March 6, 1956 G. JENISON 2,737,260

SMOGLESS AIR MUFFLERS

Filed May 10, 1954 2 Sheets-Sheet 1

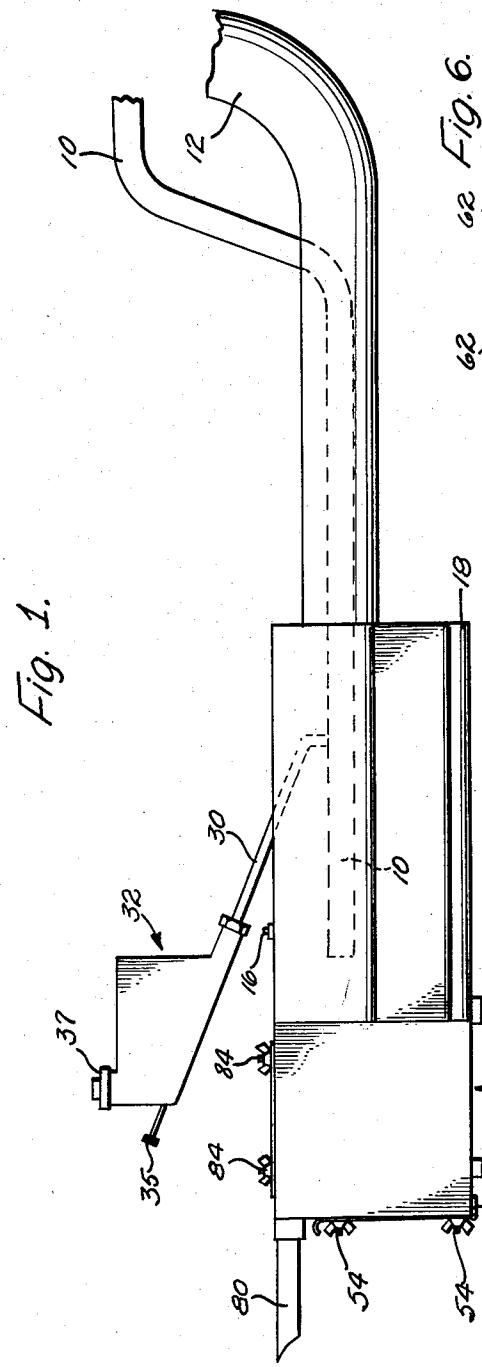

Fig. 1.

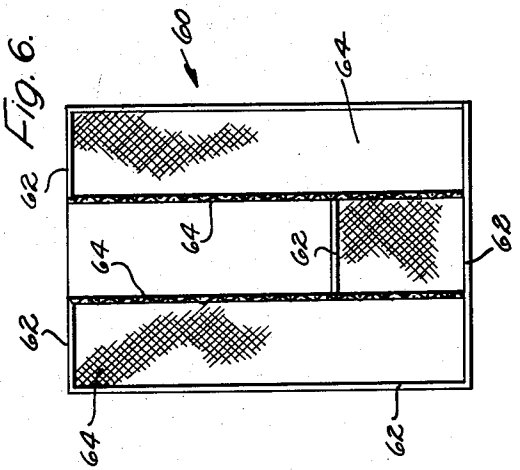

Fig. 6.

