Aug. 16, 1927. 1,639,339

G. W. GRASS

OUTBOARD MOTOR

Filed March 4, 1926 2 Sheets-Sheet 1

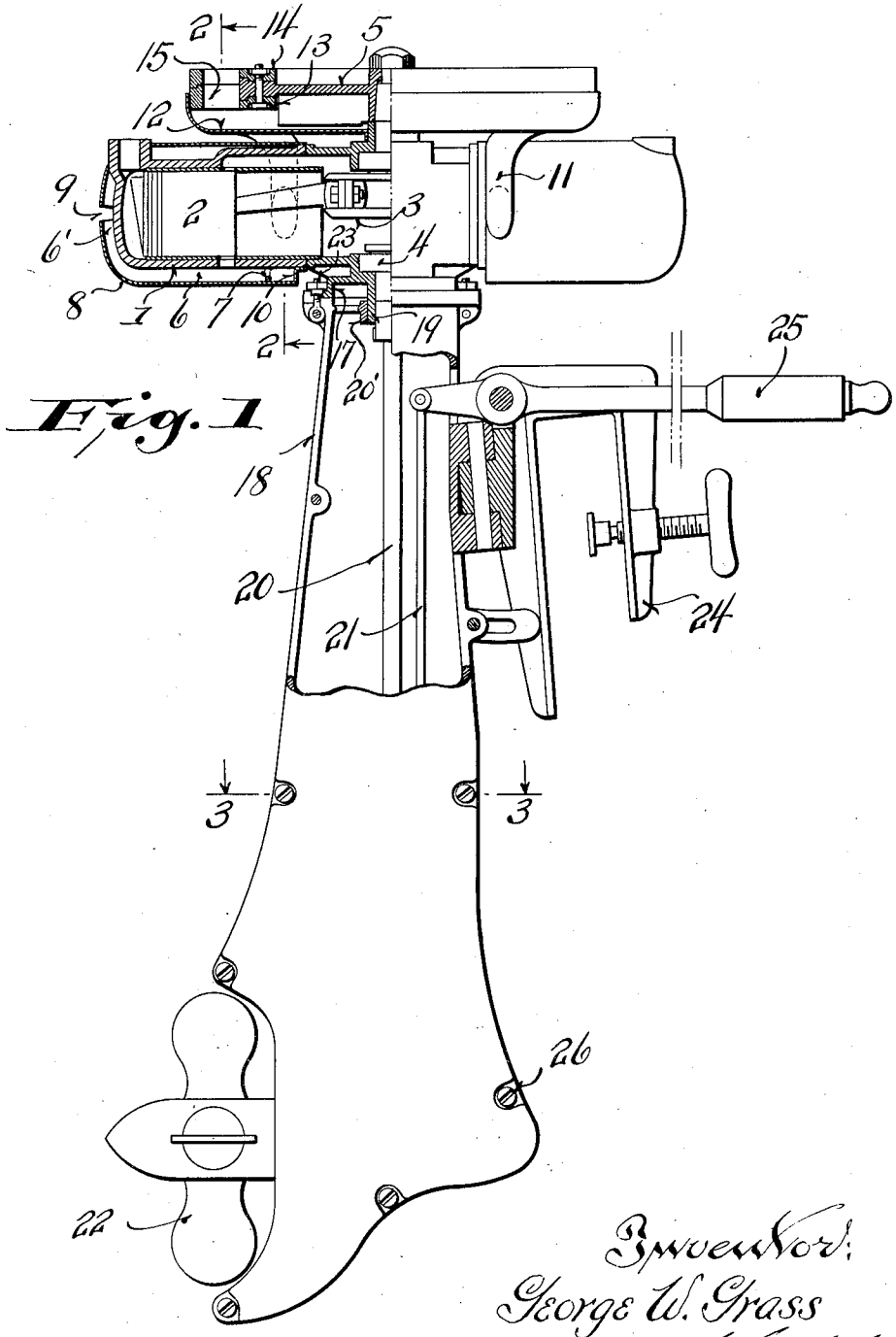


Fig. 1

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Filed March 4. 1926 2 Sheets-Sheet 2

