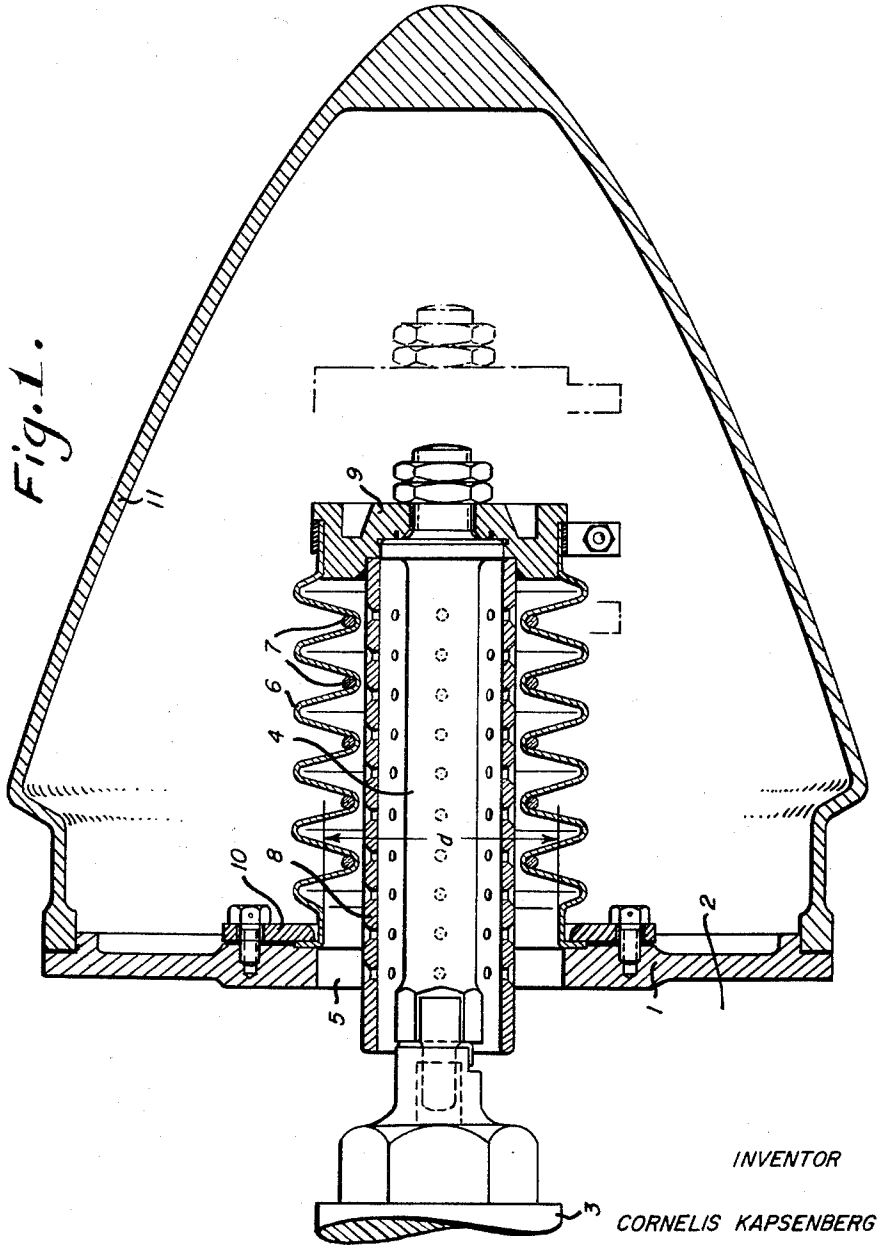
April 19, 1960 C. KAPSENBERG 2,933,141

MARINE ADJUSTABLE-BLADE PROPELLER AND SEALING MEANS THEREFOR

Filed Nov. 1, 1955 2 Sheets-Sheet 1

Fig. 1.



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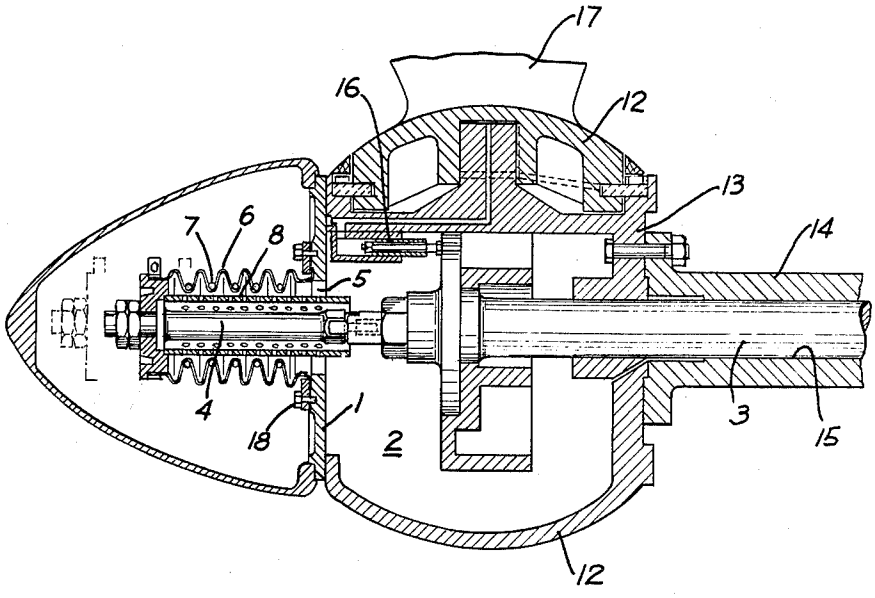
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Fig. 2



