Sept. 9, 1958 P. H. SCOTT 2,851,001

BACKING RUDDER ARRANGEMENT FOR VESSELS

Filed April 9, 1957

FIG. 1.

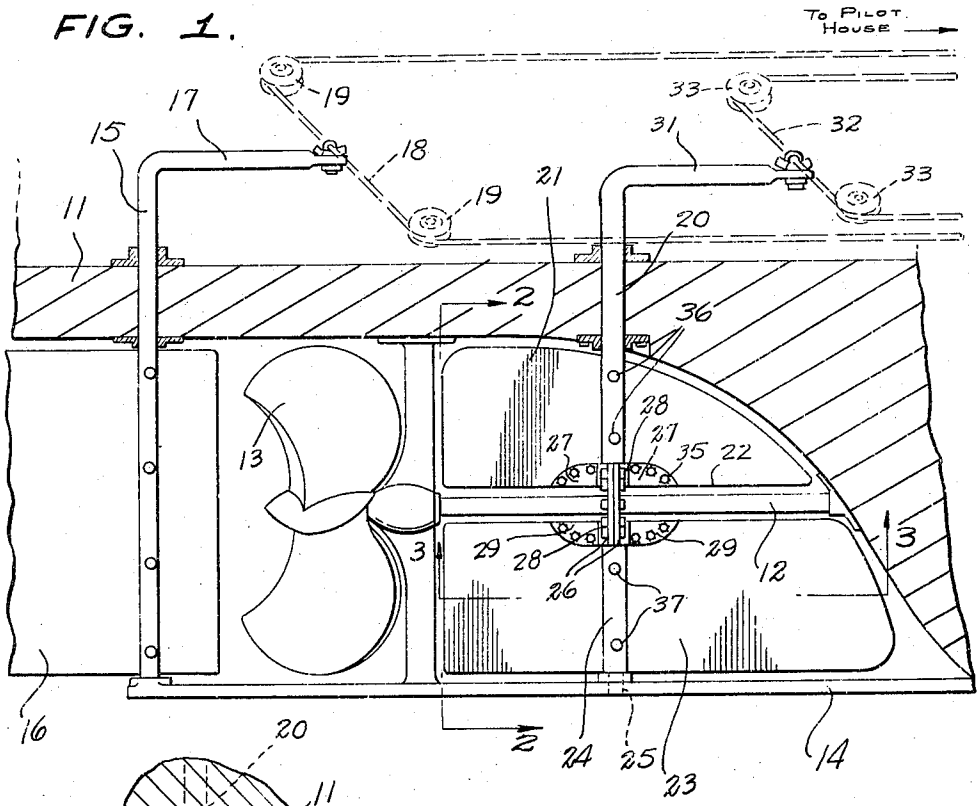



FIG. 2.

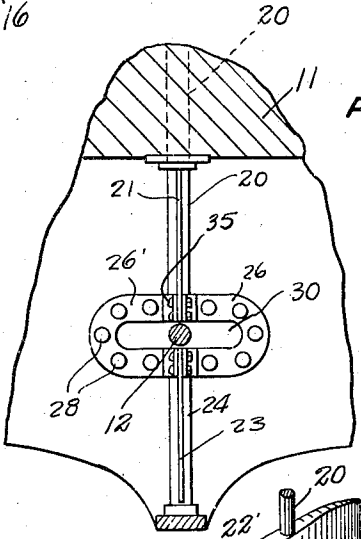



FIG. 3.

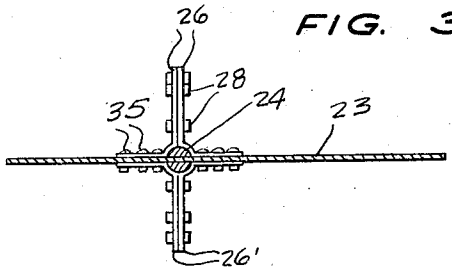



FIG. 4.

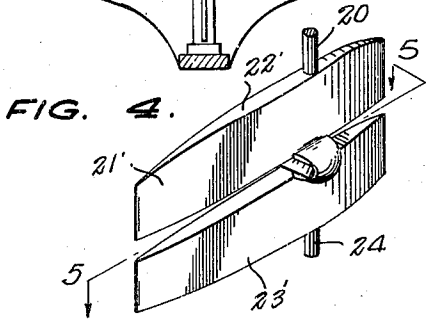
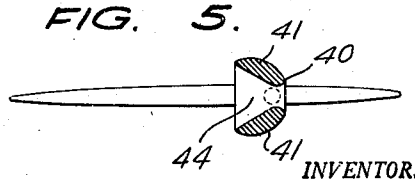



FIG. 5.

