Feb. 6, 1968 C. W. VAN RANST 3,367,423

PROPELLER

Filed June 13, 1966

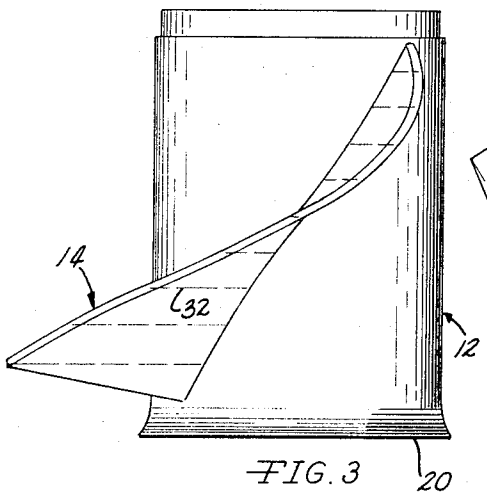


FIG. 3

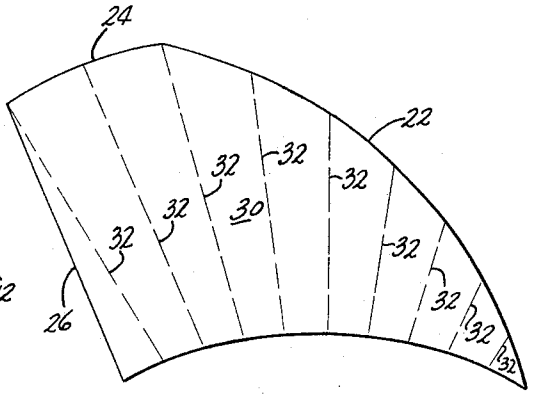


FIG. 5

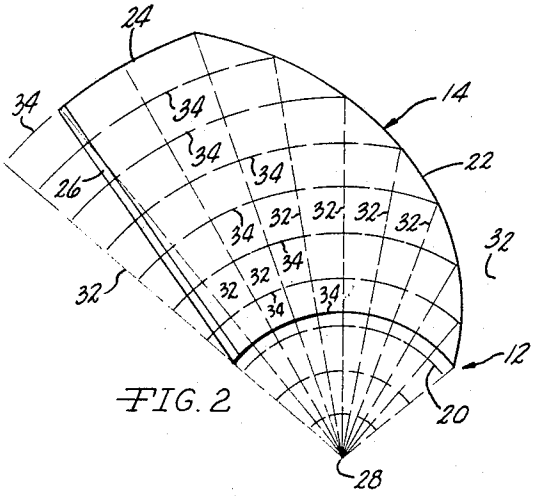


FIG. 2

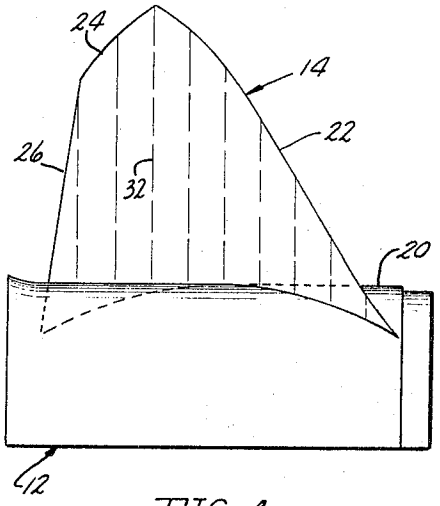


FIG. 4

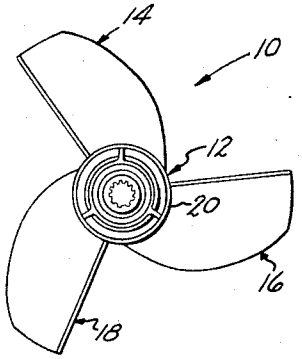


FIG. 1

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3,367,423

PROPELLER

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2 Claims. (Cl. 170—159)

The present invention relates to propellers for motor boats, and especially to improvements in propellers of the type referred to as "weedless" propellers.

It is known to provide propellers which are shaped so as to reduce to a minimum the tendency of weeds, and the like, to be caught and retained on a propeller of a boat when the propeller turns in weed infested waters. Normally, such propellers function satisfactorily when rotating in a forward direction, but, because of their shapes, they cannot turn in a reverse direction without creating a severe weed-entanglement problem.

It is an object of the present invention to provide an improved weedless propeller, and particularly one which is adapted to provide optimum weedless conditions of operation when turning in either direction of rotation.

It is another object of the present invention to provide a propeller of the foregoing character which is characterized by its efficient operation when turning in either direction of rotation.

It is still another object of the present invention to provide a propeller which is constructed and arranged so that it can be manufactured at relatively low cost, and one which is relatively light in weight.

