April 16, 1963 A. L. CRABILLE 3,085,540

AUTOMATIC FLIP-UP WATER RUDDER MECHANISM FOR SAILBOATS AND AIRBOATS

Filed April 16, 1962 2 Sheets-Sheet 1

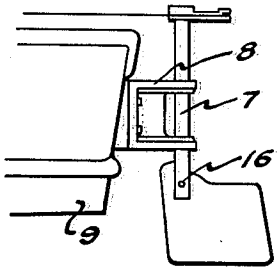


FIG. 3

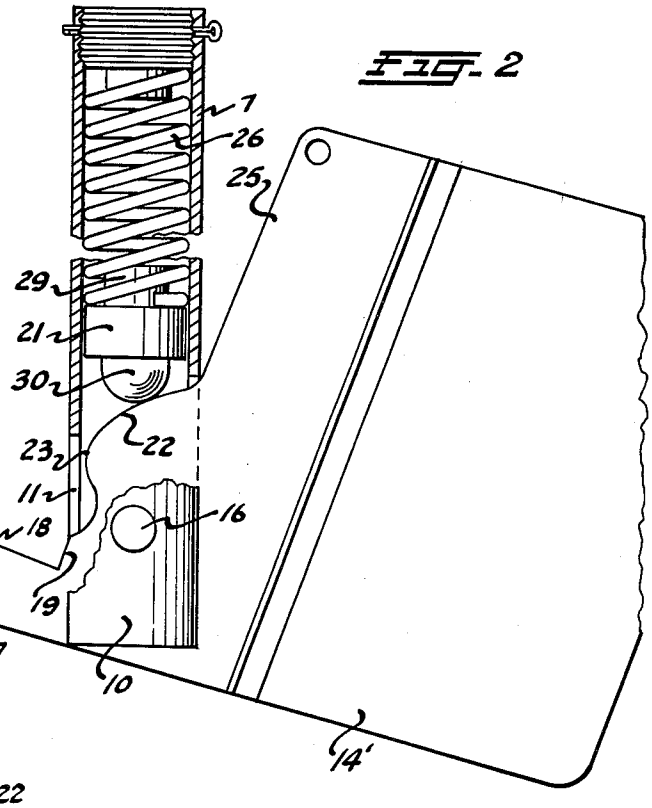


FIG. 2

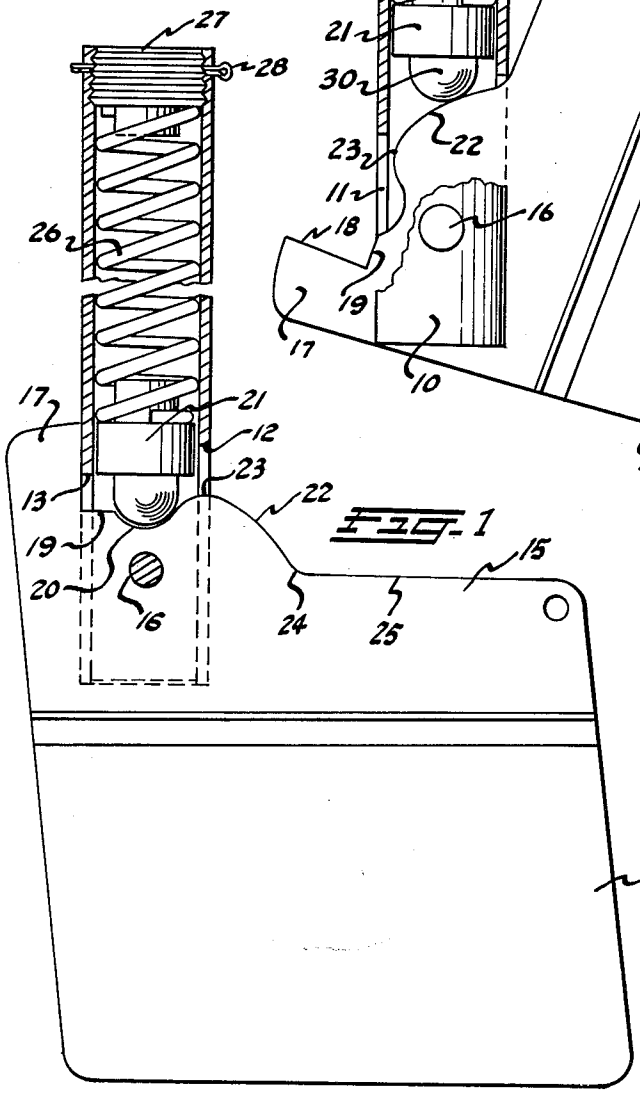


