Sept. 20, 1960 C. A. O'CONNOR 2,953,208

VARIABLE PITCH MARINE PROPELLER

Filed May 15, 1958

Fig. 1.

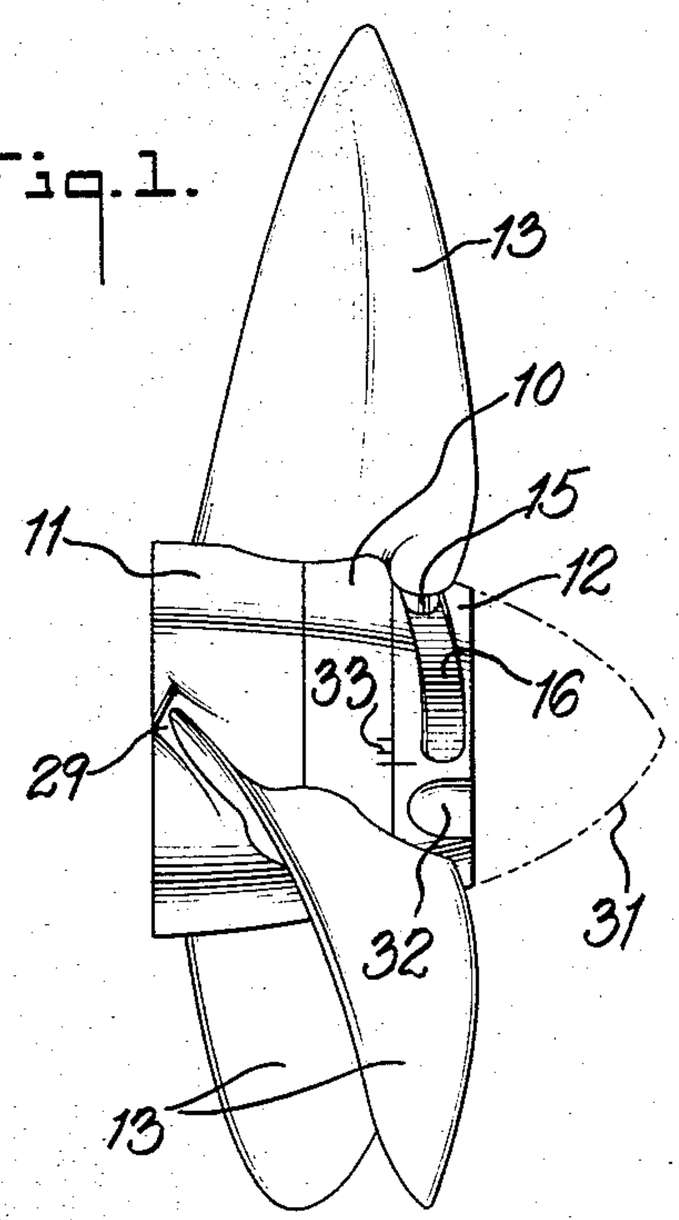


Fig. 2.

