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SILENCING CHAMBER AND AIR INLET FOR OUTBOARD MOTORS

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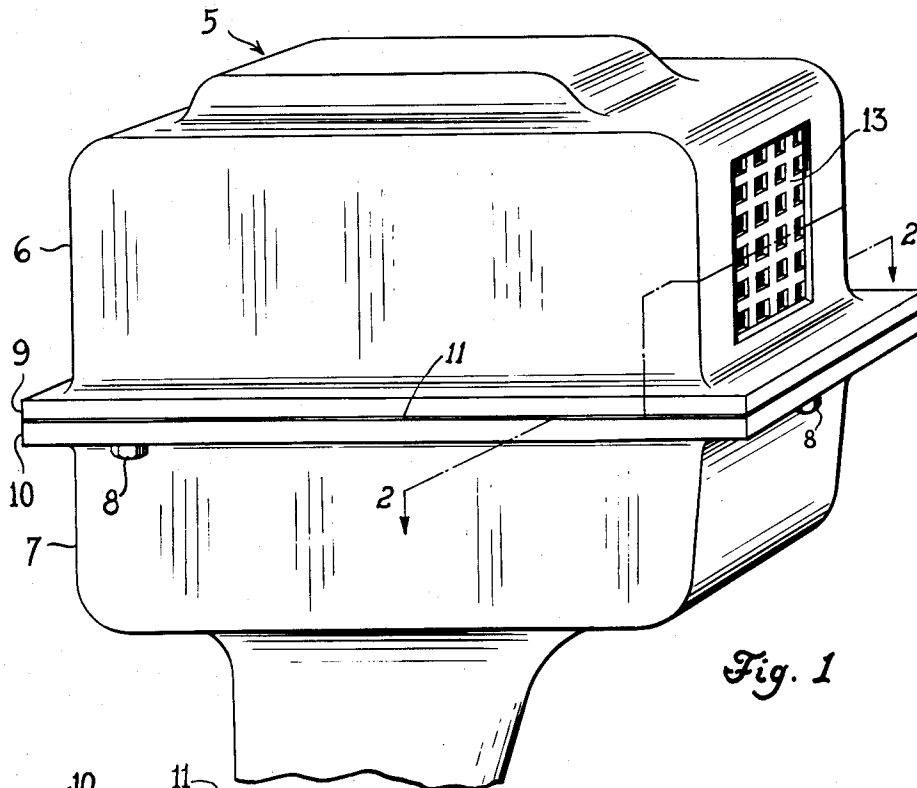


Fig. 1

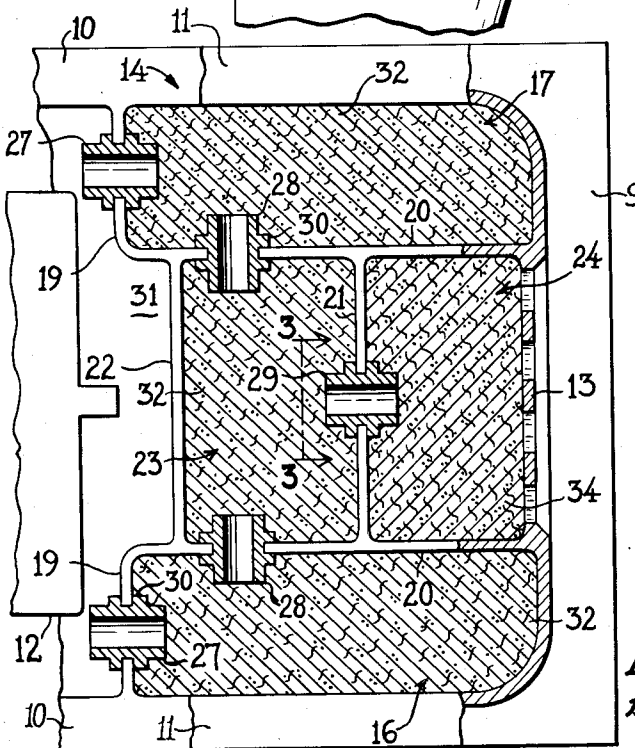


Fig. 2

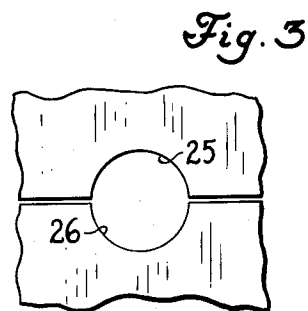


Fig. 3

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SILENCING CHAMBER AND AIR INLET FOR OUTBOARD MOTORS

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This invention relates generally to outboard motors and in particular to a combined silencing chamber and air inlet for the engine thereof.