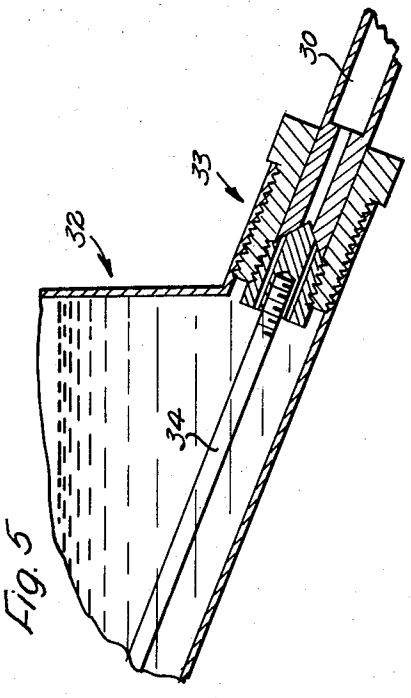

Fig. 5

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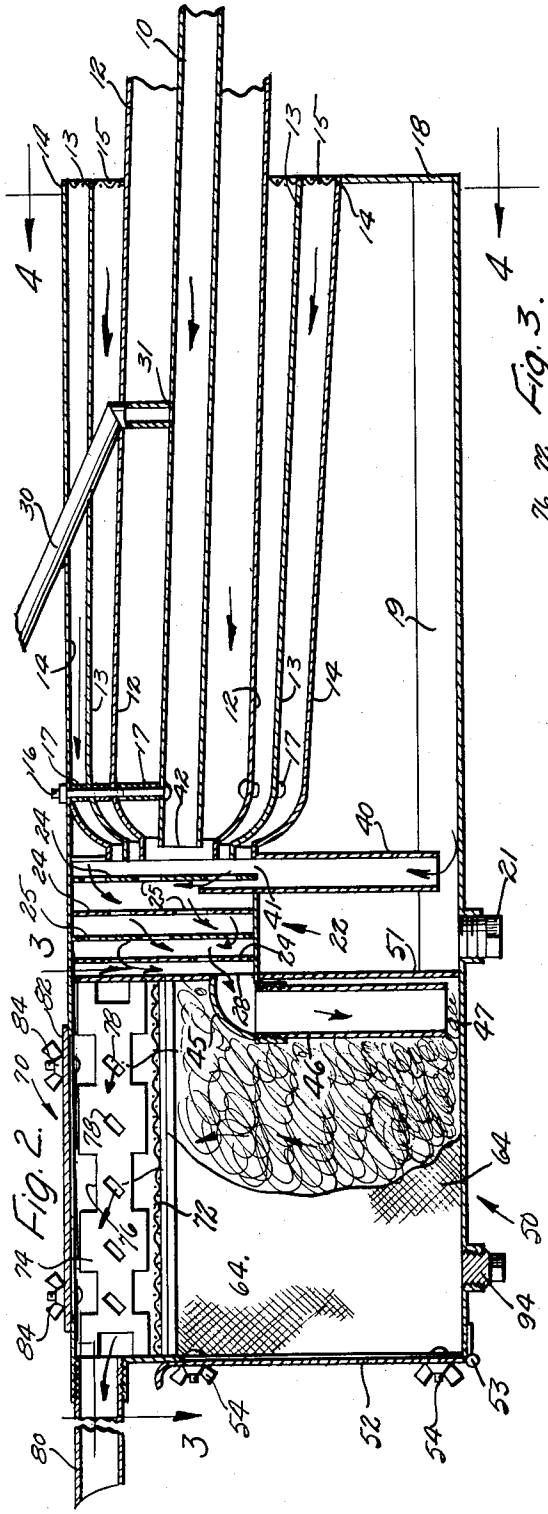

Fig. 2.

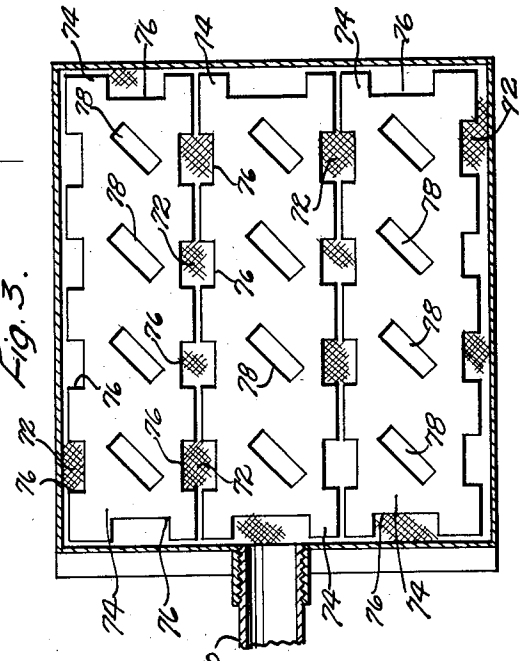

Fig. 3.