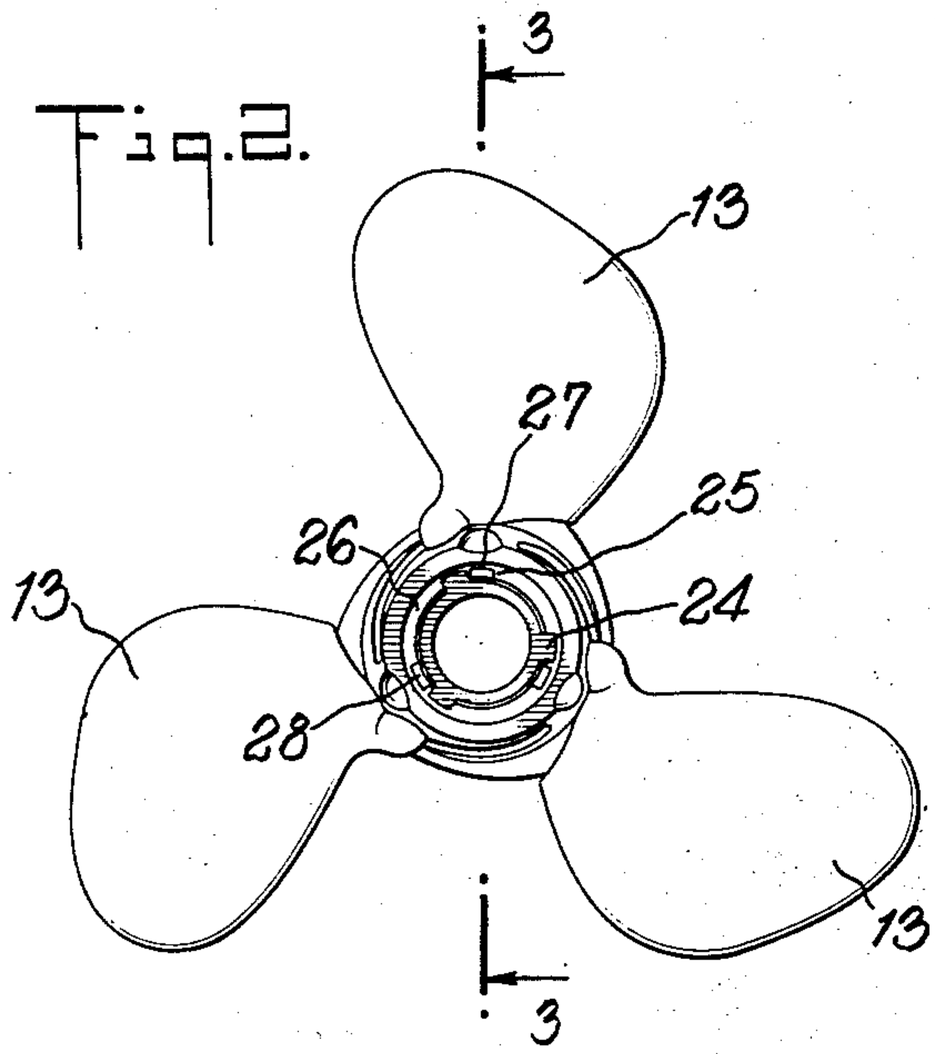


Fig. 3.

