No. 769,621. PATENTED SEPT. 6, 1904.

C. A. MANKER.

SCREW PROPELLER.

APPLICATION FILED SEPT. 8, 1903.

NO MODEL.

FIG. I.

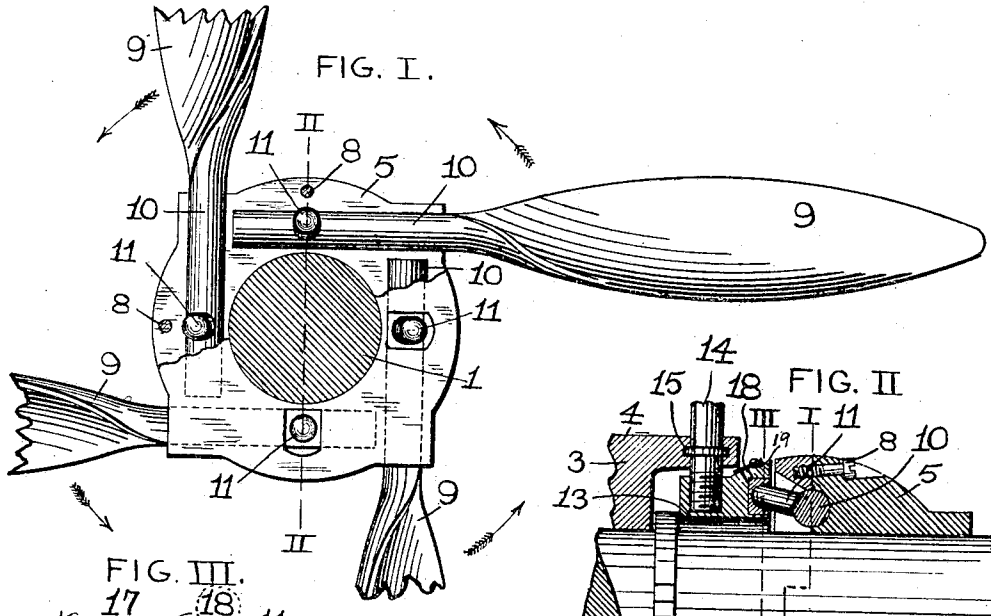


FIG. II

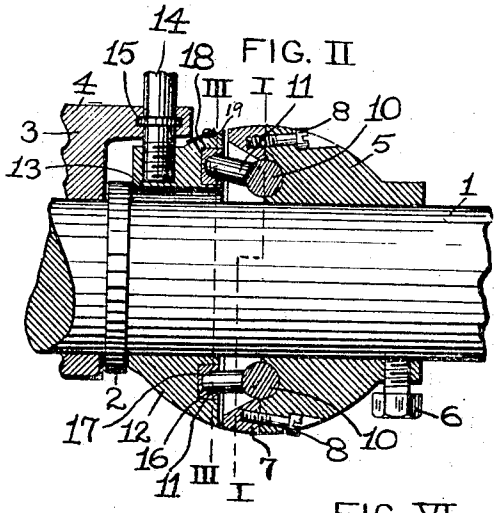


FIG. III.

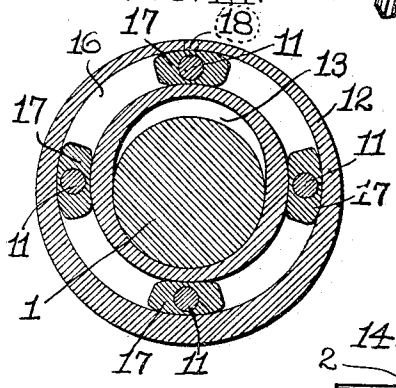


FIG. IV.

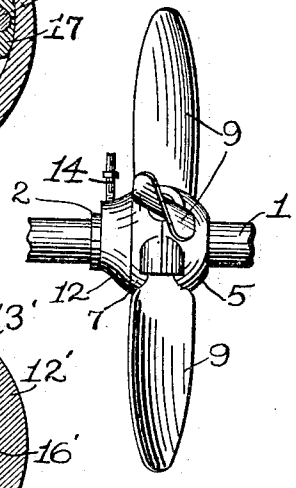


FIG. V.

