

April 11, 1961

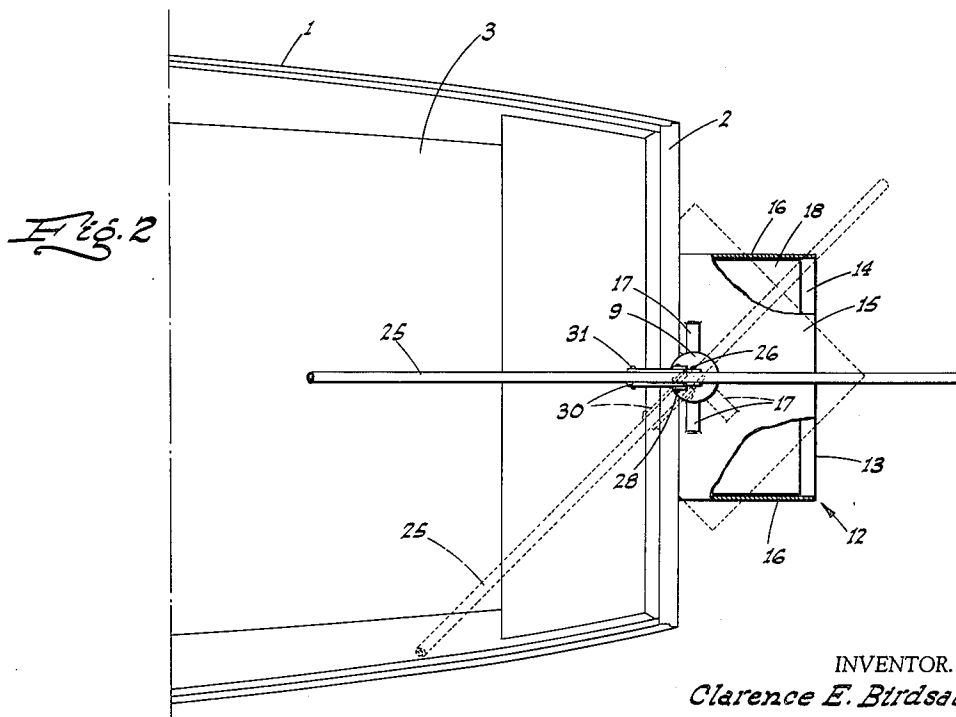
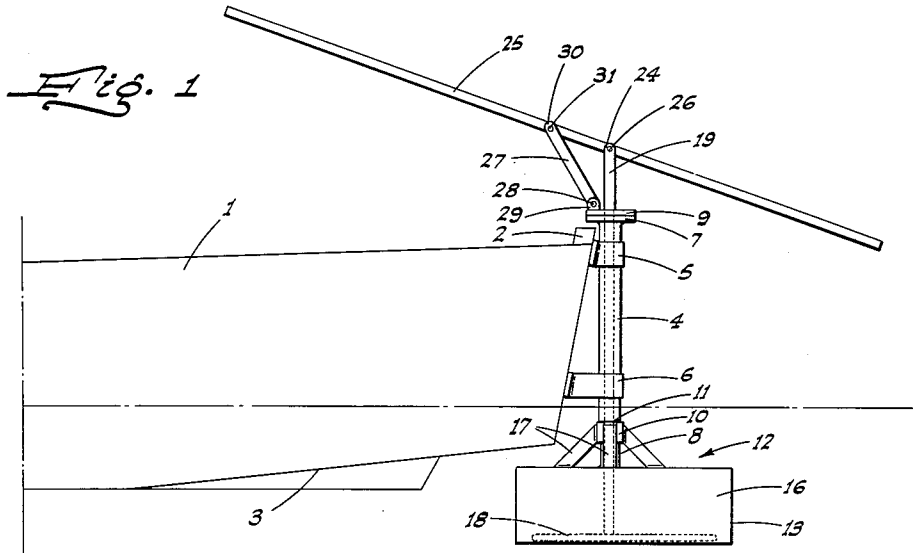
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2,979,018