FIG. 1

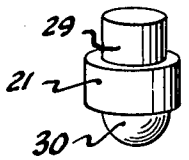


FIG. 4

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AUTOMATIC FLIP-UP WATER RUDDER MECHANISM FOR SAILBOATS AND AIRBOATS

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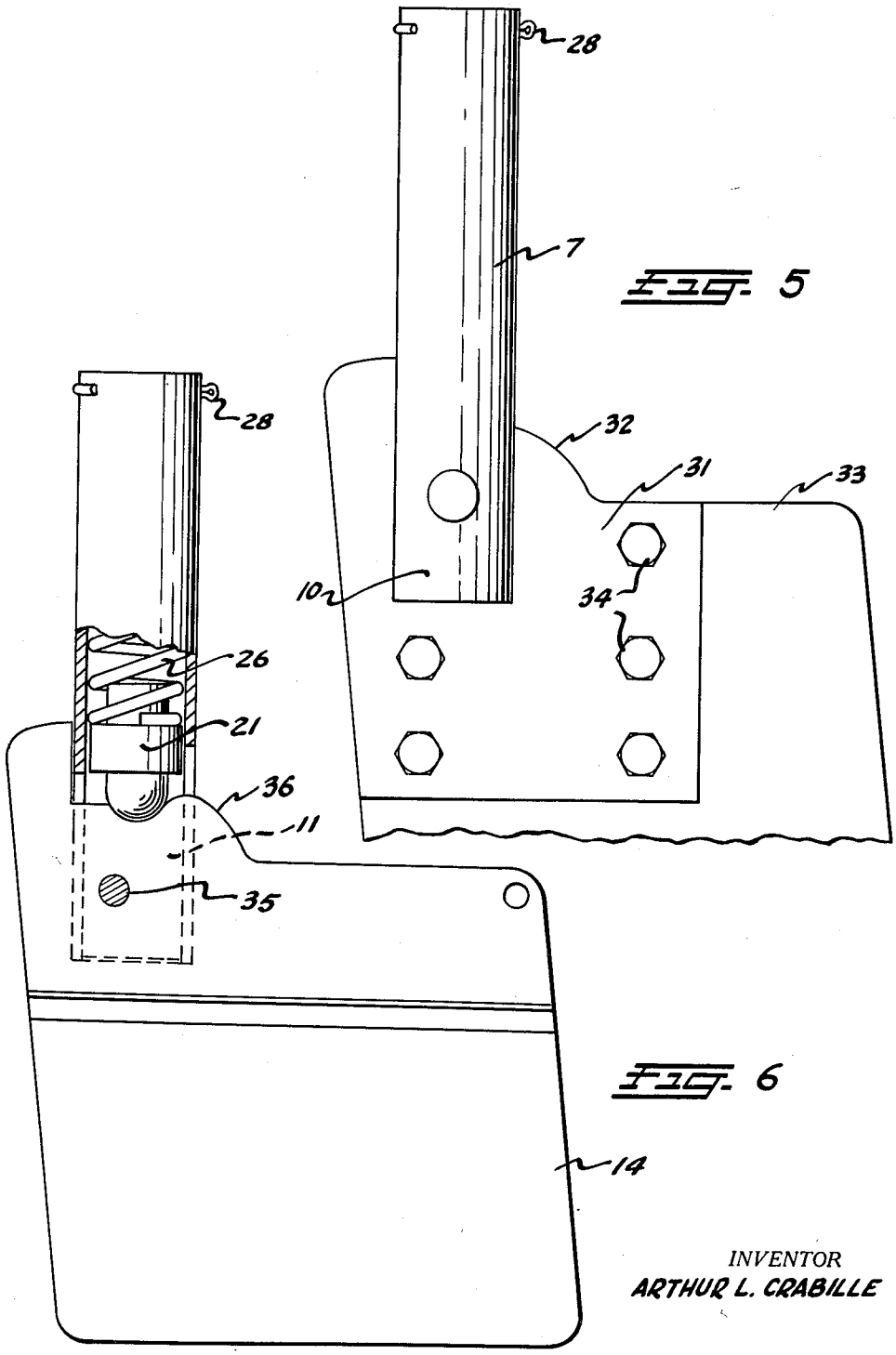


