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2,739,661

MUFFLER

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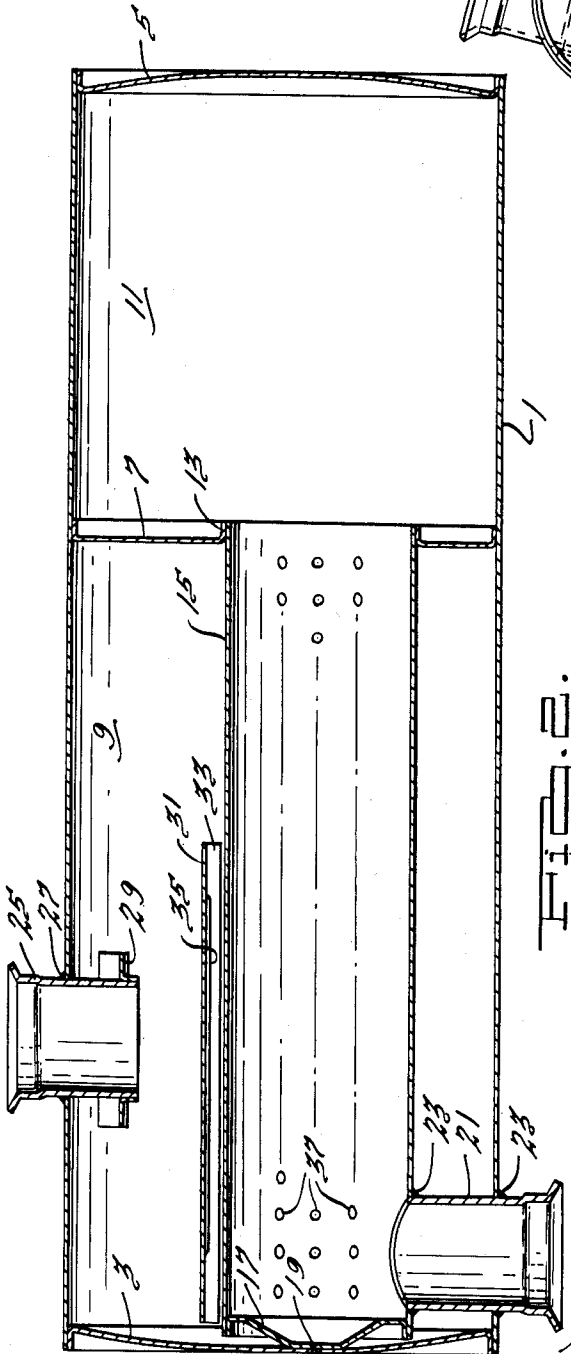


Fig. 2.

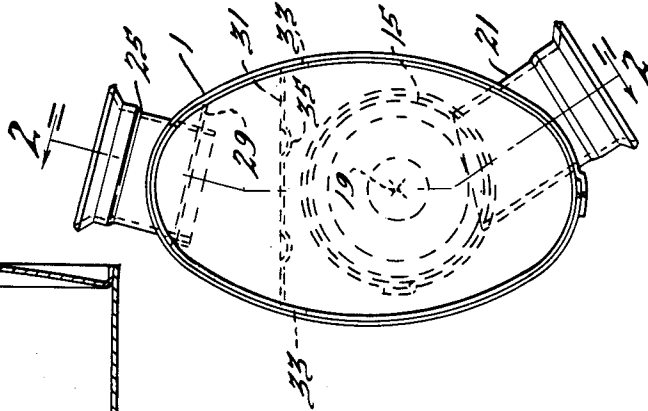


Fig. 1.

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3 Claims. (Cl. 181—59)

This invention relates to mufflers of a type that may be used to silence the exhaust gases of internal combustion engines.

It is an object of the invention to provide a simple and inexpensively manufactured muffler construction that is very effective in eliminating noise from rapidly moving, pulsating gas streams, such as the exhaust of an internal combustion engine.

The invention contemplates a muffler construction wherein the incoming gases are led into an expansion chamber and preferably impinge upon a baffle plate. After at least one change in direction of flow, the gases pass through relatively small perforations into an outlet conduit. In the outlet conduit the gases communicate with a resonator chamber, and may be subject to another reversal in direction of flow before leaving the muffler.

