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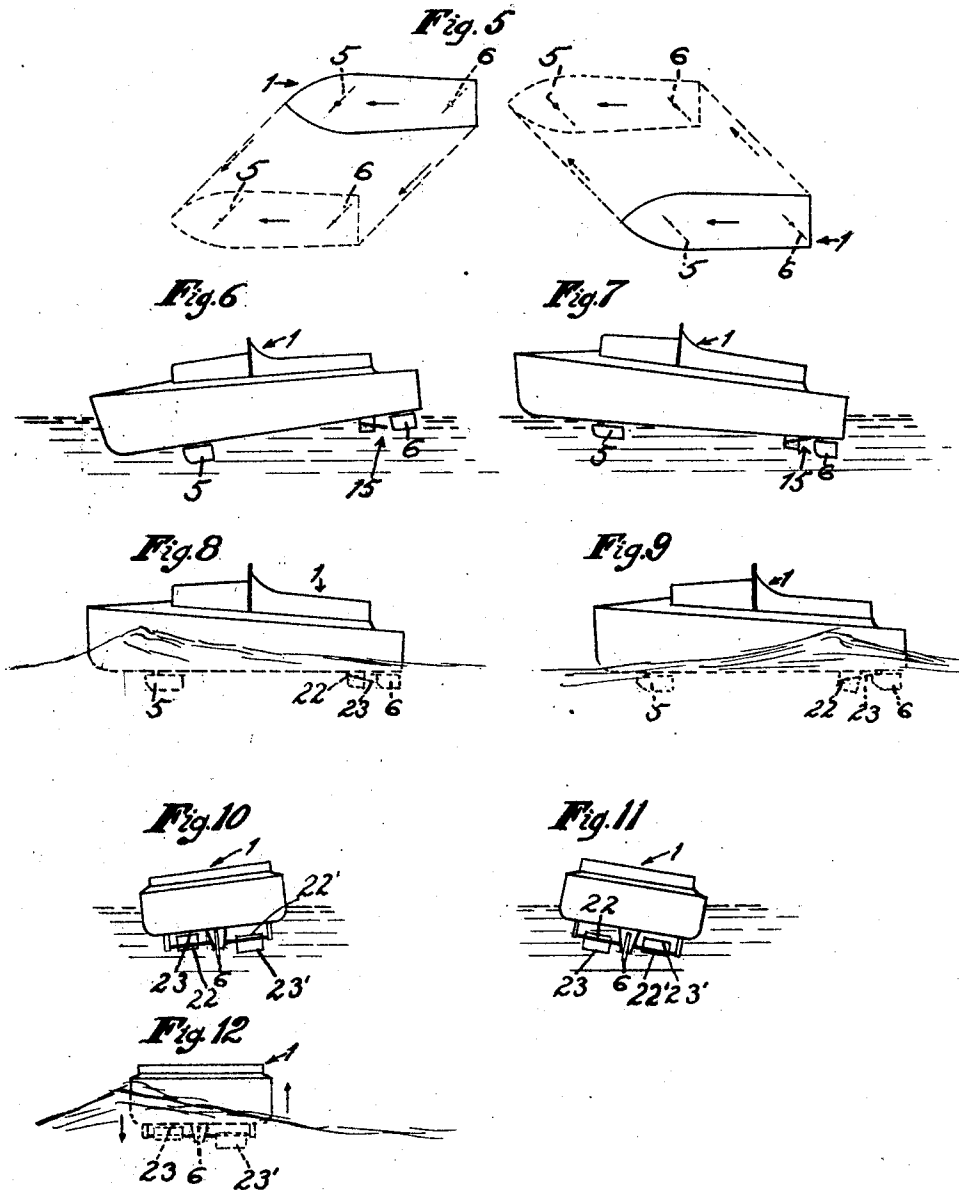
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C. F. RICHEY

RUDDER ARRANGEMENT FOR SURFACE BOATS

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2 Sheets-Sheet 2



Witness:
J. Whipple

Inventor:
Clarence F. Richey.

James R. Townsend
his atty

UNITED STATES PATENT OFFICE.

CLARENCE F. RICHEY, OF AVALON, CALIFORNIA.

RUDDER ARRANGEMENT FOR SURFACE BOATS.

Application filed May 9, 1921. Serial No. 467,783.

To all whom it may concern:

Be it known that I, CLARENCE F. RICHEY, a citizen of the United States, residing at Avalon, Santa Catalina Island, in the county of Los Angeles and State of California, have invented a new and useful Rudder Arrangement for Surface Boats, of which the following is a specification.

This invention relates to an arrangement and control of rudders mounted on the underside of a boat which is adapted to ride upon the surface of the water, whereby a varied control of the boat is attained and which will be hereinafter more fully set forth.

This invention is applicable to either commercial, pleasure or amusement boats, whether of displacement, hydroplane or glider-type, and irrespective as to whether such boat be driven by sail, motor, or by momentum produced by descending an incline, such as boats for chute the chutes. It is immaterial whether such boats are driven by air, surface or submerged type propellers.

