United States Patent

[11] **3,570,442**

[72] Inventor **William J. Shimanckas**
Waukegan, Ill.

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[73] Assignee **Outboard Marine Corporation**
Waukegan, Ill.

[54] **NO BACK STEERING**
11 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **115/18,** 74/531
[51] **Int. Cl.** **B63h 21/26**
[50] **Field of Search** 115/18, 41; 74/531; 114/170

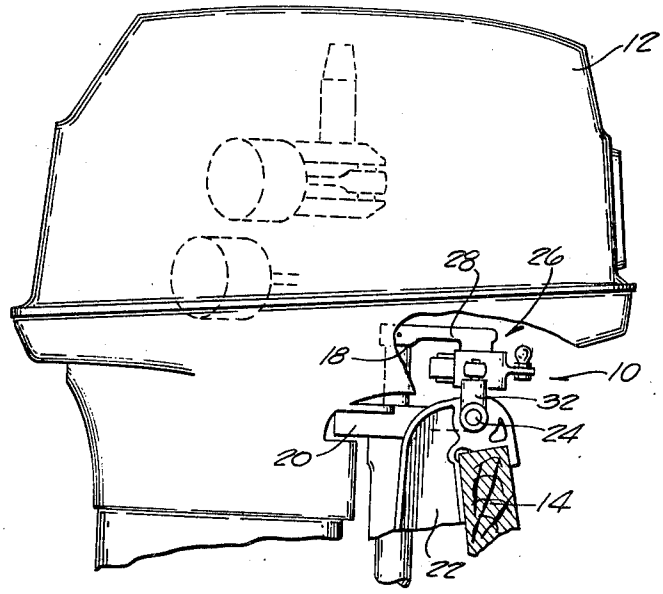
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Primary Examiner—Andrew H. Farrell
Attorney—Wheeler, Wheeler, House & Clemency

ABSTRACT: Disclosed herein is a steering mechanism for an outboard motor having a swivel bracket mounted for vertical swinging movement about a horizontal tilt pin, and a marine propulsion unit mounted for pivotal movement on the swivel bracket, the mechanism including a slide support rod connected to pivot about an axis normal to the axis of the tilt pin and a slide lock assembly connected to the marine propulsion unit and mounted for movement axially of the support rod, the slide lock assembly releasably restraining movement of the marine propulsion unit relative to the support rod from steering forces originating in the marine propulsion unit. The slide lock assembly includes a pivot pin mounted for movement axially of the support rod, a pair of levers having apertures slightly larger than the support rod, which levers are biased in angularly disposed relation on the support rod to respectively provide unidirectional restraint in opposite directions to the movement of the pivot pin with respect to the support rod and a slide block connected to a steering control member and mounted to slide on the support rod to selectively release the levers in response to steering movements originating from the steering control member.



