

F. J. GOWING.
MUFFLER FOR INTERNAL COMBUSTION ENGINES.
APPLICATION FILED JUNE 12, 1905.

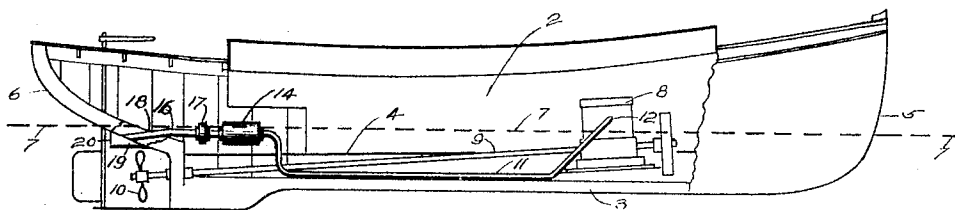


Fig 1.

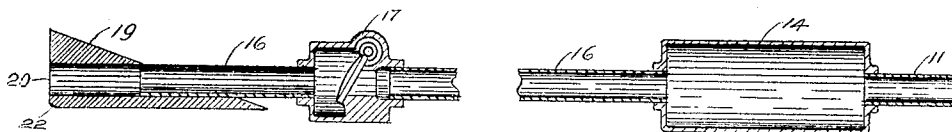


Fig 2.

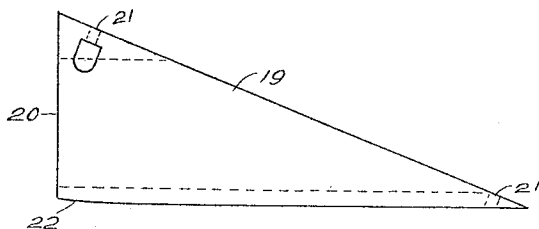


Fig 3.

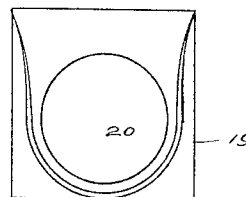


Fig 4.

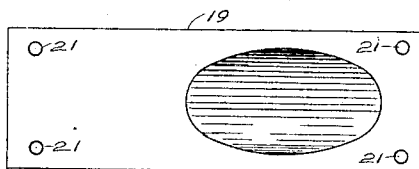


Fig 5.

WITNESSES.

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FRED J. GOWING, OF SACKET HARBOR, NEW YORK, ASSIGNOR OF ONE-HALF TO JEROME B. ROSEBOOM, OF SACKET HARBOR, NEW YORK.

MUFFLER FOR INTERNAL-COMBUSTION ENGINES.

No. 806,083.

Specification of Letters Patent.

Patented Nov. 28, 1905.

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To all whom it may concern:

Be it known that I, FRED J. GOWING, a citizen of the United States, residing at Sacket Harbor, in the county of Jefferson and State of New York, have invented certain new and useful Improvements in Mufflers for Internal-Combustion Engines, of which the following is a specification.

This invention relates to improvements in mufflers for internal-combustion engines designed for use in connection with the exhaust of engines of the class for the purpose of preventing or dulling the noises due to the explosion and exhaust of an engine; and the invention relates particularly to a muffling device to be used in connection with gas or gasoline engines such as employed in the propelling or driving of pleasure-boats, launches, and the like.

The object of this invention is to provide a simple, durable, and effective muffling device which is capable of being applied at slight expense to any of the several types of internal-combustion engines employed on the various water craft and which when properly constructed and applied will prevent entirely all the noises commonly caused by the exhausting of engines of the class referred to, thereby rendering such engines practically noiseless and freeing the atmosphere in the immediate vicinity of the boat from the offensive odor of the gas or gasoline used in operating the engine, thus greatly adding to the comfort of the persons riding in such boats.

A further object of the invention is to effect a more ready and complete relief and draining of the exhaust-pipe, and thereby increasing the motive power and efficiency of all such engines equipped with my improvement.

A prominent feature of the present invention consists in providing an extension to the exhaust-pipe common to all internal-combustion engines, the said extension being disposed on a boat in such manner that the exhaust is discharged beneath the surface of the water through a nozzle or reducer of special design, preferably at or near the stern of the boat, and also preferably arranged so that the terminus of the extended exhaust-pipe is located on line with the boat's keel, and therefore on the median line or ridge of the vessel and at a point where it will always

be submerged whether the boat is lightly or heavily loaded.

