Oct. 7, 1952 B. I. BILLMAN ET AL 2,612,859

PROPELLING AND STEERING MECHANISM

Filed Jan. 30, 1948 2 SHEETS—SHEET 1

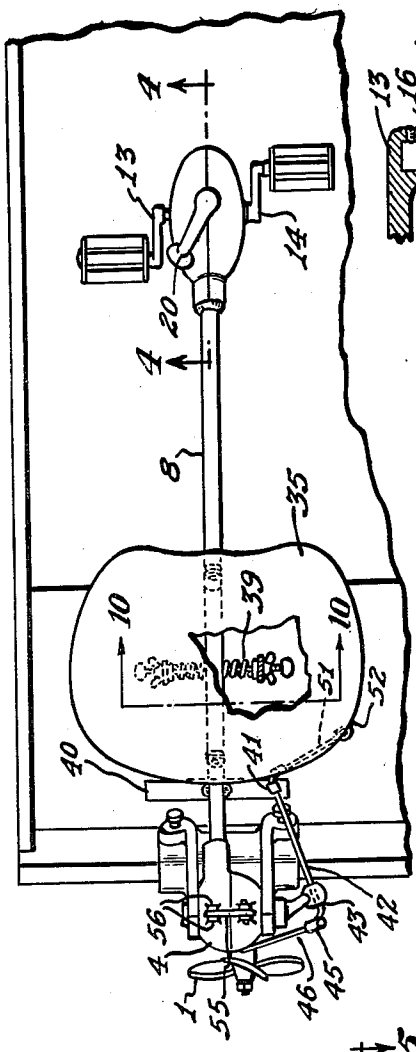


FIG. 1.

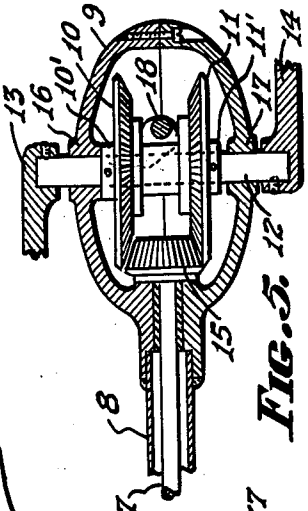


FIG. 5.

FIG. 2.

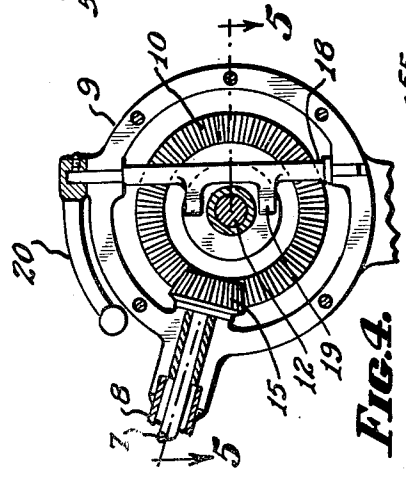


FIG. 4.

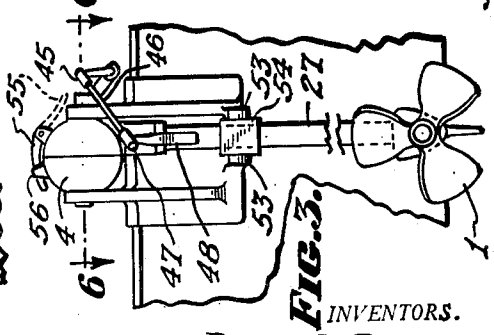


FIG. 3.

