Nov. 5, 1963 L. A. HUNZIKER 3,109,304

OUTBOARD MOTOR TEST AND SERVICE STAND

Filed Dec. 14, 1959 2 Sheets-Sheet 1

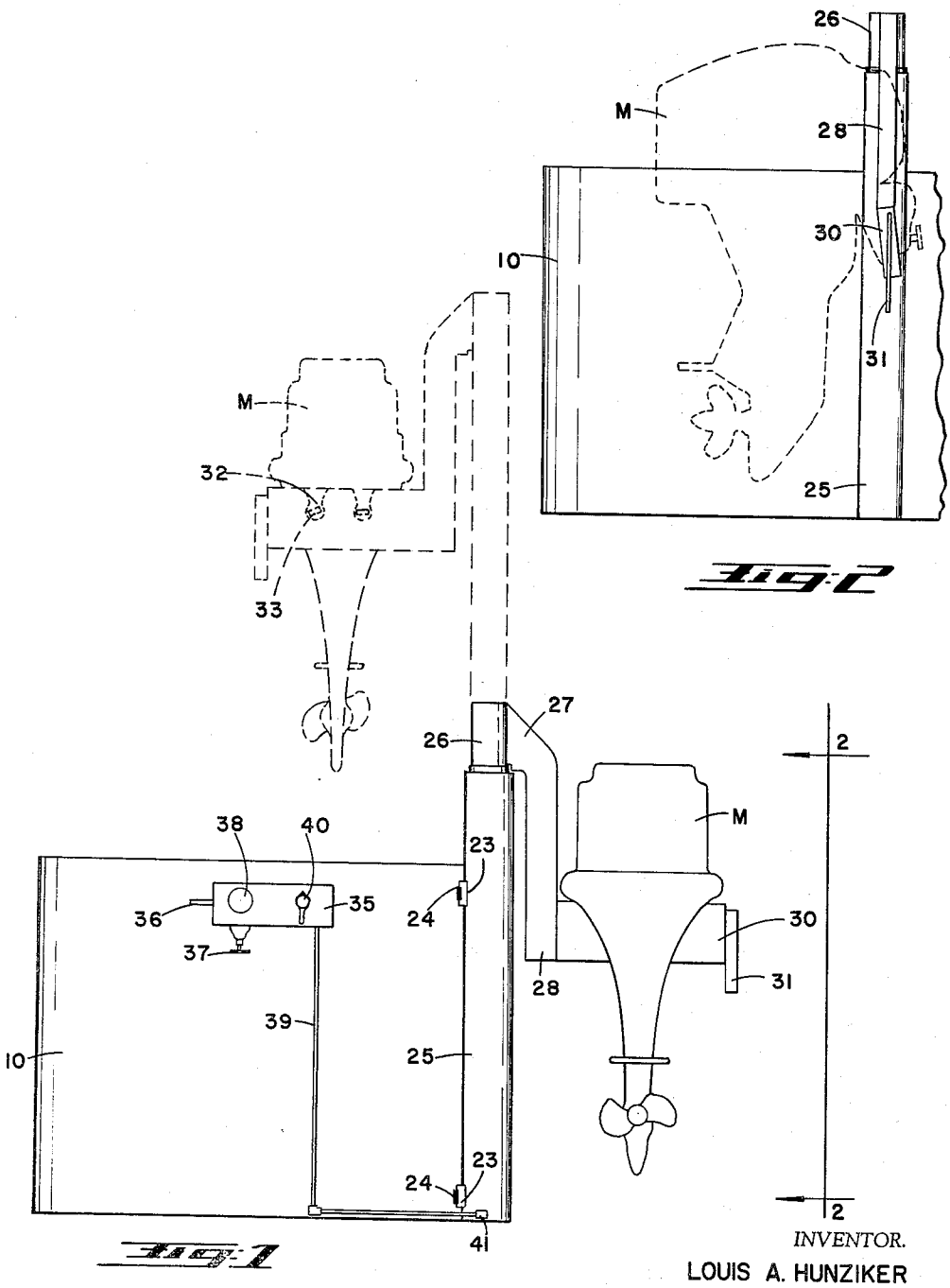


Fig. 2

Fig. 1

INVENTOR.
LOUIS A. HUNZIKER
BY
Chas. R. Schermerhorn
ATTORNEY

Nov. 5, 1963 L. A. HUNZIKER 3,109,304

OUTBOARD MOTOR TEST AND SERVICE STAND

Filed Dec. 14, 1959 2 Sheets-Sheet 2

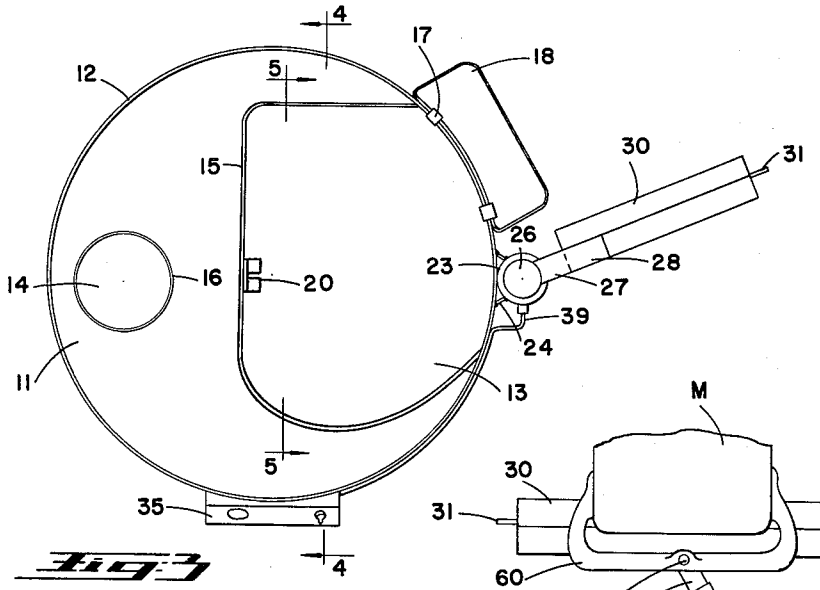


Fig. 3

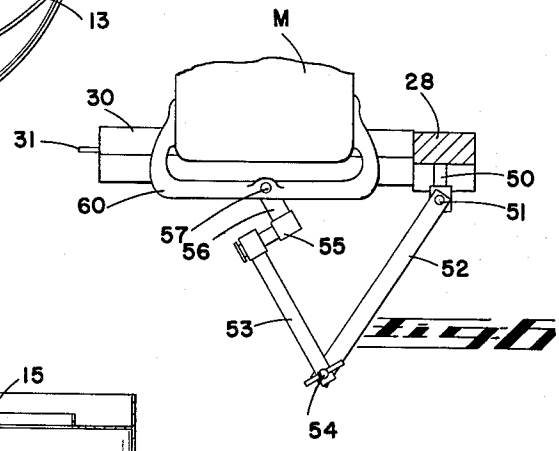


Fig. 6

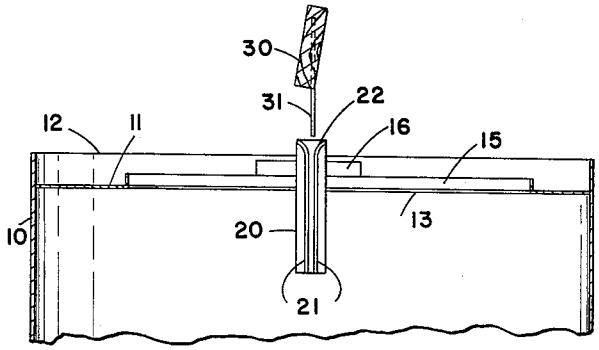


Fig. 4

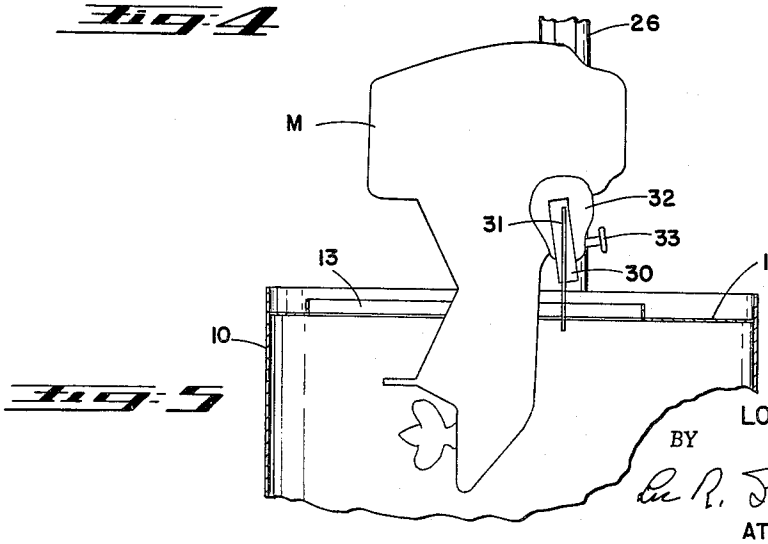


Fig. 5

INVENTOR.
LOUIS A. HUNZIKER
BY
Lee R. Schermerhorn
ATTORNEY

United States Patent Office 3,109,304 Patented Nov. 5, 1963

3,109,304

OUTBOARD MOTOR TEST AND SERVICE STAND

Louis A. Hunziker, 783 Commerce Ave., Longview, Wash.

Filed Dec. 14, 1959, Ser. No. 859,529
1 Claim. (Cl. 73—116)

This invention relates to apparatus for use in connection with the servicing and testing of outboard marine engines.

Outboard motors have become so large and heavy that they can no longer be manually lifted on and off the service bench and into and out of the test tank in tuning up the motors and doing routine service and repair work thereon. The handling of such large motors has come to present a considerable problem because in tuning up a motor it is often necessary to place it in the tank repeatedly for testing as certain adjustments are being made. The shifting of the motor from the work bench to the test tank and back