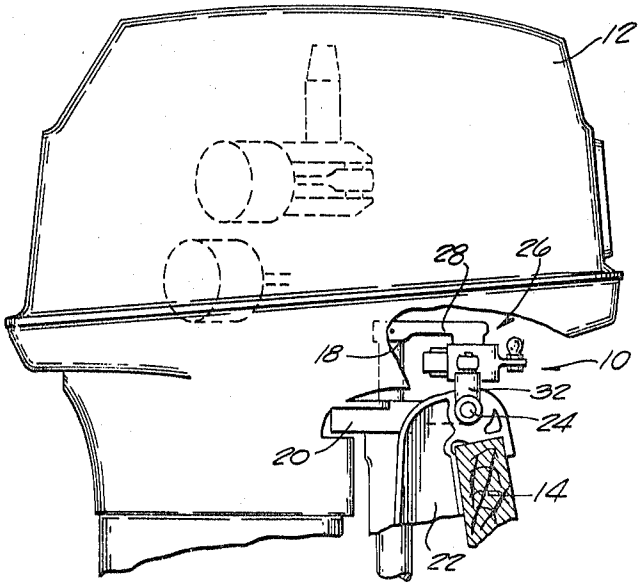


Fig. 1

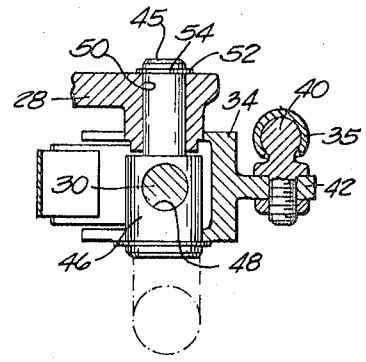


Fig. 4

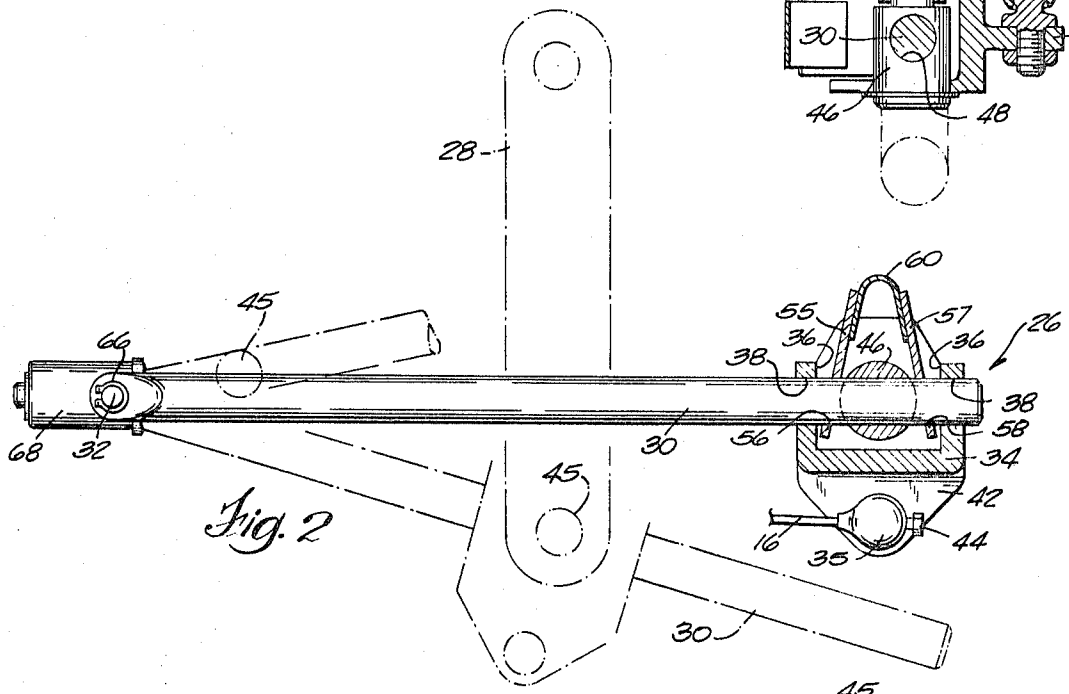


Fig. 2

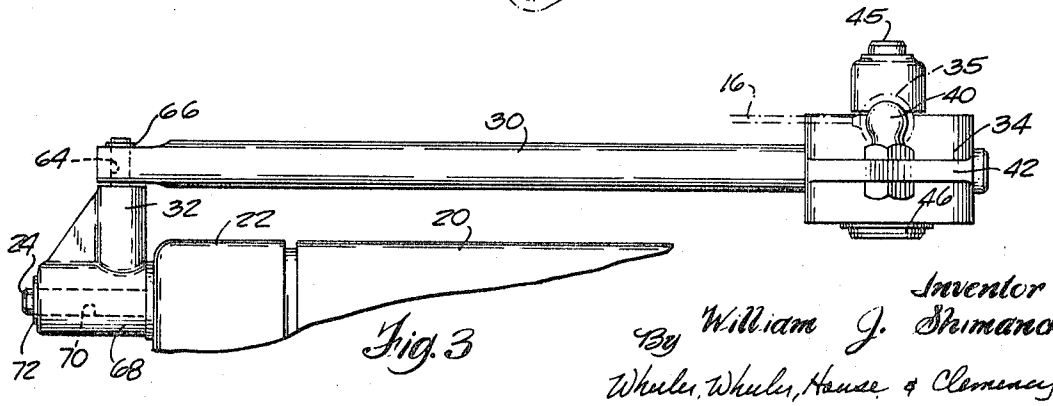


Fig. 3

Inventor
William J. Shimanckas
By Wheeler, Wheeler, House & Clemency
Attorneys

NO BACK STEERING

BACKGROUND OF THE INVENTION

Marine propulsion units of the type which are dirigibly mounted on the transom of a boat and controlled by a steering cable connected to a steering control member at a remote point in the boat have a tendency to pivot in response to forces originating in the propulsion unit. Steering mechanisms of the type shown in the irgens, U.S. Pat. No. 3,517,634, issued Jun. 30, 1970, have been designed to prevent movement of the propulsion unit from these forces.

SUMMARY OF THE INVENTION

The steering mechanism of this invention is a self-contained unit mounted directly on the horizontal tilt pin for the marine propulsion unit. This mechanism includes a slide lock assembly having a pivot pin connected to the steering arm for the marine propulsion unit and mounted for movement axially of a slide support rod connected to pivot about an axis normal to the horizontal tilt pin. The slide lock assembly is connected to the steering cable or push-pull cable provided in the boat.

Pivotal movements of the marine propulsion unit from forces originating in the propulsion unit are minimized or restrained by a pair of levers having apertures slightly larger than the diameter of the slide support rod. Each of the levers is biased to an angularly disposed relation on the support rod to respectively provide a unidirectional restraint in opposite directions against movement of the pivot pin on the support rod. The restraining action of the levers is released by the movement of a slide block into engagement with one or the other of the levers. When the motion of the slide block ceases, the levers are returned to an angular locking relation on the support rod to restrain further movement of the marine propulsion unit.

The support rod and slide lock assembly are connected to the marine propulsion unit to afford tilting of the marine propulsion unit for servicing or to clear obstructions.

