

Nov. 13, 1951

M. K. BENSON
ADJUSTABLE PROPELLER

2,574,951

Filed Aug. 3, 1945

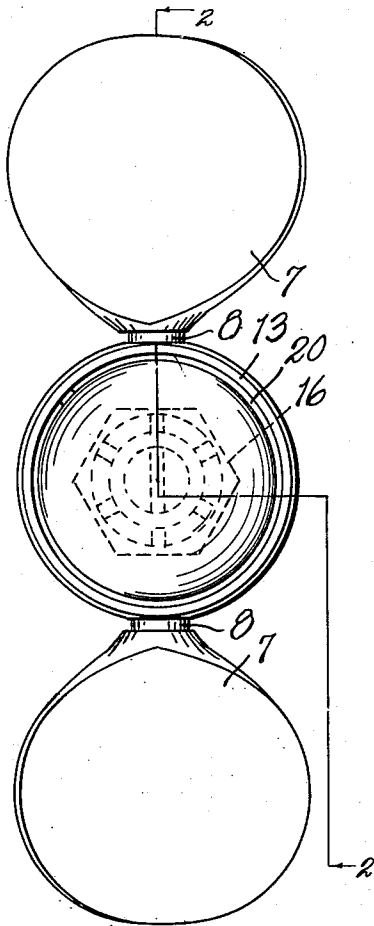


FIG. 1

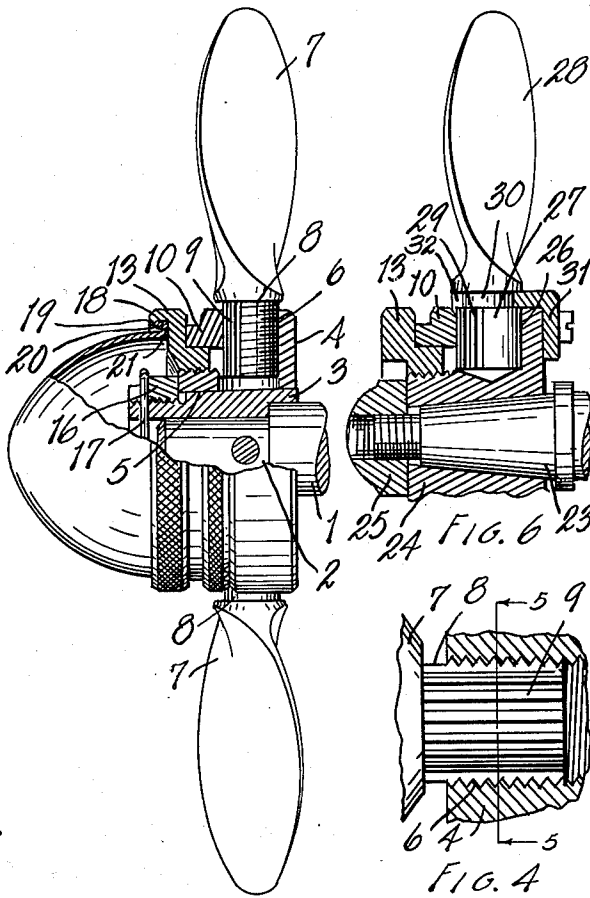


FIG. 2

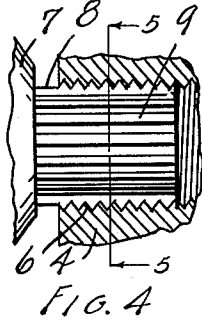


FIG. 4

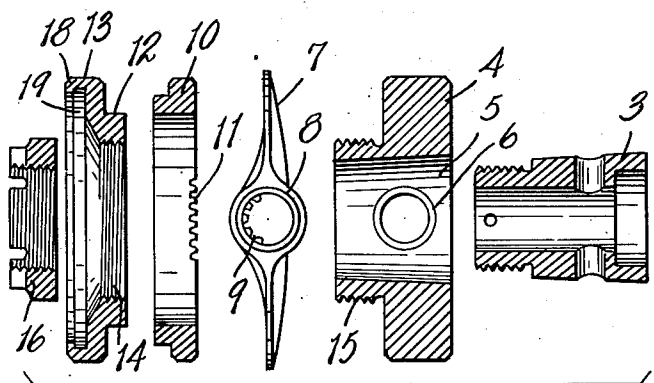


FIG. 3

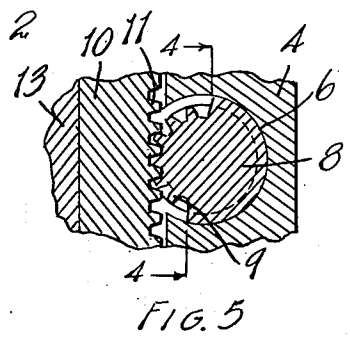


FIG. 5

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2,574,951

ADJUSTABLE PROPELLER

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Application August 3, 1945, Serial No. 608,746

12 Claims. (Cl. 170-160.24)

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This invention relates to improvements in adjustable propellers.