again has heretofore required overhead chain hoists or the like, the use of which entails the placing and removal of suitable slings each time the motor is moved, not to mention the mounting and dismounting of the motor in the tank. Thus, a relatively simple tune-up operation is considerably complicated and prolonged by the problem of handling and moving the motor.

The objects of the present invention are, therefore, to provide novel and improved power operated means for lifting an outboard motor into and out of a test tank, to provide a combined service and test stand which will support and carry the motor during both the servicing and the testing operations thereon, to provide a test stand of the type described which will received an outboard motor directly from a hand truck on the floor without requiring auxiliary hoisting mechanism, to provide a novel transom board support on which a motor may be left mounted throughout all servicing and testing operations and to provide an improved test tank for outboard motors.

In general, the present device comprises an air cylinder having a vertical ram equipped with a transom board which is movable both vertically and in rotation about the axis of the cylinder. The transom board may be lowered outside the tank to receive the motor directly from a hand truck and then the transom board may be raised and pivoted to swing the motor over the edge of the tank and lower it into the tank for testing. The ram will support the motor at any convenient level outside the tank for service work and adjustments. The motor is not removed from the transom board until all service work and adjustments have been completed and fully tested. The weight and broad base of the tank are utilized to support and stabilize the lift cylinder as the motor is raised to swing to its different positions.

The foregoing and other objects and advantages will become apparent as the description proceeds in connection with a preferred embodiment of the invention illustrated on the accompany drawings. Various changes may be made, however, in the construction and arrangement of parts and certain features may be used without others, all such modifications within the scope of the appended claim being included in the invention.

In the drawings:

FIGURE 1 is an elevation view of a combined test and service stand embodying the features of the invention;

FIGURE 2 is a fragmentary elevation view looking in the direction of the line 2—2 in FIGURE 1;

FIGURE 3 is a top plan view;

FIGURE 4 is a fragmentary sectional view on the line 4—4 of FIGURE 3, showing means for locking the position of the transom board in the tank;

FIGURE 5 is a fragmentary sectional view taken on the line 5—5 in FIGURE 3, showing a motor being lowered to test position in the tank; and

FIGURE 6 is a fragmentary top plan view with parts in section, showing means on the transom board for locking the steering movement of the motor.