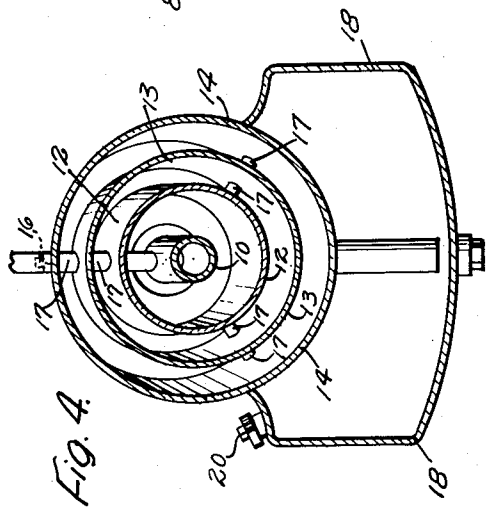

Fig. 4.

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United States Patent Office 2,737,260 Patented Mar. 6, 1956

2,737,260

SMOGLESS AIR MUFFLERS

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Application May 10, 1954, Serial No. 428,517

4 Claims. (Cl. 183—13)

The present invention relates to mufflers and, particularly to a muffler which is adapted to render the fumes emanating from the exhaust of a motor vehicle or the like less noxious.

It is well known that the exhaust fumes of internal combustion engines contain many poisonous ingredients such as carbon monoxide, and many constituents which are irritating to the nostrils and to the eyes.

It is an object of the present invention to provide a muffler which is adapted to reduce or to eliminate the unpleasant nature of such exhaust fumes.

It is a further object of the present invention to provide a muffler for the purpose set forth which makes use of steam generated by water flowing to the exhaust pipe under control of the operator.

It is a further object of the present invention to provide a muffler for the purpose set forth which has a filter chamber which normally contains filtering ingredients and which may readily be cleansed, as by a jet of water.

The various features and advantages of the invention will become more fully apparent from the following description taken in conjunction with the accompanying drawings, in which:

Figure 1 is a side elevation of the muffler according to the invention;

Fig. 2 is a cross sectional view through the muffler shown in Fig. 1 showing the interior construction thereof;

Fig. 3 is a sectional view taken along the lines 3—3 of Fig. 2;

Fig. 4 is a sectional view taken along the lines 4—4 of Fig. 2;

Fig. 5 is a fragmentary sectional view of a part of the invention; and

Fig. 6 is a sectional view through the filter chamber taken along a section transverse to the section shown in Fig. 2.

Referring to the drawings, reference numeral 10 indicates the exhaust pipe leading from an internal combustion engine. Reference numeral 12 identifies a pipe which is concentric along the length thereof with the exhaust pipe 10. A tube 13 is provided which is concentric with tube 12 and is spaced therefrom. A further tube 14 is provided, see Fig. 4, which is concentric with tube 13 and which is spaced therefrom. Reference numeral 15 identifies wire mesh which covers the inlet openings of the annular spaces defined intermediate tubes 13 and 14 and intermediate tubes 13 and 15. These annular spaces are intended to receive air, particularly in the case that the muffler is mounted on a moving vehicle. In such case the muffler is arranged so that when the vehicle moves, air is caused to enter through screen 15 into the annular spaces mentioned. Tube 12 has connected thereto a blower, not shown, which is provided to take into account the eventuality that the moving vehicle comes to a halt, as for instance may be necessary when a red light is encountered. In any case, air is caused to flow from the right to the left, in Fig. 2, through the annular spaces between tubes 13 and 14 and tubes 13 and 15, and through

tube 12. The hot exhaust gases also flow to the left, in Fig. 2, through exhaust pipe 10. The tubes 13, 14 and 12 are fastened together by means of bolts 16, spacer members 17 being provided on each bolt 16 to space adjacent tubes.