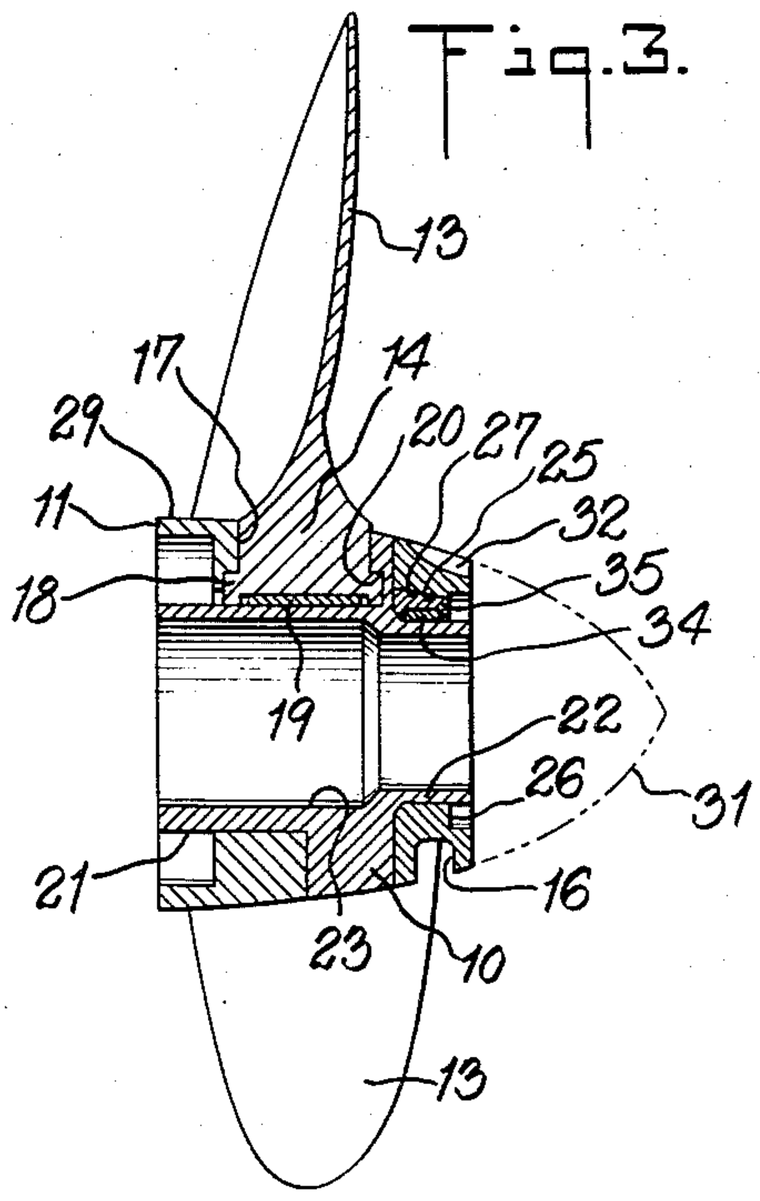
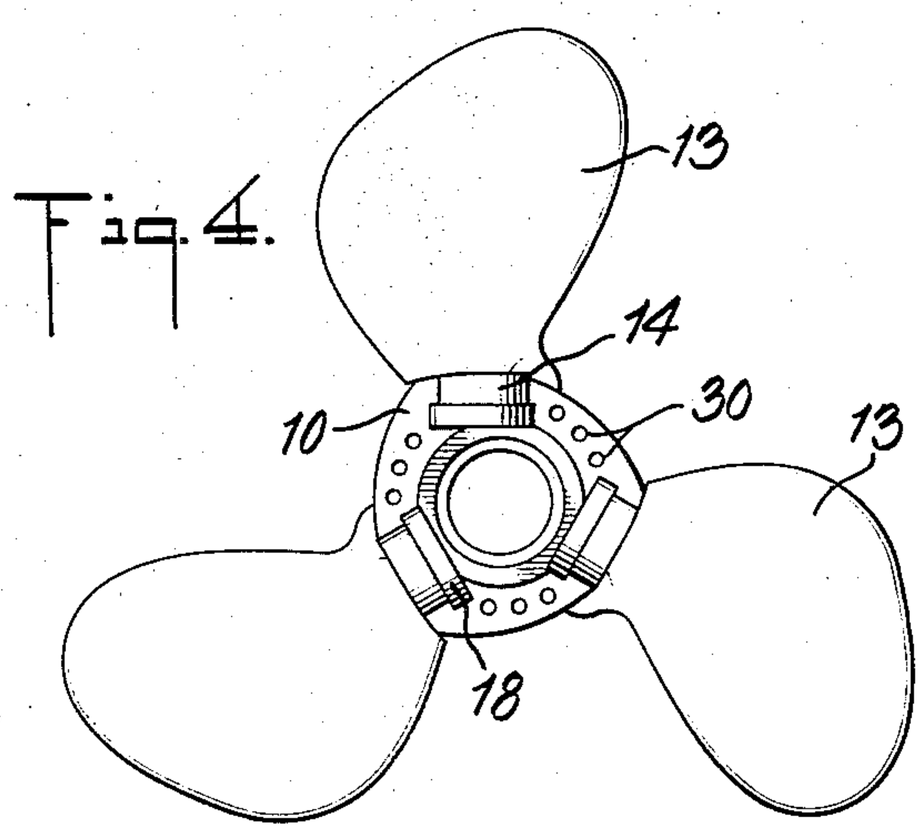


Fig. 4.



INVENTOR.
CHARLES A. O'CONNOR
BY Albert T. Kronman
ATTORNEY

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VARIABLE PITCH MARINE PROPELLER

Charles A. O'Connor, Wantaugh, N.Y., assignor, by direct and mesne assignments, to Lesnor Maehr Marine Co., Inc., Floral Park, N.Y., a corporation of New York

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7 Claims. (Cl. 170—160.24)

This invention relates to propellers and particularly to variable pitch propellers which are used on marine propulsion devices and which may be manually adjusted to improve the operation thereof.

Presently known marine propellers, such as are used on outboard motors and the like have blades which are fixed in relationship to the hub of the propeller assembly. Under certain conditions and a different speeds it is desirable to vary the pitch of the propeller blades to achieve a more favorable result.

Accordingly, it is an object of the present invention to provide a propeller for a marine propulsion device which may be varied to suit the need of the user.

Another object of the present invention is to provide a variable pitch propeller which may be easily substituted for the presently used propellers on outboard motors and the like.

A further object of the present invention is to provide a variable pitch propeller in which the blade variation may be brought about without the use of tools or by a time consuming operation.

Still another object of the present invention is to provide a variable pitch propeller which will maintain its setting despite the vibration and thrust of the blades in their passage through the water.

An object of the present invention is to provide a variable pitch marine propeller which will be durable and troublefree in its operation.

A feature of the present invention is its use of a control ring for guiding the trailing edge of the propeller blades.

Another feature of the present invention is its simplified hub and blade assembly.

Still another feature of the present invention is its use of brake blocks to prevent the blade control ring from shifting out of its set position.

The invention consists of the construction, combination and arrangement of parts, as herein illustrated, described and claimed.

