Sept. 21, 1954

E. M. KASEY

2,689,540

BOAT STABILIZING DEVICE

Filed Nov. 3, 1951

Fig. 1.

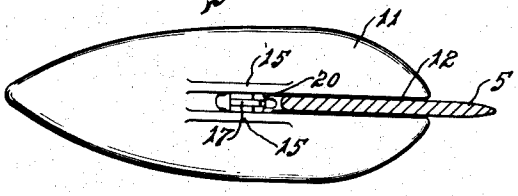


Fig. 2.

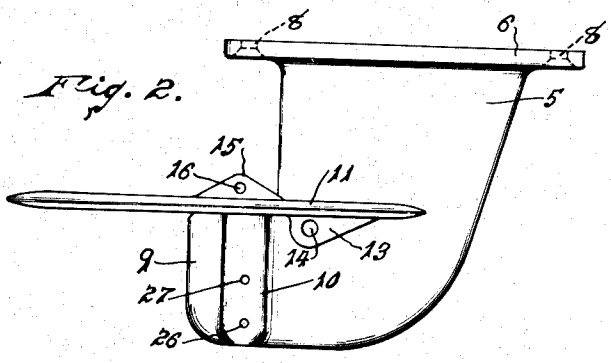


Fig. 3.

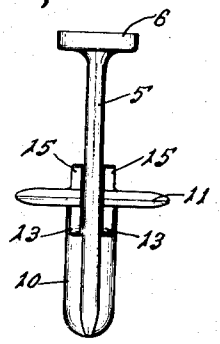


Fig. 4.

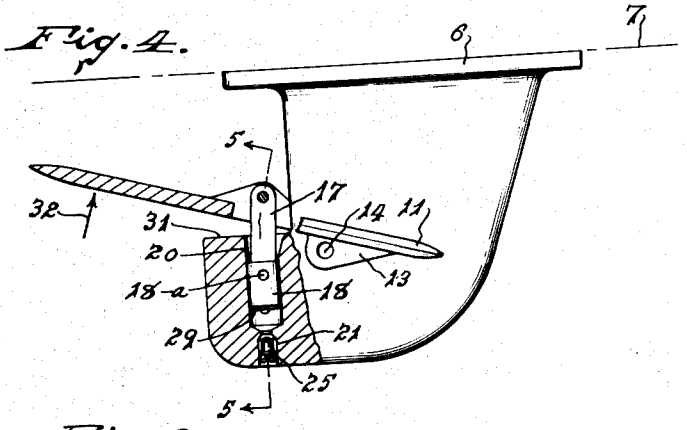


Fig. 5.

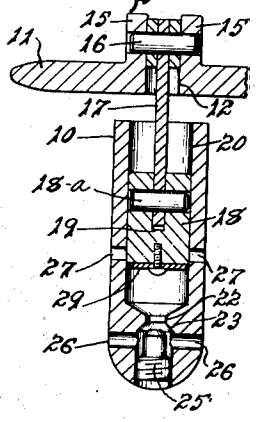


Fig. 6.

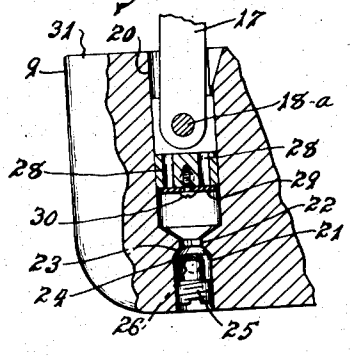
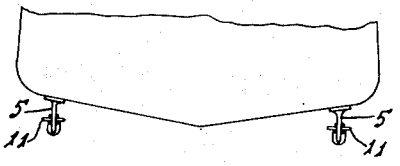


Fig. 7.



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Patented Sept. 21, 1954

2,689,540

UNITED STATES PATENT OFFICE

2,689,540

BOAT STABILIZING DEVICE

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Application November 3, 1951, Serial No. 254,698

9 Claims. (Cl. 114—126)

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This invention relates to a boat stabilizing device and more particularly to a device which is attachable to the bottom of racing boats or speed boats to prevent excessive bouncing of the bow thereof when moving at high speeds in choppy water.

