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OUTBOARD MOTOR ATTACHMENT

Filed June 5, 1964

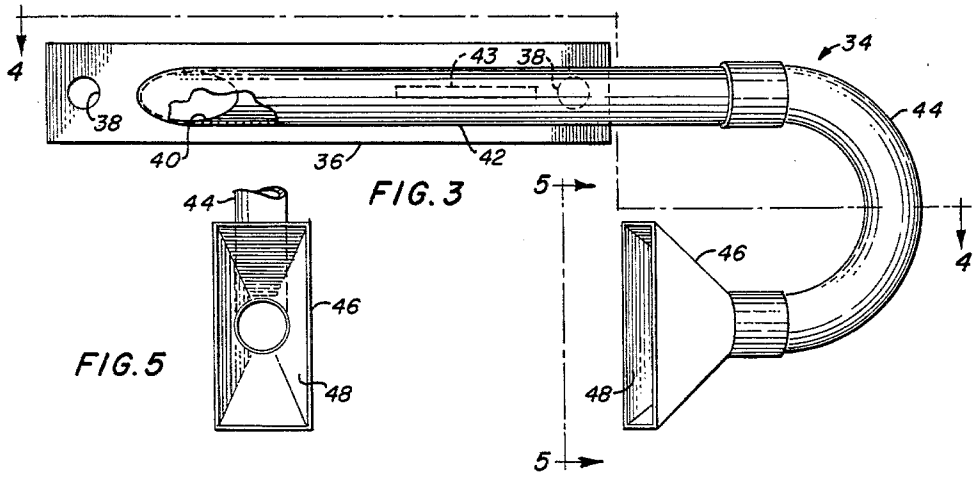


FIG. 3

FIG. 5

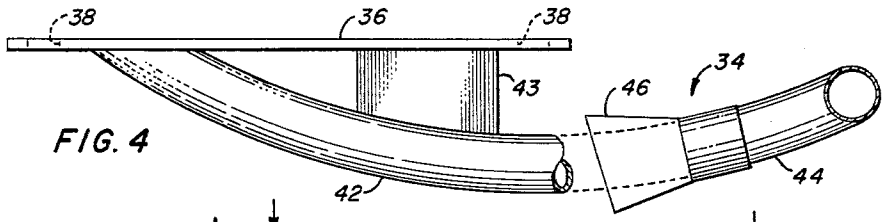


FIG. 4

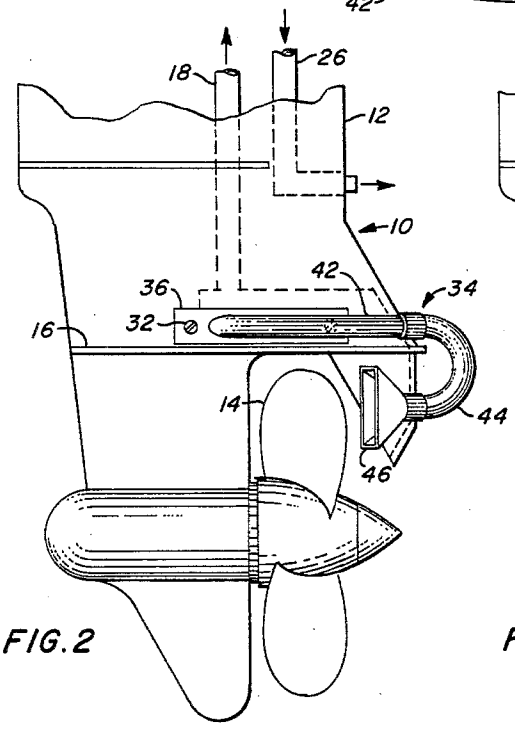


FIG. 2

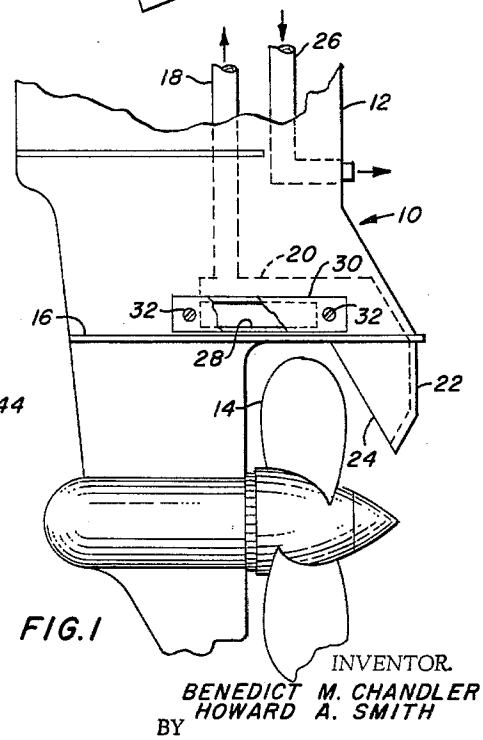


FIG. 1

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OUTBOARD MOTOR ATTACHMENT

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This invention relates to outboard motors and more particularly to novel and improved means for cooling a water cooled outboard motor when the normally operable cooling system fails due to a mechanical malfunction.

