Dec. 15, 1953 H. C. CHAPMAN 2,662,399

OUTBOARD MOTOR TEST TANK

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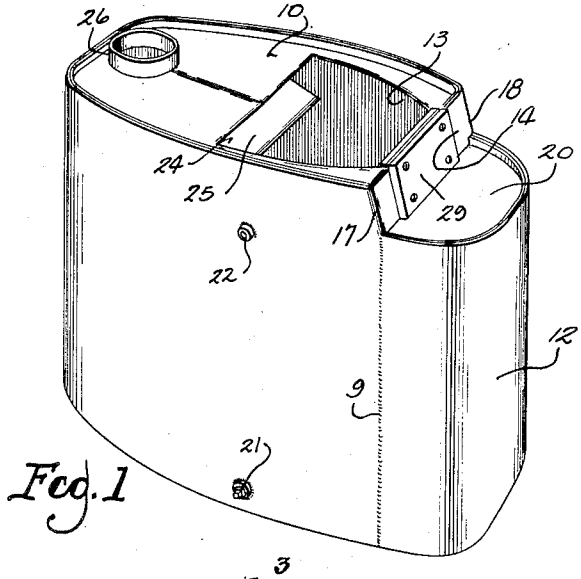


Fig. 1

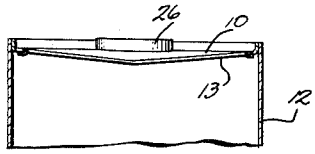


Fig. 3

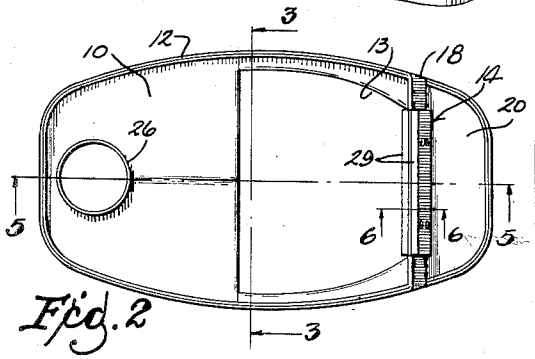


Fig. 2

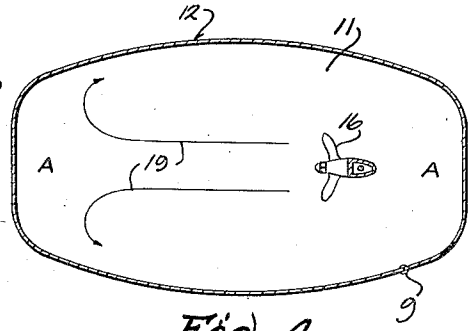


Fig. 4

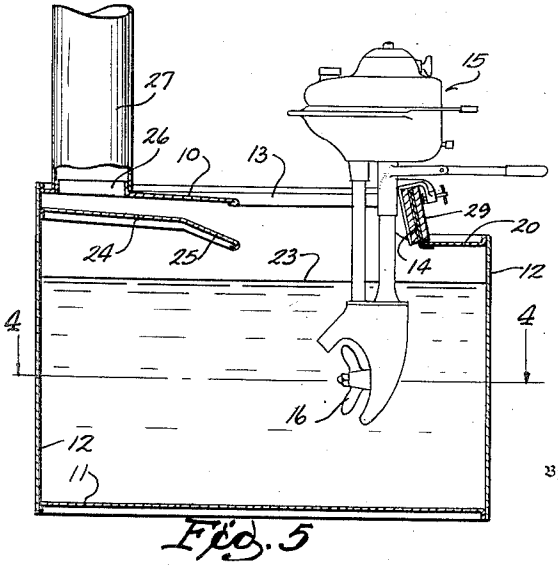


Fig. 5

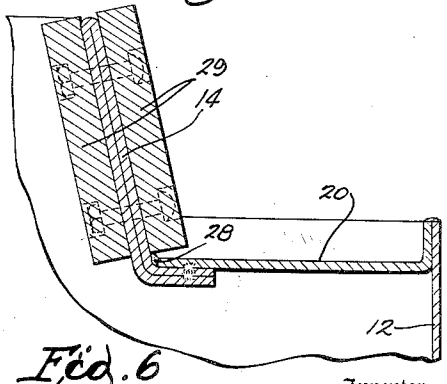


Fig. 6

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OUTBOARD MOTOR TEST TANK

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9 Claims. (Cl. 73—116)

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This invention relates to improvements in outboard motor test tanks.

