July 5, 1927. 1,634,329

H. MALM

PROPELLER

Filed April 24, 1926

Fig. 1,

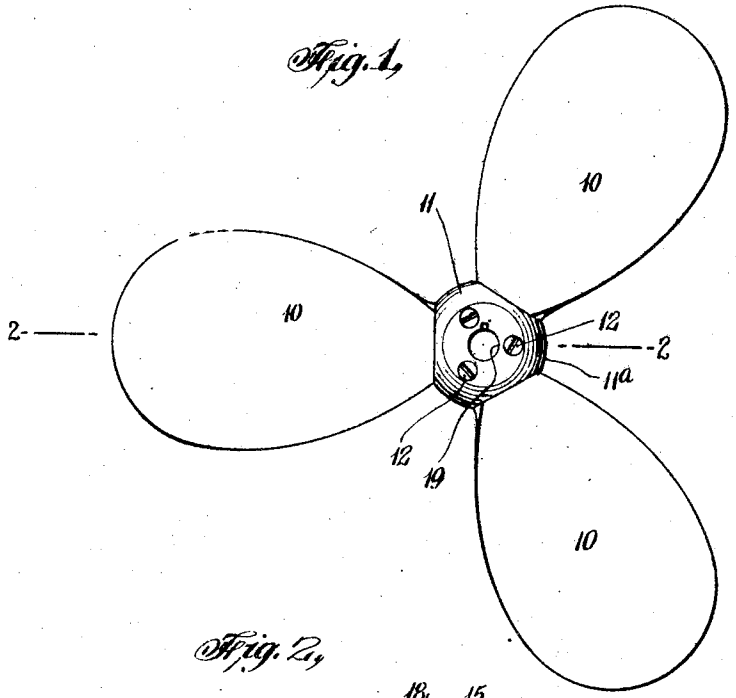


Fig. 2,

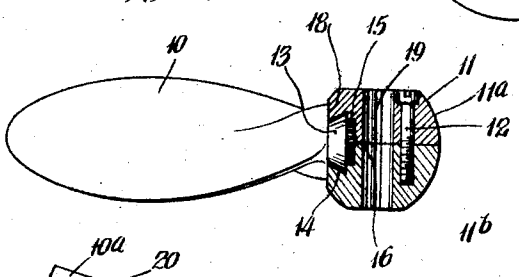


Fig. 3,

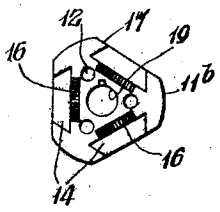


Fig. 4,

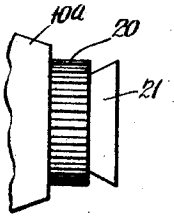


Fig. 6,

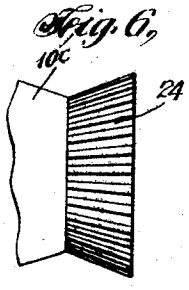


Fig. 7,

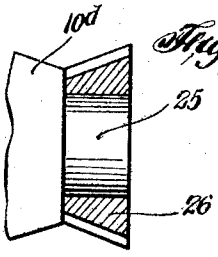
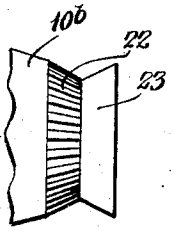


Fig. 5,



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UNITED STATES PATENT OFFICE.

HENRY MALM, OF NEW YORK, N. Y.

PROPELLER.

Application filed April 24, 1926. Serial No. 104,331.

This invention relates to propellers for marine or other uses comprising two or more propeller blades extending radially from the axis or hub portion; and the object of the invention is to provide a device of the class specified with means whereby the blades of the propeller may be adjustably supported in a hub or axis body whereby said blades may be adjusted to give different pitches thereto to adapt the propeller to motors of different sizes or horse power or to variations in the power of a given motor whereby the most efficient results may be produced; a still further object being to provide a propeller, the separate blades of which are of similar construction permitting of the production of a propeller, the blades of which are truly balanced or of equal weight as well as similar contour throughout; a still further object being to provide a propeller construction wherein the separate blades may be removed and new blades replaced or substituted therefor in the event of breakage or for other purposes, the adjustable coupling of the blades with the hub portion being made by a dove-tailed and gear-like portion or portions interlocking with corresponding recesses or apertures in the separate halves of said hub portion; and with these and other objects in view, the invention consists in a device of the class and for the purpose specified, which is simple in construction, efficient in use, and which is constructed as hereinafter described and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawing forms a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which:—

Fig. 1 is a face view of a propeller made according to my invention.