Most outboard motors of present manufacture are of the water cooled type whereby water is drawn into an inlet in the lower housing of the motor, usually adjacent the propeller, and is pumped through passages around the cylinder block to cool the same. The water pump is usually located in the motor housing. While it is accessible for inspection and repair, in order to gain access to the pump, it is usually a relatively major job to dismantle the motor sufficiently to reach the pump. At any rate the repair of the pump is an operation which can not normally be carried out while the motor is mounted on a boat and the boat is in the water. Accordingly, if the water pump should fail while the boat is cruising, the boat operator is usually faced with the problem of either stopping the motor to avoid damage due to overheating or attempting to return to shore by using the motor and risking the likelihood that the overheating will cause the pistons to seize in the cylinder with attendant major damage to the motor.

Accordingly, it is the primary object of this invention to provide novel and improved auxiliary means for cooling a water cooled outboard motor which, for example, in the event of a water pump failure, will provide sufficient cooling of the motor to permit the boat to return to shore without motor damage due to overheating.

It is a further object of this invention to provide such novel and improved auxiliary cooling means which may readily be attached to or removed from the motor from within a boat on which the motor is mounted.

It is still further an object of this invention to provide such novel and improved auxiliary cooling means which will provide forced circulation of water through the motor cooling passages when the boat is moving forwardly, and which is adapted to be attached to many existing motors without requiring a reworking of the motor.

The novel features which are believed to be characteristic of this invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and method of operation, together with further objects and advantages thereof, may best be understood by reference to the following description taken in connection with the accompanying drawing, in which:

FIG. 1 is a fragmentary, side elevational view of the lower drive portion of an exemplary outboard motor with which the cooling means of this invention is particularly adapted for use;

FIG. 2 is a view similar to FIG. 1 with the auxiliary cooling means of this invention mounted on the motor;

FIG. 3 is an enlarged, side elevational view of the auxiliary cooling means of FIG. 2 removed from the motor;

FIG. 4 is a top view of the cooling means of FIG. 3 with a portion cut away as indicated by the line 4—4 in FIG. 3; and

FIG. 5 is an end view of a portion of the cooling means of FIG. 3 as indicated by the line 5—5 in FIG. 3.

With reference to the drawing and particularly FIGS. 1 and 2, there is shown, generally at 10, the lower drive portion of an outboard motor of a type with which the auxiliary cooling unit of this invention is particularly adapted for use. The motor includes a lower housing 12 which is suspended from an upper housing (not shown), which contains the cylinder block, crankshaft, carburetor, etc. The crankshaft is connected by a drive shaft and gearing (not shown) to the propeller 14 located at the lower end of the lower housing 12. As is conventional, an anti-cavitation plate 16 is carried by the lower housing and extends generally parallel to the rotational axis of the propeller in relatively closely spaced relation to the propeller. The cylinder block of the motor is cooled by water passages in the block surrounding the cylinders. During normal motor operation, water is forced through these passages by a pump (not shown) which is driven by the motor. The inlet to the pump is connected to a passage 18 which leads to a chamber 20 in the lower housing above the anti-cavitation plate 16. This chamber communicates with a scoop 22 which extends downwardly from the anti-cavitation plate rearwardly of the propeller. The scoop 22 has an inlet opening 24 which faces generally forwardly toward the propeller and is disposed relatively close to the propeller, so that during rotation of the propeller water will tend to be forced into the scoop so as to preload the pump and improve the efficiency thereof. The cooling water exiting from the cylinder block flows into an exhaust passage 26 for discharge from the after end of the housing 12.

When the motor is operated in water in which there is silt or other foreign matter, there may be a tendency for such foreign matter to enter the cooling water inlet where it will be deposited in the enlarged chamber 20. In order to permit occasional removal of this foreign matter, a cleanout opening 28 is provided in the side of the lower housing 12 in registry with the chamber 20. The clean out opening is normally closed by a plate 30 which extends over the opening and is mounted on the lower housing by a pair of screws 32. To gain access to the chamber 20, the screws 32 are merely removed and the plate 30 lifted off.