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PROPELLING AND STEERING MECHANISM

Filed Jan. 30, 1948 2 SHEETS—SHEET 2

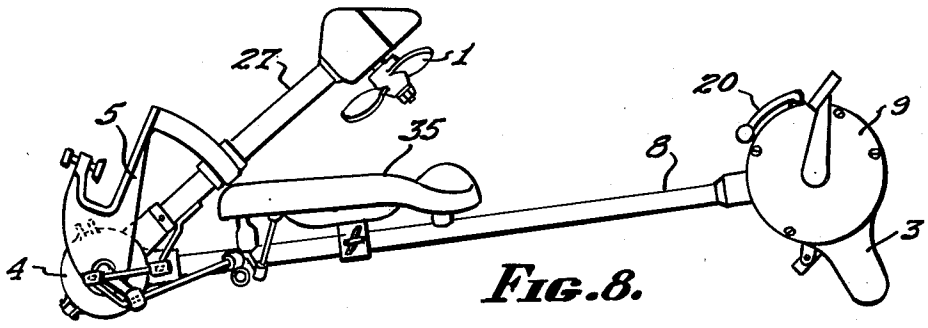


FIG. 8.

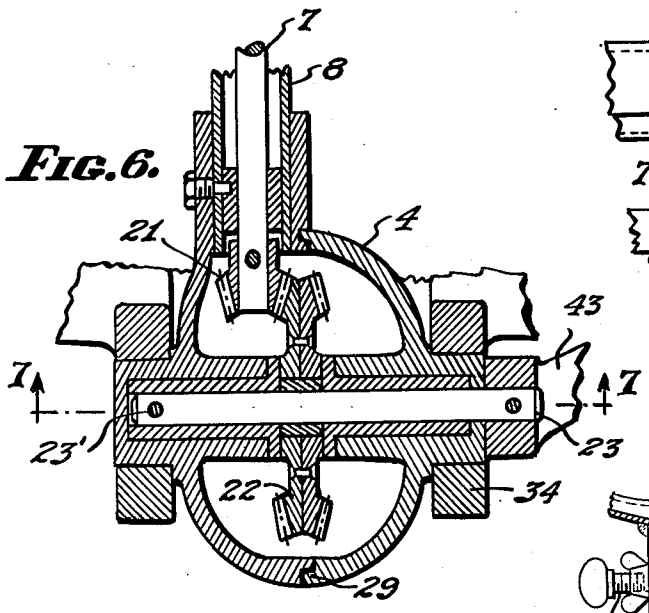


FIG. 6.

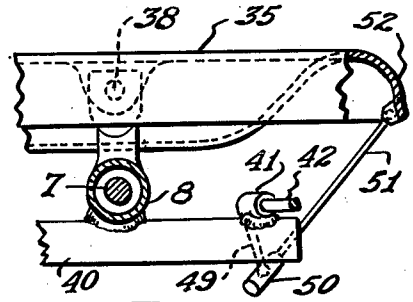


FIG. 9.

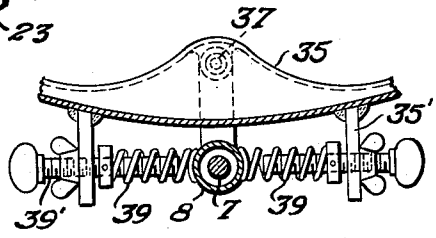


FIG. 10.

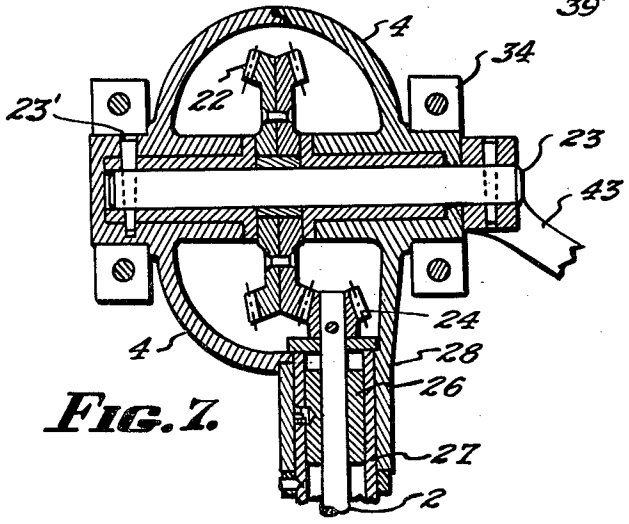


FIG. 7.

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UNITED STATES PATENT OFFICE

2,612,859

PROPELLING AND STEERING MECHANISM

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Application January 30, 1948, Serial No. 5,464

1 Claim. (Cl. 115—25)

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Our invention relates to a propelling and steering mechanism primarily for use with small boats.

