hereinbefore described, and shown at Fig. 1, the compression of the packing *g g* by the tightening of the glands G and G′ is prevented from in any way pressing upon the rollers C C, so that while the packing excludes sea-water from the operative antifriction parts of my propeller the antifriction-rollers in their races are always maintained with constant operative fitness for performing their function by the oil or other lubricant admitted to these operative parts from the lubricating-pipe *h h*, Fig. 1.

In order that my new or improved propeller may be used also for steering a ship, the outer casing thereof (marked D D) is mounted at its upper and under sides with pivotal shaft connections, as shown at Fig. 1, and which pivotal shaft connections may be of any suitable construction for enabling the propeller itself to be pivoted upon the central line of this pivotal connection, which, as shown at Figs. 1, 2, and 3 more especially, is the axis or line upon which the propeller swivels when used as a steering appliance, and in which case the ordinary rudder of a ship is or may be dispensed with. To enable this pivotal function of the propeller to be obtained in order to steer a ship, it is essential that the propeller should pivot upon a joint having a fixed or movable vertical axis, and a joint adapted for this purpose is shown at Fig. 1, but more especially in the views Figs. 3, 4, and 5. In order that this joint may move pivotally without the disturbance of the horizontal axis of either the driving-shaft or the propeller itself, the joint is constructed with four deep grooves I I on the inner central part of the propeller itself, as shown more especially at Figs. 3 and 5, and while both the inner and outer parts of the joint are spherical, as shown more especially at Figs. 1 and 3, it is to be understood that these spherical portions interlock with each other by the projections J J on the inner edge or face of the spherical hollow K of the nut of the driving-shaft, which projections J J enter into the grooves I I in the spherical end of the propeller itself, and which parts being fitted easily together permit of freedom of rotation of the propeller itself at whatever angle the propeller may be turned to for steering purposes by the action of the steering-chain L upon the chain-wheel M at the top of the steering-post N of the propeller mechanism. By means of this arrangement and as shown in plan at Fig. 3 the propeller itself may be moved around to an angle of any required extent, and while rotating for the purpose of propelling the ship to which my new or improved propeller is applied it also, by reason of the stream of water issuing aft from it, acts as a rudder would act in changing or directing the course of the ship itself at sea.

In order that the propeller may not tend to rise upward when a ship to which it is fitted pitches among the waves of the ocean, the lower pivot of the propeller-casing, when a propeller is used also for steering a ship, is preferably constructed with a groove *k k*, as shown at Fig. 1, and this part of the pivot enters a bearing or hole in the upper outer end of a projecting portion of the keel O, wherein it is mounted in operative position, so that the propeller shall not be forced upward by means of two pins driven into two holes transversely to the keel and in such position that the inner part of a portion of the length of each pin *l l* passes into the groove *k k* and maintains this pivotal portion against being pulled or lifted upward out of its pivotal socket or hole in the keel O O.

The outer casing D D is by preference made of an upper and lower part fastened together by means of flanges P P, more especially as shown at Fig. 2, and which joint is fastened together by nuts or bolts, as there shown, and in order that the antifriction-rollers may be impeded as little as possible in their rotation the outer face or larger end of these rollers C C may be mounted or fitted with smaller spherical antifriction-rollers *m m*, as shown at Fig. 1, in the case of placing a single one of such rollers at the center of the rollers C C, and as distributed over the end of the rollers C C in the enlarged views, Figs. 6 and 7. These rollers *m m* are for the purpose of reducing the friction due to any outward thrust of the rollers C C against the inner surfaces of the outer casing D D, which may some time occur by reason of the speed of rotation of the rollers C C causing them because of their conical contour to be forced outward rather than inward while in operation. For the purpose of placing the rollers C C in their operative position between the inner cylindrical casing D D a covered opening Q is provided in the upper part of the outer casing, as shown at Fig. 2

more especially and also in elevation of the edge of the cover Q at Fig. 1. By removing this cover Q by taking off the nuts *s*, whereby it is held in place upon screw-studs, as shown at Fig. 2, the passage into the roller-spaces between the casings is opened and the rollers C C are readily dropped thereinto and roll into their places in the roller-races between the casing A A and D D until the races are filled with rollers C C, as shown in particular in the sectional portion of Fig. 2.

For the purpose of giving antifrictional support to the outer cylindrical surface of the propeller when the propeller is of such size or dimensions as to press heavily downward within the outer cylindrical casing by reason of its weight, I then in such case place horizontal antifrictional rollers within the outer casing, against which the weight rests, so that it may be supported as much as possible antifrictionally at its under part.

Having now described the nature of my said invention and the best system, mode, or manner I am at present acquainted with for carrying the same into practical effect, I desire to observe in conclusion that what I consider to be novel and original, and therefore claim as the invention to be secured to me by Letters Patent, is as follows:

1. The steering-propeller consisting of a revolving cylindrical casing, the spiral blades within said casing, the outer pivotally-mounted cylindrical casing, the antifrictional rollers in recesses having inclined sides, the movable rings, the projecting rim on the outside of the cylindrical casing and the rings maintained at the requisite distance therefrom, the whole being attached to the stern of a ship and all operating in the manner and for the purposes substantially as hereinbefore set forth.

2. The steering-propeller consisting of a revolving cylindrical casing, the spiral blades within said casing, the outer pivotally-carried cylindrical casing, the antifrictional rollers in the recesses having inclined sides, the projecting rim on the outside of the cylindrical casing, the rings maintained at the requisite distances therefrom, the rings forming the outer sides of said recesses, the packing-rings and the glands for compressing the packing, all operating together in the manner and for the purposes substantially as hereinbefore described.

3. The combination of the propeller, the propeller-casing, the fixed projecting rim upon the outer cylindrical part of the propeller, the recess or recesses for the conical antifriction-rollers, the conical antifriction-rollers, the packing and glands, the pivots for the propeller to be swiveled upon by the steering-gear, the universal joint for enabling the propeller to be moved to any angle for steering, substantially as hereinbefore set forth.

4. The combination consisting of the outer casing containing the propeller and carried pivotally, the opening and removable cover in said casing, the antifriction-rollers in the roller-recesses of said casing, all operating together in the manner and for the purposes substantially as set forth.

5. The steering-propeller consisting of the combination of a revolving cylindrical casing; the spiral blades within said casing, the outer pivoted cylindrical casing, the antifriction-rollers, the recesses having inclined sides, the movable rings, the rim projecting on the outside of the rotating cylindrical casing, the rings forming the outer sides of the recesses, the packing-rings, the glands, the universal joint of the propeller and driving-shaft, the steering-head or chain-wheel, the steering-chain, the pivots for the propeller to swivel upon by the steering-gear, the recesses and cover for receiving and inclosing the antifriction-rollers, all operating together in the manner and for the purposes substantially as hereinbefore set forth.

In testimony whereof I, the said VICTOR SJOSTROM, have hereunto set my hand and seal, this 10th day of July, 1901, in the presence of two subscribing witnesses.

VICTOR SJOSTROM. [L. S.]

Witnesses:

ST. JOHN DAY,

BEATRICE WILKINS.