One of the objects of the invention is to provide an outboard motor test tank of improved design directed to the reduction of turbulence, splashing and cavitation. Another object of the invention is to provide a test tank of less weight and size than those heretofore considered necessary and to provide the motor with an improved slip stream flow and otherwise improve its test environment.

It is a further object of the invention to provide a tank of such an improved design as to reduce the volume of water required for satisfactorily testing the motor. In this manner the space occupied by the tank and the weight and size of a filled tank is substantially reduced, thus facilitating handling and installation and reducing the cost of the tank.

In this connection it is an object of the invention to provide a tank of novel elliptical and streamlined design having improved water recirculation paths which will provide for a constant resupply of the water to the rear of the propeller blade. In this manner a smaller volume of water will suffice than is required in tanks having sharp corners inducive of eddy currents and the like. The elliptical or curved side wall design is of further advantage in that the guage of metal required is reduced. The curved sides of the tank are self reenforcing, thus the sides of the tank will not bulge or warp as readily as in a tank of planiform design. Consequently a lighter guage metal than heretofore required will support the water content of the tank.

Other objects of the invention are to provide the test tank with baffle means to reduce splash, to provide an exhaust passage within the tank to remove exhaust fumes therefrom, and to combine the splash baffle and exhaust passage wall in a unitary design.

In addition to improving the performance of the tank and enhancing the convenience of its use, it is an important object of the invention to reduce the cost of its manufacture; such a reduction is a natural consequence of the reduction of tank size and guage of metal used.

Other objects will be more apparent to one skilled in the art upon an examination of the following disclosure:

In the drawings:

Fig. 1 is a perspective view of a tank embodying the invention.

Fig. 2 is a plan view of the tank shown in Fig. 1.

Fig. 3 is a cross sectional view taken along the line 3—3 of Fig. 2.

Fig. 4 is a cross sectional view taken along the lines 4—4 of Fig. 5.

Fig. 5 is a cross sectional view taken along the line 5—5 of Fig. 2 and shows the relative size and position of an outboard motor as used in the tank.

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Fig. 6 is a cross sectional view taken along the lines 6—6 of Fig. 2.

The improved tank comprises a top 10, a bottom 11 and a curved side 12 of generally elliptical form. By the use of the term "elliptical" I do not mean a true mathematical ellipse, but merely that the sides and ends of the tank are generally outwardly convex in the manner of an ellipse. The top, bottom and side walls are preferably made of light guage sheet steel and are welded together in a water tight construction. The side 12 is desirably made of one piece of metal encircling the peripheral edges of the top and bottom, welded to such edges and welded to itself along the vertical seam 9.

The side 12 is obliquely shouldered at 17 and 18 to provide seats at the opposite sides of the tank for the transversely disposed slanted transom 14. The transom may either be formed separately or comprise overlapping portions of the side folded at the shoulders 17, 18 to extend across the tank. The tank top is divided into two portions 10 and 20 at different levels, the proximate edges of which are joined by the transom in the form of a step.

The top 10 is provided with a large opening 13 near one end of the tank to receive the lower unit of the motor under test. A slanted transom 14 at one side of the opening with transom boards 29 at both sides of the transom proper provides a support for the outboard motor indicated generally as 15 of Fig. 5. The propeller 16 of the motor is desirably disposed upon the major axis of the ellipse indicated as A—A in Fig. 4 so as to act upon the water longitudinally of the tank. The transom is spaced somewhat from the end of the tank so as to similarly space the propeller 16 from the tank end, thus giving the circulating water free access to the rear of the propeller.

As diagramatically indicated by the flow lines 19, the water will be propelled centrally along the major axis of the tank and will return to the propeller along the outside walls of the tank. The generally elliptical form of the tank wall 12 will smooth this circulation path so as to keep turbulence, water splash and cavitation to a minimum. The propeller will be constantly fed with recirculated water and the water will not tend to pile up at the end of the tank away from the propeller. Consequently the volume of water necessary to establish test conditions is reduced and the operation of the propeller in this environment will more nearly approximate actual operation. The smoothness and quiet operation of the motor in my improved tank will facilitate sales of motors as the observer receives an undistorted impression of the motor's operation.

As less water for improved test results is required in my improved tank than heretofore thought necessary, a smaller tank at less cost than heretofore available becomes commercially practical. The self reenforcing characteristic of the curved tank walls makes it possible to use a light guage metal in the fabricating of the tank and the wall will not bulge or warp when the tank is filled and the motor is undergoing test. A fourteen guage steel has been here found to be completely adequate in comparison with ten guage steel which was required for previous tanks having planiform wall areas. This factor alone represents a 60% saving in tank weight. This reduction in weight is important not only from cost and handling standpoints, but also to prevent overloading of shop floors on which the test tank is installed.