When fishing alone in a boat, it is very difficult to handle a fishing rod and reel and at the same time to handle the boat. Particularly when a fish is on the end of the line, it is desirable to be able to move and manipulate the boat so as to avoid tangling the fishing gear with the boat or its propulsion means and to manipulate the boat so as to easily boat the fish. For this reason, it is usually necessary to have a second person in the boat to manipulate the same for the fisherman.

There are numerous power propulsion devices provided for boats, but most of them move the boat too rapidly through the water for trolling and are not sufficiently maneuverable to be of any great benefit when landing a fish.

It is an object of our invention to provide a boat propelling mechanism actuated by the feet together with steering controls operated by the seat position or balance of the operator.

It is a further object of our invention to provide such a device which may be attached to any boat and removed from the same without injuring the boat. Although it is within the contemplation of our invention to provide a boat propelling and steering mechanism as described above which is built into and which is a unitary part of the boat itself.

It is a further object of our invention to provide a boat propelling and steering mechanism which is relatively light in weight, may be folded together to form a compact unit so it may be easily transported and stored, but which may be quickly and easily attached to a boat without the use of tools or a great deal of physical labor.

In the example shown in the drawings and described in the specification, we describe a propelling mechanism which is actuated by the feet. However, it will be apparent that a power unit may be substituted for the foot mechanism and which may be easily controlled by the feet.

It is a further object of our invention to provide a mechanism as described above wherein the boat may be moved forwardly or backwardly, change the speed, or completely stopped and started or steered in any direction without the use of hands at all.

These and other objects of our invention which will be set forth hereinafter or will be apparent to one skilled in the art upon reading these specifications, we accomplish by that certain construction and arrangement of parts of which we shall now describe an exemplary embodiment.

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Reference is now made to the drawings which form a part thereof and in which:

Figure 1 shows a plan view of our propelling and steering mechanism mounted in a boat.

Figure 2 shows a side elevation of our propelling and steering mechanism mounted on the stern of a boat wherein the stern and a portion of the bottom is in cross section.

Figure 3 shows a rear elevation of the mechanism shown in Figures 1 and 2.

Figure 4 shows a cross section through the pedal housing taken on section line 4—4 of Figure 1.

Figure 5 shows a horizontal cross section of the pedal housing taken on the section line 5—5 of Figure 4.

Figure 6 shows a horizontal cross section of the universal housing taken on the section line 6—6 of Figure 3.

Figure 7 shows a vertical cross section of the universal housing taken on the section line 7—7 of Figure 6.

Figure 8 shows a side elevation of the propelling and steering mechanism in folded position for carrying and storage.

Figure 9 shows a rear elevation with a portion in cross section of the seat of our device taken on the section line 9—9 of Figure 2.

Figure 10 shows a cross section of our seat and adjustable springs taken on a section line 10—10 of Figure 1.

Briefly, in the practice of our invention, we provide a propeller which is actuated by pedals within the boat through shafting which in turn runs through casings. We provide a seat on one of the casings which is tiltable, and by means of linkage tie the seat in with the steering mechanism of the device. By this construction both the propelling of the boat and the steering is done by either the feet or the movement of the body and does not necessitate the use of either hand of the operator.

Referring to the drawings (see Figure 2) we provide a propeller 1 actuated by a shaft 2 riding in a casing 27. The casing 27 terminates in a housing 4 which is clamped by means of clamp 5 to the stern 6 of a boat. From the housing 4, we provide a shaft 7 encased in a casing 8 which in turn terminates in the pedal housing 9. In the pedal housing 9 are two bevel gears 10 and 11 mounted on a shaft 12, which projects through and is journaled in the housing 9. On the ends of the shaft 12, we provide pedals 13 and 14.

