May 5, 1931. J. KOENIG 1,804,016

PROPELLER

Filed June 12, 1929

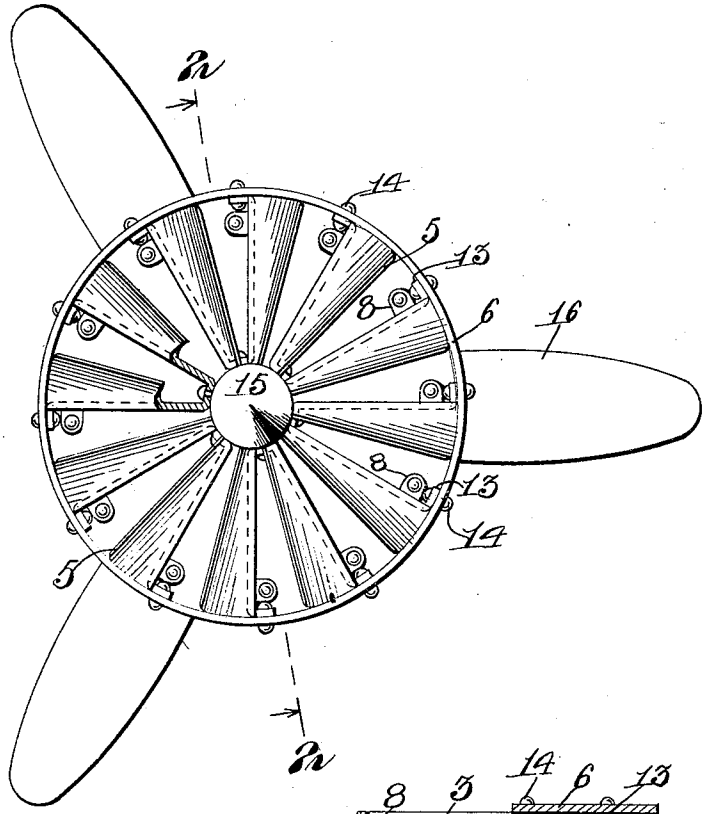

Fig. 1.

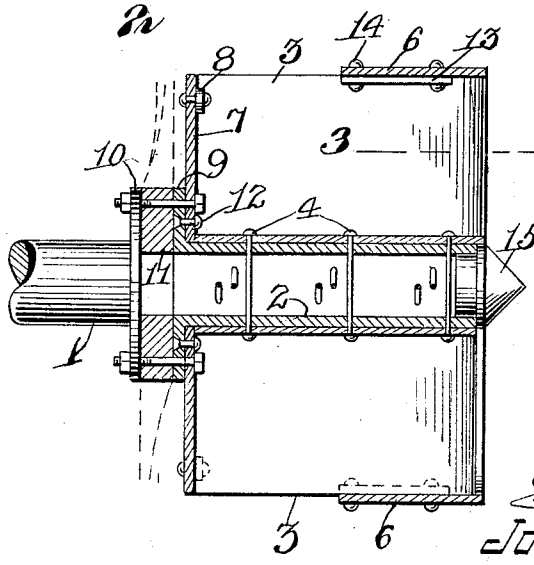

Fig. 2.

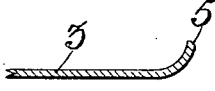

Fig. 3

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UNITED STATES PATENT OFFICE

JOSEPH KOENIG, OF MANITOWOC, WISCONSIN; REMUS KOENIG AND RUBY K. ELLIS ADMINISTRATORS OF SAID JOSEPH KOENIG, DECEASED

PROPELLER

Application filed June 12, 1929. Serial No. 370,273.

This invention relates to new and useful improvements in propellers.

One of the objects of my invention is the provision of a combination propeller including a substantially straight blade propeller to be used in combination with a fan blade propeller wherein the action of the straight blade propeller cooperates with the fluid at a point on the fan blade propeller where the fan blade propeller is less effective, so that with a combination of the two propellers, the effectiveness creates a greater pulling power than would be created by the use of either propeller by themselves.

It is a well known fact that in the use of the old fan blade style propeller, the effectiveness of this propeller is not of any particular advantage up to about one-third of its inner diameter, or to where the fan blades cooperate with the fluid in an effective manner, as the fan blades are usually somewhat narrow and do not present a broad effective surface toward their inner ends. It is, therefore, one of the principal objects of my invention to combine with the old style propeller a novel type of propeller which will be effective at the point where the old style propeller is less effective so that in the simultaneous operation of both propellers, a greater suction or pulling power will be produced.

Another object of my invention is the provision of an improved type of propeller including a plurality of radial blades having lateral flanges at their outer edges and embracing the blades with a substantially circular band which is riveted or otherwise secured to the flanges in order to securely retain the blades against movement and hold them in a rigid position and to provide a band which will not interfere with the action of the propeller.

With the above and other objects in view, the invention consists in the novel features of construction, the combination and arrangements of parts hereinafter more fully set forth, pointed out in the claims and shown in the accompanying drawings wherein:

Figure 1 is a front elevation with parts thereof broken away and illustrated in section;

Figure 2 is a sectional view on the line 2—2 of Figure 1; and,

Figure 3 is a detail section on the line 3—3 of Figure 2.