Fig. 2 is a partial section on the line 2—2 of Fig. 1.

Fig. 3 is a face view of one part of the hub portion which I employ.

Fig. 4 is a detail view of one end of a propeller showing a modification; and,

Figs. 5, 6 and 7 are views similar to Fig. 4 but showing other modifications.

In Fig. 1 of the drawing, I have shown for the purpose of illustrating one method of carrying my invention into effect, a propeller consisting of three blade members 10, of similar shape, form and construction mounted in connection with a hub or axis portion or member 11, the latter being composed of two substantially similar parts 11^a and 11^b coupled together by a number of screws 12 which in the construction shown pass through the part 11^a and are in threaded engagement with the part 11^b.

All of the propeller blade members 10 are provided at their hub portions with dove-tailed annular projections 13 which enter corresponding recesses 14 in the parts 11^a and 11^b. At the end of the dove-tailed portions 13 are projecting and externally threaded annular members 15 to form substantial gear members thereof having radially projecting teeth adapted to engage correspondingly formed recesses 16 in the separate parts 11^a and 11^b of the hub member 11.

It will be noted upon a consideration of Figs. 2 and 3 of the drawing that the separate parts 11^a and 11^b of the hub member 11 are provided with flat outer faces 17 against which the shoulders 18 in the propeller blades 10 are adapted to rest whereby when the blades 10 are mounted in position, the hub member 11 forms a substantial hub extension to said blades, resembling the natural appearances of a propeller having unitary hub and blade portions. It will be noted on a consideration of Fig. 3 of the drawing that the screws 12 pass through the separate parts 11^a and 11^b intermediate the recesses 14 and 16 and said parts having ports or apertures 19 in which the shaft with which the propeller is adapted to be coupled, is placed.

With the construction shown in Figs. 1 to 3 inclusive, it will be apparent that the dove-tailed extensions 13 on the separate blade members 10 serve to anchor said blade members within and to the hub member 11, and the gear portion 15 on said blade members engaging the tooth-cut apertures or recesses 16 in the separate parts 11^a and 11^b, serves to interlock and key the blade members 10^a against rotation in the hub member 11.

In Fig. 4 of the drawing, I have shown a modification of the construction shown in Figs. 1 to 3 inclusive, in which a part of a blade member 10^a similar to the blade 10 is provided with a projecting annular threaded or gear portion 20 next adjacent the blade and inwardly thereof with a projecting annular dove-tailed portion 21. With this construction, the diameter of the gear portion 20 becomes larger than in the con-

struction shown in Fig. 2 giving greater strength and durability thereto and also strengthening the line of junction between the parts 20—21 and the blade proper 10^a.

In Fig. 5 of the drawing, I have shown a part of a blade 10^b, the inner face portion of which is beveled inwardly and threaded to form a beveled gear face 22. Inwardly of said gear face 22 is an annular dove-tailed projection 23 and with this form of construction, it will be apparent that the widest possible gear face is obtained other than a structure similar to Fig. 4 of the drawing, thus producing a strong and durable dove-tailed lock and key against rotary displacement.

In Fig. 6 of the drawing, I have indicated at 10^c part of another blade, which is provided at the hub end portion with a projecting dove-tailed member 24 externally threaded to form a beveled gear or what might be termed a dove-tailed gear portion. In this construction, the one member or projection 24 locks the blade member 10^c against radial displacement as well as circumferential movement within the hub member employed.

In Fig. 7 of the drawing, the part of the propeller blade 10^d shown, has a projecting member 25 onto which is sweated or otherwise fixedly secured a ring 26, the outer face of which is beveled and threaded to form a gear ring thereof, which functions in the same manner as in the construction shown in Fig. 6. By making the ring 26 separate, the operation of cutting the gear teeth or other projections will be facilitated.