In the accompanying drawing, forming a part hereof is illustrated one form of embodiment of the invention and in which:

Figure 1 is a view in side elevation of a complete embodiment of the present invention with the propeller hub nut shown in dotted lines.

Figure 2 is a view in rear elevation of the propeller shown in Figure 1 somewhat reduced in scale, with the nut member removed.

Figure 3 is a longitudinal section taken on line 3—3 of Figure 2.

Figure 4 is a view in front elevation of the propeller on a somewhat reduced scale with the blade retaining ring removed, to show the manner in which the blades are held in the hub.

Referring to Figure 1 it will be seen that the propeller member consists of a hub **10**, a retaining ring **11**, on one end of the hub and a control ring **12** on the opposite end thereof. Propeller blades **13** are pivotally secured to

the hub **10** and retaining ring **11** as shown in Figure 3. Each blade **13** is provided with a pivot shaft **14** which extends from that portion of the base thereof which is near the leading edge of the blade. A guide detent depends from the base of the blade's trailing edge.

Each guide detent **15** rides within an identical helical groove **16** which is machined into the guide control ring **12**. The pitch of the groove **16** is preferably gradual as for example ¾" to one revolution to aid in maintaining the blades in their set position. Each pivot shaft **14** is received within a counter bored well **17**, half of which is cut into the retaining ring **11**. A flange **18** on the bottom of the pivot shaft **14** retains the blade **13** within the well **17**.

The blade shafts **14** are provided with a recess in the bottom thereof to receive therein a small disc of resilient material **19** such as a pad of rubber, leather, neoprene or the like. The shock pressure pad **19** serves to eliminate and absorb vibration of the propeller blade **13** and keeps the flange **18** in contact with the bearing surface of the well **17** provided by the shoulder **20** of the counter bored portion of the well **17**.

The hub **10** is formed with a reduced, retaining ring receiving portion **21**, best shown in Figure 3, and a reduced control ring retaining portion **22**, formed on the outboard end of the hub **10**. The interior of the hub **10** is provided with a two diameter bore **23**, the reduced portion of which underlies the control ring **12**. The reduced diameter of the bore **23** enables the control ring to be brought into conformity with the generally streamlined contour of the propeller hub which is desirable in marine structures. The portion of the hub **10** which underlies the control ring **12** is formed with two or more lugs **24**, best shown in Figure 2, and which may be integral with the body of the hub **10**. The outwardly extending lugs **24** slide through spaced tapered longitudinal slots **25** cut in the control ring **12**.

When the control ring **12** is slipped upon the reduced portion **22** of the hub **10**, the lugs **24** slide through the slots **25** until they extend beyond the face of the ring **12**. Thereafter, the ring is turned slightly until its shoulder **26** seats behind the lugs **24** which thereupon firmly lock it to the assembly. The tapered slots **25** are adapted to receive therein one or more brake blocks **27** and a pressure block **28**. Brake blocks **27** substantially fill the tapered cavity formed by the control ring slots **25** and the outer surface of the hub **10**. These brake blocks **27** may be made of cork **34** preferably supported by a wedge of aluminum **35** or by an aluminum block having a layer of nylon, teflon or some other material attached thereto. The pressure block **28** is preferably made of rubber or other resilient material and serves to force the control ring **12** against the hub **10**, squeezing the brake blocks therebetween.

It will be observed from an examination of Figures 2 and 4, that the hub **10** is not circular in cross-section but rather is pitched to provide a supporting bearing surface **29** for the leading edge of the propeller blade. In the embodiment illustrated the propeller is provided with three blades, each of which have a bearing surface **29**, best shown in Figure 1.

The control ring **12**, with the detent **15** slipped into the slot **16** thereof, is brought over the outboard end of the hub and rotated to lock it in place upon the lugs **24**. With the blades **13** in the position shown in Figure 4 within the hub **10**, the retaining ring **11** is slipped over the hub **10** and brought against the blade pivot shafts **17**. The retaining ring may be secured to the hub **10** by means of screws and the threaded bores **30** provided in the hub **10** for this purpose. The propeller shaft nut **31** shown in dashed lines in Figures 1 and 3, may be secured to the

propeller shaft in the customary manner to complete the streamlined appearance of the propeller.

