F. G. HALL, JR.

EXHAUST SILENCER.

APPLICATION FILED FEB. 1, 1911.

1,076,571. Patented Oct. 21, 1913.

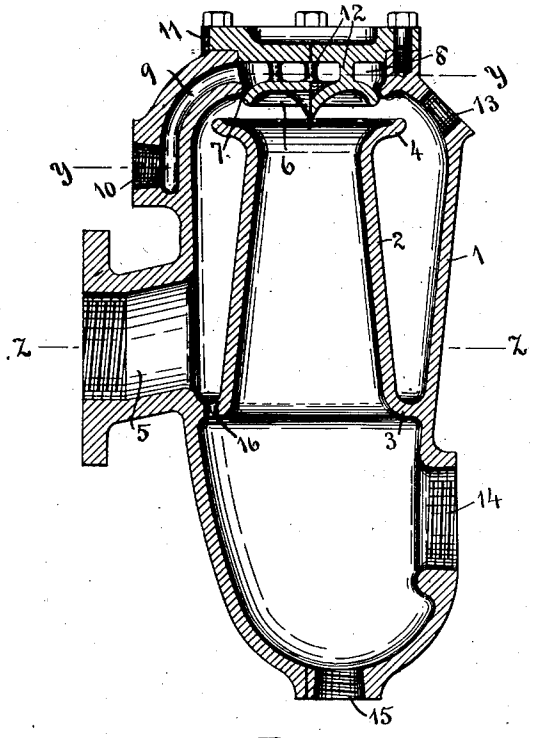


Fig. 1.

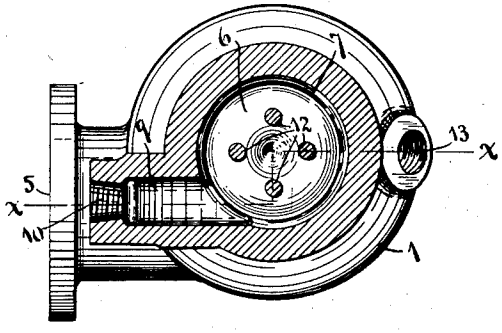


Fig. 2.

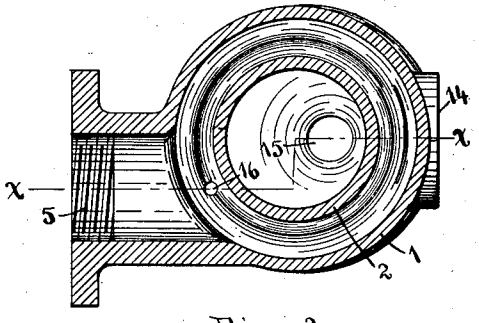


Fig. 3.

WITNESSES:

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EXHAUST-SILENCER.

1,076,571. Specification of Letters Patent. Patented Oct. 21, 1913.

Application filed February 1, 1911. Serial No. 605,902.

To all whom it may concern:

Be it known that I, FRANCIS G. HALL, JR., a citizen of the United States, residing at Dansville, in the county of Livingston and State of New York, have invented certain new and useful Improvements in Exhaust-Silencers, of which the following is a specification.

This invention relates to improvements in devices for silencing the exhaust from internal combustion engines; and the object of my invention is to provide a device of this character especially adapted for marine engines, whereby the noise of the escaping exhaust will not only be silenced effectually, but also the exhaust gases will be so cooled and condensed as to relieve the engine from back pressure.

I attain my object by constructing the silencer in the manner illustrated in the accompanying drawings, in which—

Figure 1 presents a vertical section through the silencer on the lines *x*—*x* in Figs. 2 and 3; Fig. 2, a transverse section on the line *y*—*y* in Fig. 1; and Fig. 3, a transverse section on the line *z*—*z* in Fig. 1.

Like numerals designate like parts in the several views.

The body of the silencer consists of a shell 1; herein shown as of inverted pear shape, although it may be of other shapes, according to conditions. Within the upper portion of the shell is a hollow frusto-conical partition, or Venturi tube, 2, the lower end of which is united to the shell at 3. At its upper end this tube is provided with a bell shaped rim 4, there being an annular clearance between this rim and the upper part of the shell. The exhaust from the engine is admitted to the chamber surrounding the tube 2, through an inlet 5, which is preferably offset from the center of the shell so that the gases will be given a whirling motion around the tube. In the upper portion of the shell there is a spraying nozzle formed by a sprayer cap 6 supported over the mouth of the Venturi tube; there being a narrow annular channel around this cap between it and the shell at 7; and above the cap a chamber 8 is provided into which a cooling stream of water from any suitable source, as from the water jacket of the engine cylinders, is admitted through the passageway 9 from an inlet 10. This inlet and passageway are also preferably offset from the center so as to give a whirling motion to the water in the chamber 8, and thereby delivering an unbroken annular stream of water from the nozzle. As herein illustrated, the sprayer cap is attached to a removable cover plate 11, by means of spacing studs 12. I may, however, by a suitable coring form this cap and cover plate integrally with the shell. At 13 the shell is provided with a tapped outlet 13 to receive a relief cock.