This invention is not to be confused with the rudder arrangements of ferry boats that may have two or more rudders, one or two of such rudders being at each end of the ferry boat; for the rudder or rudders at one end of a ferry boat are only used for one direction of travel and the rudder or rudders at the other end of the ferry boat are used only for travel in the opposite direction. It is not within the idea of means in this invention to conflict with such ferry boat rudders, nor with the diving rudders of submarine boats; which diving rudders as heretofore arranged are mounted on the sides of the submarine vessel.

The principal object of this invention is to provide means whereby vessels riding in smooth water can be given the effect of riding in rough water or on a heavy sea for the purpose of providing amusement and excitement to the riders.

An object of this invention is to provide means whereby a boat may be shifted obliquely to one side or the other of its line of travel without altering the main direction of its course.

Another object is to prevent the tendency of the bow of a small boat to rise high

over one wave and plunge deeply into the next wave when in a heavy sea.

Another object is to reduce side roll of the boat when running in a trough of a sea, or crossways of a current.

A still further principal object is to provide means to produce or increase such plunging and rolling motions of the boat for amusement purposes when in a smooth or comparatively smooth sea.

Another object of this invention is to provide an arrangement and control of rudders whereby all of the above objects may be attained.

Other objects, advantages and features of invention may appear from the accompanying drawing, the subjoined detail description and the appended claims.

The accompanying drawings illustrate the invention.

Figure 1 is a side elevation of a boat equipped with an arrangement of rudders in accordance with this invention.

Fig. 2 is a top plan view of Fig. 1, portions being broken away to show the fore and aft rudders.

Fig. 3 is an enlarged fragmental view on line x^3 , Fig. 2, showing in dotted lines the range of adjustment of the transverse rudders or stabilizing vanes.

Fig. 4 is a rear elevation partly in section on line x^4 , Figs. 2 and 3.

Fig. 5 is a diagrammatic top plan view showing in full and dotted lines the position of the fore and aft or longitudinal rudders when it is desired to shift the boat to the right or left, as from the full line to the dotted line position, without changing the course in which the boat is traveling.

Fig. 6 is a side elevation showing the position of the transverse rudders or stabilizing vanes to cause the bow of the boat to plunge into the sea.

Fig. 7 is a like view showing the position of the transverse rudders or stabilizing vanes to cause the bow of the boat to rise out of the sea, and to cause the stern to enter the sea.

Fig. 8 is a side elevation showing the position of the transverse rudders or stabilizing vanes to cause the bow to enter a wave and thereby reduce plunging action.

Fig. 9 is a like view showing the posi-

tion of the stabilizing vanes to reduce plunging action when the boat is coming out of a wave.

Fig. 10 is a stern elevation showing the transverse rudders or stabilizing vanes in position to cause the boat advancing in still water to roll in one direction.

Fig. 11 is a view analogous to Fig. 10, showing the stabilizing vanes in position to cause the boat to roll in the opposite direction.

Fig. 12 is a stern elevation showing the stabilizing vanes in position to keep the boat level and to prevent side roll when running in the trough of a sea.

The boat 1 may be of any desired type which is adapted to ride upon the surface of the water, and may be driven by any suitable means such as sail, gravity, momentum, or any of the known methods of applying propelling power, such as surface, submerged, or air type propellers.

By way of illustration, I have shown in Fig. 1 a boat equipped with any well known type motor 2, which is connected to one end of a propeller shaft 3. A propeller 4 is connected to the other end of the shaft 3 and serves to propel the boat in the water.

On the fore and aft ends of the boat and longitudinally thereof are mounted the longitudinal or vertical fore and aft rudders 5 and 6, respectively, which may be of any well known contour. The rudders 5 and 6 are fixed to shafts 7, 8 which are journaled in the boat. The fore and aft rudders may be adjusted by any suitable means and the means shown comprise a cable connected to the upper ends of the shafts 7, 8, in a way well known in the art, and diagrammatically shown in Figs. 1 and 2. The cable from the rudder 5 unwinds and winds upon a windlass 9 which is secured to one end of a hollow sleeve 10. A hand wheel 11 is secured to the other end of said hollow sleeve and serves as a means to turn the windlass 9. The cable from the rudder 6 unwinds and winds upon a windlass 12 which is secured to one end of a shaft 13 which extends through the hollow sleeve 10 and is journaled therein. A hand wheel 14 is secured to the other end of shaft 13 and serves as a means to turn the windlass 12.

By the construction thus set forth either of the rudders 5, 6 may be turned independently of the other by turning either of the hand wheels. If it is desired to turn both rudders 5, 6 in the same direction as shown in Fig. 5 this may be easily and accurately accomplished by grasping both hand wheels and turning both of them either to the right or left as desired. It is apparent that by turning the hand wheels in opposite directions the rudders will be positioned so as to quickly and easily change the direction of travel. The hand wheels as

shown in Fig. 1 are positioned one above the other in close relationship so as to be easily grasped by one hand.