When it is desired to vary the pitch of the blades **13** it is merely necessary to grasp the control ring **12** by means of the finger receiving portions **32** and rotate it slightly until the blades **13** have been swung about their pivot shafts **14** by the travel of the detents **15** within the helical slot **16**. The exact setting of the blades may be selected in advance by means of reference lines **33** which are scribed upon the hub **10** and the ring **12**. Once set, the propeller will remain in its position and operate without change therefrom despite conditions of vibration and the thrust of the water against the blades, because of the gradual incline of the helix of the grooves **16**.

From the foregoing it will be seen that there has been disclosed a variable pitch propeller for marine use which is simple in construction and capable of retaining its adjustment despite prolonged periods of use.

Having thus fully described the invention, what is claimed as new and desired to be secured by Letters Patent of the United States is:

1. An adjustable variable pitch propeller comprising, a hub, a retaining ring on said hub, a control ring rotatably carried on the said hub, blade members pivotally secured at one end by the hub and extending outwardly therefrom, a helical groove in the control ring, a guide detent depending from the trailing edge of each of the blades and slidably received within the groove, brake means to yieldably hold the control ring at any desired setting upon the hub and means to override the brake means and rotate the control ring groove past the guide detents to vary the pitch of the blades.

2. An adjustable variable pitch propeller comprising, a hub, a retaining ring on one end of said hub, a control ring rotatably carried on the end of said hub opposite the retaining ring, blade members pivotally secured at one end by the hub and retaining ring and extending outwardly therefrom, a helical groove in the control ring, a guide detent depending from the trailing edge of each of the blades and slidably received within the groove, brake means to yieldably hold the control ring at any desired setting upon the hub and means to override the brake means and rotate the control ring groove past the guide detents to vary the pitch of the blades.

3. An adjustable variable pitch propeller comprising, a hub, a retaining ring on said hub, a control ring rotatably carried on said hub, blade members, a pivot shaft extending from the base of each blade and pivotally secured at one end by the hub and extending outwardly therefrom, a helical groove in the control ring, a guide detent depending from the trailing edge of each of the blades and slidably received within the grooves, brake means to yieldably hold the control ring at any desired setting upon the hub and means to override the brake means and rotate the control ring groove past the guide detents to vary the pitch of the blades.

4. An adjustable variable pitch propeller comprising, a hub, a retaining ring on said hub, a control ring rotatably carried on the said hub, blade members pivotally secured at one end by the hub and extending outwardly therefrom, a plurality of helical grooves in the control ring, a

guide detent depending from the trailing edge of each of the blades and slidably received within each of the grooves, brake means to yieldably hold the control ring at any desired setting upon the hub and means to override the brake means and rotate the control ring grooves past the guide detents to vary the pitch of the blades.

5. An adjustable variable pitch propeller comprising, a hub, a retaining ring adjacent to the hub at the inboard end thereof, a rotatable control ring carried upon the outboard end of said hub, at least two openings in said hub and retaining ring formed by complementary cavities in the said hub and ring, a blade pivot shaft journaled within each opening, a blade on each shaft extending outwardly from said hub, a guide detent depending from the trailing edge of each blade, a helical groove in the control ring to slidably receive the detent and means including the rotatable, grooved control ring and the guide detents to simultaneously swing the blades to vary the pitch of the propeller.

6. An adjustable variable pitch propeller comprising, a hub, a retaining ring adjacent to the hub at the inboard end thereof, a rotatable control ring carried upon the outboard end of said hub, at least two tapered longitudinal slots in the control ring, outwardly extending lugs on the outboard end of the hub receivable within the slots and extending therebeyond, at least two openings in said hub and retaining ring formed by complementary cavities in the said hub and ring, a blade pivot shaft journaled within each opening, a blade on each shaft extending outwardly from said hub, a guide detent depending from the trailing edge of each blade, a helical groove in the control ring to slidably receive the detent and means including the rotatable, grooved control ring and the guide detents to simultaneously swing the blades to vary the pitch of the propeller.

7. An adjustable variable pitch propeller comprising, a hub, a retaining ring adjacent to the hub at the inboard end thereof, a rotatable control ring carried upon the outboard end of said hub, at least two tapered longitudinal slots in the control ring, outwardly extending lugs on the outboard end of the hub receivable within the slots and extending therebeyond, brake members consisting of resilient blocks carried within the slots and in contact with the hub, at least two openings in said hub and retaining ring formed by complementary cavities in the said hub and ring, a blade pivot shaft journaled within each opening, a blade on each shaft extending outwardly from said hub, a guide detent depending from the trailing edge of each blade, a helical groove in the control ring to slidably receive the detent and means including the rotatable, grooved control ring and the guide detents to simultaneously swing the blades to vary the pitch of the propeller.

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