PROPELLING AND STEERING DEVICE FOR WATERCRAFT

Filed Oct. 19, 1959

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

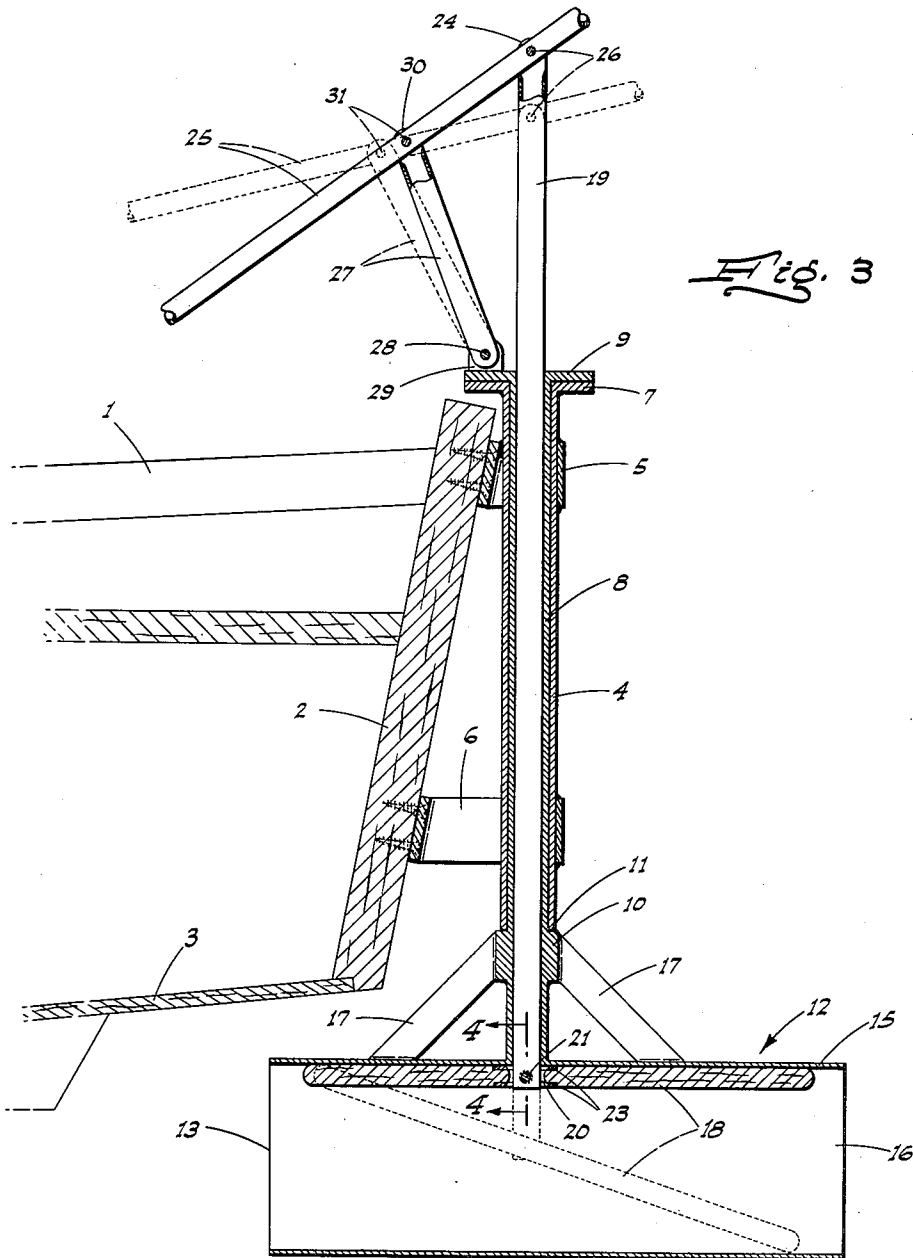


Fig. 3

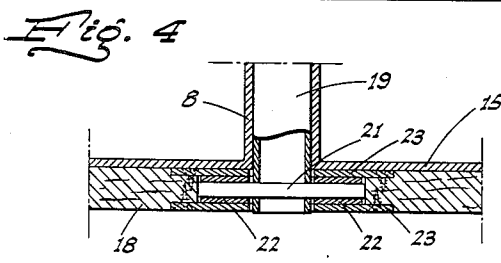


Fig. 4

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1

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## PROPELLING AND STEERING DEVICE FOR WATERCRAFT

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3 Claims. (Cl. 115—29)

This invention is directed to, and it is a major object to provide, a novel device for propelling and steering a small watercraft; the device being operated by an occupant of said craft.

While the device, by way of example, is presently shown and described as used on a small boat of the type heretofore occupant-propelled by oars, the present invention is readily adaptable to other types of watercraft, such as self-propelled floats or surf boards, and the like.

Another important object of the invention is to provide a device, for the purpose described, which embodies a novel under-water motor unit; such unit including a water flow tunnel and a pressure vane therein adapted to be oscillated in a manner to cause a stream of water to be recurrently and relatively forcefully discharged from the rear end of said tunnel so that by reaction the watercraft is forwardly propelled.

A still further object of the invention is to provide a device, as above, which includes an actuating member, manually accessible to an occupant of the watercraft, and by means of which member said craft can be both propelled and steered, selectively and independently, or simultaneously.

An additional object of the invention is to provide a device, for propelling and steering a watercraft, which is readily reversible so that the craft can be caused to travel rearwardly when desired, yet remaining under steering control.

