Aug. 24, 1943. E. A. F. PRESSER 2,327,453

HELICAL MARINE PROPELLER

Filed Oct. 4, 1941 3 Sheets-Sheet 1

Fig. 10.

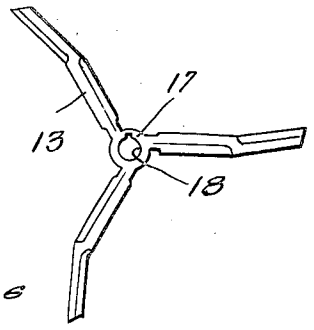
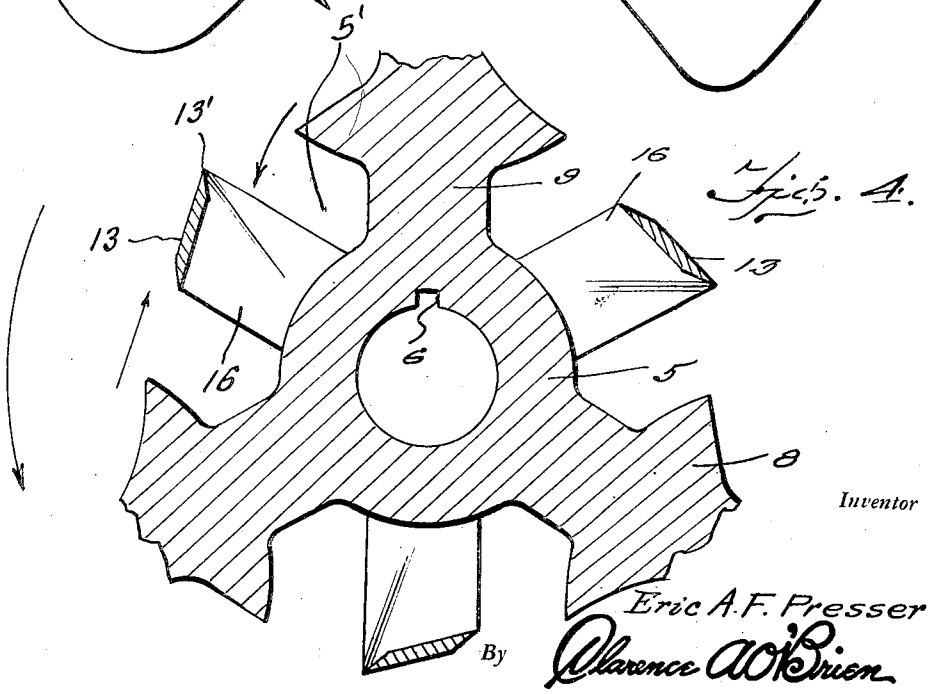


Fig. 1.



Inventor

Eric A.F. Presser

By Clarence O'Brien

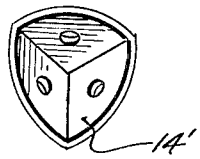
Attorney

Aug. 24, 1943. E. A. F. PRESSER 2,327,453

HELICAL MARINE PROPELLER

Filed Oct. 4, 1941 3 Sheets-Sheet 2

Fig. 11.



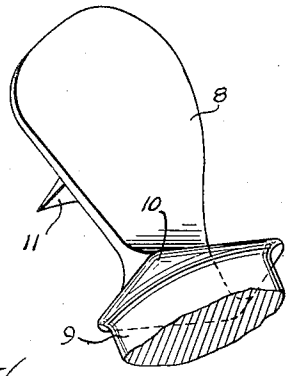


Fig. 12.

Fig. 2.