The operators of high speed racing craft, such as hydroplanes and "racing shells" which are propelled by either outboard or inboard engines, encounter great difficulty in operating such craft in rough or choppy water due to the excessive bouncing of the bow of the craft as it strikes the waves or swells in the water. Such bouncing reduces the speed of the boat, places severe stress upon its structural members and can cause the bow of the boat to turn completely over the stern thereof.

An object of this invention is to provide a stabilizing device which will materially reduce the bouncing of the bow of a boat as it strikes the water.

A further object of the invention is to provide a stabilizing device which will not effect the gradual rise of the boat from the water, but will restrain sudden upward movement thereof, with respect to the water, such as would occur when the craft strikes swells or waves.

A further object of the invention is to provide a stabilizing device which will not impede the forward movement of the boat nor effect the turning movement thereof.

A still further object of the invention is to provide a stabilizing device which is particularly adapted for preventing the pitching and rolling of large water craft such as yachts and cruisers.

Further objects and advantages of this invention will be more clearly understood from the following description and the accompanying drawings in which:

Fig. 1 is a plan view, partly in section, of my improved stabilizing device.

Fig. 2 is a side view thereof.

Fig. 3 is a front view of said device.

Fig. 4 is a side view, partly in section, illustrating the operation of said device.

Fig. 5 is a sectional view taken on line 5—5 of Fig. 4.

Fig. 6 is a fragmentary side view, partly in section, illustrating the dampening mechanism employed in the device.

Fig. 7 is a view illustrating the manner in which my stabilizing device may be used on large water craft to prevent the pitching and rolling thereof.

Referring to the drawings, my improved stabilizing device comprises a strut 5 which is in

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the form of a flat plate that is suitably streamlined to reduce the drag effect on the boat and which is provided with a flange 6 at the upper end thereof for attaching the strut to the bottom, indicated at 7, of the boat; the said flange having holes 8—8 therein for the reception of fastening bolts or screws. The strut 5 also has a rearwardly projecting portion 9 which is enlarged, as at 10, for the purpose hereinafter described.

My improved stabilizing device also includes a fin 11 which extends transversely to the strut and has a notch 12 extending longitudinally therethrough for the reception of the strut 5 as shown in Fig. 1. The said fin is provided with a pair of downwardly extending bosses 13—13 having holes therein for the reception of a pivot pin 14 which extends through the strut 5 to thereby pivotally secure the fin 11 to the said strut. It will be noted that the pivotal point of the fin is substantially forward of its center to thereby provide a greater area rearwardly of the pivotal point than forwardly thereof.

The fin 11 has a boss 15 projecting upwardly from the top surface thereof adjacent each edge of the notch 12 and a pin 16 extends between said bosses and pivotally carries one end of a link 17 that extends downwardly through the slot 12 and is pivotally secured to a piston 18 by means of a pin 18-*a* which extends across a notch 19 in the piston; the said piston being slidably contained in a cylinder 20 in the enlarged portion 10 of the rearwardly extending strut portion 9.

The cylinder 20 communicates with a chamber 21, in the said portion 10, through a passage 22 and the said chamber is provided with an annular tapered seat 23 which is adapted to receive the tapered end 24 of an adjusting screw 25 that is threaded into the chamber 21. A pair of outlet ports 26—26 are provided in the walls of the chamber 21 and below the seat 23 to thereby provide an outlet, or bleed valve, for the cylinder 20 which may be adjusted by means of the screw 25. The walls of the cylinder are provided with outlet ports 27—27 at an intermediate portion of said cylinder.

The piston 18 has holes 28—28 therein which extend from the bottom of the notch 19 through the head of the piston and are covered by a flexible diaphragm 29 that is secured to the head of the piston by means of a screw 30. The said holes 28—28 and the diaphragm 29 constitute a check valve which permits the flow of water through the piston in one direction, but prevents its flow in the opposite direction.