Further objects and advantages of the present invention will become apparent from the following detailed description when read in connection with the accompanying drawings, in which:

FIG. 1 is a side view of an outboard motor showing the location of the steering mechanism with respect to the marine propulsion unit;

FIG. 2 is a top view partly in section of the steering mechanism with the slide lock assembly in the extreme right-hand position on the support rod;

FIG. 3 is a view in elevation of st the steering mechanism shown mounted on the horizontal tilt pin for the marine propulsion unit; and

FIG. 4 is a view partially in section of the slide lock assembly.

DESCRIPTION OF THE INVENTION

The steering mechanism 10 shown in FIG. 1 is connected to a marine propulsion unit 12 of the type dirigibly mounted rearwardly of the transom 14 of a boat and to a steering actuator located at a remote point in the boat by means of a push-pull or steering cable 16. The marine propulsion unit 12 includes a steering arm 28 and is secured to a kingpin or steering bracket 18 pivotally mounted on a swivel bracket 20 connected to a clamp or stern bracket 22 by means of a horizontal tilt pin 24. The steering arm 28 is releasably connected to the horizontal tilt pin 24 by means of the steering mechanism 10 which generally includes a slide lock assembly 26 and a slide support 30. The slide lock assembly 26 is connected to the steering arm 28 for the marine propulsion unit 12 and is carried on the slide support rod 30 which is connected to the horizontal tilt pin 24 by means of a radial arm 32.

More specifically, and referring to FIGS. 2 and 4, the slide lock assembly 26 includes a slide block 34 having spaced sidewall flanges 36 with apertures 38 in the sidewall flanges to receive the slide support rod 30. The slide block 34 is connected to a socket connector 35 provided on the steering cal cable 16 by means of a ball type connector 40 provided on a flange 42 on the slide block 34. A screw 44 is provided in the socket connector 35 to releasably engage the ball connector 40.