If, during operation of the motor, the water pump should fail, for example, because of a broken impeller, continued operation of the motor will result in overheating of the cylinder block usually with attendant seizure of the pistons in the cylinders. While rotation of the propeller will tend to force water into the inlet scoop 22, the amount of water passed through the cylinder block in this manner is usually insufficient to prevent damaging overheating of the motor. In accordance with the invention auxiliary cooling means are provided to increase the flow of water through the cylinder block when the motor is operated with a defective pump thereby to permit continued operation of the motor without causing serious damage to the motor due to overheating. More particularly, and with reference to FIGS. 2–5, the auxiliary cooling means of this invention is generally indicated at 34 and comprises a mounting plate 36 of the same size and configuration as the closure plate 30. The mounting plate 36 is provided with a pair of apertures 38 for reception of the screws 32 which normally hold the closure plate 30 in place. The mounting plate is further provided with a generally elliptical opening 40 which communicates with an end of a cylindrical tube 42 rigidly secured, as by welding, to the mounting plate. The tube 42 extends from the opening 40 in the mounting plate rearwardly of the plate 36 and generally in vertical alignment therewith. The tube 42 is rigidly supported intermediate its ends by a strut 43 extending between the tube and the plate 36. The ends of the strut are secured, as by welding, to the plate 36 and tube 42, respectively. As can be seen from FIG. 4 the tube 42 is curved, in the horizontal plane, about a center spaced

from and disposed on the side of the plate 36 opposite that which the tube faces. The curvature of the tube is such that the end thereof remote from the opening 40 is redirected generally toward the general plane of the mounting plate.

The tube 42 terminates at a U-shaped cylindrical tube 44 to which the tube 42 is rigidly connected in sealed relation. The tube 44 depends from the after end of the tube 42, whereby the lower end of the tube 44 faces generally toward the forward end of the mounting plate 36 to which the tube 42 is connected. A scoop 46 is rigidly connected in sealed relation to the lower end of the tube 44. In the specific embodiment shown in the drawing, the main body of the scoop 44 is of generally rectangular cross-section having a relatively large inlet opening 48. The body of the scoop tapers from the inlet 48 to cylindrical end remote from the inlet 48 and is rigidly connected in sealed relation to the lower end of the tube 44. As will be observed in the drawing the cross-sectional area of the scoop inlet is very substantiially larger than the cross-sectional area of the tube 44 or 42.

Normally the auxiliary cooling unit 34 will not be mounted on the motor. However, in the event of a water pump failure, the closure plate 30 is removed and the auxiliary unit 34 mounted on the lower housing 12 of the motor by securing the mounting plate on the housing in place of the closure plate 30. The screws 32 which normally secure the closure plate to the housing are also used to secure the mounting plate 36 to the housing. As noted previously, the mounting plate 36 is preferably of the same size and configuration as the closure plate 30. With the auxiliary unit secured in place as shown in FIG. 2, the tube 42 will extend above and generally parallel to the anti-cavitation plate 16. The tube 44 extends beyond the after end of the anti-cavitation plate 16 and then is redirected downwardly and under the plate 16 so as to lie alongside the motor water inlet scoop 22. The scoop 46 of the auxiliary unit 34 is thus disposed below the anti-cavitation plate. The inlet of the scoop 46 is disposed closely adjacent the propeller 14 with the general plane of the scoop inlet being inclined relative to the propeller axis generally similarly to the pitch of the portion of the propeller blades passing by the scoop inlet. In practice a spacing of about 3/8" between the propeller and scoop inlet 48 has been found to be satisfactory. In order to improve the efficiency of the unit, it is preferred to locate the scoop inlet 48 adjacent the outer diameter of the propeller where the lineal speed of the propeller blades, and thus the pressure of the propeller wash, will be greater.

With the auxiliary unit installed as described, operation of the motor will cause the propeller to force water into the scoop 46, through the tubes 44 and 42 and into the chamber 20 from whence it will pass through the passage 18 to the cylinder block and then out the passage 26. At the same time water will be forced into the scoop 22 and thus into the chamber 20. As noted above the water forced into the scoop 22 will not be sufficient, of itself, to maintain the cylinder block cool enough to prevent operation of the motor without damage due to overheating. However, the additional cooling water provided by the auxiliary unit 34 will be sufficient to permit operation of the motor without risk of seizure of the pistons. It is preferred though that when the motor is operated with the auxiliary cooling unit as a result of a pump failure that the motor not be operated in excess of moderate speeds.

While the specific embodiment shown and described has been related to a motor having an existing access opening to the inlet water cooling passages in the lower motor housing, the invention is not limited to use with such motors. For example where no such access opening is provided on the motor, an opening of suitable size may be provided in the lower housing of the motor so as to communicate with the inlet passage to the water pump. This hole may be normally closed in any suitable manner such as by a plate extending across the opening and secured to the housing by screws in much the same manner as the closure plate 30 previously described. Alternately, the specially provided opening could be tapped and closed with a threaded plug. In this event additional holes would be required to receive screws for securing the mounting plate 36 to the housing. The holes for these screws could be tapped or self-tapping screws could be utilized.