My improved boat stabilizer is attached to the

keel of the boat forward of the center thereof and, when the boat is traveling at high speeds and is planing over the surface of the water, the fin 11 assumes the position illustrated in Fig. 2 wherein it is parallel to the direction of the boat's motion and thereby reduces the drag effect on the boat to a minimum. When the bow of the boat strikes a wave on the surface of the water, its upward movement due to the impact with the wave is resisted by the fin 11 through the abutment of said fin with the stop surface 31 on the portion 9 of the strut.

Should the boat strike a wave with a force beyond the capacity of the resistance to upward movement provided by the fin, the bow of the boat will rise out of the water for a limited distance. Then, as the bow descends towards the water, the downward movement of the fin 11 in the water will cause a force to be exerted against the bottom surface of the said fin in the direction of the arrow 32. Since the area of the fin rearwardly of its pivotal point is greater than its area forwardly of the said point, the upward force exerted on the larger area of the fin causes it to pivot in a clockwise direction as viewed in Fig. 4. The upward movement of the fin will cause the piston 18 to rise upwardly in the cylinder 20 and no resistance is presented to the upward movement of the piston since the water in the cylinder 20 is permitted to flow through the openings 28—28 and past the diaphragm 29. As the bow of the boat continues to descend towards the water, the fin will move further about its pivot and thereby carry the piston 18 past the ports 27—27 in the walls of the cylinder.

As the bow strikes the water and the downward motion of the fin relatively to the water ceases, the force on the fin is immediately transferred from the bottom surface thereof to the upper surface behind the pivotal point due to the forward motion of the fin relatively to the water as it is carried therethrough by the boat. This force causes the fin to pivot in a counterclockwise direction about the pin 14. The downward movement of the rear portion of the fin will cause the piston to descend in the cylinder 20 and force the water therein outwardly through the ports 27—27 thereby providing unrestricted downward movement of the fin until the piston descends a sufficient distance to cover the said ports as illustrated in Fig. 5. This period of unrestricted downward movement of the fin permits the bow of the boat to rise quickly towards its normal planing position and prevents the bow from diving under. When the piston covers the ports 27—27 the fin will still be at an angle to the direction of travel thereof through the water as illustrated in Fig. 4. In this position the fin tends to dive and thereby restrains the further upward movement of the bow of the boat under the force of the impact with the water. The force exerted on the larger area of the fin due to its motion through the water, will urge the fin further about its pivot and move it towards normal position. Further movement of the fin is retarded by the piston as it forces the water in the cylinder past the adjusting screw 25 and out of the holes 26—26. This retarding of the return movement of the fin towards its normal position is sufficient to counteract upward force on the bow of the boat and thereby greatly minimizes the bounding of the boat and maintains it on a substantially even keel.

The movement of the fin from the commencement of its dampening or snubbing period, as illustrated in Fig. 5, to the resumption of its normal position can be hastened or retarded by adjustment of the screw 25 to vary the capacity of the valve 26. This provides an adjustment to accommodate the various conditions of the water in which the boat may be required to travel.

My improved stabilizing device is also useful in preventing both the pitching and rolling of large vessels and when so used one of the units is fastened to the bottom of the boat on each of the sides of the keel as illustrated in Fig. 7. The action of the units in controlling the pitch and roll of the vessel is similar to that above described.

I claim:

1. A boat stabilizing device comprising a strut having means thereon for attaching it to the bottom of a boat, a fin pivotally mounted on said strut, stop means on said strut for limiting the movement of the fin to a predetermined position wherein the said fin will resist the upward movement of the boat relatively to the water, and means carried by said strut and secured to said fin for resisting the movement of the fin towards said stop means to thereby resist movement of the boat away from the water; said resisting means being adapted to offer no resistance to the movement of the fin in a direction away from the stop means.