Fig. 5

Fig. 6

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AUTOMATIC FLIP-UP WATER RUDDER MECHANISM FOR SAILBOATS AND AIRBOATS

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Filed Apr. 16, 1962, Ser. No. 187,784
3 Claims. (Cl. 114—162)

This invention relates generally to boat rudders, and more specifically to an automatic flip-up rudder for use on air-boats and other boats wherein the rudder is the sole object which protrudes beneath the hull.

Boats which operate by air propulsion and water jet principles are particularly useful for travelling over water which is shallow due to the lack of propeller drives which might become snagged and damaged by protrusions from the bed of the river or lake. Such craft however require rudder control, and it is necessary for a lower portion of the rudder to protrude below the level of the hull. Rudders used in these circumstances are thus subject to damage resulting from engaging with some submerged object. My invention is thus directed towards the provision of a rudder which is adapted to yieldably pivot in a vertical plane out of engagement with any obstruction which may be encountered. The rudder is mounted such that it will be automatically returned to an effective operating position after passing over the obstruction.

It is therefore a primary object of this invention to provide a rudder and mechanisms therefor which permit rearward pivotal movement upon engagement with an obstruction so as to enable the rudder to pass thereover, and subsequently return to its full operative position.

It is a further object of this invention to provide an automatic flip-up water rudder mechanism for sailboats and other craft having a low draft which will enable the craft to travel over shallow water without risking damage thereto as a result of unseen obstructions beneath the water.

It is a still further object of this invention to provide a rudder assembly which is fully balanced and may be adapted for use in conjunction with blades of various shape and size so as to provide complete flexibility to the boat builder.

A full understanding of the construction of this invention, together with further novel features and advantages, will be had from the following detailed description of preferred embodiments thereof, taken in conjunction with the attached drawings wherein:

FIG. 1 is a side elevation shown partly in cross section of an automatic rudder mechanism constructed according to one embodiment of my invention.

FIG. 2 is a side elevation of the invention shown with the rudder in the raised position.

FIG. 3 is a fragmentary side elevation showing how the rudder may be secured to a boat.

FIG. 4 is a perspective view of the spring loaded camming pin used in the construction of the mechanism.

FIG. 5 is a fragmentary side elevation showing how the mechanism may be secured to a blade stub so as to permit a blade of any specified design to be secured thereto.

FIG. 6 is a side elevation shown partly in cross section of a slightly modified design wherein the blade mounting pin is laterally spaced forwardly of the camming pin axis.

Similar reference characters indicate corresponding parts throughout the several views in the drawings.

Referring now to the drawings in detail, the numeral 7 represents a hollow tubular rudder shaft which is pivotally mounted for rotation about a vertical axis by means of a bracket 8 which is secured to the transom of a boat 9.