It will be understood that in the construction shown in Figs. 4 to 7 inclusive, a hub portion or member similar to the member 11 will be provided, the same being modified to suit the modified shape, form and construction of the hub portion of the blade members 10^a, 10^b, 10^c and 10^d. For this reason, the repetition of said hub member has not been carried out as it is quite apparent that the shape of the inner ends of the respective blades will govern the shape of the recesses in the hub member employed.

It will also be understood that where I refer to the geared or threaded parts, it is to be assumed that this phraseology refers to any part or member having projecting teeth or radial projections of any kind or class sufficient in number to permit of substantially fine circumferential adjustment whereby the relative pitch of the blades 10 to 10^d inclusive may be adjusted to suit the desired conditions, it being understood that all of said blades may be adjusted to a given pitch or the pitch of the respective blades may be varied. While I have shown certain details of construction for carrying my invention into effect, it will be understood that various changes in and modifications of the construction herein shown and described may be made within the scope of the appended claims without departing from the spirit of my invention or sacrificing its advantages.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a propeller of the class described, a blade member, the hub end portion of which is provided with a projecting part having a plurality of radially directed and circumferentially spaced teeth, and said projecting part being dove-tailed in form whereby said blade may be locked against displacement from a hub portion.

2. The combination with a separable part hub portion of a propeller, of a propeller blade detachably and adjustably mounted in connection with said hub portion, means on said hub portion and propeller for retaining the parts against relative movement when the propeller is in use, and said hub portion and blade having intermeshing gear faces.

3. The combination with a separable part hub portion of a propeller, of a propeller blade detachably and adjustably mounted in connection with said hub portion, means on said hub portion and propeller for retaining the parts against relative movement when the propeller is in use, said hub portion and blade having intermeshing gear faces, and interlocking dove-tailed portions.

4. In a propeller of the class described, a blade member, the hub end portion of which is provided with a projecting part having a plurality of radially directed and circumferentially spaced teeth, said projecting part being dove-tailed in form whereby said blade may be locked against displacement from a hub portion, and said blade member being provided outwardly of the projecting part with a shoulder portion adapted to seat upon said hub portion.

5. In a propeller of the class described, a blade member, a projecting dove-tailed part at the hub end portion of said blade member, the wide end of said dove-tailed part being adjacent the axis of the hub portion of the propeller and the narrow end directed outwardly, and a shoulder portion adjacent and outwardly of said dove-tailed part.

6. In a propeller of the class described, a blade member, a projecting dove-tailed part at the hub end portion of said blade member, the wide end of said dove-tailed part being adjacent the axis of the hub portion of the propeller and the narrow end directed outwardly, said projecting part having a plurality of substantially circumferentially spaced teeth or projections.

7. In a propeller, a hub portion divided transversely of the axis thereof to form two independent parts, said parts having on ad-

jacent faces and arranged about the periphery of said hub portion, dove-tailed recesses, and means for coupling said parts together.

8. In a propeller, a hub portion divided transversely of the axis thereof to form two independent parts, said parts having on adjacent faces and arranged about the periphery of said hub portion, dove-tailed recesses, means for coupling said parts together, and propeller blades having dove-tailed projections adapted to be mounted in the recesses of said parts and retained against displacement from said hub portion when the separate parts thereof are secured together.

9. In a propeller, a hub portion divided transversely of the axis thereof to form two independent parts, said parts having on adjacent faces and arranged about the periphery of said hub portion, dove-tailed recesses, means for coupling said parts together, propeller blades having dove-tailed projections adapted to be mounted in the recesses of said parts and retained against displacement from said hub portion when the separate parts thereof are secured together, and the recessed portions of said parts and the dove-tailed projections of the propeller blades having interlocking members to permit of rotary adjustment of the blades with reference to the hub portion and to retain said blades against rotary displacement with reference to the hub portion.

10. In a propeller of the class described, a blade member, the hub end portion of which is provided with a projecting part having a plurality of radially directed and circumferentially spaced teeth, and said projecting part being dove-tailed in form whereby said blade may be locked against displacement from a hub portion, and said blade member having a shoulder portion arranged adjacent the dove-tailed part and outwardly thereof with reference to the hub portion of the propeller.

In testimony that I claim the foregoing as my invention I have signed my name this 21st day of April, 1926.

HENRY MALM.