The stabilizing vanes 15, 16 are spaced apart on opposite sides of the boat and are secured to the shafts 17, 17' which are mounted transversely of and on opposite sides of the longitudinal vertical plane of the boat and are journaled in the bearings 18, 19, 20 fastened to the underside of the boat by suitable means as the bolts 21. The shafts 17, 17' are spaced apart and disposed at right angles to the longitudinal axis of the boat, and transverse to the longitudinal or vertical rudders 5, 6. The stabilizing vanes 15, 16 have front and rear portions 22, 23 and 22' and 23', respectively, and which extend oppositely on each side of the shafts 17, 17'.

The portions 22, 23 and 22' 23' are arranged in a horizontal position and can be raised or lowered as desired.

The middle bearing 19 is V-shaped and the ends of the shafts 17, 17' extend within the acute angle formed by the V-shape of the bearing. The propeller shaft 3 is journaled in said bearing 19 at the apex of such acute angle.

Levers 24, 24' are secured within the angle formed by the V-shaped middle bearing, to the inner ends of the shafts 17, 17', respectively. Connecting rods 25, 25' are pivotally connected at one end to the outer end of said levers 24, 24' and are pivotally connected at their other end to operating levers 26, 26' which are pivotally connected to the bottom of the boat in any well known manner so that the stabilizing vanes may be easily operated from a compartment in the boat.

From the foregoing it is apparent that the horizontal rudders or stabilizing vanes 15, 16 can be operated independently of one another as well as independently of the longitudinal or vertical fore and aft rudders. They may also be operated in unison with one another by simultaneous operation of the levers 26, 26'.

This novel arrangement of rudders or vanes is particularly adapted for amusement and pleasure boats, and various effects and advantages are produced by the different positions of the rudders while advancing in the water.

I have shown the transverse rudders or stabilizing vanes as having front portions, but it is well known in the art that such portions can be omitted without defeating the desired result. Also, the transverse rudders or stabilizing vanes can be located rearwardly of the aft rudder with equal effect to produce the desired movement of the boat.

Referring to Fig. 5, a boat equipped with my arrangement of rudders and travelling

in the direction of the full line arrow can be shifted either to the right or left, or to the dotted line position, by positioning the fore and aft rudders as is diagrammatically shown.

It will thus be seen that several advantages are made possible by this setting of the rudders, viz, by shifting the boat to either side collisions can be reduced to a minimum, landings may be approached and left with greater convenience, and wind and wave conditions can be overcome to a considerable extent.

By simultaneously raising both of the front portions 22, 22' and in consequence lowering the rear portions 23, 23' of the stabilizing vanes the stern of the boat is forced or raised toward the surface of the water, as shown in Figs. 6 and 8, and by reversing the position of the vanes the stern of the boat is forced or drawn into the water, as shown in Figs. 7 and 9.

By raising the rear portion 23 of the stabilizing vane 15 and lowering the rear portion 23' of the stabilizing vane 16 a rolling motion or a tipping of the boat to the left is produced such as shown in Fig. 10. A reverse operation of the vanes 15, 16 will cause the boat to tip to the right as shown in Fig. 11. This adjustment of the stabilizing vanes also serves to prevent rolling of the boat when running in a trough of the sea or across the current. The tendency of the stabilizing vanes when in the position shown in Fig. 12 is to force each side of the boat in the direction indicated by the arrows in Fig. 12.

From the foregoing it is apparent that when advancing upon a smooth sea by alternately raising and lowering both of the stabilizing vanes 15, 16 the bow and stern of the boat will alternately rise and fall, and thereby give the effect of riding transversely over waves or the effect of a rough sea. By raising the vane 15 and lowering the vane 16 and vice versa a rolling effect will be produced such as is present when

riding in a trough of the sea or longitudinally of a wave.

When advancing in a rough sea, by raising the transverse rudders or stabilizing vanes as shown in Fig. 8 the bow of the boat will be caused to enter the wave and when the boat has nearly passed through the wave, by lowering the vanes as shown in Fig. 9 the stern of the boat will be kept in the wave and thereby reduce the plunging action of the boat, or the tendency of the bow of the boat to rise high over one wave and plunge deeply into the next wave, to a considerable extent.

An advantage in reducing plunging and rolling action of the boat is the prevention of seasickness on board, and to prevent the boat from running with the wave motion of the sea.

While I have shown my rudder arrangement as applied to a flat bottom boat it can be readily applied to a round bottom boat by making the bearings 18, 20 slightly longer as is apparent to one skilled in the art.

I claim:

In combination with a boat; bearings, one of which is V-shaped, fastened to the underside of the boat; shafts transverse to the vertical longitudinal plane of said boat and mounted in said bearings; the inner ends of said shafts extending within the angle formed by said V-shaped bearing; vanes fixed to said shafts; levers fixed to the inner ends of said shafts; and means connected to said levers and operable from the inside of the boat to operate said vanes oppositely to one another, in unison with one another and independently of the other substantially as set forth.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 2nd day of May, 1921.

CLARENCE F. RICHEY.

Witness:

JAMES R. TOWNSEND.