Another feature of the invention consists in providing a drum or like part disposed in the line of said exhaust-pipe, the purpose or object of said drum being to afford an intermediate relief for the quick and rapid pulsations or discharges of the exhaust from the combustion-cylinder, it being found that the nearer to the engine the relieving port or chamber is placed the more readily the engine will free itself from the dead or burned gases and the more effectively it will perform its work.

A further feature of the invention consists in providing a check-valve which may partake of any suitable form or make and which is placed in the line of the said extension-pipe at any convenient point between the said drum and the terminus or nozzle of said pipe, the object of this check-valve being to permit the free outward passage of the gas or vapor ejected by the engine while working and at the same time preventing the inflow or backing up of the water by reason of the nozzle or terminus of the exhaust-pipe being submerged and the consequent continual pressure of the water upon the said parts. By the employment of the check-valve referred to a boat or other craft having my invention applied may be propelled either backward or forward without inconvenience or trouble from the water entering or filling the exhaust-pipe.

Other features and parts of the invention will be more readily understood by reference to the drawings forming a part of this specification, and in which—

Figure 1 is a view of a boat or launch, partly in elevation and partly in section, showing the application and arrangement of the parts embodying the invention. Fig. 2 is an enlarged detail view of the parts comprising the invention, showing the exhaust-pipe, drum, check-valve, and nozzle in section. Fig. 3 is an enlarged view in elevation of the nozzle. Fig. 4 is an enlarged front end view of the nozzle, showing the orifice through which the exhaust is discharged into the water. Fig. 5 is a plan view of the nozzle, showing the opening into which the end of the extension-pipe is inserted.

Similar reference-numerals are assigned to

corresponding parts throughout the several figures of the drawings.

2 represents the body or hull of a boat of the type having a keel.

3 is the keel or central timber of the vessel.

4 represents the floor, 5 the bow, and 6 the stern of the boat.

The dotted line 7 is intended to represent the water-line and incidentally the depth of draft of the boat.

8 represents an engine of the internal-combustion or explosive type, such as commonly used on pleasure or other boats. 9 is the propeller-shaft, and 10 the propeller. The exhaust-pipe connects with the engine-cylinder at 12. After leaving the engine the exhaust-pipe 11 is shown bent downward at an angle sufficient to permit of the pipe being extended toward the stern of the boat, passing between the floor and the bottom until it reaches the inclosed portion of the stern. At this point a drum 14 is connected with exhaust-pipe 11. The object of this drum is to provide an enlarged space or cavity into which the gases or vapors of the exhaust may be forced and expanded, thereby relieving the combustion chamber or cylinder of the engine to a greater extent and more quickly than if the exhaust-pipe was of the same size throughout its entire length.

16 represents a short section of pipe which connects with the outer end of the drum 14 and in which the check-valve 17 is disposed. The check-valve may be of any suitable form and size. It is employed for the purpose of closing the said pipe against the admission of water, which might fill the pipe by reason of the back pressure when the boat is being driven backward or when the boat is standing still. The check-valve is disposed near enough to the discharge-port so that the pressure from the exhaust will open it readily, even though it is partially filled with water due to the back pressure, and thus permit the gases to escape or to be forced into the water in accordance with the construction of the present invention. The pipe 16 passes through the hole 18 in the keel of the boat and terminates a slight distance beyond, where it enters the nozzle or part 19. It has been found that the best results are produced when the pipe 16, extending between the drum 14 and the nozzle 19, is placed at an angle of from thirty to sixty degrees.

The nozzle 19 is made angular in form, as shown in the drawings, to facilitate attaching it to the sloping surface of the stern or keel. It is preferably made of metal, and its external surface should be finished smooth. It will be seen by reference to the drawings, Fig. 1, that the nozzle 19 is secured to the stern of the boat in a position which will insure its being submerged at all times while the boat is lying in or gliding through the water. The holes 21 near the four corners of

the flat side of the nozzle are for use in fastening the nozzle to the boat, and screws, nails, or any other suitable fastening means may be employed for the purpose. The upper side of the nozzle is preferably made flat and to an angle to conform to the surface of the vessel at the point where it is to be attached, and the edges of the walls forming the orifice 20 of the nozzle are slightly curved or oveled, as shown by the numeral 22. The object in forming the nozzle in the manner described is to provide for the displacement of the water immediately behind or opposite the orifice 20 in order to permit the escape or discharge of the exhaust into the water. It has been found that if the outer end of the nozzle 19 is formed with full sharp edges at right angles to its sides the water will break and close in directly behind the nozzle and destroy the muffling as well as interfere with the free exhaust of the engine; but when the part is formed with the curve and oval, as shown, it causes an air space or cavity to form immediately back of the nozzle, into which the gases are discharged.