According to the present invention, a propeller is provided which has a hub portion and a plurality of blades radiating therefrom, with each blade having a leading edge, an outer circumferential edge and a trailing edge shaped to provide optimum weedless conditions irrespective of the direction of rotation of the propeller. In a preferred form of the invention, the leading edge defines a line which is a continuous rearward progression from its origin at the hub portion to its termination at the circumferential edge, and the trailing edge defines substantially a straight line inclined rearwardly from its origin at the outer circumferential edge and to its termination at the hub portion. In this form of the invention, the circumferential edge defines a line which is located on a constant radius from the axis of the hub portion. It is also contemplated that the individual blades can be made from sheet metal stampings which will be suitably secured to the hub portion, as by a welding operation. In this form of the invention each blade will have a uniform thickness throughout its entire surface.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawing forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

In the drawing:

FIGURE 1 is a rear end elevation of a propeller embodying the present invention;

FIGURE 2 is an enlarged fragmentary end elevation illustrating one of the blades of the propeller with dotted lines in the figure to illustrate the manner in which the edges of the blades are established;

FIGURE 3 is a fragmentary top plan view of the blade illustrated in FIG. 2;

FIGURE 4 is a fragmentary side elevation of the blade illustrated in FIGS. 2 and 3; and

FIGURE 5 is a developed blade, showing its shape in a sheet metal blank prior to being warped to the shape of the blade illustrated in FIGS. 2, 3 and 4.

Before explaining the present invention in detail, it is to be understood that the invention is capable of other embodiments and of being practiced or carried out in various ways. It is also to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

Referring now to the drawing, the invention will be described in greater detail. The propeller **10** comprises a hub portion **12** from which the blades **14**, **16** and **18** radiate. Any suitable hub portion construction may be employed, and for a more detailed description of the hub portion **12**, reference is made to copending application Ser. No. 557,227, filed June 13, 1966, for "Propeller Assembly." The propeller blades **14**, **16** and **18** are suitably secured to the outer sleeve **20** of hub portion **12** by a welding operation. Each of the blades **14**, **16** and **18** have the same configuration, and therefore only blade **14** will be described in detail. As shown in the drawing, the propeller blade **14** has a leading edge **22** which originates at the hub portion **12** and terminates at the circumferential edge **24**. The circumferential edge **24** defines the shape of the propeller at the outer circumference and this edge extends rearwardly to the trailing edge **26** which extends radially inwardly until it terminates at the hub portion **12**. As can be seen best in FIG. 2, the leading edge **22** defines a line which is a continuous rearward progression from its origin at the hub portion **12** to its termination at the circumferential edge **24**. Thus, there is no portion on the leading edge where weeds or the like can be caught or trapped so as to entangle the propeller blade.

As also can be seen best in FIG. 2, the circumferential edge **24** defines a line which remains at a constant radius from the axis **28** of the hub portion **12**. Similarly, the trailing edge **26** can be seen to be substantially a straight line from the terminal edge of the circumferential edge **24** to its point of termination on the hub portion **12**. The trailing edge **26** is inclined rearwardly at a uniform slope from its point of origin at circumferential edge **24** to its point of termination on hub portion **12**. Thus, this trailing edge also does not have any portion of its length on which weeds or the like can be snagged or retained when the propeller **10** is rotating in a reverse direction.

In forming the propeller blade **14**, it is preferred that it be made from a sheet metal stamping or blank **30** shown in its developed or flat shape in FIG. 5. For the purpose of establishing the shape of blank **30**, the optimum shape of the blade **14** is initially determined, as shown in FIG. 2, wherein the dotted radial lines **32**, which are at ten degree intervals, are shown intersecting circular lines **34** which increase in radius in uniform increments so as to define a line, passing through the points of intersection, having a continuous rearward progression. Seven of such ten degree intervals are provided for establishing the line. Thereafter the outer circumferential edge **24** is determined by extending two more of such ten degree intervals from the same center, and the edge **24** is defined by an arc of a circle having the same center. The trailing edge **26** is established by extending a substantially straight line from the end of the edge **24** to a point on hub portion **12** which is ten degrees beyond the last ten degree interval used in defining the arc for the edge **24**. The pitch of the propeller can be varied depending on the use that is to be made of the propeller. If it is to be used in connection with a light load, a higher pitch may be employed than is the case when the boat that is to be propelled is relatively heavy, in which case a lower pitch will be employed. The extent of the pitch to be employed will thus vary in a manner well known to those skilled in the art.

Having established the desired shape of a blade **14**, a developed shape can be projected therefrom which will be essentially the shape of the blank **30** shown in FIG. 5. This shape will then be used as a pattern by which the blank **30** can be formed in a stamping operation. After the blanks **30** have been formed, they will be warped to the illustrated shape of the blade **14**, and thereafter the

blades **14**, **16** and **18** can be welded to the outer sleeve **20** by any suitable means.

From the foregoing description, it will be observed that an improved propeller has been provided which can be turned either in a forward or in a rearward direction without having surfaces or edges on which weeds can be caught and entangled. The propeller blades also have maximum surface areas at their outer circumferences so as to provide optimum working conditions for the propeller for turning in both directions. The propeller is light in weight and can be economically produced so as to provide a relatively low cost unit.

Having thus described my invention, I claim:

1. A propeller having a hub portion and three blades of uniform thickness throughout radiating therefrom, each blade overlying 100 degrees of the circumference of the hub portion and having in sequence a leading edge which overlies 70 degrees of said circumference, an outer circumferential edge which overlies 20 degrees of said circumference and a trailing edge which overlies 10 degrees of said circumference, said leading edge defining a line which is a continuous rearward progression from its origin at the hub portion to its termination at the circumferential edge, said circumferential edge defining a line which is substantially a constant radius from the axis of said hub portion, said trailing edge defining a substantially straight line inclined rearwardly from its origin at said outer circumferential edge to its termination at said hub portion.

2. A propeller according to claim **1**, wherein said blades are integrally joined to said hub portion by welded joints.

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