The tank 10 in FIGURE 1 is preferably made of sheet metal with a cylindrical side wall and a flat bottom adapted to rest on the floor whereby the tank is portable and may be placed in any convenient position in the shop. As shown in FIGURES 3 and 4, the top of the tank is partially covered with a flat top wall 11 which is adapted to serve as a work bench for tools and parts. This work surface 11 is depressed below the top rim 12 of the side wall of the tank for retaining the tools and parts on the work bench surface. Top wall 11 is provided with a large opening 13 at one side to receive the motor to be tested and a smaller opening 14 at the opposite side for communication with a suction fan for removing exhaust gases from the motor during test operation. The opening 13 is surrounded by an upstanding rim 15 and the opening 14 is surrounded by an upstanding rim or collar 16 for connection with the suction duct, now shown. The rim 12 also provides support for the hangers 17 of a portable tool tray 18. The rim 15 is equipped with a vertical guide channel 20 having a pair of spaced parallel outstanding flanges 21 which are divergent at their upper ends as indicated at 22. The purpose of this guideway will appear as the description proceeds.

Referring again to FIGURE 1, a vertical air cylinder 25 is securely anchored to the outside of the tank side wall adjacent the opening 13 by mounting blocks 23 welded to the tank at 24. It is also within the scope of the invention to provide other suitable means, such as band clamps or the like, for securing the cylinder to existing test tanks in lieu of welding. The tank thereby provides a broad and stable base which, when partially filled with water, has sufficient weight to resist overturning moments which may be applied to cylinder 25.

Cylinder 25 is equipped with an elongated piston or ram 26 which is connected at its upper end with the upper offset end 27 of a depending arm 28. Arm 28 extends vertically parallel with the ram 26 and cylinder 25 in spaced relation to the cylinder, as shown. Mounted on the lower end of arm 28 is an outstanding transom board 30 having the approximate thickness and inclination of the transom of a boat. Mounted on the outer free end of transom board 30 is a vertical guide plate 31.

Transom board 30 is shown in solid lines in FIGURE 1 lowered outside tank 10 in a position to receive the outboard motor M directly from a two-wheeled hand truck whereby the motor is transferred from the hand truck to the transom board and mounted thereon without lifting the motor. Such trucks are designed to support the motor from its stern side whereby the truck may be tipped forward to hook the conventional C-clamp supports 32 on the motor over the upper edge of the transom board. Clamp screws 33 are then tightened on the transom board.

When ram 26 is lifted by air pressure it may be rotated around to the position shown in broken lines, swinging the lower end of the motor over the top of the tank and placing the motor in a position directly above opening 13. Then by lowering ram 26 the motor is lowered into the tank for testing. As the transom board is lowered into opening 13, vertical guide plate 31 is manipulated into guideway 20, as shown in FIGURE 4, to lock the

transom board against rotation on the vertical axis of the ram 26.

FIGURE 1 further shows a control panel 35 mounted on the side of tank 10. A compressed air supply pipe 36 is connected with an adjustable pressure regulating valve 37 which reduces the pressure to a value appropriate for the weight of motor to be lifted. The air pressure as thus adjusted is registered on a pressure gauge 38. The air pressure supply to ram cylinder pipe 39 is controlled by a conventional rotary valve 40. Pipe 39 connects at 41 with the lower end of cylinder 25 below the bottom end of ram 26.

In one position of the valve 40 compressed air is admitted into pipe 39 to raise the ram 26. The ram may be held in any desired vertical position by closing the valve 40 to a hold position which closes pipe 39 against inlet or egress of air. When it is desired to lower the ram, valve 40 is turned to a down position which permits the air to escape slowly from pipe 39 as it is forced out of the cylinder by the load on the ram. Thus, by means of the valve 40, the ram may be held in any selected vertical position while work is being performed on the motor M. This is of particular advantage in working on the propeller or other parts at the lower end of the motor since these parts may then be placed in a convenient and readily accessible position by raising the ram as high as desired. The water in tank 10 provides sufficient weight distributed over a broad base to prevent overturning with the heaviest motor in any possible position.