In case the construction of a boat's stern is such as to render it inconvenient or impracticable to apply the nozzle 19 to the keel it may be attached to the stern of the boat a short distance to either side of the keel and perform the same perfect work.

It is believed that numerous attempts have been made to devise and construct mufflers of the class described herein; but none, so far as I am aware, have employed a discharge-nozzle of the form or in the manner herein shown. In order to effect the complete muffling or deadening of the noises caused by the exhaust, I have found that the discharge port or nozzle must be submerged in the water a sufficient depth to prevent the gases and vapors from forcing their way through to the atmosphere instantly upon leaving the exhaust-pipe. Otherwise the noises would be heard and the smoke and vapor would be seen the same as under the old methods employed. It has also been found that if the end of the pipe is made flush with the surface of the bottom of the boat when submerged for the purpose of muffling, as described, there will be no perfect exhaust, because the pressure of the mass of water is too great to be overcome, and thus interferes with the working of the engine; but by the employment of the nozzle or part 19, constructed and applied in the manner described and shown herein, being made considerably larger than the plain end of the exhaust-pipe 16, and when attached to the keel, as shown, it has the effect when the boat is in the water of creating an air-space or vacuum-like cavity in the water immediately opposite the orifice 20 of said nozzle. The effect of this air space or pocket is to provide a relief and at the same time produce a suction which will draw away from the engine and the

exhaust-pipe the gas and vapor discharged after each explosion and stroke of the engine. In experimenting with my device it has been found to be impossible to obtain perfect

5 working of the muffling parts without the combined use of the drum 14 and the nozzle 19. It has also been found that the relief afforded by the said drum and nozzle employed as described in discharging or getting
10 rid of the gases and vapors ejected by the engine is so complete and instantaneous as to perceptibly increase the power, and therefore the speed, of the engine equipped with my muffling device, and it is believed that it will
15 have the same effect when applied to any engine of the class described.

It is claimed that with slight modification in the construction and arrangement of the parts my invention may also be applied to
20 engines of the same class employed on automobiles or in stationary plants and produce the complete muffling or deadening of the noises caused by the exhaust of the engines.

It is obvious that many of the details of the construction of the device may be varied
25 without departing from my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

30 1. In a muffler of the class described, the combination with a boat or other water craft and an engine to operate the same mounted thereon, of a pipe adapted at one end to receive the exhaust from said engine, a drum or
35 like part connected with said exhaust-pipe, an extension-pipe, a check-valve connected with said extension-pipe, and a nozzle adapted to discharge the exhaust from said engine beneath the surface of the water, substantially
40 as described.

2. A muffler of the class described, comprising a pipe in connection with, and adapted to receive the exhaust from, an engine carried by a boat, a drum connected with
45 said pipe, an extension-pipe, a check-valve

in said last-named pipe, and a nozzle having a free open end forming the outlet for said exhaust through the stern of the boat, substantially as described.

3. A muffler of the class described, comprising a pipe adapted at one end to receive
50 the exhaust from an engine carried by a boat, a drum or cylinder connected to the other end of said pipe, a second pipe connected with said drum or cylinder and extending through
55 the keel of the boat, a nozzle secured to the outer surface of the boat, and adapted to receive the end of said second pipe and to effect the discharge of said exhaust beneath the surface of the water, and a check-valve in
60 said second pipe adapted to prevent the flow of water into said pipe and drum, substantially as described.

4. In a muffler of the class described, the combination with the exhaust-pipe of an engine, of a drum connected with said exhaust-
65 pipe, an extension-pipe connected with said drum, a check-valve in said extension-pipe, and a nozzle connected with, and forming a discharge port or outlet for said exhaust
70 through, said extension-pipe, substantially as described.

5. In a muffler of the class described, the combination with a boat or launch having an engine connected therewith, of a pipe adapted
75 at one end to receive the exhaust from said engine, a drum connected with said exhaust-pipe, an extension-pipe, a check-valve, and a nozzle having an unrestricted opening there-through connected with said extension-pipe
80 and adapted to discharge the exhaust from the engine beneath the surface of the water, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FRED J. GOWING.

Witnesses:

EDGAR L. BLOODOUGH,
HARRY DE WALLACE.