

A. RONNING

BOAT PROPULSION APPARATUS

FIG-4 -

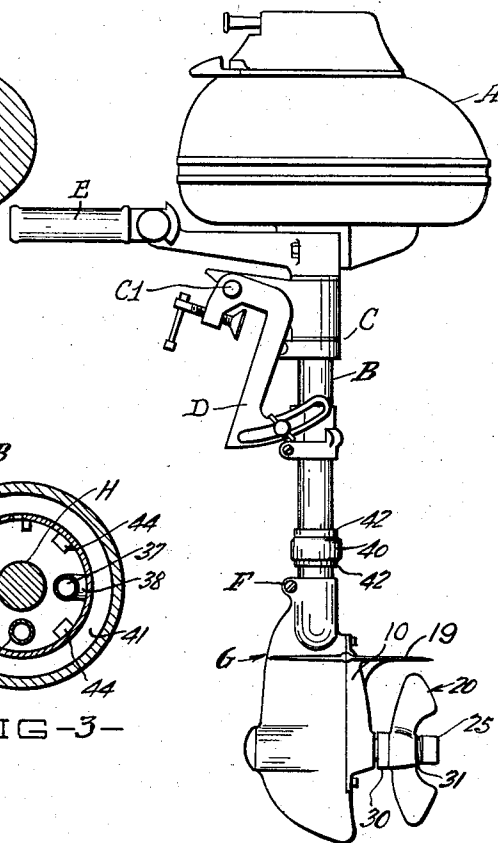


FIG-1 -

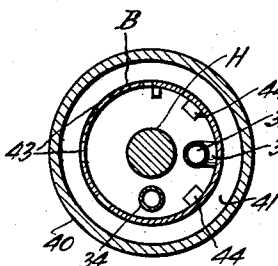


FIG-3-

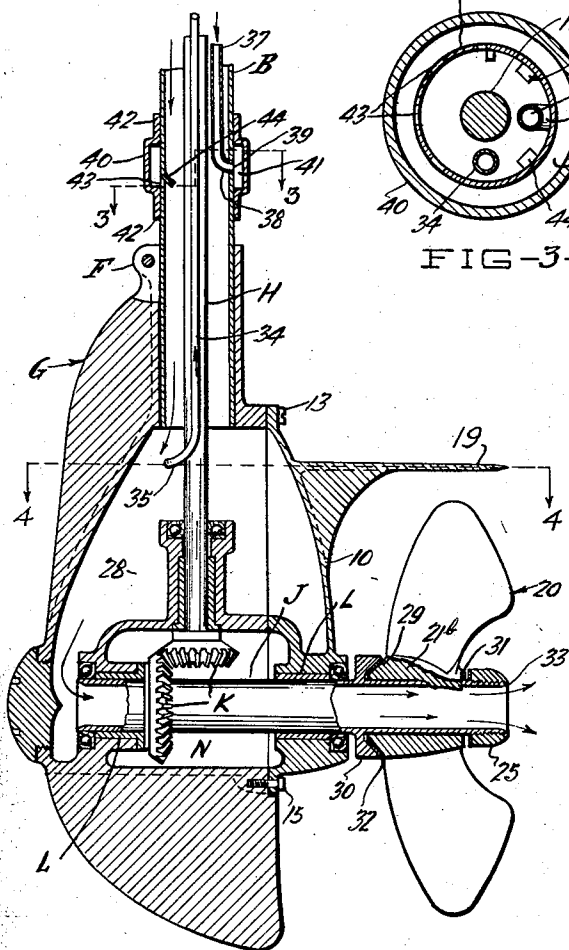


FIG-2-

INVENTOR
ADOLPH RONNING
BY 

BY Andrew E. Carlson
ATTORNEY

UNITED STATES PATENT OFFICE

2,213,612

BOAT PROPULSION APPARATUS

Adolph Ronning, Minneapolis, Minn.

Original application April 15, 1938, Serial No. 202,258. Divided and this application January 18, 1939, Serial No. 251,648

4 Claims. (Cl. 115—18)

This invention relates to boat propulsion apparatus, particularly of the type known as outboard motors in which the propelling mechanism is carried by a detachable power unit, and the primary object is to provide such an apparatus with improved means for utilizing force of the exhaust gas stream to circulate the motor cooling fluid, and to provide improved means for the efficient and comparatively quiet disposition of waste products of the motor including particularly the exhaust gases. These and other objects will be disclosed in the course of the following specification, reference being had to the accompanying drawing, wherein:

Fig. 1 is a side elevation of an outboard motor embodying my invention.

Fig. 2 is an enlarged vertical and longitudinal section through the lower portion, or transmission unit of the assembly shown in Fig. 1.

Fig. 3 is an enlarged section on line 3—3 in Fig. 2.

Fig. 4 is a horizontal cross section on line 4—4 in Fig. 2.

Referring to the drawing more particularly and by reference characters, A designates the motor which may be of conventional type and which includes a depending tubular standard B journaled at C in a bracket D by which the assembly is supported in "outboard" fashion on the boat to be propelled. The unit may thus be oscillated about a vertical axis with respect to the bracket D, by manipulation of a handle E, to steer the boat, and may be tilted about a transverse fulcrum or pivot C', to raise the propeller end out of the water in well known manner. It will be understood that when the motor is being operated to propel the boat the standard B assumes a substantially vertical position as shown in Figs. 1 and 2.

At its lower end the standard B supports a transmission unit G secured thereto by clamp F. A drive shaft H of the motor extended down through the standard B to drive the fore and aft extending propeller shaft J through the medium of bevel gears K, one of which is attached to the lower end of shaft H while the other is mounted on shaft J between the ends thereof, the shafts H and K being supported or journaled in suitable bearings L preferably oil sealed so that the chamber N may retain a lubricant for the gears and bearings.

