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HYDRAULIC STABILIZER FOR BOAT STEERING

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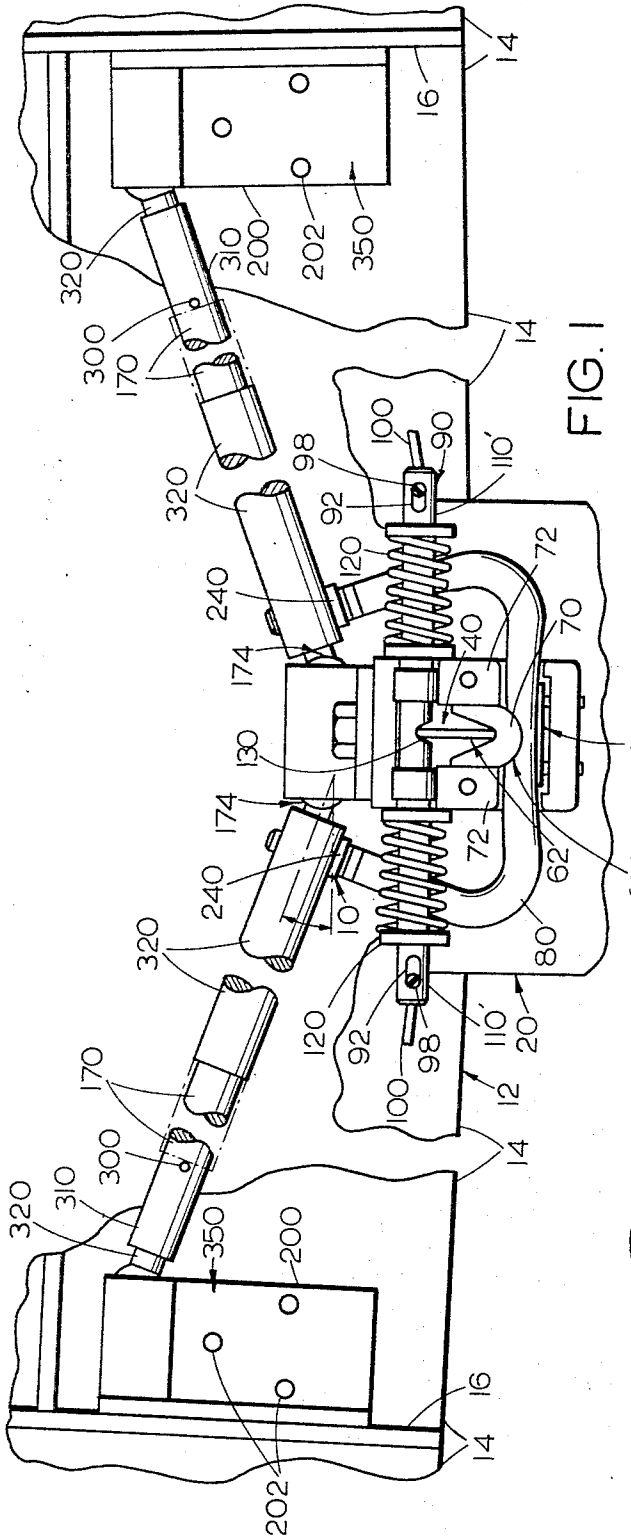

FIG. 1

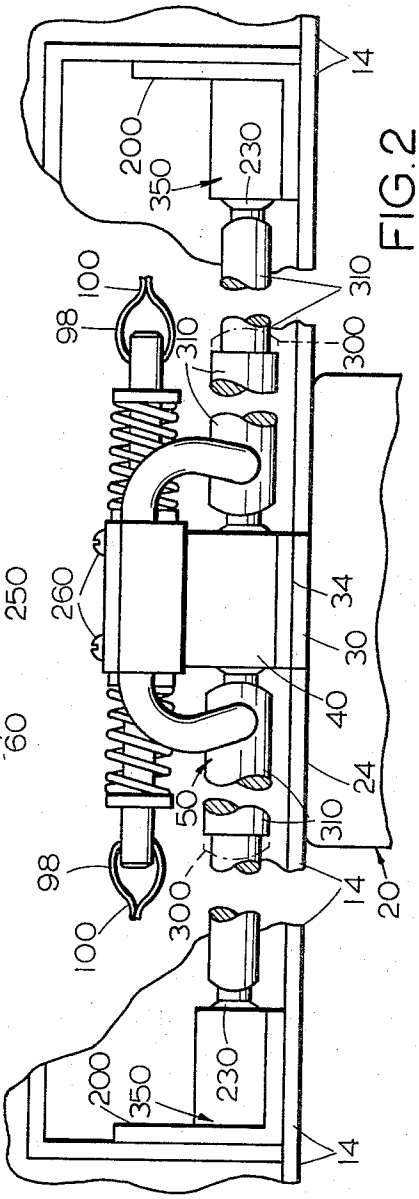

FIG. 2

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HYDRAULIC STABILIZER FOR BOAT STEERING

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This invention relates to the steering of boats for hinging or pivoting steering elements such as rudders or motors of a type which have a directable propeller, as is the case with all common outboard motorboat motors.