On the end of the shaft 7 is a bevel gear 15 positioned between the gears 10 and 11. The

spacing between the journals 16 and 17 in the housing 9 is greater than the distances between the hubs 10' and 11' of the gears 10 and 11. This permits the shaft 12 to be longitudinally moved in the journals 16 and 17. The bevel gear 15 is of such a size and so located that it will selectively mesh with either gear 10 or 11, depending upon the position of the cam on shaft 12. Journaled in the housing 9, we provide a shaft 18 which is mounted in a position at right angles to the shaft 12 (see Figure 4). The shaft 18 has fingers 19 integral therewith which embrace the shaft 12 between the gears 10 and 11. One end of the shaft 18 projects beyond the housing 9 and is keyed to an arm 20 which is positioned outside of the housing 9.

From the above, it is apparent that as the arm 20 is moved to the right or the left, the shaft 12 carrying the gears 10 and 11 will be moved longitudinally to the right or the left, thus selectively engaging the gear 15 with either the gear 10 or 11. The arm 20 is to be actuated by the foot and, as is apparent, will control either the forward or reverse movement of the propeller 1, through the shafting and gearing without the need of reversing the pedal action.

The casing 8 runs from the housing 9 up to one half of the housing 4 (see Figure 6). On the end of the shaft 7 and within the housing 4 is keyed a bevel gear 21 which engages one side of a double bevel gear 22 riding on the stationary shaft 23 which is mounted on one half of the housing 4 by a pin 23' and projects through the other half through a bearing. The double bevel gear 22 provides a means of changing the gear ratio to handle different propeller sizes.

The opposite side of the bevel gear 22 meshes with a bevel gear 24 (see Figure 7) which in turn is keyed to a shaft 2. The shaft 2 is journaled in a bushing 26 within a casing 27 which in turn is rotatable within a journal 28 integral with the other half of the housing 4. The half of housing 4 within which the casing 27 is journaled is the opposite half within which the casing 8 is journaled. The two halves of the casing 4 are joined by a circular rotatable lap fit or seal 29 so one half of the casing 4 may be rotated on the other half.

From the above, it is apparent that the shaft casing 27 and the shaft casing 8 may be moved in different angular positions by rotating the two halves of the casing 4 on each other.

At the lower end of the shaft 2 is keyed a bevel gear 25 which in turn is meshed with a bevel gear 30 at right angles thereto which is keyed to shaft 31 on which the propeller 1 is mounted. A housing 32 encloses the gears 25 and 30 and the shaft 31 in which it is journaled is mounted on the shaft casing 27. A rudder 33 may be mounted on the gear casing 32 (see Figure 2). The rudder 33 protects the propeller when it contacts an obstruction such as a rock or a log by forcing the gear casing 32 upwardly around the housing 4.

As is apparent from the above, the actuation of the pedals 13 and 14 will rotate the propeller 1 through either gear 10 or 11 engaged with gear 15 which rotates shaft 7 which in turn through gearing 21 and 22 rotates gear 24 and shaft 2, which in turn actuates gear 25 and 30, which is keyed to shaft 31. It is also apparent that the angular position between shaft 7 and shaft 2 may be changed at will by rotating the two halves of the housing 4 on each other.

The housing 27 carrying the propeller assembly is rotatable in the housing 4 as stated above, thus permitting steering of the boat by rotating the housing 27. The housing 4 is mounted on the boat by means of the clamp 5, the upper portion 34 of which carries the housing 4 rotatably mounted thereon (see Figures 6 and 7).

We provide a seat 35 which is adjustably mounted on the housing 8 at bearing points 37 and 38, which are preferably spaced above the housing 8 which are aligned parallel to the housing 8. A seat 35 is so mounted that it will rock from side to side on the bearing points 37 and 38 and is held against rocking by means of adjustable springs 39, which bear against the housing 8 and are held in position by thumb screws 39'. The thumb screws 39' are screwed in straps 35', which are welded to the bottom of the seat 35. Collars are affixed to the thumb screw 39' by pinning or otherwise, so that upon rotation of the screw 39' the springs 39 will be compressed or decompressed against the side of the housing 8. (See Figure 10.) In this way by adjusting the springs 39 the rocking motion of the seat 35 may be adjusted. Rigidly attached to the housing 8, we provide a bar 40 carrying a journal 41 through which runs a rod 42. The rod 42 is also journaled in an arm 43 immovably mounted on the end of the shaft 23. The end of the rod 42 is bent upwardly as at 44 (see Figure 2) and is fastened by a universal joint 45 whose pivot point is on the housing swivel shaft center line to a second rod 46 which in turn is fastened by a universal joint 47 to an arm 48 permanently welded to the housing 27 (see Figure 3).