An exhaust chamber 28 is arranged in the unit housing G above the chamber N, and communicates with the exhaust ports of the engine A through the annular space between the shaft

H and tube standard B. This chamber 28 is sealed at its rear by a housing member 10 which is removably secured thereto by bolts 13 and 15, so as to give ready access to both chambers N and 28. The member 10 carries the usual anti-cavitation plate 19, disposed over the propeller 20 mounted on shaft J and retained thereon by nut 25.

The propeller shaft J is of tubular form opening at its forward end into the exhaust receiving chamber 28 while its rear end opens axially through the propeller so as to discharge into the water rearwardly thereof. It is to be noted that with this construction and arrangement it is unnecessary to provide any peripheral openings in the propeller shaft to receive the exhaust gases, and that by placing the lower bevel gear K on the shaft J rearwardly of the point where the gases are received it is unnecessary to in any way perforate the shaft tube at any point between the gear and the propeller, with a result that this portion of the tube, which is subject to the greatest stresses and strains, may be kept solid throughout its length and will therefore be stronger than if gas entrance side ports were required between the gear and propeller.

It will be understood from the foregoing that the exhaust gases will flow downwardly through the standard B into the chamber 28 and thence axially out through the shaft J to escape into the water behind the propeller where they will be absorbed and the sound muffled by the turbulence of the water. The partial vacuum created axially behind the propeller will tend to assist in the outward gas discharge and the flow will be further accelerated by the flared end of the hollow shaft which creates a venturi-like action.

In the water circulating system for cooling the motor no separate mechanical pump or circulator is used, but instead the water is supplied to the motor A by an intake pipe 34 extending vertically within the standard B, and at its lower end has a lateral extension 35 which communicates with the exterior of the unit G at a point 36 below the water level. After passing through and cooling the engine the water is conducted down through a pipe 37, within the standard B, and to a point near the lower part thereof, where it turns outwardly at 38 and discharges as at 39 into an annular chamber 41 formed by an outer casing 40 having flanges 42 welded or otherwise secured about the standard to seal the chamber 41. The water thus entering the annular chamber 41 escapes therefrom through a series

of annularly spaced ports or jets 43 cut in the wall of the standard B and these ports, upon their inner sides, have overhanging, inwardly and downwardly inclined baffles or deflectors 44.

5 In operation as the exhaust gases move downwardly through the standard under the accelerated flow or current action above described they impinge on the deflectors 44, and as they are thus diverted inwardly or constricted they set up
10 a constant suction in the ports 43, and as the total cross sectional area of these ports is substantially greater than that of the tube 37 it will be evident that the pull or suction on the water in this tube will be sufficient to produce full circulation of the cooling medium from point 36
15 and completely through the engine. As the water passes in through the ports 43 under the venturi-like action of the deflectors it co-mingles with the exhaust gases and passes with them down into the chamber 28 and out through the propeller shaft.

It may here be noted that this application is a division of application Serial No. 202,258, filed April 15th, 1938, for Boat propulsion apparatus.

25 It is understood that suitable modifications may be made in the structure as disclosed, provided such modifications come within the spirit and scope of the appended claims. Having now therefore fully illustrated and described my invention, what I claim to be new and desire to
30 protect by Letters Patent is:

1. In a boat propulsion apparatus, a motor, a hollow standard, a propeller unit supported from the motor by said hollow standard, means for
35 directing exhaust gases from the motor down through said standard for discharge below the water level from the propeller unit, a water cooling system for the motor including a passageway discharging through an opening inwardly to the
40 hollow standard, and a deflector disposed in the standard adjacent such opening to deflect the gas flow and thereby create a suction in the discharge opening and promote circulation of the cooling medium.

45 2. In a boat propulsion apparatus including a motor and a propeller driven thereby, a tubular

member conducting exhaust gases from the motor, an annular chamber formed about the member and communicating with the interior thereof through a plurality of ports, and a motor cooling system having a water inlet below the normal water level and an outlet discharging into said annular chamber, said tubular member being provided upon its interior with gas deflecting means adjacent said ports to increase the suction producing effect of the gas flow passing the ports. 5

3. In a boat propulsion apparatus comprising a motor and a propeller driven thereby, a tubular standard conducting exhaust gases downwardly from the motor, a housing on the lower end of the standard and having a chamber communicating with the tubular standard for receiving exhaust gases therefrom, a tubular propeller shaft carrying the propeller, bearing means supporting the shaft in longitudinally extending direction, the frontal bearing means and forward end of the shaft being spaced from the forward wall of the housing to admit exhaust gases from the chamber directly to the exposed forward end of the shaft for discharge rearwardly there-through, and means establishing driving connection between the motor and propeller shaft. 10 15 20 25

4. A boat propulsion apparatus comprising a motor and a propeller driven thereby, a tubular standard carrying exhaust gases from the motor, a housing on the lower end of the standard and having a chamber for receiving exhaust gases from the motor, the said chamber extending forwardly to the forward wall of the housing, bearing means in the housing, a tubular propeller shaft having solid imperforate walls and journaled in longitudinally extending direction in said bearing means to carry said propeller, the forwardly located bearing means and forward end of the shaft being spaced rearwardly from the forward wall of the housing and exposed directly to the chamber for the free escape of gases rearwardly through said shaft, and means isolated from said chamber for establishing driving connection between the motor and propeller shaft. 30 35 40 45

ADOLPH RONNING.