The main objects of this invention are:

First, to provide an adjustable propeller well adapted for motor boats, outboard motors and the like in which adjustments may be very quickly and easily made, the blades being simultaneously and uniformly adjusted and when adjusted, readily clamped or secured in their adjusted positions.

Second, to provide a propeller having adjustable blades and one in which the adjusting means is very simple and compact and does not detract from the appearance—in fact, one which may be embodied in a structure which is very attractive in appearance.

Third, to provide a structure having adjustable propeller blades in which there is no slack in the blades after they have been adjusted.

Fourth, to provide an adjusting mechanism for adjustable propeller blades which is compact and light in weight and may be readily embodied in propellers such for example as those used in outboard motors where weight is an important factor.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined and pointed out in the claims.

Preferred embodiments of the invention are illustrated in the accompanying drawing, in which:

Fig. 1 is a rear elevation of a propeller embodying my invention with the blades approximately in feathering position, certain structural details being indicated by dotted lines.

Fig. 2 is a side view partially in section on the broken line 2-2 of Fig. 1.

Fig. 3 is an exploded view, showing only one of the propeller blades, the parts other than the blades being shown in central longitudinal section.

Fig. 4 is an enlarged fragmentary view showing the relation of the propeller to the hub and certain structural details thereof, the view being partially in section on line 4-4 of Fig. 5.

Fig. 5 is a fragmentary view in section on line 5-5 of Fig. 4.

Fig. 6 is a fragmentary view partially in longitudinal section of a modified form or embodiment of my invention.

In the embodiment of my invention shown in Figs. 1 to 5 inclusive, 1 represents the propeller shaft having a reduced portion 2 at its rear end adapted to receive the adapter 3 for the propeller hub 4. The adapter is desirable in that it adapts the propeller to various designs and sizes of propeller shafts. It will be understood of course that interiorly the adapter is shaped to the particular shaft on which the propeller is

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to be used. The adapter is externally tapered to fit the internal taper 5 of the hub 4.

The hub is provided with radial sockets 6 provided with internal threads, these sockets being open at one side, as best shown in Fig. 5. In effect, the sockets are segmental.

The blades 7 are provided with stems 8 having segmental or mutilated threaded portions in threaded engagement with the threads of the sockets. The stems also have longitudinal rack teeth 9 providing segmental rack portions complementary to the threaded portions of the stems and exposed through the side openings of the sockets.

The annular adjusting member 10 is provided with rack segments 11 coacting with the racks of the propeller stems. These adjusting members 10 are rotatably supported on the shoulders 12 of the clamping nuts 13 which are internally threaded at 14 to coact with the external threads 15 on the rear end of the hub. The clamping member 13 when loosened permits the rotative adjustment of the adjusting member 10 and that adjustment results in the simultaneous rotative adjustment of the blades. When properly adjusted, the clamping member 13 is tightened. This clamps the adjusting member against the stems and clamps the stems in the sockets. The threaded engagement of the blade stems with the sockets is provided to secure effective connection for the stems to the hubs. While some axial adjustment of the blades takes place, this is so slight as not to materially change the diameter of the propeller. The adjusting member 10 and the clamping member 13 are preferably peripherally knurled to facilitate manipulation.

The adapter is drawn into the hub by means of the nut 16 threaded upon the end of the adapter and secured by means of the cotter pin 17, the nut being of the castellated type.

In the embodiment shown in Figs. 1 to 5, the clamping member 13 is provided with a rearwardly projecting flange 18 having an internal groove 19 adapted to receive the snap ring 20, this snap ring retainingly engaging the outwardly projecting flange 21 on the inner end of the housing 22.

In the embodiment of my invention shown in Fig. 6 the propeller shaft 23 has a rearwardly tapered end portion, the hub 24 being correspondingly tapered. The retaining nut 25 is threaded upon the end of the shaft to engage the end of the hub. In this embodiment, the sockets 26 are not threaded, the stems 27 of the blades 28 having segmental cylindrical portions fitting within the sockets. The sockets, however, are open on one side and the blade stems are provided with racks 29 corresponding to the racks described. The adjusting member 10 and the clamping member 13 function as have been

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described for the previously described embodiment.