Referring more particularly to FIG. 1 and 2, the lower end 10 of the shaft 7 is bifurcated by a slot 11, the said slot terminating rearwardly at 12 at a slightly greater depth than the front 13. A rudder 14 has an upper portion 15 which is received within the slot 11 and is pivotally connected thereto by a pin 16 which extends diametrically through the shaft normally to the plane of the slot 11. The upper portion 15 of the rudder has an outwardly protruding front stop 17 which is adapted to abut with the side of the rudder shaft above the bifurcating slot 11. The stop has a vertical engaging edge 18 which extends downwardly below the termination of the front 13 of the slot 11. The upper edge 19 of the rudder portion 15 extends rearwardly into the slot 11 and is formed with a semi-circular cut-out 20 providing a locating stop or seat for a camming pin 21. Continuing rearwardly of the cut-out 20 is a parabolic camming surface 22 which has a peak 23 raised above the upper edge 19, and terminates at 24 rearwardly and vertically spaced beneath the cut-out 20. A straight edge 25 extends parallel to the upper edge 19 to complete the upper edge of the rudder.

Mounted within the rudder shaft 7 is a coiled compression spring 26 which is anchored at its upper end by means of a threaded cap 27, suitably locked in position by means of a cotter pin 28. The camming pin 21 is slideably received within the shaft and has a plug portion 29 which extends inwardly of the lower end of the spring. The pin 21 has a semi-circular bearing head 30 which protrudes downwardly into the bifurcated portion of the shaft for engagement in the locating stop 20 and over the camming surface 22. Upon striking an obstruction, the rudder 14 will be forced rearwardly and take up a position 14' as indicated in FIG. 2. Such movement causes the spring to be compressed and the bearing head to be traversed over the parabolic camming surface 22. When the obstruction has been passed, the spring which urges the bearing head 30 downwardly against the camming surface causes the rudder to return to its original operating position due to the angular loading on the camming surface.

FIG. 5 shows a rudder stub 31 which has an upper edge 32 identical to that already described. The stub enables a blade 33 of any specific shape or design to be mounted thereto by means of fastening bolts 34.

In FIG. 6, the design of the mechanism is slightly modified so as to provide an alternative return moment on the rudder. The design differs only in providing a mounting pin 35 which extends horizontally through the bifurcated portion of the shaft 7 and is forwardly spaced from the axis of the shaft. Such placement of the pin 35 enables a camming surface 36 to be formed with a circular contour, the centre of which coincides with the mounting pin 35. This simplifies the forming of the camming surface, and in all other respects the mechanism is identical to that already described and disclosed in FIGS. 1 and 2 of the drawings. The advantages offered by this rudder device will be quite apparent to those familiar with boats, and the use and adoption of the same will virtually eliminate damage to a rudder resulting from hidden obstruction beneath the water.

Having described the invention in a preferred form, it will be appreciated that some modifications may be made to the precise configuration, without departing from the scope or spirit of the invention, as defined by the following claims.

I claim:

1. An automatic rudder and yielding mechanism, comprising, a hollow rudder shaft secured to the transom of a boat, a bifurcation formed diametrically through the lower end of the shaft, a rudder having an upper portion

adapted to be received within the bifurcation, a mounting pin extending through the lower end of the shaft and through the upper portion of the rudder permitting pivotal movement of the rudder relative to the shaft, a front stop protruding from said upper portion and adapted to abut with the shaft above the bifurcation, said upper portion having an upper edge forming a locating recess within the bifurcation and continuing to form an arcuate camming surface rearwardly and adjacent the said recess, a camming pin received within the shaft and protruding into the bifurcation for engagement with the recess and camming surface, and a compression spring urging the camming pin downwardly against said upper edge.

2. An automatic rudder and yielding mechanism according to claim 1, wherein the rudder is detachable from the upper portion thereof.

3. An automatic rudder and yielding mechanism according to claim 1, wherein said mounting pin extends normally to the plane of said bifurcation, and wherein the axis of the pin is forwardly spaced from the central axis of the rudder shaft, said camming surface having a major portion of circular contour centered on the axis of the mounting pin.

No references cited.