The stepped form of the tank top between the transom and the nearest end of the tank provides space to manipulate the motor transom clamp. The top portion 20 also serves as a shelf useful for temporary storage of tools and the like.

Adequate drainage is provided by the detachable plug 21 near the bottom of the tank. Oil scum and the like may be bled from the tank through the overflow tube 22.

Although excessive turbulence and splashing of the water is largely eliminated by virtue of the streamlined and elliptical design of the tank, a splash baffle 24 is desirably provided above the water level 23 and is spaced generally below the top 10 of the tank. The baffle is desirably supported from the side walls of the tank and is downwardly lipped at its edge portion 25 proximate the opening 13. The lip directs splash downwardly into the tank and away from the opening.

The spacing between the baffle 24 and the tank top 10 also provides an exhaust passageway which leads to a vent 26 in the top 10 near the other end of the tank from the propeller shaft opening. The vent 26 may be optionally connected with an exhaust pipe 27 or the like which may house a fan (not shown) to remove substantially all of the motor exhaust fumes if the tank is to be used indoors.

As best shown in Fig. 3, the top 10 is dished along the longitudinal axis of the tank so as to provide a downwardly slanting trough to drain splash, rain or other water which might tend to accumulate upon the top of the tank.

All of the exposed edges of the metal, such as at the edges of the opening 13 and the end of the lip 25, are rolled so as to present smooth and nonabrading surfaces to accidental hand and finger contact of test personnel manipulating the motor 15.

An all welded method of tank fabrication is preferred, the top 10 and bottom 11 of the tank having the same initial stamped form. The opening 13, vent 26 and the lower top section 20 are formed from the top in subsequent operations.

As best shown in Fig. 6 the transom 14 desirably comprises a double thickness sheet of metal which is welded, as shown at 28, to the shelf 20. The transom boards 29 are bolted both to the inside and outside of the transom 14 to provide an anchorage for the motor clamp 30.

I claim:

1. An outboard motor test tank having a wall of elliptical form and a top opening, and a transom extending transversely of the major axis of the tank and intermediate its ends for the support of a motor with its propeller disposed within the tank.

2. The combination with an outboard motor test tank having a top, curved elongated side walls, end walls, a bottom and an opening in the top and a transom at one side of the opening and intermediate the end walls for the support of an outboard motor with its propeller in the tank, of a baffle in the tank spaced from and substantially parallel with the top at the opposite side of the opening from the transom and extending from the end wall toward the opening.

3. The device of claim 2 wherein the baffle is further provided with an offset downturned edge proximate the top opening to direct splash away from said opening.

4. The device of claim 2 wherein the top is further provided with a vent spaced from the transom opening and the spacing between the baffle and the tank top provides an exhaust fume passage communicating with said vent to provide an outlet for said fumes.

5. An outboard motor test tank having a top, a side and a bottom, said top being provided with an exhaust fume vent near one end of the tank and an opening nearer the other end of the tank to admit the lower unit of a motor to be tested, said top being provided with a transom at one side of the opening disposed transversely of the tank and spaced from the last mentioned end for the support of said motor, a baffle supported from the sides of the tank at the same end of the tank as the exhaust vent and substantially parallel with the top, said baffle being spaced from the top to provide an exhaust fume passage therebetween in communication with said exhaust vent, said baffle further extending proximate the opening and having a downturned edge portion to direct splash away from said opening.

6. The device of claim 5 wherein the top is slanted downwardly from said vent toward said opening to provide a water drainage trough.

7. An outboard motor test tank having a top, a bottom and elliptical side portions, said top having an exhaust vent and an opening spaced from the vent, the top portions between said vent and opening being downwardly slanted toward said opening, and a transom at the side of the opening opposite the vent and spaced from the end of the tank for the support of an outboard motor with its propeller in the tank upon the long axis of the ellipse, a baffle plate spaced from and substantially parallel with the top beneath the vent to provide an exhaust passage communicating with the vent and having a downwardly lipped portion proximate the edge of the opening opposite the transom to direct splash away from said opening.

8. An outboard motor test tank having a top, an opening in the top, a bottom, a generally elliptical wall encircling the top and bottom and providing side and end portions for the tank, said wall being provided with shoulders at opposite sides of the tank, and a transom extending across the tank intermediate the ends and transversely of the major axis of the tank, said transom being proximate the top opening and fixed to the side at the said shoulders.

9. The tank as defined in claim 8 wherein the top comprises two portions at different levels, the proximate edges of said portions being joined by the transom in stepped relation.

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No references cited.