In this embodiment of Fig. 6 the stems are provided with annular grooves 30 which are engaged by the retaining member 31 secured to the hub and slotted at 32 to engage the groove portion of the stems. With the parts thus arranged, the propeller blades may be quickly and uniformly adjusted.

While the propellers have a wide adaptation, this feature makes them particularly desirable for use in motor boats and the like where fishermen, for example, desire to travel rapidly to and from a fishing area and the blades may be adjusted for that purpose. At the fishing area, it is desirable to control the speed of the boat, for trolling or in casting, to move quietly about the area, and the blades can be adjusted to secure the desired speed.

I have illustrated and described my propeller in embodiments thereof which I consider highly practical. I have not attempted to illustrate or describe various embodiments or adaptations thereof for different uses as it is believed that this disclosure will enable those skilled in the art to embody or adapt my invention as may be desired.

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

1. In a propeller, the combination of a hub provided with segmental radial internally threaded sockets open on their rear sides, said hub being externally threaded at its rear end, propeller blades having stems provided with segmental threaded portions in threaded engagement with said segmental threaded sockets and having segmental rack portions exposed through the side openings of said sockets, a clamping nut coaxing with the threads of said hub, said clamping nut being externally shouldered on its inner side and having a rearwardly projecting annular flange provided with an internal groove, an annular adjusting member rotatably mounted on the shoulder of said clamping nut and having racks on its inner edge coaxing with the racks of said stems whereby on the rotation of said adjusting member the propeller blades are simultaneously and uniformly adjusted, said adjusting member being releasably clamped upon said stems by said clamping member, a housing member provided with a peripheral flange fitting within the flange of said clamping nut, and a snap ring engaging said groove in said clamping nut flange for retaining said housing member.

2. In a propeller, the combination of a hub provided with segmental radial internally threaded sockets open on their rear sides, said hub being externally threaded at its rear end, propeller blades having stems provided with segmental threaded portions in threaded engagement with said segmental threaded sockets and having segmental rack portions exposed through the side openings of said sockets, a clamping nut coaxing with the threads of said hub, said clamping nut being externally shouldered on its inner side, and an annular adjusting member rotatably mounted on the shoulder of said clamping nut and having racks on its inner edge coaxing with the racks of said stems whereby on the rotation of said adjusting member the propeller blades are simultaneously and uniformly adjusted, said adjusting member being releasably clamped upon said stems by said clamping member.

3. In a propeller, the combination of an in-

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ternally tapered hub provided with segmental radial internally threaded sockets open on one side, propeller blades having stems provided with segmental threaded portions in threaded engagement with said segmental threaded sockets and having segmental rack portions exposed through the side openings of said sockets, a clamping nut having an axially threaded engagement with said hub, said clamping nut being externally shouldered on its inner side, an annular adjusting member rotatably mounted on the shoulder of said clamping nut and having racks on its inner edge coaxing with the racks of said stems whereby on the rotation of said adjusting member the propeller blades are simultaneously and uniformly adjusted, said adjusting member being releasably clamped upon said stems by said clamping member, an externally tapered adapter within said hub, and a nut threaded upon the rear end of said adapter to draw the same into said hub.

4. In a propeller, the combination of a hub provided with segmental radial internally threaded sockets open on one side, propeller blades having stems provided with segmental threaded portions in threaded engagement with said segmental threaded sockets and having segmental rack portions exposed through the side openings of said sockets, a clamping nut having an axially threaded engagement with said hub, said clamping nut being externally shouldered on its inner side, and an annular adjusting member rotatably mounted on the shoulder of said clamping nut and having racks on its inner edge coaxing with the racks of said stems whereby on the rotation of said adjusting member the propeller blades are simultaneously and uniformly adjusted, said adjusting member being releasably clamped upon said stems by said clamping member.

5. In a propeller, the combination of an internally tapered hub provided with sockets having side openings, propeller blades having stems having threaded engagement with said sockets and having segmental racks exposed through the said side openings thereof, a clamping nut threaded upon said hub, an annular adjusting member rotatably mounted on said clamping nut and having racks coaxing with the racks of said stems whereby on the rotation of said adjusting member the propeller blades are simultaneously adjusted, said adjusting member being releasably clamped upon said stems by said clamping member to anchor the blades in their adjusted position, an externally tapered adapter within said hub, and a nut threaded upon said adapter to draw the same into said hub.

6. In a propeller, the combination of a hub provided with sockets having side openings, propeller blades having stems having threaded engagement with said sockets and having segmental racks exposed through the said side openings thereof, a clamping nut threaded upon said hub, and an annular adjusting member rotatably mounted on said clamping nut and having racks coaxing with the racks of said stems whereby on the rotation of said adjusting member the propeller blades are simultaneously adjusted, said adjusting member being releasably clamped upon said stems by said clamping member to anchor the blades in their adjusted position.