Fig. 2

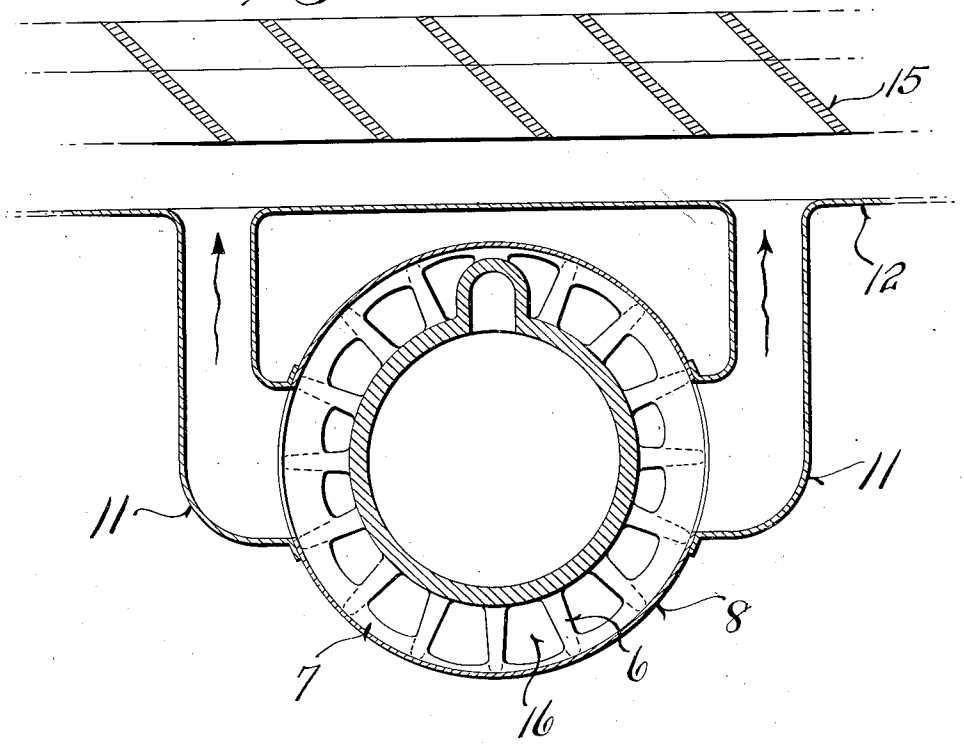
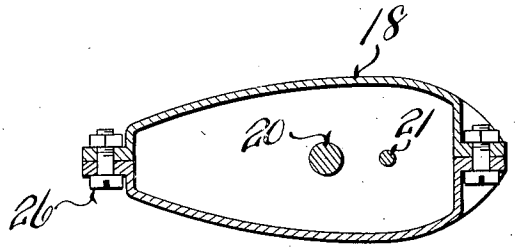


Fig. 3



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UNITED STATES PATENT OFFICE.

GEORGE W. GRASS, OF MILWAUKEE, WISCONSIN.

OUTBOARD MOTOR.

Application filed March 4, 1926. Serial No. 92,265.

This invention relates to outboard motors.

In outboard motors such as those adapted for detachable association with a small boat, it has been the usual practice to provide for water cooling. This water cooling, however, entails certain complications of structure, and due to the fact that the boat is used in all kinds of water, it has been found that the water cooling systems frequently clog and give trouble.

This invention is designed to provide an outboard motor which is air cooled, and which is so constructed that the same amount of cooling air is supplied all portions of the cylinder, irrespective of the point at which the air is admitted or withdrawn from the cooling shell.

Further objects are to provide a novel form of air cooled motor in which fins are employed both radially and circumferentially of the cylinder.

Further objects are to provide a novel form of fly wheel associated with the air cooled motor so that the fly wheel itself acts as the air propelling means.

An embodiment of the invention is shown in the accompanying drawings, in which:

Figure 1 is an elevation partly in section of the motor.

Figure 2 is an enlarged sectional view approximately on the line 2—2 of Figure 1 with the fly wheel developed in the section.

Figure 3 is an enlarged sectional view on the line 3—3 of Figure 1.

Referring to the drawings, it will be seen that the motor is of the opposed piston type. It is provided with a pair of opposed cylinders 1 within which the pistons 2 operate. These pistons are connected by suitable piston rods with the cranks 3 carried by the engine shaft 4. This engine shaft projects upwardly and carries a fly wheel 5 which will be described in greater detail hereinafter. The cylinders are each provided with a plurality of longitudinal fins 6 which project radially from the body of the cylinder. These radial fins are joined at their outer ends by means of the circumferential or annular fin 7 as most clearly shown in Figure 2. The fins are surrounded by an outer shell or casing 8 which contacts with their outer edges. The radial fins are continued over the ends of the cylinders as indicated at 6′ in Figure 1, and the shell 8 is provided with an inlet aperture 9, as shown in such figure, through which the entering air may pass. This shell is closed at its inner end by means of the annular member 10 as shown in Figure 1, adjacent the inner end of the shell. A pair of conduits or pipes 11 extend outwardly from opposite sides of the cylinder as most clearly shown in Figure 2. These pipes provide the outlet passages for the air. They open through the bottom of a casing 12 whose edges are upturned into proximity to the outer periphery of the composite fly wheel as shown in Figure 1.