To the bottom of outer tube 14 there is connected, as by welding, a tank 18 for containing water 19. The tank can be filled by means of an inlet opening cap 20, Fig. 4. When necessary, the tank 18 may be drained by means of removable plug 21, Fig. 2. A mixing chamber indicated generally by the reference numeral 22 is provided for receiving air from the tubes 12, 13 and 14. The mixing chamber is provided with a number of spaced parallel baffle members 24, each of which baffle members is provided with a plurality of openings 25 therein, said openings 25 being displaced from adjacent openings in adjacent baffle members whereby to cause air entering the mixing chamber 22 from the tubes 12, 13 and 14 to alter its direction frequently in traversing the mixing chamber 22. The mixing chamber has an exit opening 28 at its lower lefthand end, as viewed in Fig. 2. A tube 30 is provided which connects to exhaust pipe 10 at 31 and which supplies exhaust pipe 10 with small, measured amounts of water from a reservoir indicated generally by 32. A needle valve 33, Fig. 5, controlled by a rod 34 having an operating knob 35 may be operated to control the amount of water flowing from water reservoir 32 through pipe 30 into exhaust pipe 10. It will be understood that the water reservoir 32 will be located at some location which is conveniently accessible to the operator in order that the needle valve 33 may readily be adjusted.

Reservoir 32 may be replenished by the intermediary of a closure member 37, Fig. 1.

A vertically extending tube 40 is provided which extends from below the water level of water tank 18 into communication with an opening 41 in the bottom of the mixing chamber 22. The passage of exhaust gases from exhaust pipe 10 through mixing chamber 22 will cause water from tank 18 to pass upwardly through tube 40 by means of a syphoning action, the water becoming thoroughly entrained in the exhaust gases as a result of the turbulence created in mixing chamber 22 as a result of the baffle members 24 and the placement of the openings 25 therein. It may be mentioned that the exhaust pipe 10 becomes hot very quickly and conducts hot gases therethrough. Accordingly, the small quantities of water entering exhaust pipe 10 through tube 30 from reservoir 32 will turn into steam substantially immediately upon contacting the interior of exhaust pipe 10. Therefore, the exit end 42 of exhaust pipe 10 discharges therefrom not only hot gases but also steam, all of which swirls through mixing chamber 22 to become thoroughly mixed with water from tank 18. A downwardly extending elbow 45 is provided at the lefthand bottom end of the mixing chamber and communicating with exit opening 28 of such chamber. A downwardly extending tube 46 is connected to the lower end of the elbow 45, and the gases and vapors discharged from mixing chamber 22 pass through downwardly extending tube 46 and are discharged from the bottom 47 thereof. Elbow 45 and tube 46 are disposed within a filter chamber identified generally by the reference numeral 50, said filter chamber having a common wall 51 with the tank 18.

Filter chamber 50 is provided with a door 52 having a hinge 53 along the bottom thereof, said door 52 being adapted to be fastened into closed position by means of the fastening elements 54. A filter element generally indicated at 60, in Fig. 6, is intended to be inserted in filter chamber 50, shown in Fig. 2. Filter element 60 is provided with a frame for supporting wire mesh 64 which confines aluminum particles and shavings which are loosely disposed therein, but in a manner to fill all avail-

able spaces intermediate the spaces defined by the mesh.