Much effort has been directed to the problem of reducing the noise of an outboard motor, for example, by lining the inside metal surface of the engine cowl with a sound absorbing blanket. Separate silencing chambers have also been proposed with the cowl for isolating the carburetor from the rest of the engine. Various rubber mountings have also been proposed, and used with considerable success, as a means to help isolate noise of the various component parts.

An air inlet must be provided for combustion purposes of the engine and an opening in the cowling which surrounds the engine is usually provided for this purpose. This opening, unfortunately, permits much of the engine noise to issue from the cowling.

In accordance with the present invention, there is provided a cowl for an outboard motor which forms an acoustically sealed chamber in which the powerhead operates.

More specifically the invention provides a combined silencing chamber and air inlet which may if desired, also be made to serve as an air cleaner. The arrangement of the chamber and inlet is such, in respect to the boat on which its motor is attached, that any noise not reduced by the chamber will be directed away from the occupants of the boat. At the same time engine power is not sacrificed by this silencer.

Other objects and advantages of this invention will appear hereinafter as this disclosure progresses, reference being had to the accompanying drawings in which:

Figure 1 is a partial perspective view of an outboard motor embodying the invention;

Figure 2 is an enlarged fragmentary horizontal section through the silencing chamber, taken generally on line 2—2 of Fig. 1; and

Figure 3 is a fragmentary elevation view taken on line 3—3 of Fig. 2 and showing the air passage openings in the walls but with the tubes removed and on an enlarged scale.

Referring in greater detail to the drawings, the outboard motor shown for illustrative purposes includes the engine cowling 5 comprising an upper cowl 6 and lower cowl 7 which are sealed together by suitable means such as cap bolts 8 extending through the flange 10 and threadably engaged in flange 9. Quick acting clamps are also often used for this purpose. A flexible gasket 11 is located between the flanges 9 and 10 and is effective to prevent any sounds from passing therethrough.

Within the cowling is mounted an internal-combustion engine 12 which requires an air supply for combustion purposes. This air supply should be clean and readily available in unlimited quantities to the engine.

At the rear end of the cowling is a decorative grill 13 which forms an air intake opening therethrough. The air passing through the grill 13 then enters the silencing chamber 14 and passes into the cowl proper. The arrange-

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ment is such that an unlimited supply of air is available and no appreciable restriction is imposed in the air flow path to impede its flow and thereby reduce engine power. At the same time any noise from the engine is almost completely absorbed by the silencing chamber and prevented from escaping from the cowling.

The silencing chamber 14 is shown for illustrative purposes as being formed by a series of walls or partitions which are die-cast into the upper and lower cowls 6, 7. The walls of the cowls are complementary and when the upper and lower cowls are assembled they form four separate chambers which extend along the entire interior height of the cowling 5. The sound absorber chambers 16, 17, one located on each side of the grill, are defined by the front walls 19 and side walls 20. An intermediate wall 21 and a central front wall 22, which are formed integrally with walls 20 and the upper and lower cowls, define a central sound absorbing chamber 23 and an initial air inlet chamber 24.

As shown in Figure 3, the walls 19, 20 and 21 of the upper and lower cowls have complementary semi-circular openings 25, 26, respectively cast therein. Tubes 27, 28 and 29 are inserted in the lower openings 26 just prior to assembly and are held captive therein by their flanges 30. Thus these tubes form openings between the inside 31 of the cowl proper, the chamber 16, 17, the central chamber 23 and inlet chamber 24. It will be noted that tubes 27 are disposed longitudinally and at right angles to the next tubes 28 which are positioned transversely. Tube 29, on the other functional side of tubes 28 is also at right angles to tubes 28. Thus any sound waves passing therethrough are directed well into the sound chambers and must be reflected before entering the next tube.

Air entering the grill 13 passes through chambers 24, 23 and 16 and 17 in a rather tortuous path defined by the particular relative location of the chambers and the disposition of their tube openings.

