

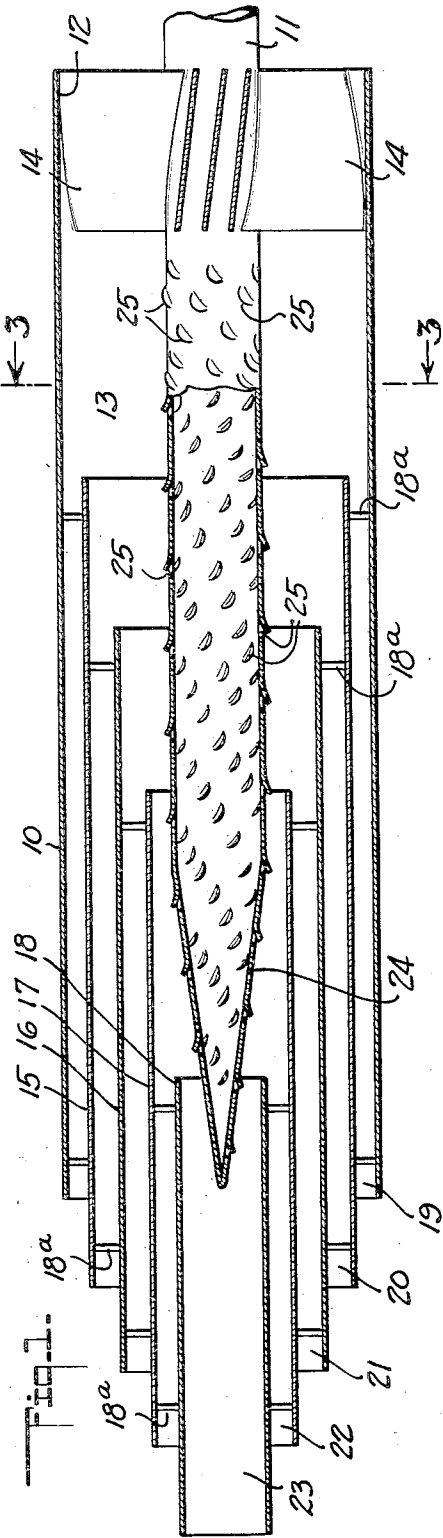
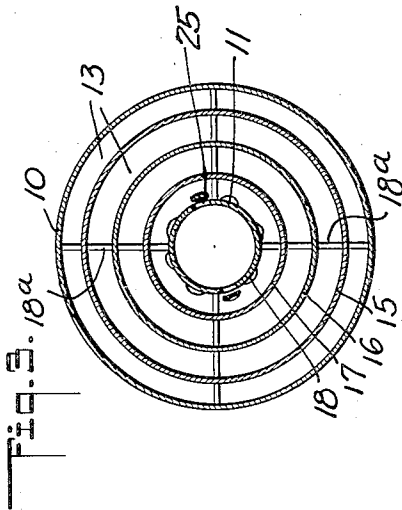
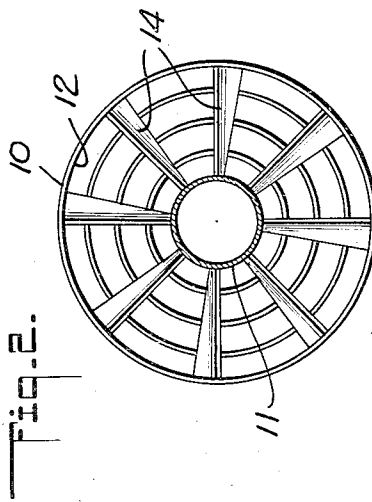
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EXHAUST GAS SILENCING AND COOLING DEVICE FOR ENGINES

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EXHAUST GAS SILENCING AND COOLING
DEVICE FOR ENGINES

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2 Claims. (Cl. 137—160)

This invention relates generally to internal combustion engines, and more particularly to a device for silencing and cooling the exhaust gases as discharged from such engines during operation thereof.

An object of the invention is to provide a device structurally characterized by a novel arrangement of elements functionally related to effectively muffle the noise of exhaust gases discharging from an engine while reducing back pressure upon the gases to a minimum so as to increase the efficiency of the engine.

Another object of the invention is to provide a device of the above described character which also functions to cool the hot exhaust gases to a comparatively low temperature by diluting the gases with atmospheric air, whereby to practically eliminate any fire hazard from this source and to materially reduce the obnoxious characters of the gases.

With these and other objects in view, the invention consists in the novel arrangement and functional relationship of elements, as set forth in the following specification and the appended claims.

In the accompanying drawing,

Figure 1 is a longitudinal axial sectional view of one form of device embodying this invention;

Figure 2 is a view of the device in front end elevation;

Figure 3 is a transverse sectional view taken on the line 3—3 of Figure 1.