The muffler construction, as just briefly described, combines several different energy removing methods into a single, simple construction. Energy is removed acoustically by means of the resonator chamber and physically by expansion of the gases, by reversal of their flow path, and by impingement thereof against a baffle as well as passage through relatively small perforations.

The nature and scope of the invention will become clearer upon consideration of the accompanying drawings which illustrate one form of the invention and in which:

Figure 1 is an end elevation of one embodiment of the invention; and

Figure 2 is a section taken through the muffler of Fig. 1 along the line 2—2 of Fig. 1.

The improved muffler construction selected to illustrate the principles of this invention has a tubular, sheet metal housing or shell 1 that may be, but is not necessarily, oval in cross section. Headers 3 and 5 are hermetically secured, as by welding, in the ends of the housing 1. A transverse partition 7 is hermetically secured to the housing 1 and longitudinally divides it into chambers 9 and 11. The partition 7 is imperforate except for a single, flanged opening 13 which receives and supports one end of a longitudinal but axially offset outlet tube 15. The other end of the tube 15 is closed by a header 17, hermetically secured therein, that is welded at 19 to the header 3 whereby such other end of the tube 15 is supported within the housing 1. The outlet tube 15 may include a radial, imperforate outlet nipple 21 that is secured by welding 23 or otherwise to the tube 15 and housing 1 at one end thereof. Gases enter the muffler through the inlet nipple or tube 25 that is located longitudinally inwardly from the nipple 21 and header 3. It is supported on the housing by a weld 27 and its inner end is secured to a bracket 29 that extends chordwise of the housing 1 and affixed thereto. Directly in line with the inlet nipple 25 is a longitudinally extending, transverse baffle plate 31 that is affixed to opposite sides of the housing by means of its flanges 33. The plate 31 may be provided with ribs or corrugations 35 extending over in-

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intermediate lengths thereof to increase its strength and to provide a roughened surface for breaking up the stream of incoming gases and deflecting the gases into the chamber 9.

It will be seen that the gases coming through inlet nipple 25 are abruptly expanded as they enter chamber 9 and that they therefore lose energy and are cooled. The gases lose further energy by impingement against baffle 31 which breaks the stream and scatters it in various directions, the ribs 35 tending, however, to guide the flow in radial or circumferential directions with respect to the longitudinal axis of the muffler. Gases can leave the expansion and cross-over chamber 9 only by passing through perforations 37 spread around the outlet tube 15. The perforations 37 are sufficiently small to subdivide any remaining gas streams leaving the chamber 9 and this coupled with the change in direction of flow abstracts more energy from the gases. However, the perforations 37 are in sufficient number and of sufficient individual size so as not to cause undue back pressure. Pulsations in the cooled gas within the tube 15 can enter the resonator chamber 11 by way of opening 13 which is the sole means of ingress and egress to this chamber and which thus prevents it from acting as an ordinary throughflow expansion chamber. The size of the chamber 11 is selected to attenuate the desired frequencies and, if desired, the tube 15 may be imperforately extended into the chamber 11 to form a tuning neck, as illustrated in my Patent 2,357,791, whereby further control over the characteristics of chamber 11 may be obtained. The gas in tube 15, after subjection to the above energy removing devices, changes its flow direction to pass out of the muffler through nipple 21.

From the foregoing illustration it will be seen that the invention provides an effective combination of several energy removing methods in a rather simple construction. It will be evident that modifications can be made, for example, it may be desirable to have the inlet and outlet nipples axially instead of radially disposed to pass out the ends of the housing, without departing from the spirit and scope of the invention.

I claim:

1. In a muffler, a casing, a transverse partition dividing the casing into a first chamber and a second chamber, a perforated tube extending lengthwise of the first chamber and having an open end supported on said partition and opening into said second chamber, said tube opening constituting the sole inlet and outlet to said second chamber, a muffler inlet offset from said tube and opening into said first chamber, and an imperforate outlet conduit opening at one end in said tube and at the other end outside of the casing.

2. The invention set forth in claim 1 including a baffle plate obstructing a part only of said chamber between said muffler inlet and said tube and directly in line with gas flowing through said inlet.

3. The invention set forth in claim 2 wherein said muffler inlet is transverse to the tube and said baffle extends parallel to said tube along only a part of the length of said first chamber.

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