Thus it can be seen that there has been provided a novel and improved auxiliary cooling unit for a water cooled outboard motor which will permit continued operation of the motor in the event of water pump failure. The unit may readily be attached to the motor when required. The ease and manner of attachment permits the same to be accomplished from within a boat merely by tilting the motor up whereby the necessary portion of the lower housing may be reached from the transom of the boat. Once the boat has reached shore and repairs made to the pump, the auxiliary unit may be removed and stored away on the boat for further use, if required.

While only a certain preferred embodiment of this invention has been shown and described by way of illustration, many modifications will occur to those skilled in the art and it is, therefore, desired that it be understood that it is intended in the appended claims to cover all such modifications as fall within the true spirit and scope of this invention.

What is claimed as new and what it is desired to secure by Letters Patent of the United States is:

1. An auxiliary cooling unit for a water cooled outboard motor of a type having a housing containing a cooling water inlet passage and having an opening in the side portion of said housing communicating with said passage, comprising an elongated mounting plate adapted to be readily attached to and removed from the side portion of the housing of an outboard motor of the type described, means providing an opening in said plate located so as to be in fluid flow communication with said passage in the motor when said mounting plate is secured to the housing of the motor, an elongated tubular member, mounting means securely connecting said plate to said tubular member, said tubular member having one end in flow communication with said opening in the plate, the other end of said tubular member terminating in a scoop having an inlet with a cross-sectional area substantially greater than the cross-sectional area of said tubular member, said tubular member extending outwardly from said one end and longitudinally of said plate and thence downwardly to locate the inlet of the scoop spaced closely to and rearwardly of the propeller of the motor in line with a portion of the propeller when the mounting plate is secured to the side portion of the housing of the motor.

2. An auxiliary cooling unit for a water cooled outboard motor comprising a mounting plate having opposite ends and being adapted to be readily attached to and removed from an outboard motor, means providing an opening in said plate, a tubular member connected at one end in fluid tight relation to said plate with said one end of the tubular member surrounding said opening in the plate, the tubular member extending from said one end thereof generally longitudinally of said plate beyond one end of the plate and then being redirected downwardly and toward the other end of said plate, the other end of said tubular member terminating in a scoop having an inlet with a cross-sectional area substantially greater than the cross-sectional area of said tubular member, and a strut fixed at one end to said plate and at the other end to said tubular member intermediate the ends thereof.

3. In combination with an outboard motor having a lower housing, an anti-cavitation plate and a propeller disposed below said anti-cavitation plate, said housing

containing a chamber disposed at least in part above said anti-cavitation plate in fluid flow communication with a cooling water inlet passage in the motor, said housing having a side portion provided with an access opening above said anti-cavitation plate in registry with said chamber, said access opening being normally at least substantially closed by a closure plate secured to said housing; an auxiliary cooling water inlet unit comprising a mounting plate extending over said access opening in lieu of said closure plate, said mounting plate being removably secured to said housing side portion and having an opening therethrough in registry with said access opening, a tubular member connected at one end to said mounting plate in fluid flow communication with said opening in the mounting plate and extending from said one end over said anti-cavitation plate and downwardly around and under the rearward portion of said anti-cavitation plate, and a scoop connected at one end to the other end of said tubular member, said scoop having an inlet portion at its other end generally facing and closely adjacent the propeller and having a cross-sectional area substantially greater than the cross-sectional area of said tubular member.

4. In combination with an outboard motor having a lower housing, an anti-cavitation plate and a propeller, said housing containing a chamber disposed at least in part above said anti-cavitation plate and which is in fluid flow communication a cooling water inlet passage in the motor, said housing being provided with an access opening above said anti-cavitation plate and in registry with said chamber which is normally at least substantially closed by a closure plate secured to said housing by a plurality of screws received in openings in said housing; an auxiliary cooling water inlet unit comprising a mounting plate extending over said access opening in lieu of said closure plate, said mounting plate generally of the

same size as said closure plate and being secured to said housing by a plurality of screws received in the openings for receiving the screws for mounting the closure plate, said mounting plate having an opening therethrough in registry with said access opening, a tubular member connected at one end to said mounting plate in fluid flow communication with said opening in the mounting plate, said tubular member having a first portion extending from said one end over said anti-cavitation plate toward the rearward portion thereof, and curving from said one end outwardly from and then inwardly toward the general plane of said mounting plate, said first portion terminating in U-shaped second portion extending downwardly around and under the rearward portion of said anti-cavitation plate, a strut connected at one end to said mounting plate and at its other end intermediate the ends of said tubular member, and a scoop connected at one end to the lower end of said U-shaped portion, said scoop having an inlet portion at its other end generally facing the propeller and disposed rearwardly thereof in relatively closely spaced relation, the scoop inlet being adjacent the outer ends of the propeller blades and having a cross-sectional area substantially greater than that of said tubular member.

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