2. A boat stabilizing device comprising a strut having means thereon for fastening it to the bottom of a boat in a substantially vertical position, a fin pivotally mounted to said strut intermediate its upper and lower ends on an axis substantially perpendicular thereto; the area of said fin behind the pivotal point being greater than the area of the fin forward of said pivotal point whereby the rear portion of said fin is adapted to move upwardly upon downward movement of the boat and, upon completion of said downward movement, in a downward direction under the force of water acting upon the top of the larger area thereof, a rearwardly extending portion on said strut disposed under said fin and engageable thereby to limit the downward movement of the said rear portion of the fin to a substantially horizontal position whereby the said fin resists the upward movement of the boat caused by impact with the water.

3. A boat stabilizing device comprising a strut that is attachable to the bottom of a boat, a fin pivotally mounted on said strut, stop means on said strut engageable by said fin for limiting the movement thereof to a position at which the said fin will resist the upward movement of the boat relatively to the water; the said fin being movable in a direction away from said stop means by the force of the water thereon, means carried by said strut for resisting the movement of said fin towards the stop means to thereby urge the boat in a downward direction, and means associated with said resisting means for varying the amount of resistance offered thereby to the said movement of said fin towards said stop means.

4. A stabilizing device comprising a strut which is attachable to the bottom of a boat, a fin pivotally mounted on said strut and extending transversely thereto, a rearwardly extending portion on said strut engageable by said fin to provide a stop for limiting the movement of the fin to a position at which the said fin will resist the upward movement of the boat relatively to the water; the said fin being freely movable in a direction away from said stop, and means in said rearwardly extending portion of the strut for

yieldingly resisting movement of the fin towards said stop.

5. A boat stabilizing device as set forth in claim 4 wherein said resisting means is provided with adjustable control means to vary the resistance offered thereby to the movement of the fin towards said stop.

6. A stabilizing device for boats including a strut that is attachable to the bottom of a boat, a fin pivotally mounted on said strut, a rearwardly extending portion on said strut engageable by the fin to provide a stop for limiting the movement of the fin to a position at which said fin will resist the upward movement of the boat relatively to the water, a cylinder in said rearwardly extending portion of the strut, a piston secured to said fin and slidably contained in said cylinder, an outlet valve in said cylinder for controlling the flow of water therefrom to restrict the downward movement of the piston with respect to the cylinder; the said piston, cylinder and outlet valve providing a control for yieldingly resisting the movement of the fin to thereby control the position of the boat relatively to the water.

7. A boat stabilizing device as set forth in claim 6 wherein said outlet valve is provided with adjustable means for changing the capacity thereof to vary the resistance to the movement of the piston within the cylinder.

8. A boat stabilizing device comprising a strut which is attachable to the bottom of a boat, a fin pivotally mounted on said strut, a rearwardly extending portion on said strut having a cylinder therein and an outlet communicating with said cylinder for the entry of water thereinto, a piston attached to said fin and slidably contained within said cylinder, a check valve in said piston; said check valve being adapted to close as the piston is moved downwardly in said cylinder by said fin whereby the water in said cylinder is forced through said outlet and offers resistance to the downward movement of the piston, the said fin and said check valve being adapted to open as the piston is moved upwardly in the cylinder by the upward movement of the fin and thereby offer no substantial resistance

to said fin; the said piston cylinder outlet and control valve providing means for yieldingly resisting the movement of the fin in a downward direction to thereby control the position of the boat relatively to the water.

9. A boat stabilizing device comprising a strut which is attachable to the bottom of a boat, a fin having a notch therein to receive said strut, means adjacent the forward end of said pin for pivotally mounting it to said strut; the area of said fin rearwardly of said pivotal mounting being greater than the area forwardly of said mounting, a rearwardly extending portion on said strut engageable by said fin to limit the movement of the fin to a position at which the fin resists the upward movement of the boat relatively to the water, a cylinder in said rearwardly extending portion, a piston secured to said fin and slidably mounted within said cylinder, an adjustable outlet valve in said cylinder to vary the flow of water therefrom and thereby control the resistance offered to the movement of said piston, and a check valve in said piston; the said check valve being adapted to close as the piston moves downwardly, and thereby resist said downward movement and to open, as the piston moves upwardly; the said cylinder being provided with an outlet port in the wall thereof to permit substantially free downward movement of the piston to a position at which it closes the said outlet port.

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