The slide lock assembly 26 includes means for connecting the steering arm 28 to the slide support rod 30 in the form of a pivot pin 45 having an enlarged section 46 positioned in the space between the sidewall flanges 36 and an aperture 48 in the enlarged section 46 to receive the slide support rod 30. The pivot pin 45 extends radially from the support rod 30 and is received in an aperture 50 provided in the steering arm 28. Means are provided to retain the pivot pin 45 in the aperture 50 in the form of a snap ring 52 positioned in a groove 54 provided at the end of the pivot pin 45.

In order to restrain movement of the slide lock assembly 26 with respect to the slide support rod 30, means are provided for releasably engaging the support rod 30. This means includes two levers 55 and 57, one of which is positioned on each side of the pivot pin 45 in the space between the enlarged section 46 and the sidewall flanges 36. Apertures 56 and 58 are provided in each of the levers 55 and 57, respectively, to receive the support rod 30 and are slightly larger than the diameter of the support rod 30. The levers 55 and 57 are biased at an angle to a line drawn perpendicular to the axis of the support rod 30 by means of a spring 60 secured to the converging ends of the levers 55 and 57 with each of the apertures 56 and 58 releasably engaging the support rod 30. Each of the levers 55 and 57, respectively, provides a unidirectional restraint to the movement of the pivot pin 45 on the slide support rod 30. Movement of the enlarged section 46 of the pivot pin 45 into engagement with either of the levers 55 and 57 will tend to increase the angular relation of the engaged lever with the support rod 30 increasing the locking action of the aperture in that lever on the support rod 30. Accordingly, propulsion unit steering movements which could otherwise originate in the propulsion unit are prevented.

The levers 55 and 57 are released from locking engagement with the support rod 30 by means of a lost motion connection provided between the slide block 34 and the pivot pin 45. This can be seen in FIG. 2 where the slide lock assembly 26 is shown on the right end of support rod 30. When the slide lock assembly 26 is moved to the left by steering movements originating from a remote point in the boat, the right sidewall flange 36 on the slide block 34 will initially engage the outer end of lever 57 moving the lever 57 toward a generally perpendicular relation with respect to the axis of the support rod 30. As the locking action of the engaged lever is released from the support rod 30, the lever will be brought into engagement with the enlarged section 46 of the pivot pin 45. Further movement of the slide lock assembly 26 on the support rod 30 will pivot the steering arm 28 and kingpin 18 about the kingpin axis, thereby rotating the propulsion unit 12. Since the levers 55 and 57 each provide only unidirectional locking action, lever 55 will not have any effect on the movement of the slide lock assembly 26 to the left. When the direction of motion of the slide lock assembly 26 is reversed, the locking action of the lever 55 is released by the movement of the slide block 34 into engagement with the lever 55 in the same manner as described for the release of lever 57 from the support rod 30.

In order for the slide lock assembly 26 to follow the circular motion of the outer end of the steering arm 28 when the propulsion unit 12 is rotated to steer the boat, means are provided to allow the support rod 30 to pivot about an axis extending radially from the tilt pin 24 and in a plane generally parallel to the tilt pin 24. This means comprises the radial arm 32 which is pivotally mounted on the tilt pin 24 and extends radially outwardly through an aperture 64 provided in the end of the support rod 30. The support rod 30 is retained on the arm 32 by means of a snap ring 66 positioned in a groove in the end of the radial arm 32. The support rod 30 is free to pivot about the radial arm 32 in a plane generally parallel to

the axis of the tilt pin 24. As seen in FIG. 2, as the slide lock assembly 26 is moved from the right end of the support rod 30 to the left end, the support rod 30 will pivot initially clockwise until the slide lock assembly 26 reaches the center of the support rod 30. Further movement of the assembly 26 will pivot the support rod 30 counterclockwise until the assembly 26 reaches the left end of the support rod 30.