The motor is mounted on transom board 30 by means of the C-clamps 32 and screws 33, the same as it would be mounted on the transom of a boat. As has already been explained, the transom board 30 is locked against rotation in the tank by means of vertical guide plate 31 which is engaged by the guideway 20. Steering movement of the motor must also be locked relative to the transom board. This is accomplished with the device shown in FIGURE 6. The supporting arm 28 is equipped with a stud 50 having a pivotal mounting 51 for an arm 52. Arm 52 is pivotally connected with an arm 53 through a clamp screw 54 which may be tightened to make the joint rigid. Mounted on the other end of arm 53 is a double jointed adapter 55 having a connector 56 which may be secured by a bolt 57 to a frame element 60 on the motor. This is the frame element to which the tiller handle is normally attached for turning the motor about its vertical pivotal axis on its mounting bracket 32 for steering the boat. Adapter 55 is arranged to make operative connection with a corresponding part of other motors which may vary in size and details of construction. In mounting the motor it is turned on its steering pivot to its normal position for straight-forward drive, placing the axis of its propeller shaft approximately perpendicular to transom board 30. The motor is held rigidly in this position by tightening clamp 54 which fixes the angle between arms 52 and 53 so that the motor cannot then pivot on its steering axis.

When the motor is thus secured to the transom board 30 and the latter is lowered into the tank through opening 13 and locked in vertical guideway 20, the propeller is disposed at one side of the center of the tank with its axis approximately tangential and perpendicular to an imaginary radius drawn from the propeller to the center of the tank. When the motor is operated, the water is circulated around the inside of the tank in substantially streamlined flow to simulate most nearly the condition of operation on a boat. In most test tanks heretofore proposed, actual operating conditions have not been duplicated to provide a good test because in most cases the water current from the propeller is driven directly against the opposite side or end of the tank without provision

being made for return of the water in a smooth flow. The present arrangement provides a better test on a large motor without restoring to an excessively large tank or a tank of special shape.

Also, in conventional test tanks, the motor support is not adjustable vertically to provide the proper depth of submergence for motors of different size. As a result, small motors are not submerged to their normal depth and large motors are submerged to an excessive depth thereby again departing from normal operating conditions on a boat. In the use of the present device, when the motor is lowered into the tank, the valve 40 is turned to its hold position when the motor is submerged precisely to its correct depth whereby motors of all sizes may be submerged to the proper depth for testing.

In tuning up a motor, the motor may be tested in the tank and then returned to its full line position in FIGURE 1 for further adjustment repeatedly without any substantial effort or waste of time on the part of the operator. This is particularly important because many adjustments on a sensitive internal combustion engine are largely a matter of trial and error, requiring numerous test runs before the operator will be satisfied that the motor is functioning in optimum condition. The facility of the present device fosters more painstaking work on the part of the mechanic.

The motor is not removed from the transom board 30 until all adjustments and tests are completed. Then it is only necessary for the operator to wheel the conventional motor hand truck up to engage the stern side of the motor in its FIGURE 1 solid line position, the transom board being lowered to transfer the weight of the motor to the truck so that no lifting is required. In this way, complex outboard motor mechanisms may be quickly adjusted and tuned to perfection without the use of the customary work bench and overhead chain hoist whereby both the servicing and testing are accomplished with facility and dispatch.

Having now described my invention and in what manner the same may be used, what I claim as new and desire to protect by Letters Patent is:

An outboard motor test and service stand comprising a tank, a vertical cylinder mounted on a side wall of said tank, a piston having an upwardly extending piston rod in said cylinder, a downwardly extending vertical arm having an offset upper end connected with the upper end of said piston rod, a transom board radial to said cylinder and having an inner end connected to the lower end of said arm, said piston having vertical and rotary movements in said cylinder for shifting said transom board from a position outside said tank to a position inside said tank, a cover on said tank having an opening to admit said transom board with a motor mounted thereon, a vertical guide channel mounted on said cover within said opening, and a vertical guide plate on the outer end of said transom board slidable in said guide channel as said transom board is lowered into the tank, said tank being cylindrical and said guide channel and guide plate being in radial position at one side of the center of the tank so that said motor will circulate water in the tank around the tank in circular flow concentric with the center of the tank.

References Cited in the file of this patent

UNITED STATES PATENTS

2,149,141	Hunsicker	Feb. 28, 1939
2,662,399	Chapman	Dec. 15, 1953
2,725,093	Saelen	Nov. 29, 1955
2,779,949	Crispen	Feb. 5, 1957
2,831,345	Wolf et al.	Apr. 22, 1958