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# BACKING RUDDER ARRANGEMENT FOR VESSELS

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3 Claims. (Cl. 114—163)

This invention relates to propulsion arrangements for vessels, and more particularly to steering means for power driven vessels.

A main object of the invention is to provide a novel and improved propulsion arrangement for a ship, such as a tug boat, or the like, for enabling the vessel to steer efficiently when going astern, the propulsion arrangement involving relatively simple parts, being easy to install, and being easy to maintain in operating condition.

A further object of the invention is to provide an improved backing rudder arrangement for tug boats or similar vessels to facilitate the steering of the vessel when backing or otherwise maneuvering, the rudder arrangement involving inexpensive components, being durable in construction, and causing no interference with the normal operation of the propeller shaft or other propulsion elements of the vessel.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is a fragmentary longitudinal vertical cross sectional view taken through the stern portion of the hull of a vessel provided with an improved propulsion arrangement according to the present invention and showing the elements of the propulsion arrangement in elevational view.

Figure 2 is a fragmentary transverse vertical cross sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a horizontal cross sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a perspective view showing a modified form of flanking rudder assembly constructed in accordance with the present invention.

Figure 5 is a horizontal cross-sectional view taken on the line 5—5 of Figure 4.

Referring to the drawings, 11 designates the hull of a tug boat, or similar vessel, the vessel being provided with a horizontal propeller shaft 12 which is rotatably mounted in the hull and which extends rearwardly therefrom. Secured on the end of the propeller shaft 12 is the usual propeller 13. Projecting rearwardly from the hull at its bottom is the longitudinally extending keel member 14 which extends parallel to the propeller shaft 12, as is clearly shown in Figure 1, the keel member 14 extending rearwardly a substantial distance beyond the propeller shaft 12.

Designated at 15 is a vertical steering post which is rotatably mounted in the hull 11 and which is rotatably supported at its lower end on the rear end of the keel 14. Secured to the steering post 15 is the usual rear rudder 16, which is thus arranged rearwardly adjacent to the propeller 13 and which has its major area located rearwardly of the rudder post 15.

The top end of the rudder post 15 is provided with the horizontal steering arm 17 which is fastened to a suitable control cable, shown in dotted view at 18, or other coupling means for actuating the arm, as is well understood in the art. If a cable 18 is employed, the cable may be



engaged around supporting pulleys 19, 19, as shown in dotted view in Figure 1, and may extend to suitable control means, such as a steering wheel located in the pilot house of the craft.

Designated at 20 is an auxiliary vertical steering shaft which is rotatably mounted in the hull 11 and which is located forwardly of the propeller 13, the shaft 20 having secured thereon a flanking rudder segment 21 which is suitably contoured at its top edge to fit beneath the hull with proper clearance and to be rotatable therebeneath in response to the rotation of the auxiliary shaft 20. The flanking rudder segment 21 has a horizontal bottom edge 22 which is located just above the propeller shaft 12 so as to be freely rotatable relative to said propeller shaft.

Designated at 23 is a second flanking rudder segment which is located immediately below the propeller shaft 12 and in the same plane as the first flanking rudder segment 21. The lower rudder segment 23 is secured on a vertical shaft member 24 which is in vertical alignment with the steering shaft 20 and which is journaled at its lower end 25 in the keel member 14.

Designated at 26, 26 are a pair of opposing vertical U-shaped bracket members which are secured together around one side of the propeller shaft 12 in vertical opposing relationship, as by bolts 28, said U-shaped bracket members having flanges 27 at the ends of their upper arms which are rigidly connected to the lower marginal portion of the upper flanking rudder segments 21 and having similar flanges 29 at the ends of their lower arms which are rigidly connected to the upper marginal portion of the lower flanking rudder segment 23. A similar pair of opposing U-shaped bracket members 26', 26' is provided on the opposite side of the propeller shaft 12 as are clearly shown in Figure 3, rigidly connecting the lower marginal portion of the upper flanking rudder segment 21 to the upper marginal portion of the lower flanking rudder segment 23. The bracket members 26, 26' are horizontally aligned, as shown in Figure 2, to define a horizontal slot 30 through which the propeller shaft 12 extends, said horizontal slot being of substantial length so as to allow free rotation of the flanking rudder segments 21, 23 without interfering with or contacting the propeller shaft 12. As shown in Figure 2, the slot 30 is of substantial length so that the flanking rudder segments may be rotated through wide angles, sufficient in magnitude to perform the required steering operations required for maneuvering the vessel.