It is also an object of the invention to provide a device, for propelling and steering a small watercraft, which is designed for ease and economy of manufacture; ready installation on the watercraft; and effective operation without undue effort on the part of the occupant of the craft.

Still another object of the invention is to provide a propelling and steering device for watercraft which is practical, reliable, and durable; being exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

Fig. 1 is a side elevation of the device as mounted on a small boat.

Fig. 2 is a plan view of the device, partly broken away and partly in section, mounted as in Fig. 1.

Fig. 3 is an enlarged sectional elevation of the device as so mounted.

Fig. 4 is a fragmentary transverse sectional elevation on line 4—4 of Fig. 3.

Referring now more particularly to the drawings and to the characters of reference marked thereon, the device is here shown as mounted in connection with a small boat 1 having a transom 2 and a bottom 3; such device comprising the following:

A fixed, vertically elongated, tubular post 4 is disposed rearwardly of the transom 2 centrally between the ends

2

thereof; such post 4 being rigidly attached to the transom 2 by an upper bracket 5 and a lower bracket 6. At its upper end the fixed post 4 includes an annular radial flange 7.

5 A rotatable, elongated, tubular post 8 extends—in relatively turnable relation—through the fixed post 4; such post 8 being provided at its upper end with an annular radial flange 9 which rests in matching relation on the flange 7.

10 The rotatable post 8 is of such length that it extends some distance below the lower end of the fixed post 4, and terminates in a plane below the bottom 3 of boat 1.

15 Adjacent but short of the lower end thereof the rotatable post 8 is formed with an enlarged integral collar 10 which forms a shoulder 11 against which the lower end of the fixed post 4 abuts.

20 An under-water motor unit, indicated generally at 12, is fixed in connection with the lower end portion of the rotatable post 8. The motor unit 12 comprises a horizontal water flow tunnel 13 which is rectangular in cross section, preferably being relatively wide in comparison to its depth; such tunnel—open at both ends—comprising a bottom plate 14, a top plate 15, and sides 16. The lower end of the rotatable post 8 is fixed to and opens through the top plate 15 centrally between the sides 16 and at a point somewhat ahead of the center of the tunnel 13 lengthwise thereof.

25 Diagonal braces 17 connect between the collar 10 and top plate 15 to assure of rigidity or stability of the tunnel 13 relative to the rotatable post 8.

30 A non-flexible pressure vane 18 is disposed in the tunnel 13 for up and down oscillation in the manner hereinafter described; such pressure vane 18 being flat, rectangular, and dimensioned so that the ends terminate adjacent but short of the corresponding ends of the tunnel 13. Additionally, said pressure vane 18 is of a width approximating the inside transverse dimension of the tunnel 13, but with sufficient clearance so that such pressure vane may oscillate up and down in said tunnel.

35 A vertically reciprocable actuating rod 19 extends in relatively close fitting but slidable relation through the post 8; such rod 19 being transversely pivoted at its lower end in connection with the pressure vane 18 in the following manner:

40 Such pressure vane 18 is formed—centrally of its sides, and somewhat ahead of the center thereof in a lengthwise direction—with an opening 20 into which the lower end of the rod 19 projects; said end of the rod carrying a cross pin 21 whose laterally projecting end portions are journaled in bushings 22 retained in the vane 18 by retention plates 23.

45 As so mounted on the lower end of the rod 19 the pressure vane 18 is vertically rockable; the portion of the vane ahead of the rod being shorter than the portion of said vane rearwardly of the rod.

50 The rod 19 projects some distance above the assembly of the posts 4 and 8, and at its upper end said rod is formed with a fork 24 which straddles an elongated, normally longitudinally extending lever arm 25 intermediate the ends of the latter; the lever arm 25 being secured in said fork—in vertically swingable relation—by a transverse pivot 26.

55 An upstanding link 27 is transversely pivoted at its lower end, as at 28, between ears 29 on the flange 9 in offset relation to the rod 19; such link thence extending at an upward and outward incline toward the corresponding portion of the lever arm 25. At its upper end the link 27 is formed with a fork 30 which straddles the lever arm 25 at a point some distance from the pivot 26; said lever arm being secured in said fork 30 by a transverse pivot 31.