The exhaust gases on entering the silencer are deflected upward and at the same time given a whirling motion around the Venturi tube 2. At the top of the silencer the gases pass over the bell rim 4 of the Venturi tube and into the upper end of said tube. In passing into the tube the whirling, pulsating gases pass through the annular sheet of water issuing from the passageway 7, produced from the whirling motion given to the water in the chamber 8. On passing through and mingling with this downpouring sheet of water the gases incidentally lose their heat and pressure, and consequently the noise; the combined water and gas flowing downward through the expanding tube 2 and passing into the chamber at the lower end of the shell; whence the cooled gases issue quietly from the silencer through the outlet 14 into piping which leads through the rear or side of the boat. The water is drawn off through the outlet 15 at the bottom of the shell, and is carried out by suitable piping at the bottom of the boat. Any condensation taking place while the silencer is not in use, or at any other time, is drawn from the upper chamber, through the partition 3, by way of a vent 16.

While I have described this silencer as adapted for marine purposes, it will be understood that it may be used in connection with any internal combustion engine where the necessary stream of water can be supplied.

What I claim as my invention and desire to secure by Letters Patent is—

1. A silencer comprising a shell divided into intercommunicating admission and exhaust chambers by a hollow frusto-conical partition, said shell being provided with an inlet to the first chamber at or adjacent the base of said partition and an outlet from the second chamber, and means for admitting a cooling fluid at the intercommunicating point.

2. A silencer comprising a shell divided into intercommunicating admission and ex-

haust chambers by a hollow frusto-conical partition joined to the shell at its large end and spaced away from the shell at its small end, said shell being provided with an inlet to the first chamber at or adjacent the base of the partition and an outlet from the second chamber, and means for directing an annular stream of cooling fluid into the small end of the partition.

3. A silencer comprising a shell divided into intercommunicating admission and exhaust chambers by a hollow frusto-conical partition joined to the shell at its large end and spaced away from the shell at its small end, said shell being provided with an inlet to the first chamber at or adjacent the base of the partition and an outlet from the second chamber, an annular spray nozzle in the shell opposite the small end of the partition, and means for delivering a cooling fluid to said nozzle.

4. A silencer comprising a shell divided into intercommunicating admission and exhaust chambers by a hollow frusto-conical partition joined to the shell at its large end and spaced away from the shell at its small end, said shell being provided with an inlet to the first chamber off-set from the center at or adjacent the base of the partition and an outlet from the second chamber, an annular spray nozzle in the shell opposite the small end of the partition, and means for delivering a cooling fluid to said nozzle.

5. A silencer comprising a shell divided into intercommunicating admission and exhaust chambers by a hollow frusto-conical partition joined to the shell at its large end and provided with a bell shaped mouth at its small end spaced away from the shell, said shell being provided with an inlet to the first chamber off-set from the center at or adjacent the base of the partition and an outlet from the second chamber, a chamber in the shell opposite the small end of the partition, a sprayer cap at the mouth of said chamber providing a narrow annular passageway therefrom, and an offset inlet for a cooling fluid leading into said chamber.

6. A silencer comprising admission and exhaust chambers, a Venturi tube extending from the exhaust chamber into the admission chamber with its small end opening into the latter chamber, and means for delivering an annular stream of cooling fluid into said end of the tube, the admission chamber being provided with an inlet adjacent the base of the tube and the exhaust chamber having an outlet beyond the tube.

7. A silencer comprising a shell divided into intercommunicating admission and exhaust chambers by a partition, and means for admitting a sheet of cooling fluid across the point of communication.

8. A silencer comprising a shell, a tube communicating with the exterior of said shell and having its open inner end facing upward and spaced from the walls of said shell, means for supplying a cooling fluid above said open end, and means for spreading said fluid in annular form over said end.

In testimony whereof I have affixed my signature, in presence of two witnesses.

FRANCIS G. HALL, JR.

Witnesses:
WM. E. WOERTENDYKE,
A. F. MAYHAM.