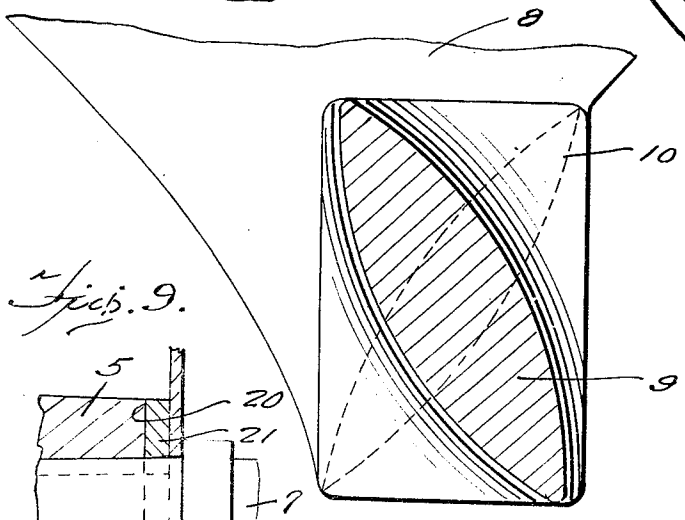
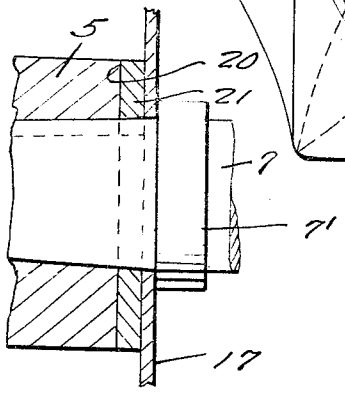


Fig. 9.

Fig. 6.



Inventor

Eric A. F. Presser

By Clarence O'Brien

Attorney

Aug. 24, 1943. E. A. F. PRESSER 2,327,453

HELICAL MARINE PROPELLER

Filed Oct. 4, 1941 3 Sheets-Sheet 3

Fig. 3.

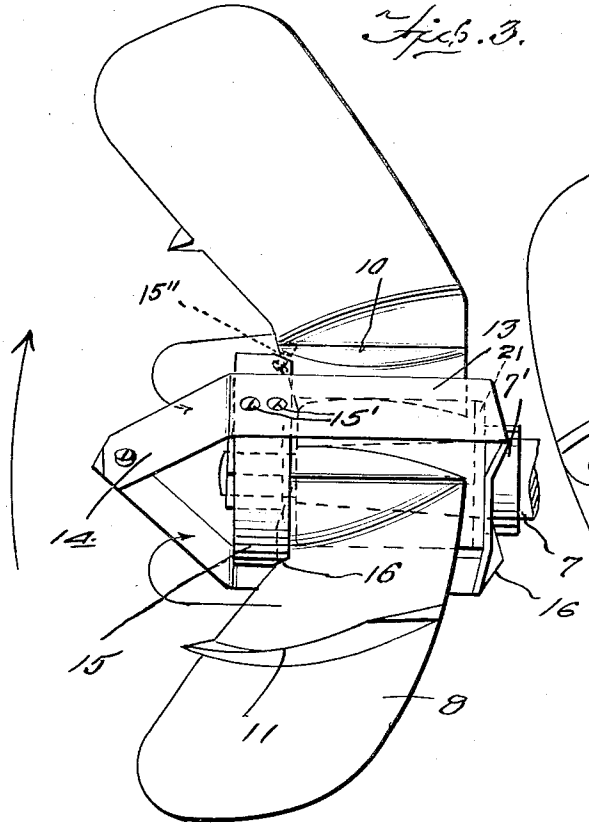


Fig. 7.

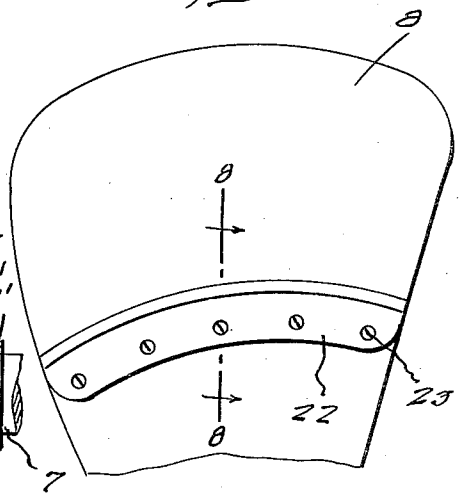
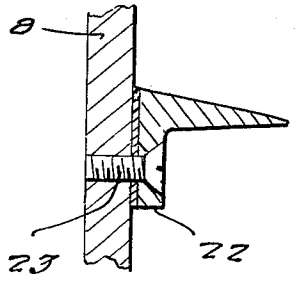


Fig. 8.