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MARINE ADJUSTABLE-BLADE PROPELLER AND SEALING MEANS THEREFOR

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Application November 1, 1955, Serial No. 544,322

Claims priority, application Netherlands November 13, 1954

4 Claims. (Cl. 170—160.23)

The invention relates to a marine (or ship's) propeller with adjustable blades, the adjustment being effected by means of a rod adapted to move in a bore in the propeller shaft, while the propeller hub and the bore are filled with oil and the propeller is provided with a device for compensating the change of volume of the free space in the hub owing to the reciprocating movement of the adjusting rod and for sealing the mechanism in the hub against the penetration of outboard water. A marine propeller of this type is known from the British patent specification No. 208,434. In this known construction the adjusting rod passes through the back wall of the hub with a part as thick (of the same diameter) as the part with which it passes through the front wall of the hub, so that the movement of the adjusting rod leaves the volume of the free space constituted by a chamber in the interior of the hub unchanged. The adjusting rod extends through the back wall of the hub into a space outside said back wall which is in open communication with the outboard water. This involves the drawback that there is a great risk of sea-water entering into the chamber of the propeller hub or of oil leaking out of this chamber, thus increasing the risk of sea-water entering the same.

The invention aims at providing a construction which does not involve this risk.

To achieve this end, according to the invention the adjusting rod or its extension passes through an opening in the back wall of the hub chamber, and the opening in the latter is sealed by means of a concentric bellows, the averagely operative cross-sectional area of the bellows being equal to the cross-sectional area of the adjusting rod where the latter enters the hub chamber through the front wall thereof.

A bellows of the type here referred to is an expedient known per se for application in those cases where a rod has to be passed axially movably through a wall, but where a stuffing box, in view of the leakage risk, cannot be used, while moreover the axial movability of the rod is limited.

The bellows could, of course, extend into the outboard water. It is, however, preferable to protect it therefrom, so as to prolong its life and in particular to prevent the deposition of dirt in its folds, which might interfere with its operation and cause wear. To this end, according to another feature of the invention, a hub-cap preventing the access of outboard water to the bellows is provided over the opening in the back wall of the hub chamber, to the outside of which wall the bellows is fitted.

The drawing illustrates an embodiment of the invention.

Figure 1 is a vertical sectional view of the hub cap and structure included therein rearwardly of the back wall of the propeller hub.

Figure 2 is a vertical sectional view of the propeller hub and hub cap assembly.

Reference numeral 1 designates the back wall of the hub, i.e. the back wall of the hub chamber 2 which is

filled with oil. In the same manner as disclosed in the British patent supra, the hub chamber 2 is provided in the interior of a propeller hub 12 which bears propeller blades 17. This chamber 2 has, apart from the aforesaid back wall 1, a front wall 13 to which the propeller shaft 14 is secured. The shaft 14 is provided with a bore 15 in which the adjusting rod 3 for the propeller is reciprocatingly housed. The adjusting rod 3, extends through the chamber 2 and operates through an axial movement the known mechanism 16 for adjusting the propeller blades 17. The end section 4 of the adjusting rod passes through the opening 5 in the wall 1. It is surrounded by a bellows 6, which may be made of flexible material, such as canvas-reinforced rubber, but possibly also of metal. The bellows is secured against bulging by the rings 7, whilst in order to prevent it buckling inwardly, a perforated sleeve 8 is secured rigidly to the rod end section 4, while enclosing it with some clearance. The rod end section 4, the bellows 6, and the sleeve 8 are connected at their respective free ends by a plate 9. The bellows 6 is clamped at its other end to the wall 1 by means of the ring 10 and a plurality of screws 18 so as to seal it hermetically.

When the length of the bellows 6 changes, its volume undergoes a change that is equal to the product of its change in length and the area of the averagely operative cross-sectional area of the bellows. This area is determined by rough approximation by the geometrically average diameter *d* of the bellows.

Secured against the back wall 1 of the boss is the hub-cap 11. It completes the streamlined shape of the hub and is preferably attached so firmly that no outboard water can enter. The bellows 6 and the plate 9 with accessories therefore cannot be damaged by this water. The changes of volume caused by the reciprocating bellows in the free space inside the hub-cap 11 can easily be taken up by the air present in said space.