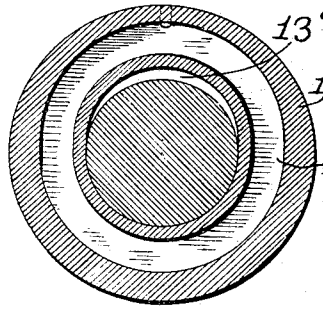
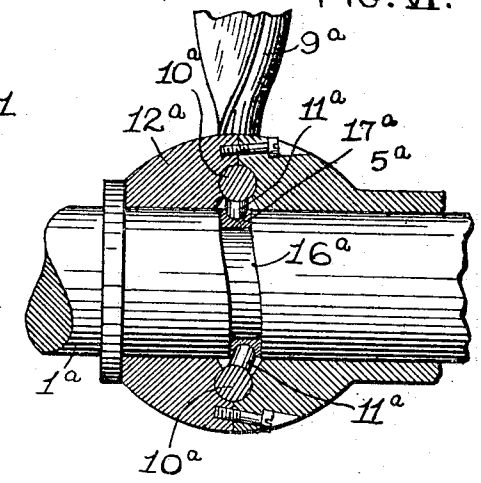


FIG. VI.



ATTEST.

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No. 769,621. Patented September 6, 1904.

UNITED STATES PATENT OFFICE.

CAREY A. MANKER, OF PEARL, ILLINOIS, ASSIGNOR TO MANKER-HEAVNER NAVIGATION COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF ARIZONA TERRITORY.

SCREW-PROPELLER.

SPECIFICATION forming part of Letters Patent No. 769,621, dated September 6, 1904.

Application filed September 8, 1903. Serial No. 172,375. (No model.)

To all whom it may concern:

Be it known that I, CAREY A. MANKER, a citizen of the United States, residing in Pearl, in the county of Pike and State of Illinois, have invented certain new and useful Improvements in Screw-Propellers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to that class of screw-propellers in which the propeller-blades are moved into a pitch on their descending strokes varying from the pitch on their ascending strokes, and vice versa, whereby a lifting action or thrust is obtained in the plane of the propeller's revolution in addition to the horizontal propelling thrust, so that while the vessel is being propelled it will more or less be lifted toward the surface of the water to partially eliminate the resistance of the water to the movement of the hull of the boat therein.

The invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

Figure I is a vertical section taken through the propeller on irregular line I I, Fig. II. Fig. II is a longitudinal section taken on line II II, Fig. I, through the center of the propeller. Fig. III is a vertical cross-section taken on line III III, Fig. II. Fig. IV is an elevation of the propeller. Fig. V is a similar view to Fig. III, showing modification or variation in the shape of the cam-groove in the shiftable hub member of the propeller. Fig. VI is a longitudinal section taken through a modification of the propeller-hub.

1 designates a propeller-shaft, that is journaled in a bearing 3, provided with an extension-arm 4. (See Fig. II.)

2 is a collar fixed to the propeller-shaft and located adjacent to the bearing 3 to limit the end thrust of the propeller-shaft.

5 designates a hub member mounted on the propeller-shaft and rigidly secured thereto by any suitable means, such as the set-screws 6. (Seen in Fig. II.)

7 is a ring carried by the rear end of the hub member 5, to which it is attached by suitable means, such as the connecting-screws 8.

9 designates propeller-blades that are of helical shape, as seen in Figs. I and IV. Each blade has a stem 10, that is rockingly fitted in channels provided for its reception in the rear side of the hub member 5 and the opposing ring 7, the channels extending in lines transversely to the axes of said member and ring. Projecting from each blade-stem is a rocking stem 11. (See Figs. I, II, and III.) These stems serve to impart oscillation to the blades to vary their pitch in the manner hereinafter stated.

12 designates a shiftable hub member having a central aperture 13 of greater vertical area than the diameter of the propeller-shaft which it encircles. This shiftable hub member opposes the fixed propeller-shaft carried by hub member 5 and the ring 7 fitted thereto, and it is arranged to be shifted vertically through the medium of a shift-screw 14, that is rotatably mounted in the bearing-extension arm 4 and is held from endwise movement by a collar 15 thereon (see Fig. II) that is located in said extension-arm. The lower end of the shift-screw has threaded engagement with the shiftable member 12, so that when the screw is turned the shiftable hub member is raised or lowered. In the forward end of the shiftable hub member is a cam-groove 16, that occupies a position eccentric to the axes of the propeller-blade stems 10, the degree of eccentricity being dependent upon the degree of elevation of the shiftable hub member.

17 represents runner-blocks that are positioned in the cam-groove 16 to ride therein during the rotation of the propeller-shaft, its blades and their stems to cause travel with the blade-stems of their studs 11. The runner-blocks are recessed to receive the studs 11, which fit thereinto, as seen in Figs. II and III.