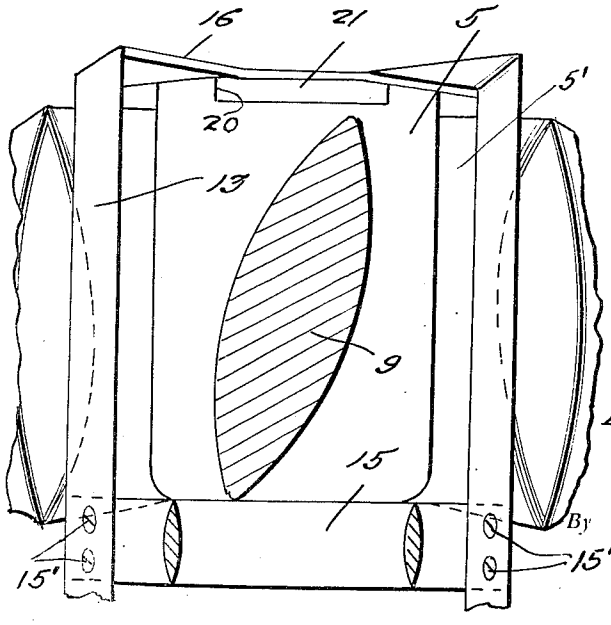


Fig. 5.

Inventor

Eric A. F. Presser

By Clarence O'Brien

Attorney

Patented Aug. 24, 1943

2,327,453

UNITED STATES PATENT OFFICE

2,327,453

HELICAL MARINE PROPELLER

Eric A. F. Presser, Hammond, Ind.

Application October 4, 1941, Serial No. 413,675

11 Claims. (Cl. 170—170)

The present invention relates to new and useful improvements in helical propellers for marine purposes, as well as for use for ventilating and other purposes of the so-called screw type, in which the blades may be inclined rearwardly at an acute angle with respect to the axis of the hub, or which may project radially at right angles to the axis of the hub, the blades having fins thereon at a point where the blades have an approximate angle of 45 degrees with respect to an imaginary radial plane parallel or in line with the axis of the hub, and the invention has for its primary object to substantially eliminate the usual cavitation and vortex caused rearwardly of the hub by the centrifugal action of the blades on the water, and thus reduce vibration and improve the efficiency of the propeller, the water constituting the resisting force against which the propeller works.

A further object is to provide a blade construction embodying means for reducing the centrifugal action of the blades on the water and to produce a centripetal action to counteract the tendency of the blades to produce a vortex at the rear of the blades.

Another object is to provide auxiliary blades for the propeller adapted to act by suction on the water in the region of the hub and to move it forwardly to also assist in reducing vortex at the rear of the hub and to prevent the creation of vacuum at the front end of the propeller.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout and in which:

Figure 1 is a rear elevational view of the propeller embodying the present invention.

Figure 2 is a front elevational view thereof.

Figure 3 is a side elevational view.

Figure 4 is a fragmentary transverse sectional view through the hub and showing the auxiliary group of blades in section.

Figure 5 is a sectional view through one of the shanks of the propeller blades and showing the auxiliary blade unit in elevation.

Figure 6 is a sectional view through one of the propeller blades taken substantially on a line 6—6 of Figure 1.

Figure 7 is a detail of one of the blades showing a modified form of fin thereon to eliminate centrifugal action of the blade.

Figure 8 is a fragmentary sectional view taken substantially on a line 8—8 of Figure 7.

Figure 9 is a fragmentary sectional view of the hub of the propeller showing the manner of connecting the auxiliary blade thereto.

Figure 10 is a plan view of the blank form from which the auxiliary blades are formed and showing the same before the blades are bent in parallel relation.

Figure 11 is a perspective view of the connecting cap for the free ends of the auxiliary blades, and

Figure 12 is a fragmentary isometric view of one of the blades and shanks connecting the blade to the hub.

Referring now to the drawings in detail the numeral 5 designates the hub of the propeller having the key way 6 formed therein for securing the propeller shaft 7. The blades 8 extend radially from the hub at a rearwardly inclined angle as shown to advantage in Figure 3 of the drawings, the blades being integrally formed with the hub and connected thereto by means of a shank portion 9. The shank 9 is of substantially elliptical form in cross-section as shown to advantage in Figure 6 of the drawings and is connected to the blade by a connecting plate-like portion or flange 10 having a substantially rectangular contour with the edges of the blade projecting from opposite corners of the outer face of the portion 10, said plate-like connecting portion cooperating with the shanks to form channels 5' extending longitudinally of the hub. The surface of the portion 10 immediately adjacent the shank 9 is concaved and merges gradually with the shank, while the front and rear edges of the plate-like portion 10 are curved as at 10' in an arc concentric with the axis of the hub. Likewise the surface of the plate-like portion 10 adjacent the blade 8 is rounded to merge gradually with the blade.