A second filter chamber 70 indicated generally in Fig. 4 is disposed above and in registration with filter chamber 50. The upper filter chamber 70 is separated from the lower filter chamber 50 by means of a mesh 72. Disposed within the interior of filter chamber 70 are a plurality of filter elements 74, each of which is provided with numerous indentations 76 and elongated openings 78 through which vapors and gases which pass through filter chamber 50 and through filter chamber 70 must pass on their way to the exhaust pipe 80 of the muffler. Filter chamber 70 is provided with a cover 82 which is removable and which may be fastened into place by any suitable fastening means such as at 84. It will be evident that the gases and vapors leaving the mixing chamber 22 will pass out from the exit end of tube 47, through the filter element 60, through the wire mesh 72, through the filter elements 74, through the slots or openings 76, and from thence out through the exhaust pipe 80 of the muffler.

Each of filter elements 74 may comprise pumice, diatomaceous earth, or two parts air slaked lime, two parts fire clay, two parts powdered bauxite, two parts bone ash, one part water and one part salt. The ingredients other than water and salt are first mixed thoroughly, and the salt and the water are then added to produce a dough-like mixture, which is thereafter pressed into a mold, adapted to give a configuration such as that shown in the drawings, said mixture being allowed to dry in said mold. After drying, the dried mixture is burned to a dull red, and after cooling is adapted for use in the filter chamber 70.

By means of the arrangement described hereinabove, the exhaust gases from pipe 10 are mixed with steam and water and are passed over to different filter elements which reduce the possibility of hydrocarbon, monoxide gas poisoning, as well as reducing troublesome and irritating characteristics of the exhaust insofar as the nostrils and the eyes are concerned.

While the present invention has been described with reference to a single preferred embodiment, it will be understood that many changes may be made therein by those skilled in the art without in any way departing from the spirit and scope of the present invention. It is accordingly intended that the foregoing disclosure be interpreted not in a limiting sense.

Having thus set forth and disclosed the nature of my invention, what is claimed is:

1. In a muffler for an internal combustion engine, a muffler housing, a mixing chamber within said housing, an exhaust receiving pipe delivering exhaust gases from the engine into said housing, a plurality of concentric tubes disposed around said exhaust pipe and spaced from said exhaust pipe and each other, the unused spaces intermediate the adjacent ones of said pipes and intermediate the exhaust pipe and the adjacent surrounding pipe carrying air in the direction of the exhaust gases, said air and said exhaust gases entering said housing at said mixing chamber, a water tank disposed below said plurality of tubes and mounted on the outermost tube, a vertically extending tube the bottom of which is disposed below the water level of said tank and the top of which communicates with the bottom of said mixing chamber, water being drawn through said vertical tube from said tank by reason of the flow of the exhaust gases past the top of said tube, a first filter chamber in said housing containing a first kind of filter element, a conduit connecting the exit end of said mixing chamber with the entrance end of said first filter chamber, a second filter chamber disposed above and in registration with said first filter chamber, said second filter chamber containing a plurality of filter elements of a second kind of material, a wire mesh separating the first filter chamber from the second filter chamber, an exhaust pipe for said muffler for conveying exhaust gases and vapors from the exit end of said second filter chamber, said mixing chamber comprising a plurality of spaced baffle members, a plurality of openings in each of said baffle members, said baffle openings being arranged out of registration with adjacent openings in adjacent baffle members whereby gases and vapors entering said mixing chamber are caused to undergo many changes of direction whereby to cause turbulence and thorough mixing.

2. In a muffler according to claim 1, including a pipe connected to said exhaust pipe from the engine, a water reservoir above said pipe and connected to said pipe, and valve means operable by an operator associated with said reservoir permitting water to flow from said reservoir through said pipe to said exhaust pipe from the engine whereby said water will turn to steam in said exhaust pipe and whereby the exhaust gases entering said mixing chamber will include steam.

3. In a muffler according to claim 2, said first filter element comprising a frame member, wire mesh on said frame member defining a filter material receiving space therewithin, and comminuted aluminum within said space, said aluminum filling said space but being loosely packed therein.

4. In a muffler according to claim 3, said second filter element comprising a mold made up of two parts air slaked lime, two parts fire clay, two parts powdered bauxite, two parts bone ash, two parts water and one part sodium chloride.

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