The end of the rod 42 projecting through the journal 41 is bent downwardly as at 49 and connected by a universal joint 50 to a rod 51 which in turn is attached by a universal joint to the side 52 of the seat 35. From the above, it is apparent that when the seat 35 is tilted to the right, the linkage through 51, 42, and 46 through the arm 48 rotates the housing 27 to the left, thus steering the boat to the right. When the seat 35 is tilted to the left, the housing 27 through the same linkage is rotated to the right and the boat turns to the left.

In order to prevent the propeller from being injured by hitting rocks or the like, we preferably permit both halves of the housing 4 to freely rotate relative to each other, and we provide arms 53 which embrace the housing 27 (see Figures 2 and 3). A sliding bearing 54 surrounds housing 27 and bears against the inside of the arms 53, thus preventing any sideward movement of the housing 27 with its enclosed and appended structure. However, in reversing the boat, it, of course, is necessary that the propeller be prevented from riding away from the boat and up out of the water. For this purpose, we provide a latch 55 mounted on one half of the housing 4 and which engages in a keeper 56 on the other half of the housing 4, thus preventing relative rotative movement between the same. It is to be understood that we may provide a series of keepers 56 so the two halves of the housings 4 may be locked together against rotation in any operative position depending on the pitch of the stern 6 of the boat.

As is apparent from the above, when the mechanism is removed from the boat, the shaft casing 27 carrying the propeller, etc. may be swung around near the seat 35, as shown in Figure 8. It is also apparent that the relative angle between casing 8 and casing 27 may be changed to accommodate boats with sterns 6 having different

transom angles. There is a leg 3, an integral part of the housing 9, which supports the same on the bottom 57 of the boat.

From the above, it is apparent that we have provided a propelling and steering mechanism which is adaptable for use in any kind of a boat and wherein the operator may propel and also steer the boat without the use of either hand, but solely by the use of his feet and body, the forward or reverse action being selected by the foot through arm 20.

While we have described our propelling mechanism as being actuated by the feet, it is, of course, apparent that a power device may replace the pedal housing 9 and actuate the shaft 7 with foot controls for the same.

It is also apparent that while we have shown a device which may be readily and easily attached to any boat, it is also within the contemplation of our invention to incorporate our novel mechanism as an integral part of a boat.

While we have shown specific linkage for steering the boat by means of tilting the seat, it is to be understood that other types of linkage or other means may be used for steering the boat by movement of the seat or other parts of the body except the hands. While we have shown and described the controlling mechanism as applied to a boat, it is to be understood that it may be used with any other type of vehicle where it is advantageous to control the action of the vehicle without the use of the hands of the operator.

It is to be understood that modification may be made in our invention without departing from the spirit thereof, and we do not intend to limit ourselves otherwise than as pointed out in the claim which follows. Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

A removable boat propelling and steering mechanism comprising a clamp adapted to be fastened to the stern of a boat, a gear housing supported by said clamp, a shaft in a tubular casing projecting downwardly from said housing, a propeller mounted on the end of said casing and geared to said shaft, a second shaft in

a tubular casing projecting from said gear housing to a second gear housing adapted to be supported on the bottom of a boat, foot actuated pedals associated with said second housing and a seat mounted on the casing containing said second shaft at a point between said first and second housings, said pedals rotating said propeller through said shafts and connecting gears, said first mentioned gear housing being formed of two halves, with one of the shaft casings being mounted on each half, the halves being rotatable in relation to each other in a vertical plane so as to permit variation of the angle formed by the two shafts, said first mentioned shaft casing being rotatable on said housing and said seat being mounted on bearings in a line substantially parallel to said second mentioned tubular casing so as to be tiltable, and connecting means between said seat and said first mentioned shaft casing so that the latter is rotated in response to the tilt of said seat for steering the boat.

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