The sides of the shank 9 forming the ellipse converge adjacent the corners of the portion 10 remote from the edges of the blade. The shank portion 9 is provided with a reverse pitch in relation to its associated blade 8 and because of this arrangement of the shank and blade, the plate-like portion or flange 10 is provided to add strength at the junction thereof and thereby to make one solid structure.

Formed on the rear faces of the blades 8 is an arcuate fin 11 extending transversely with respect to the blades, the arc of the fin being disposed substantially concentric with respect to the axis of the propeller, said fin being placed at a point, where the blade angle is approximately 45 degrees.

Carried by the propeller, adjacent the hub portion thereof, is an auxiliary blade unit designated

generally at 12 and including blade members 13 disposed longitudinally with respect to the hub and in spaced relation therefrom, the rear ends of the blades 13 being bent inwardly, as shown at 14, and suitably connected to each other by a cap 14' to provide a substantially pointed rear end for the auxiliary member 12 which is spaced rearwardly from the rear end of the shaft 7, as shown to advantage in Figure 3 of the drawings to provide access to the nut employed for securing the shaft to the propeller.

The blades 13 are connected adjacent the rear end of the hub 5 to a ring member 15 by means of screws 15', the ring member being formed with notches 16 adapted to receive the rear edge of the shank portion 9 of the blades to secure the auxiliary blade member 12 against rotation. The ring may also be secured to an adjacent part of the plate-like portion 10 by screws or the like 15''.

As illustrated to advantage in Figure 4 of the drawings, the faces of the blade members 13 are angularly disposed with respect to the axis of the propeller. As shown more clearly in Figures 1, 3 and 5 the ring member 15 is provided at circumferentially spaced intervals with portions shaped to fit flatly against the inner surface of the blades 13 for detachably securing thereto by the screws 15' to facilitate assembly and removal from the hub, when desired.

The front ends of the blades 13 are bent radially inwardly at right angles as shown at 16 and have formed therewith an annular member 17 having an opening 18 adapted for receiving the propeller shaft 7, the opening 18 also being formed with a key way 19 for receiving the key employed in securing the propeller to the propeller shaft. The shaft is formed with a flange 7' against which the annulus abuts.

The end of the hub 5 is formed with a recess 20 adapted for receiving a lug 21 formed on the annulus 17 to secure the rear end of the auxiliary blade member against rotation on the hub.

As shown to advantage in Figures 2 and 5 of the drawings, the radially extending ends 16 of the blades 13 are twisted angularly for a purpose to be presently described.

In a propeller of this type, it is commonly known that the blades 8 in acting on the water have a tendency to throw the water centrifugally away from the blades and thus produce a cavitation and resulting vortex extending substantially in the form of a cone axially from the rear end of the hub portion of the propeller. The fins 11 are provided to overcome this centrifugal action by acting as a wall against which the water is adapted to strike during its radial movement from the hub of the propeller, thereby retaining the water adjacent the hub and preventing the formation of the aforementioned vortex.

The auxiliary blade member 12 further acts to counteract the formation of this vortex by reason of the angular arrangement of the blades 13, as shown to advantage in Figure 4 of the drawings, the trailing edge 13' of the blades 13 being inclined away from the hub to produce a partial vacuum between the trailing edge of the blades 13 and the hub, which causes the water to be drawn inwardly toward the hub as shown by the arrows, the fins 11 and the auxiliary blade member 13 thus cooperating to create a centripetal action upon the water lateral to the hub rather than the usual centrifugal action.

The inclined position of the shank portions 9 produces a screw action on the water received from the blades 13 and 14 and thereby causes a tendency of the water to flow forwardly toward the angular lateral front ends 16 of the auxiliary blade unit which acts on the water in a like manner to maintain a normal pressure of water at the front hub portion of the propeller and thus eliminate the possibility of creating any vacuum in the region of the front end of the hub.

In Figures 7 and 8 I have illustrated a modified form of fin construction comprising an angular flange 22 on the base of the fin adapted to receive screws or other fastening devices 23 for detachably securing the fins to blades of previously manufactured propellers of the conventional helical type.

While I have illustrated a type of propeller having a single fin on each blade, it will be understood that in larger propellers additional fins may be added where necessary for more effectively accomplishing the desired purpose. If a propeller needs only one fin, it is to be placed at a distance from the hub where the blade angle is approximately 45 degrees. If a propeller needs more than one fin, all additional fins must be between the first named fin and the hub.