What I claim is:

1. A marine propeller of the type having adjustable blades comprising, in combination, a propeller hub, there being a chamber therein, a hub front wall, a hub back wall, sealing means on said hub back wall enclosing a space exterior of said back wall, there being an opening in said hub back wall connecting said hub chamber and said enclosed space, said hub chamber being oil filled, a plurality of adjustable blades mounted on said hub, a propeller shaft connected to said hub at the front wall thereof and having a central bore, a blade-adjusting rod adapted for reciprocating axial movement in said bore and passing through said front wall into said chamber, a mechanism in said chamber adapted for adjusting said blades according to the axial movement of said rod, a rod end section connected to said rod and passing from the interior of said chamber through said back wall opening, said sealing means enclosing the part of said rod end section protruding therethrough, said sealing means including a bellows in said space arranged concentrically relative to the axis of said rod end section, the interior of said bellows communicating with the interior of said hub through said back wall opening whereby oil may be displaced from said hub chamber into said bellows by said rod, the average operative cross sectional area between the said bellows and the rod end section passing through said back wall being equal to the cross-sectional area of said adjusting rod where the latter passes through said front wall into said hub chamber.

2. A marine propeller of the type having adjustable blades comprising, in combination, a propeller hub, there being a chamber therein, a hub front wall, a hub back wall, sealing means on said hub back wall enclosing a space exterior of said back wall, there being an opening in said hub back wall connecting said hub chamber

and said enclosed space, said hub chamber being oil filled, a plurality of adjustable blades mounted on said hub, a propeller shaft connected to said hub at the front wall thereof and having a central bore, a blade-adjusting rod adapted for reciprocating axial movement in said bore and passing through said front wall into said chamber, a mechanism in said chamber adapted for adjusting said blades according to the axial movement of said rod, a rod end section connected to said rod and passing from the interior of said chamber through said back wall opening of smaller cross section than said rod, said sealing means enclosing the part of said rod end section protruding therethrough, said sealing means including a bellows in said space arranged concentrically relative to the axis of said rod and section, the interior of said bellows communicating with the interior of said hub through said back wall opening whereby oil may be displaced from said hub chamber into said bellows by said rod, the average operative cross sectional area between the said bellows and the rod end section passing through said back wall being equal to the cross-sectional area of said adjusting rod where the latter passes through said front wall into said hub chamber.

3. A marine propeller of the type having adjustable blades comprising, in combination, a propeller hub, there being a chamber therein, a hub front wall, a hub back wall, sealing means on said hub back wall enclosing a space exterior of said back wall, there being an opening in said hub back wall connecting said hub chamber and said enclosed space, said hub chamber being oil filled, a plurality of adjustable blades mounted on said hub, a propeller shaft connected to said hub at the front wall thereof and having a central bore, a blade-adjusting rod adapted for reciprocating axial movement in said bore and passing through said front wall into said chamber, a mechanism in said chamber adapted for adjusting said blades according to the axil movement of said rod, a rod end section connected to said rod and passing from the interior of said chamber through said back wall opening, said sealing means enclosing the part of said rod end section protruding therethrough, said sealing means including a bellows in said space arranged concentrically relative to the axis of said rod end section, the interior of said bellows communicating with the interior of said hub through said back wall opening whereby oil may be displaced from said hub chamber into said bellows by

said rod, and cylindrical means inside said bellows and spacedly surrounding said rod end section concentrically with said bellows, the average operative cross sectional area between the said bellows and the rod end section passing through said back wall being equal to the cross-sectional area of said adjusting rod where the latter passes through said front wall into said hub chamber.

4. A marine propeller of the type having adjustable blades comprising, in combination, a propeller hub, there being a chamber therein, a hub front wall, a hub back wall, sealing means on said hub back wall enclosing a space exterior of said back wall, there being an opening in said hub back wall connecting said hub chamber and said enclosed space, said hub chamber being oil filled, a plurality of adjustable blades mounted on said hub, a propeller shaft connected to said hub at the front wall thereof and having a central bore, a blade-adjusting rod adapted for reciprocating axial movement in said bore and passing through said front wall into said chamber, a mechanism in said chamber adapted for adjusting said blades according to the axial movement of said rod, a rod end section connected to said rod and passing from the interior of said chamber through said back wall opening, said sealing means enclosing the part of said rod end section protruding therethrough, the improvement of said sealing means including a bellows in said space arranged concentrically relative to the axis of said rod end section, the interior of said bellows communicating with the interior of said hub through said back wall opening whereby oil may be displaced from said hub chamber into said bellows by said rod, the average operative cross sectional area between the said bellows and the rod end section passing through said back wall being equal to the cross-sectional area of said adjusting rod where the latter passes through said front wall into said hub chamber.

References Cited in the file of this patent

UNITED STATES PATENTS

1,360,833	Vuilleumier	Nov. 30, 1920
1,510,436	Englesson	Sept. 30, 1924
2,208,602	Ruths et al.	July 23, 1940
2,749,757	Adelt	June 12, 1956

FOREIGN PATENTS

675,767	Great Britain	July 16, 1952
675,850	Great Britain	July 16, 1952