The fly wheel is provided with vanes arranged in a slanting manner so as to entrain or scoop up the air from the interior of the casing 12 and to project it outwardly as the fly wheel rotates. A convenient way of forming this fly wheel is to bolt a lower annular member 13 and an upper annular member 14 to opposite sides of the fly wheel as shown in Figure 1. These members are provided with vanes 15 carried jointly by the two portions as shown in Figures 1 and 2.

From Figure 2, it will be seen that as the fly wheel rotates in the direction of the arrow, air will be drawn outwardly from the casing 12 and will be sucked through the passage provided by the pipes 11. This air is drawn from opposite sides of each cylinder at diametrically opposite points.

In order to insure a uniform flow of air for all portions of the cylinder, it is to be noted from Figure 2, that the annular fin 7 cooperates with the radial fins 6 to form apertures 16 which are smallest immediately adjacent the pipe 11 and largest at the most remote points. In other words, the fins or flanges 7 are thicker, or of greater depth adjacent the pipe 11 than at other portions of the cylinder. This construction of fins insures a uniform flow of air for all portions of the cylinder.

Further, it will be noted from Figure 1, that the pairs of pipes 11 open into the casing 12 on opposite sides thereof, and thus, a very uniform flow of air is secured.

This outboard motor is provided with a flanged portion 17 which rests upon the corresponding flange of the hull or body portion 18 of the device. Further, the body of the motor is provided with a sleeve 19 which fits within a collar 20′ carried within the upper end of the body portion 18. This body portion 18 houses the vertical driving shaft 20 and the reverse rod 21 for

controlling the angle of the blades of the propeller 22 in the usual manner. Further, it is preferable to provide a slip joint for the engine shaft 4 in regard to the shaft 20 so that the motor may be lifted from the body portion 18 of the apparatus when it is desired, such motor being temporarily locked in place by means of the pivotally mounted bolts 23. This body portion is hingedly joined to clamps 24 by means of which it may be attached to the boat. A controlling lever 25 is employed in the usual manner to steer and control the setting of the propeller blades.

The body portion 18 is preferably formed of two half sections secured together, as shown, by means of bolts 26. The body portion widens in a forward and rearward direction towards its lower end and forms a stream line section as shown in Figure 3. This body portion obviously forms, in effect, the rudder for the apparatus, and may be rocked by means of the lever 25.

It is to be particularly noted that by means of this invention a novel form of air cooled motor is produced in such a way that the motor has its cylinders cooled equally at all portions by the uniformly distributed air stream. Further, it is to be noted, that an easily produced fly wheel construction is provided by this invention so that the fly wheel itself acts as the air propelling device.

Although the invention has been described in considerable detail, such description is intended as illustrative rather than limiting as the invention may be variously embodied and as the scope of such invention is to be determined as claimed.

I claim:

1. In an outboard motor, the combination of a cylinder provided with a plurality of radial fins, an annular fin joining the outer portions of the radial fins, a casing surrounding said cylinder and having an opening adjacent the head of the cylinder for the admittance of air, a pair of pipes opening into the casing at diametrically opposite points, a fly wheel provided with air propelling means, and a casing associated with the fly wheel and communicating with said pipes, the annular fin forming apertures with the radial fins of gradually decreasing size adjacent the air pipe and of gradually increasing size at points remote from the air pipe.

2. In a air cooled motor, the combination of a cylinder having radial fins, and having an annular fin joining the outer portions of the radial fins adjacent the inner end of the cylinder, a shell surrounding the cylinder and contacting with the fins, said shell having an air entrance aperture adjacent the head of the cylinder, a pair of pipes opening into said shell adjacent the inner end of the cylinder and at diametrically opposed points, the radial fin being spaced from the body of the cylinder to form apertures of a minimum size adjacent said pipes and to form apertures of a large size at points remote from said pipes.

3. An outboard motor comprising a body portion, a pair of opposed cylinders carried by the upper end of said body portion, a propeller carried by the lower end of the body portion and operatively connected to said motor, the cylinders of said motor each having a plurality of radial fins and having an annular fin joining the outer ends of the radial fins and providing with the radial fins a series of apertures of large size at diametrically opposite points and of small size at points intermediate the first mentioned points, said motor having a fly wheel at its upper end, a plurality of vanes formed on said fly wheel, a casing surrounding the lower portion of said fly wheel, a casing surrounding each of said cylinders and contacting with said fins, and a plurality of air pipes joining the fly wheel casing with the cylinder casings, such pipes opening into the cylinder casings at the above mentioned intermediate points.

In testimony that I claim the foregoing I have hereunto set my hand at Milwaukee, in the county of Milwaukee and State of Wisconsin.

GEORGE W. GRASS.