It is believed the details of construction and manner of use of the device will be readily understood from the foregoing without further detailed explanation.

Having thus described the invention what is claimed as new is:

1. A propeller of the screw type comprising a hub, a plurality of blades projecting from the hub, said blades having helical pitch angles, and means carried by the hub of the propeller and extending longitudinally of the hub in spaced relation therefrom for producing a centripetal action on the water contacted by the blades.

2. A propeller of the screw type comprising a hub, a plurality of blades projecting from the hub, said blades having a predetermined pitch, and means carried by the hub of the propeller and disposed in longitudinally spaced relation therefrom for acting on the water to reduce vortex at the rear end of the hub.

3. A propeller of the screw type comprising a hub, a plurality of blades projecting from the hub, said blades having a predetermined pitch, means carried by the blades for producing a centripetal action on water contacted by the blades, and means carried by the hub of the propeller for urging the water forwardly relative to the bodily movement of the propeller.

4. A propeller of the screw type comprising a hub, a plurality of blades projecting from the hub, said blades having a predetermined helical and reverse pitch, fins carried by the blades adapted to reduce centrifugal action of the blades, and auxiliary blades carried by the hub of the propeller for urging the water inwardly toward the hub and forwardly relative to the bodily movement of the propeller.

5. A propeller of the screw type comprising a hub, blades projecting radially from the hub, a spiral shank between the hub and the blade, said shank spacing the inner end of the blade from the hub and having a reverse pitch with relation to the pitch of the blade and a plate-like connecting portion between the blade and the shank defining longitudinal channels between the blade and hub.

6. A propeller of the screw type comprising a hub, blades projecting radially from the hub, a spiral shank between the hub and the blade, said shank spacing the inner end of the blade

from the hub and having a reverse pitch with relation to the pitch of the blade and a plate-like connecting portion between the blade and the shank defining longitudinal channels at each side of the shank between the blade and hub.

7. A propeller of the screw type comprising a hub, blades projecting radially from the hub, a spiral shank between the hub and the blade, said shank spacing the inner end of the blade from the hub and having a reverse pitch with relation to the pitch of the blade and a plate-like connecting portion between the blade and the shank defining longitudinal channels at each side of the shank between the blade and hub and auxiliary blades disposed in said channels and adapted to feed water into the channels.

8. A propeller of the screw type comprising a hub, blades projecting radially from the hub, a spiral shank between the hub and the blade, said shank spacing the inner end of the blade from the hub and having a reverse pitch with relation to the pitch of the blade and a plate-like connecting portion between the blade and the shank defining longitudinal channels at each side of the shank between the blade and hub, and a detachable auxiliary blade unit secured to the propeller and including blades disposed in said channels and adapted to feed water into the channels.

9. A propeller of the screw type comprising a hub, blades projecting radially from the hub, a spiral shank between the hub and the blade, said shank spacing the inner end of the blade from the hub and having a reverse pitch with relation to the pitch of the blade and a plate-like connecting portion between the blade and the shank defining longitudinal channels at each side of the shank between the blade and hub, an auxiliary blade unit including blades positioned in the channels for feeding water thereto, and means for detachably securing the auxiliary unit to the propeller.

10. A propeller of the screw type comprising a hub, blades projecting radially from the hub, a spiral shank between the hub and the blade, said shank spacing the inner end of the blade from the hub and having a reverse pitch with relation to the pitch of the blade and a plate-like connecting portion between the blade and the shank defining longitudinal channels at each side of the shank between the blade and hub, an auxiliary blade unit including blades positioned in the channels for feeding water thereto, means connecting one end of the auxiliary blades together, and an annular member connecting the auxiliary blades adjacent their other ends, said annular member engaging the propeller for securing the auxiliary blades in a fixed position.

11. A propeller of the screw type comprising a hub, blades projecting radially from the hub, a spiral shank between the hub and the blade, said shank spacing the inner end of the blade from the hub and having a reverse pitch with relation to the pitch of the blade a plate-like connecting portion between the blade and the shank defining longitudinal channels at each side of the shank between the blade and hub, an auxiliary blade unit including blades positioned in the channels for feeding water thereto, said unit also including blades at each end thereof for feeding water forwardly from the channels, and means for detachably securing the auxiliary unit to the propeller.

ERIC A. F. PRESSER.