Sound absorbing material 32, for example, Fiberglas strands, asbestos yarn or the like, may be packed into chambers 16, 17 and 23, if desired. Alternatively, these chambers may be left empty if as much sound absorbing quality is not required. In the latter case the chambers act as resonators. A porous air filtering material 34 may be placed in air inlet chamber 24, if necessary, so as to filter the air before it enters the sound absorbing chambers.

With these large sound absorbing chambers air is free to pass unrestrictedly through the grill and into the engine space 31. Any sound waves originating in the engine, however, are substantially eliminated before they find their way through the tortuous path of the silencing chamber and out of the grill.

With this construction the entire cowl is acoustically sealed and any noise that is not reduced by the silencing chamber will be directed rearwardly out of the grill and away from the occupants of the boat. At the same time an abundant supply of air is available to the interior of the cowling from which the engine draws for combustion purposes.

Various modes of carrying out the invention are contemplated as being within the scope of the following claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention.

I claim:

1. An outboard motor having a cowl forming an internal-combustion engine chamber, said cowl having an air inlet rearwardly thereof, an air cleaner within the rear portion of said cowl and adjacent said inlet, and a silencing chamber within said cowl and adjacent said cleaner whereby air entering said inlet passes through said cleaner and then through said silencing chamber and to said engine chamber.

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2. In an outboard motor having a cowl forming a chamber for an internal-combustion engine, said cowl having a grill at its rear end through which air passes for engine combustion purposes, a central sound absorber within said cowl and in air receiving communication with said grill, and a sound absorber within said cowl and at each side of said central absorber and in air receiving communication therewith and also in communication with said engine chamber, whereby air is directed through said grill and said absorbers to said engine, and any noise from the latter that is not absorbed by absorbers is directed rearwardly through said grill out of said cowl.

3. An outboard motor having a cowl forming an internal-combustion engine chamber, said cowl having a rear end containing an air inlet, a central sound absorbing chamber in said cowl and in communication with said inlet, and a sound absorbing chamber at each side of said central chamber and in communication with said central chamber and also in communication with said engine chamber, whereby air for engine combustion purposes passes progressively through said inlet, said central chamber, said side chambers and then into said engine chamber.

4. An outboard motor having a cowl forming an internal-combustion engine chamber, said cowl having a rear end containing an air inlet, a central sound absorbing chamber in said cowl, a longitudinally positioned tube placing said central chamber in communication with said inlet, a sound absorbing chamber at each side of said central chamber, a transversely positioned tube placing each of said side chambers in communication with said central chamber, and a longitudinally positioned tube placing each of said side chambers in communication with said engine chamber, whereby air for engine combustion purposes passes progressively through said inlet, said central chamber, and the respective side chambers into said engine chamber.

5. An outboard motor having a cowl forming an internal-combustion engine chamber, said cowl having a rear end containing an air inlet, a central sound absorbing chamber in said cowl and spaced a distance from said inlet to define an air inlet chamber, an air cleaner in said

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inlet chamber, a longitudinally positioned tube placing said central chamber in communication with said inlet chamber, a sound absorbing chamber at each side of said central chamber, a transversely positioned tube placing each of said side chambers in communication with said central chamber, and a longitudinally positioned tube placing each of said side chambers in communication with said engine chamber, whereby air for engine combustion purposes passes progressively through said inlet, said inlet chamber, said central chamber, and the respective side chambers into said engine chamber.

6. In an outboard motor having a cowl forming an internal-combustion engine chamber, said cowl having an air inlet for receiving combustion air, a central sound absorbing chamber in said cowl disposed in communication with said inlet, and a sound absorbing chamber disposed to each side of said central chamber and in communication with said central chamber and said engine chamber, said chambers together providing a tortuous passage through which air for engine combustion purposes passes progressively from the atmosphere to the engine chamber and further providing sound absorbing and directing means for noises emanating from said engine.

7. An outboard motor having a cowl forming an internal-combustion engine chamber, said cowl having a separate air inlet chamber, filter means within said separate air inlet chamber, and a separate silencing chamber within said cowl and having passages connecting the same to said inlet chamber and to said engine chamber whereby air entering said inlet passes through said cleaner and then through said silencing chamber and to said engine chamber.

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