As will be readily apparent from Figure 1, when the propeller 13 is reversed, for example, to propel the vessel astern, due to the direction of rotation of the propeller, the main rudder 16 is effective substantially only to turn the vessel in one direction. However, the propeller drives the water forwardly against the flanking rudder segments 21, 23, which may be thus employed to steer the vessel rearward in either direction with substantially equal effectiveness.

The auxiliary shaft 20 is provided at its top end with a horizontal steering arm 31 which is connected to a suitable control cable, such as the cable 32 shown in dotted view in Figure 1, which is engaged around guide pulleys 33, 33 and connected to a suitable steering wheel or similar control element, similar to that employed for the main steering cable 18.

The flanges of the bracket members 26, 26' are detachably secured to the rudder segments, as by bolts 35. As shown, the auxiliary steering shaft 20 is vertically slotted to receive the upper flanking rudder segment 21 and is detachably secured thereto, as by bolts 36. Similarly, the upper portion of the shaft member 24 is vertically slotted to receive the lower flanking rudder segment 23 and is detachably fastened thereto, as by bolts 37. Therefore, the upper and lower rudder segments 21 and 23 may be

easily removed or replaced without the necessity of dismantling the propeller shaft **12**, since the various components of the flanking rudder assembly may be removed or replaced without any interference with said propeller shaft.

Figures 4 and 5 illustrate a modified form of flanking rudder assembly according to the present invention wherein the upper segment, shown at **21'**, and the lower segment, shown at **23'**, are formed integrally with the intervening sleeve element **40** which is formed with the opposite bight portions **41, 41** projecting outwardly at opposite sides of the common vertical plane of the rudder segments **21'** and **23'**. As shown, the sleeve element **40** is horizontally flattened, and has the rearwardly flaring horizontal passage **44** through which the propeller shaft of the vessel extends. The top edge **22'** of the upper flanking rudder segment **21'** is suitably contoured to fit beneath the hull with proper clearance. The bottom edge of segment **21'** and the top edge of segment **23'** are substantially horizontal and are spaced apart so as to be freely rotatable relative to the propeller shaft.

While a specific embodiment of an improved propulsion arrangement for a vessel has been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore, it is intended that no limitations be placed on the invention except as defined by the scope of the appended claims.

What is claimed is:

1. In a propulsion arrangement for a ship, a hull having a horizontal propeller shaft rotatably mounted therein and extending rearwardly thereof, a propeller secured on said shaft, a vertical main steering shaft rotatably mounted on said hull rearwardly adjacent said propeller, a main steering rudder secured on said main steering shaft, an auxiliary vertical steering shaft rotatably mounted on said hull forwardly adjacent said propeller and terminating above said propeller shaft, a first flanking rudder segment secured on said auxiliary steering shaft, a second flanking rudder segment disposed below said propeller shaft in the same plane as said first flanking rudder segment, and bracket means extending around said propeller shaft and rigidly connecting said flanking rudder segments.



2. In a propulsion arrangement for a ship, a hull having a horizontal propeller shaft rotatably mounted therein and extending rearwardly thereof, a propeller secured on said shaft, a horizontal keel on said hull extending rearwardly thereof parallel to and beyond said propeller shaft, a vertical main steering shaft rotatably mounted on said hull and said keel rearwardly adjacent said propeller, a main steering rudder secured on said main steering shaft, an auxiliary vertical steering shaft rotatably mounted on said hull forwardly adjacent said propeller and terminating above said propeller shaft, a first flanking rudder segment secured on said auxiliary steering shaft, a second flanking rudder segment disposed below said propeller shaft in the same plane as said first flanking rudder segment and rotatably mounted on said keel, and bracket means extending around said propeller shaft and rigidly connecting said flanking rudder segments.

3. In a propulsion arrangement for a ship, a hull having a horizontal propeller shaft rotatably mounted therein and extending rearwardly thereof, a propeller secured on said shaft, a horizontal keel on said hull extending rearwardly thereof parallel to and beyond said propeller shaft, a vertical main steering shaft rotatably mounted on said hull and said keel rearwardly adjacent said propeller, a main steering rudder secured on said main steering shaft, an auxiliary vertical steering shaft rotatably mounted on said hull forwardly adjacent said propeller and terminating above said propeller shaft, a first flanking rudder segment secured on said auxiliary steering shaft, a second flanking rudder segment disposed below said propeller shaft in the same plane as said first flanking rudder segment and rotatably mounted on said keel, and a pair of opposing vertical U-shaped bracket members rigidly connected to the lower margin of the first flanking rudder segment and the upper margin of the second flanking rudder segment and extending around the propeller shaft, rigidly connecting said flanking rudder segments.

No references cited.