7. In a propeller, the combination of a hub provided with sockets having side openings, propeller blades having stems having threaded engagement with said sockets and having racks

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exposed through the said side openings thereof, a clamping nut threaded upon said hub and having a rearwardly projecting annular flange, an annular adjusting member rotatably mounted on said clamping nut and having racks coacting with the racks of said stems whereby on the rotation of said adjusting member the propeller blades are simultaneously adjusted, said adjusting member being releasably clamped upon said stems by said clamping member to anchor the blades in their adjusted position, and a housing member detachably secured within the peripheral flange of said clamping member.

8. In a propeller, the combination of a hub provided with radial sockets having segmental side openings through one face of said hub, blades provided with stems engaged in said sockets and having segmental rack toothed portions of said stems exposed through said socket side openings, the sides of the sockets opposite from the segmental side openings thereof having walls for supportingly and slidably engaging the sides of the stems opposite the segmental toothed portion thereof, a blade adjusting and clamping member provided with racks coacting with said rack teeth, and a clamping nut threaded upon said hub and radially supporting and axially adjustably supporting said adjusting member whereby the blades may be simultaneously adjusted on their axes, said nut clamping said adjusting member in its adjusted position upon said stems and releasably clampingly engaging the sides of the stems opposite from the segmental toothed portions thereof against the walls of the sockets opposite the segmental side openings thereof, said hub having a centrally disposed opening therethrough for the reception of propeller operating means.

9. In a propeller, the combination of a hub provided with radial sockets having segmental side openings, blades provided with stems engaged in said sockets and having segmental rack toothed portions of said stems exposed through said socket side openings, the sides of the sockets opposite from the segmental side openings thereof having walls for supportingly and slidably engaging the sides of the stems opposite the segmental toothed portion thereof, a blade adjusting and clamping member provided with racks coacting with said rack teeth, and a clamping member axially adjustably supporting said adjusting member whereby the blades may be simultaneously adjusted on their axes, said clamping member clamping said adjusting member in its adjusted position upon said stems and releasably clampingly engaging the sides of the stems opposite from the segmental toothed portions thereof against the walls of the sockets opposite the segmental side openings thereof, said hub having a centrally disposed opening therethrough for the reception of propeller operating means.

10. In a propeller, the combination of a hub provided with sockets having segmental side openings, propeller blades having stems disposed in said sockets and having segmental racks exposed through the openings thereof, the sides of the sockets opposite from the segmental side openings thereof having walls for supportingly engaging the sides of the stems opposite from the segmental racks thereof, a clamping member carried by said hub, and an adjusting member carried by said clamping member and having racks coacting with the racks of said stems whereby on the adjustment of said adjusting

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member the propeller blades are simultaneously adjusted, said adjusting member being releasably clamped upon said stems by said clamping member, and said sides of the stems opposite from said segmental racks thereof being releasably clampingly engaged upon the walls of the socket opposite from the segmental side openings thereof by said clamping member to anchor the blades in their adjusted positions, said hub having a centrally disposed opening therethrough for the reception of propeller operating means.

11. In a propeller, the combination of a hub provided with radial sockets having side openings, blades provided with stems having annular grooves at their outer ends, said stems having segmental cylindrical portions coacting with said sockets and rack portions within said socket side openings, an annular blade adjusting and clamping member provided with racks coacting with said rack teeth, and a clamping nut threaded upon said hub and having a shoulder rotatably supporting said adjusting member whereby the blades may be simultaneously adjusted on their axes, said nut clamping said adjusting member in its adjusted position upon said stems, and a retaining member secured upon said hub and transversely slotted to engage the peripheral grooves in said blade stems.

12. In a propeller, the combination of a hub provided with radial sockets having side openings along segments of the sides of said sockets, blades provided with stems having segmental cylindrical portions coacting with said sockets and segmental rack portions within said socket side openings, the sides of the sockets opposite from the side openings thereof having walls for supportingly engaging the cylindrical portions of the stems, an annular blade adjusting and clamping member provided with racks coacting with said rack teeth, and a clamping nut threaded upon said hub and having a shoulder rotatably supporting said adjusting member whereby the blades may be simultaneously adjusted on their axes, said nut clamping said adjusting member in its adjusted position upon said stems and releasably clampingly engaging the cylindrical portions of said stems against the walls of said sockets opposite from the side openings thereof, said hub having a centrally disposed opening therethrough for the reception of propeller operating means.

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