Referring more particularly to the drawings, 1 indicates the driving shaft of a ship which may be in the form of a boat or an airplane and attached to this drive shaft 1 is a substantially hollow shaft 2, to which the propeller blades 3 are secured.

In the construction of the propeller blades, it will be noted that these blades are formed in pairs in the form of a U-shaped body having its intermediate portion bolted to the shaft 2 by means of the bolts 4, thus the inner edges of the blades are securely fastened to the shaft 2 for rotation therewith. The forward ends of these blades are disposed laterally to form a tapering flange 5, preferably curved and disposed at an angle relative to the body of the blades, as shown in Figure 3. These curved end portions have a tendency to cut into or engage the fluid for guiding the fluid between the propeller blades 3.

In view of the fact that these propeller blades 3 are rigidly connected at their outer edges by means of a band 6, this band forms a channel between the different propeller blades, to guide the fluid backward toward the end closure disc 7. It will be noted that the blades 3 are also secured to this disc 7 by having perforated lugs 8 formed on the inner ends of the blades and bolted or otherwise secured to the disc 7. The disc 7 is rigidly bolted to the annular flange 9 at the inner end of the shaft 2, and the flange 9 in turn is securely bolted to flange 10 on shaft 1 with the central hub 11 disposed between the two flanges.

Rivets 12 may also be used for connecting the disc 7 to the flange 9 so as to rigidly retain the inner ends of the blades 3 in their proper position.

The outer edges of the blades are formed with lateral flanges 13 and these flanges are riveted or otherwise secured, as shown at 14, to the band 6, whereby it will be noted that when the blades of the propeller are connect-

ed to the flanges 13 and the disc 7, these blades will be securely held against lateral movement.

The outer end of the shaft 2 is closed by means of a conical stopper 15 which will have a tendency to guide the fluid that strikes the center of the shaft, in between the blades 6 and these stoppers may be removable or fixed in position, as desired.

As noted in Figure 2, the central hub 11 of the fan blade propeller is bolted between the flanges 9 and 10 and extending radially from the core 11 are the fan blades 16, and it will be apparent that the effectiveness of the fan blades is greater at the central and toward the outer ends of these blades, while the inner ends which extend radially from the hub 11 do not possess more effective area as the remaining portion of the blades.

It is therefore, one of the principal objects of my invention to provide a combination propeller which will include my improved style propeller to be used in connection with the old fan blade style of propeller, and the result from this combination will be the effectiveness of the new type of propeller at that portion of the old style propeller where the effectiveness of the blade is reduced to a minimum.

It will be apparent from the foregoing that in using my improved combination, the fluid will enter at the front of the main propeller, travel rearwardly and be ejected at the inner ends of the radial blades 3, thus disposing of the fluid on an angle of about 45°. As the fluid is expelled from the forward propeller at a 45° angle, it will be thrown into contact with the effective portions of the blades 16, and these blades will then act upon the expelled fluid from the forward or central portion.

It will thus be apparent, that as the fluid is expelled from the forward propeller and acted upon by the old style propeller, there will be considerable vacuum created at the forward end of the vessel, causing a suction, which will have a tendency to exert a forward pull on the vessel, and due to the combination of the two propellers, the suction created is far greater than by the use of a single propeller.

Furthermore, a greater area of fluid is acted upon during the operation of the two propellers than there would be with a single propeller, and this will assist in creating a greater suction at the forward end of the vessel.

The band 6 which encircles the radial blades 3, may be of any transverse dimension, from a narrow band up to a width covering substantially one-half of the blades 3, and the diameter of the forward propeller will be approximately one-third the diameter of the old style propeller so that the fluid passing through the forward propeller will be acted upon in advance of that portion of the old propeller which is least effective.

I claim:

1. A propeller of the class described including a central hollow shaft, a disc at one end of the shaft, radial blades connected to the shaft, means connecting the blades to the disc, a band encircling the blades and connected to their outer edges, said band extending inwardly from the outer ends toward the disc and tapering curved portions formed at the outer ends of said blades.

2. The combination with a fan blade propeller having a central hub, a shaft for supporting the hub, fan blades radiating from said hub, a disc carried by the shaft with its periphery extending beyond the hub, radial blades carried by the shaft and having their inner ends connected to the disc and a band encircling the radial blades and connected to the outer edges thereof whereby to direct current from the radial blades onto the fan blades.

3. The combination with a fan blade propeller having a central hub, a radial blade propeller having an inner closed end abutting the central portion of the fan blade propeller, said propellers having their blades pitched in the same general direction, tapering curved portions at the outer ends of the blades of the second propeller and a band encircling the radial blades and connected to the outer edges thereof whereby to direct the current from the radial blade propeller onto the fan blades.

In testimony that I claim the foregoing I have hereunto set my hand at Manitowoc, in the county of Manitowoc and State of Wisconsin.

JOSEPH KOENIG.