A particular object of this invention is to provide a hydraulic stabilizer and control for the controllable steering element of such a boat, the stabilizer serving to lock the steering element in position at any time steering cables attached to the stabilizer are not being pulled.

In this way, the stabilizer has the tendency to hold a boat on its course at times when its steering wheel has been released by the helmsman.

More particularly it is an object of this invention to provide a hydraulic stabilizer and control as described which has a pair of hydraulic cylinders and in which means attaching the inner ends of each cylinder indirectly to the steering element and in which means attaching the outer ends of each cylinder to anchor points on the boat, are both sufficiently flexible as to permit a movement of the controllable steering element sufficiently for effective control of the steering of the boat.

Still another object is to provide a hydraulic stabilizer as described in which the means for attaching the inner and outer ends of each cylinder assembly comprise ball and socket joints for permitting the hydraulic cylinder to extend in various positions inclining upwardly, downwardly, forwardly, or rearwardly from their inner ends to their outer ends.

Particularly it is an object of this invention to provide pivotal mounting means for the cylinder assemblies of the hydraulic stabilizer which allow the hydraulic cylinders to be placed in sufficient different operative positions as described that it is possible to install the stabilizer without cutting holes in the water-well at the back of a boat. This is important because otherwise the function of the water-well for retaining water is lost and whenever the boat slows down water falling into the water-well would tend to leak out through the openings into the boat, as has been the condition of the prior art before this invention was conceived.

In the drawings:

FIGURE 1 is a frontal elevation of the hydraulic stabilizer of this invention shown as attached to the transom of a boat, and as attached to an outboard motor, parts of the boat, motor, and stabilizer being broken away for convenience of illustration.

FIGURE 2 is a top plan view of the stabilizer of FIGURE 1 shown attached to boat and motor with parts of the boat and motor stabilizer broken away.

The hydraulic stabilizer and control assembly of this invention is generally indicated at **10** in FIGURE 1 and is adapted to be attached to a boat **12** having a transom **14** and water-well sides **16**.

An outboard motor generally indicated at **20** is pivotally mounted on the transom **14** in a conventional manner by means not shown.

An upper forward side of the motor **20** is attached by suitable means **30** to a rearward side **34** of the frame **40** of the hydraulic stabilizer and control assembly of this invention as is generally indicated at **50**. As the outboard motor **20** has a propeller adapted for normally directing a thrust rearwardly for propelling the boat forwardly, the rotation or twisting of the motor about an axis extending vertically at approximately the center of

the transom **14** will cause the boat **12** to be turned to one side or the other in a conventional manner. Because of this, the motor **20** can also be referred to as a steering element **20** in the same sense that the rudder of a ship is a steering element pivotally mounted on the ship.

In accordance with this invention, a valve generally indicated at **60** is provided, the valve **60** having a controllable member **62** movably mounted on the frame **40** or movably mounted with respect to the frame **40** and adapted to engage a sliding member **70** slidably mounted between parts **72** of the frame **40** for pressing the sliding member **70** into a position for compressing and closing a hose or passageway forming means **80** at times. The hydraulic stabilizer assembly **10** further has a valve control rod **90** having openings **92** therethrough which are spaced apart, the openings **92** serving to receive the end loops **98** of a pair of steering cables **100** of a conventional and suitable outboard motorboat steering system.

End portions **110** of the rod **90**, in areas surrounding the openings **92**, serve to provide spaced means **110'** for spaced end portions **110** to which the control cable ends or loops **98** can be attached.

The rod **90** is slidably mounted in the valve frame **40** for sliding to the right or to the left of the boat **12**.

Spring assemblies **120** can also be called means **120** for continually urging each of the spaced means **110'** into positions for causing a notch **130** receiving a forward end of the controllable member **62** to be urged into a central position, whereby it is disposed at a right angle to the elongated rod **90** for exerting a maximum pressure on the sliding member **70** so as to maintain the hose **80** in a closed or squeezed condition, or in other words, the spring assemblies **120** tend to cause the controllable member **62** to be disposed in a position for closing the passageway through the passageway forming means or hose **80**.

A pair of elongated hydraulic cylinder assemblies generally indicated at **170** are provided and the elongated cylinder assemblies **170** are attached to the frame **40** by suitable means such as ball and socket joints **174** for providing a flexability.

Mounting brackets **200** receiving bolts **202** are anchored to the transom **14** by the bolts **202**.

The brackets **200** are attached to outer ends of the hydraulic cylinder assemblies **170** by ball and socket joint units **230** and the hydraulic cylinder assemblies **170** extend generally in opposite directions to the right and left from the frame **40**, the assemblies **170** extending, when seen in top plan view, preferably approximately in parallelism with a line extending through the spaced means **110'**. However, it will be seen that the cylinder assemblies **170** can extend downwardly at their outer ends, or upwardly or forwardly or rearwardly, with respect to their inner ends. Each of the assemblies **170** has a single port fitting or port means **240** connected to one of the hydraulic cylinder assemblies **170**, and the port means **240** are each connected to a different one of the ends of the hose **80**.