60 In use of the above described device the lever arm 25

initially extends at a forward and upward incline from the rod 19; the latter then being in a lowered position with the pressure vane 18 resting flat against the bottom plate 14 of the tunnel 13. Thereafter, the occupant of the boat 1, grasping the forwardly projecting portion of the lever arm 25—i.e. the portion ahead of the link 27—swings or pumps it downwardly and then upwardly, recurringly. Upon down swinging of the lever arm 25, and by reason of the inclusion of the pivotally mounted link 27, the actuating rod 19 is pulled upwardly. This results in the pressure vane 18 likewise being pulled upwardly, but because of the differential in length of said vane ahead and to the rear of the cross pin 21, such vane first rises from its initially flat position in engagement with the bottom plate 14 to a longitudinally diagonal position with the front end of such vane abutting the top plate 15, while the rear end remains in engagement with the bottom plate 14. With continued upward movement of the actuating rod 19, the pressure vane 18 swings upward from such diagonal position to a position flat against the top plate 15. When this occurs the water trapped between such pressure vane 18 and the top plate 15 is discharged from the rear end of the tunnel 13 in a relatively forceful stream, and which—by reaction—causes advance of the boat 1.

When the lever arm 25 is next swung upwardly, the actuating rod 19 thrusts downwardly, whereupon the pressure vane 18 moves through the progressive positions above described, but from the top plate 15 to the bottom plate 14; again causing water discharge from the rear end of the tunnel 13 to further propel the boat.

Thus, by the simple expedient of "pumping" on the lever arm 25 the pressure vane 18 oscillates in the tunnel 13 in a manner to effectively propel the boat forwardly, and without undue effort.

The occupant of the boat—in addition to causing actuation of the under-water motor unit 12 by pumping on the grasped lever arm 25—can also readily steer the boat by merely swinging such lever arm to right or left, which causes corresponding rotation—through resultant turning of the post 8—of said motor unit 12, with rod 19 as an axis. Such corresponding rotation of the motor unit 12—by change in the direction of discharge of the water from motor unit 12—steers the boat during forward movement thereof.

If it be desired to propel the boat 1 in reverse, the lever arm 25 is grasped and reversed so that its normally rearwardly projecting portion extends forwardly. This turns the motor unit 12 through a half-circle, and thereafter by pumping on the then forwardly projecting portion of the lever arm 25, said motor unit 12 functions to discharge the recurrent streams of water forwardly and the boat 1 travels rearwardly, still under steering control.

From the foregoing description it will be readily seen that there has been produced such a device as will substantially fulfill the objects of the invention as set forth herein.

While the present invention sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful, and upon which Letters Patent are desired:

1. A propelling device for a watercraft comprising an

upstanding tubular post depending to a level below the bottom of the watercraft, means mounting the post on the watercraft, a substantially horizontal, under-water tunnel fixed on the lower end of the post, the latter opening into the tunnel, a vertically swingable pressure vane disposed in and extending lengthwise of the tunnel, a vertically reciprocal rod in the post and projecting therefrom into the tunnel, a transverse axis pivotal connection between the lower end of the rod and the pressure vane at a point ahead of the center of the latter lengthwise thereof, and means operative by an occupant of the watercraft to reciprocate said rod; the rod including a portion projecting above the upper end of the post, and said last named means comprises a vertically swingable lever arm transversely pivoted in connection with said projecting portion of the rod and thence extending in overhanging relation to the watercraft, and a link pivotally connected between the post and said lever arm, the link diverging upwardly and outwardly relative to said post.

2. A propelling and steering device, for a watercraft having a transom, comprising a tubular post upstanding rearwardly of the transom, means securing the post to the transom, a substantially horizontal, under-water tunnel fixed on the lower end of the post, the latter opening into the tunnel, a vertically swingable pressure vane disposed in and extending lengthwise of the tunnel, a vertically reciprocable rod in the post and projecting therefrom into the tunnel, a transverse axis pivotal connection between the lower end of the rod and the pressure vane at a point ahead of the center of the latter lengthwise thereof, the rod including an upper end portion projecting above the post, a normally longitudinally extending vertically swingable lever arm transversely pivoted intermediate its ends on said upper end portion of the rod, and a link pivotally connected between the post and the lever arm at a point on the latter longitudinally offset relative to the point of pivotal connection between said post and lever arm; the securing means for the post rotatably supporting the latter.

3. A propelling and steering device for a watercraft having a transom, comprising a first tubular post upstanding rearwardly of the transom, bracket means fixedly securing said first tubular post to the transom, a second tubular post turnable in said first post, means maintaining the posts against relative axial displacement, a substantially horizontal under-water tunnel fixed on the lower end of said second post, the latter opening into the tunnel, a vertically swingable pressure vane disposed in and extending lengthwise of the tunnel, a vertically reciprocable rod in said second post and projecting therefrom into the tunnel, a transverse axis pivotal connection between the lower end of the rod and the pressure vane at a point ahead of the center of the latter lengthwise thereof, the rod including an upper end portion projecting above said posts, a normally longitudinally extending vertically swingable lever arm transversely pivoted intermediate its ends on said upper end portion of the rod, said second post including an exposed upper end part, and an upwardly and outwardly inclined link pivotally connected between said part and lever arm.

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