18 is an oil-hole leading through the hub member 12 to the cam-groove 16, this oil-hole being protected by a cover 19.

In the practical operation of my propeller as the propeller-shaft revolves it carries there-

with the hub member 5 and its ring 7, thereby conducting the propeller-blades in a circular path. During the rotation of such parts the runner-blocks 17 are caused to travel in the cam-groove 16 of the hub-member 12, due to the engagement therewith of the blade-stem studs 11. It will therefore be seen that a rocking motion is imparted to the blade-stem studs and the blade-stems that occasions constant change of pitch or angle of the propeller-blades during their course of travel. This change of pitch or angle is considered with respect to the axis of the propeller-shaft, and the degree of change is governed by the degree of eccentricity of the cam-groove to the axes of the propeller-blade stems. The result of this construction is that as the propeller-blades move in the direction indicated by the arrows, Fig. I, their working faces are caused to face downwardly and rearwardly during the descending stroke of the blades, and during their ascending strokes the blades are turned rearwardly and upwardly to offer the least resistance to their passage through the water. As a consequence the blades act with the greatest efficiency to propel the boat forwardly when they are descending and also exert a lifting influence to raise the boat to which the propeller is applied, thereby elevating the boat and diminishing the water displacement, so that less resistance to the travel of the boat is secured. The blades being deflected into the positions stated during their upward strokes move with less resistance through the water than during their descending strokes, and therefore the blades descending may act with greater force than they could if their pitch were altered previous to the ascending movement. When it is desired to operate the propeller in securing slower speed or to back the vessel, the shiftable hub member 12 may be moved into position that will render its axis corresponding to the axis of the propeller-shaft, and when this is done the propeller-blade will occupy uniform pitch, and the propeller may be operated with the same utility as screw-propellers of common type.

In Fig. V, I have shown a modification in which the shiftable hub member 12′ is provided with a vertical elongated cam-groove 16′, as distinguished from the cam-groove illustrated in Figs. II and III.

In Fig. VI, I have shown a modification in which a fixed propeller-stem 1^a is utilized as a support for the propeller in lieu of its being rotatably carried by the propeller-shaft. In this stem is a cam-groove 16^a, that receives the runner-blocks 17^a, into which the studs 11^a of the blade-stems 10^a are fitted. The hub members 5^a and 12^a are rotatably mounted on the stem 1^a and connected for united rotation. These members are designed to be rotated on the supporting-stem 1^a by power applied thereto in any suitable manner, and as the members are rotated the propeller-blades are varied in pitch in a similar manner to that described in connection with the construction shown in Figs. I to IV.

I claim as my invention—

1. In a screw-propeller, the combination of a shaft, a member carried by said shaft, helical blades rockingly mounted in said member, and means whereby the pitch of said blades is varied with respect to the axis of said shaft at different positions in the path of their movement; said means consisting of a shiftable member provided with a cam-groove adapted to receive parts carried by said blades.

2. In a screw-propeller, the combination of a shaft, a member carried by said shaft, helical blades rockingly mounted in said member, and means whereby the pitch of said blades is varied with respect to the axis of said shaft at different positions in the path of their movement; said means consisting of a shiftable member provided with a cam-groove adapted to receive parts carried by said blades, and means for shifting said shiftable member.

3. In a screw-propeller, the combination of a shaft, a member carried by said shaft, helical blades rockingly mounted in said member, and means whereby the pitch of said blades is varied with respect to the axis of said shaft at different positions in the path of their movement; said means consisting of a shiftable member provided with a cam-groove adapted to receive parts carried by said blades, and a set-screw engaging and shifting said shiftable member, substantially as set forth.

4. In a screw-propeller, the combination of a shaft, a hub member carried by said shaft, a plurality of helical blades having stems fitted to said hub, studs carried by said blade-stems, and a shiftable hub member located in proximity to said shaft-carried hub member and provided with a cam-groove in the course of which said blade-stem studs travel, substantially as set forth.

5. In a screw-propeller, the combination of a shaft, a hub member carried by said shaft, a plurality of helical blades having stems fitted to said hub, studs carried by said blade-stems, a shiftable hub member located in proximity to said shaft-carried hub member and provided with a cam-groove in the course of which said blade-stem studs travel, and runner-blocks operating in said cam-groove and receiving said blade-stem studs.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CAREY A. MANKER.

Witnesses:
ARTHUR MANKER,
GENEVIEVE MANKER.