Fluid is disposed in the cylinders **170** and in the passageway through the hose **80** and the cylinder assemblies **170** are so constructed that the fluid flows from one of the cylinders **170** to the other whenever one of the cylinders is shortened and the other lengthened by a movement of the frame **40** toward the shortened cylinder, as will occur whenever a cable **100** is pulled, such pulling having the first effect of causing the member **62** to be disposed at other than a right angle with respect to the rod **90** as will open the passageway **80**, and then having the second effect in that further pulling in the same direction will compress the spring **120** on the opposite side enough to increase its pressure such that the entire frame **40** and the motor to which it is attached will be pulled in the

direction of the pulling cable for turning the motor as causes the steering of the boat in a manner substantially conventional. It is to be understood that the cables **100** are connected to a conventional steering system such that a turning of the steering wheel of the boat in one direction or the other will cause the pulling of the cables **100**.

An adjustment plate **250** engages the opposite side of the hose **80** from the sliding member **70**, and the plate **250** is positioned by adjustment screws **260** to a preferred position.

Limit pins **300** are provided on the plunger portion **310** of each hydraulic cylinder assembly **170**. The pins **300** are so placed that they tend to limit the outward movement of the sleeve portion **320** of each hydraulic cylinder assembly so that a sleeve **320** cannot move out on its plunger **310** beyond a certain limit sufficient for permitting effective steering control of the boat, but the pins **300** tend to maintain the parts of the hydraulic cylinders in operative relationship by not permitting the motor to rotate them excessively far.

It is important that the means anchoring the outer ends of the cylinder assemblies, which can be called a means **350**, comprising in combination the anchoring brackets **200** and the universal joints **230**, be of a certain amount of flexibility.

It is important that the anchoring means **350** anchoring the outer end of each cylinder assembly and the means **174** attaching the inner ends of each cylinder assembly to the frame together form attachments sufficiently flexible as to permit a movement of the frame **40** sufficiently for effective control of steering of the boat; furthermore, this flexibility should be sufficient as to permit the cylinders **170** to be positioned with respect to the inner ends thereof upwardly or downwardly therefrom, or forwardly or rearwardly therefrom, or any combination of relative vertical and forward and rearward positions. In this way, the outer ends **310** of the hydraulic cylinders will be positionable so as to make it unnecessary to cut holes in the water-well of most boats in order to properly position the outer ends of the cylinders **170** for permitting movement of the frame **40** sufficiently for effective control of the steering of the boat.

As thus described, it will be seen that this invention will fulfill the objectives above set forth.

From the foregoing description, it is thought to be obvious that a hydraulic stabilizer for boat steering constructed in accordance with my invention is particularly well adapted for use, by reason of the convenience and facility with which it may be assembled and operated, and it will also be obvious that my invention can be changed and modified without departing from the principles and spirit thereof, and for this reason, I do not wish to be understood as limiting myself to the precise arrangement and formation of the several parts herein shown in carrying out my invention in practice, except as claimed.

I claim:

1. In combination: a boat, a controllable steering element mounted pivotally on said boat, a hydraulic stabilizer and control comprising a frame attached to said steering element, a valve attached to said frame and having two ports and having means forming a passageway between said ports, said valve having a controllable member movably mounted on said frame and operably correlated with said passageway forming means for closing said passageway at times and for opening said passageway at other times, spaced means to which control cable ends can be attached, means operably correlating said spaced means and said controllable member whereby when either one of said spaced means is pulled in a direction away from the other spaced means said controllable member is moved in a direction for opening said passageway, and means continually urging each of said spaced means into positions for causing said controllable member to be moved into a position for closing said passageway, a pair of elongated hydraulic cylinder assemblies, means attaching inner ends of said cylinder assemblies to said frame, means anchoring outer ends of said cylinder assemblies to said boat, said elongated assemblies extending generally in opposite directions approximately in parallelism with a line extending through said spaced means, each of said assemblies having a single port connected to one of said two valve ports, fluid in said cylinders and said passageway, and said cylinders being so constructed that said fluid flows from one of said cylinders to the other whenever one of said cylinders is shortened and the other lengthened by a movement of said frame toward the shortened cylinder, said means anchoring the outer end of each said cylinder assembly and the said means attaching the inner ends of each cylinder assembly to said frame together forming attachments sufficiently flexible as to permit a movement of said frame sufficiently for effective control of the steering of said boat.

2. The combination of claim **1** in which the means anchoring the outer end of each cylinder assembly and the means attaching the inner ends of each cylinder assembly each have universal joint means therein for providing the said sufficiently flexible attachments.

3. The combination of claim **1** in which the said means anchoring said cylinder assemblies to said boat are disposed on the inside of said water well housing of said boat.

4. The combination of claim **1** in which said passageway forming means connects to said cylinder assemblies on the sides thereof and the said means attaching the inner ends of each cylinder assembly to said frame being disposed directly at the ends of each cylinder assembly and substantially in alignment with the elongation thereof respectively.

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