In its present embodiment, the invention comprises a cylindrical metallic casing 10 open at both ends, with one end of the casing axially receiving an exhaust pipe 11 which leads from an internal combustion engine (not shown). At said one end of the casing, the annular space between the axially disposed pipe 11 and the casing 10 provides an air inlet 12 to the casing which defines a mixing and cooling chamber 13. The inlet 12 is spanned by a series of circumferentially spaced and spirally extending vanes 14 which have the functional effect of imparting a whirling motion to air drawn through the inlet into the chamber 13, all for a purpose to be later described.

Extending into the opposite end of the casing 10 in concentric relation to each other and to the casing are a plurality of silencing or muffling elements 15, 16, 17 and 18 in the form of open-ended tubes of graduated diameters which are supported by pins 13^a in spaced relation to each other and to the casing. In the present

instance, four of these elements are shown, but it will be understood that a greater or less number can be provided if desired.

The tubes 15, 16, 17 and 18 project different distances into the chamber 13 so that the inner end of one tube terminates in spaced relation to the inner end of the next larger tube with the exception of the largest tube, the inner end of which terminates in spaced relation to the inlet 12 of the chamber. Conversely, the outer ends of the several tubes project different distances from the rear end of the chamber 13 with the outer end of one tube projecting from the outer end of the next larger tube, all as clearly shown in Figure 1. The several tubes thus co-act with each other and with the casing to provide outlets 19, 20, 21, 22 and 23 from the chamber 13.

The rear end portion of the exhaust pipe 11 is tapered as indicated at 24, so as to reduce in diameter towards its rear closed extremity which is disposed within the forward end of the innermost tube 18. Throughout the portion of its length within the chamber 13, the exhaust pipe 11 is provided with a multiplicity of ports 25 in the form of obliquely cut slots disposed in spirally arranged rows, all for the purpose of causing exhaust gases to discharge from the exhaust pipe in a rearward and spiral direction so as to impart a whirling motion to the gases towards the outlet end of the chamber 13.

The operation of the invention is as follows:

Let it be assumed that the exhaust pipe 11 is connected to the exhaust manifold of an internal combustion engine and that the engine is in operation so as to discharge the hot burned gases into the exhaust pipe. The gases are discharged from the pipe through the ports 25 in rearward and spirally directed streams into the forward end of the chamber 13 and into the forward ends of the several tubes 15, 16, 17 and 18 at sufficient velocity to induce suction at the inlet 12 so as to draw air through the latter into the casing.

The incoming air is caused to be whirled by the vanes 14 and to intermix with the rearwardly whirling gases discharging from the exhaust pipe, so as to have the functional effect upon the gases in reducing the temperature thereof to a comparatively cool state and to dilute the gases so that the obnoxious character thereof is materially lessened.

As the cooled gases traverse the several tubes 15, 16, 17 and 18, the explosion noise attending the exhausting of the gases is caused to be dead-

ened or muffled by the action of the tubes in more effectively diluting the gases with air and in separating the total volume of gases into several portions which are diverted and conducted in separate flow paths to the independent and longitudinally spaced outlets 19, 20, 21, 22 and 23 so as to be silently discharged at different points into the atmosphere in a cooled and diluted state.

From the foregoing description, it will be manifest that I have provided a device of simple and comparatively inexpensive construction which effectively air-cools and dilutes the hot exhaust gases as discharged from an engine, and muffles the attendant noise, all while reducing back pressure to a minimum and avoiding excessive formation of carbon deposits with the resultant loss of efficiency.

What is claimed is:

1. A device of the class described comprising a casing defining an open-ended elongated chamber; an exhaust pipe extending axially into the chamber through one end thereof to provide an annular air inlet at said one end of the chamber around the exhaust pipe; the exhaust pipe having ports in its portion within the chamber, arranged to discharge exhaust gases from the pipes laterally and spirally away from the air inlet so as to suck air through the latter into the chamber for mixing with the hot exhaust gases; a plurality of concentrically ar-

anged open ended muffling tubes projecting into the opposite end of the chamber around the exhaust pipe with the inner end of each tube terminating short of the inner end of the next larger tube for the discharge of the gas and air mixture through the tubes; and means correlated with said inlet for imparting a whirling motion to air flowing through the inlet to effect a more intimate mixing of the air with the exhaust gases.

2. A device of the class described comprising means defining a chamber; an exhaust pipe having ports and being correlated with the chamber to discharge exhaust gas thereinto at intervals along its length; and a plurality of open-ended tubular muffling elements of different sizes extending into the chamber around the exhaust pipe and arranged one within the other in spaced relationship with the inner end of one element terminating short of the inner end of the next larger element and the outer end of one element projecting beyond the outer end of the next larger element exteriorly of the chamber, whereby to separate the total volume of gas as discharged into the chamber, into several portions which are conducted independently of each other through the respective tubes and are maintained separated until discharged from the tubes exteriorly of the chamber into the atmosphere.

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