Means are provided for supporting the slide support rod 30 for movement with the propulsion unit 12 when the propulsion unit is pivoted vertically with respect to the horizontal tilt pin 24. Various means can be employed for connecting the slide support rod 30 to the swivel bracket 20, the clamp bracket 22, or the tilt pin 24 to allow for movement of the slide support rod 30 with the propulsion unit 12. In the drawing this is shown as the pivotal connection of the radial arm 32 to the tilt pin 24. The radial arm 32 includes a hub 68 having an aperture 70 to receive the horizontal tilt pin 24. The radial arm is retained on the tilt pin 24 by a snapring 72 provided on the end of the tilt pin 24. Whenever the propulsion unit is tilted vertically about the horizontal tilt pin 24, the support rod 30 will be free to move with the propulsion unit 12 about the horizontal tilt pin.

Various of the features of the invention are set forth in the following claims.

I claim:

1. In an outboard motor, the combination of a clamp bracket, a swivel bracket, a tilt pin connecting said swivel bracket to said clamp bracket for vertical swinging movement of said swivel bracket relative to said clamp bracket, a propulsion unit mounted for pivotal movememnt on said swivel bracket about an axis transverse to the axis of said tilt pin to afford steering movement of said propulsion unit, a steering arm extending rigidly from said propulsion unit, and means for releasably connecting said steering arm to said horizontal tilt pin to releasably restrain steering movement.

2. An outboard motor according to claim 1 whrerein said releasable connecting means includes a support rod connected to said tilt pin and a slide lock assembly connected to said steering arm and mounted for movement axially of said support rod.

3. An outboard motor according to claim 2 including means for connecting said support rod to said tilt pin for pivotal support rod movement about an axis extending radially from said tilt pin.

4. An outboard motor according to claim 2 wherein said slide lock assembly includes a pair of levers having apertures slightly larger than the diameter of said support rod, said levers being biased in angularly disposed relation on said support rod to respectively provide unidirectional restraint in opposite directions to the movement of said slide lock assembly with respect to said support rod.

5. An outboard motor according to claim 4 wherein said assembly includes a slide block adapted for connection to a remote actuator and mounted for movement axially of said support rod to selectively release said levers in response to steering movements originated by the remote actuator.

6. An outboard motor according to claim 1 wherein said connecting means includes a support rod connected to said tilt pin, a pivot pin mounted for axial movement on said support rod and pivotally connected to said steering arm, a pair of levers having apertures slightly larger than the diameter of said support rod, said levers being biased in angularly disposed relation on said support rod to respectively provide unidirectional restraint in opposite directions to the movement of said pivot pin with respect to said support rod, and a slide block mounted for movement axially of said support rod to selectively release said levers in response to steering actuated from a remote point and to move said pivot pin axially on said support rod to effect steering of said propulsion unit.

7. An outboard motor according to claim 6 including means for connecting said support rod to said tilt pin for pivotal support rod movement about an axis extending radially from said tilt pin.

8. A steering mechanism for a marine propulsion unit having a steering arm, which mechanism is adapted to be connected to a remote actuator and is mounted for pivotal movement on an axis transverse to a horizontal tilt pin, said mechanism including a support rod, means for supporting said support rod for movement with the propulsion unit, means for connecting the steering arm to said support rod for movement axially of said support rod to effect steering of the propulsion unit, and means for releasably restraining movement of said connecting means with respect to said support rod in response to steering movements originating from the propulsion unit.

9. A steering mechanism according to claim 8 wherein said restraining means includes a pair of levers having apertures slightly larger than the diameter of said support rod and including means for biasing said levers to angularly disposed positions on said support rod to respectively provide unidirectional restraint in opposite directions to the movement of said connecting means with respect to said support rod.

10. A steering mechanism according to claim 8 wherein said supporting means includes a radially extending arm mounted for pivotal movement about the axis of the tilt pin.

11. A steering mechanism according to claim 9 including a slide block adapted for connection to the remote actuator and mounted for movement axially of said support rod and having spaced flanges positioned to engage said levers for selectively releasing said levers in response to steering movements originating from the remote actuator.