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2,706,012

SPARK ARRESTING MANIFOLD SNUBBER

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2 Sheets-Sheet 1

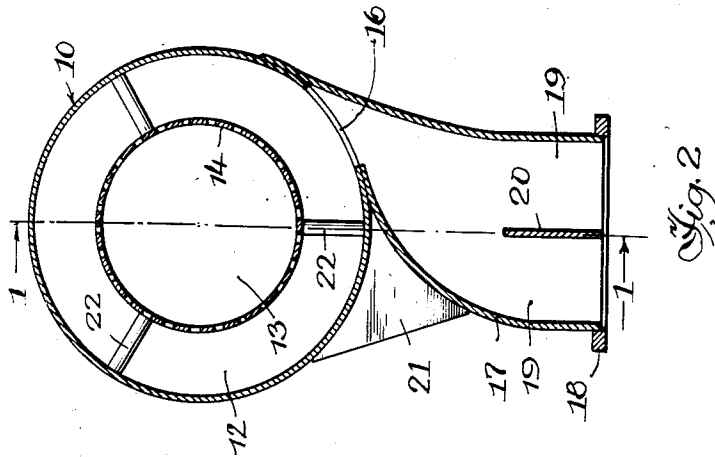


Fig. 2

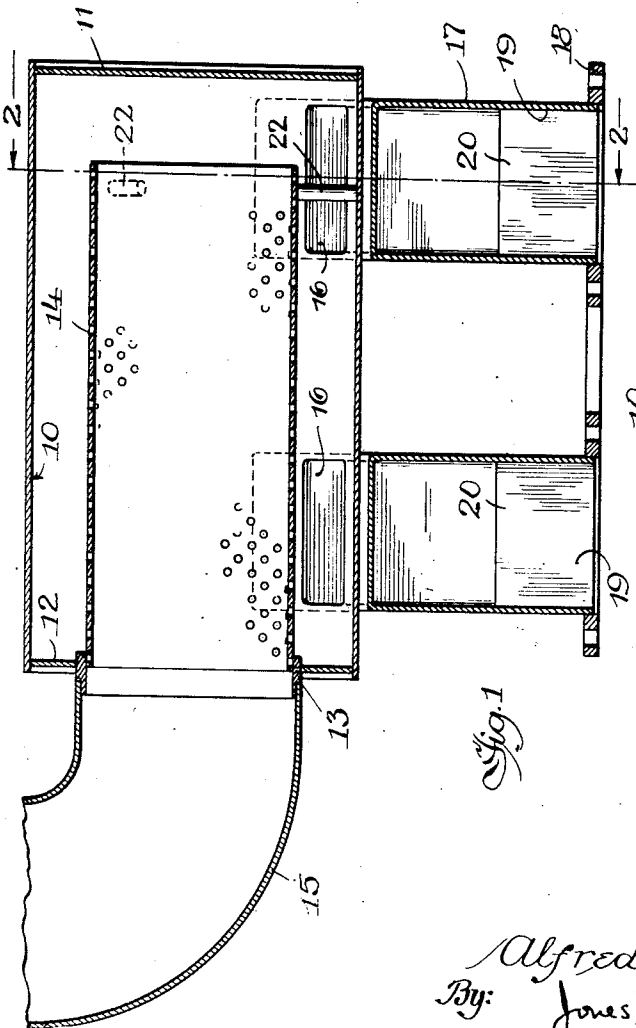


Fig. 1

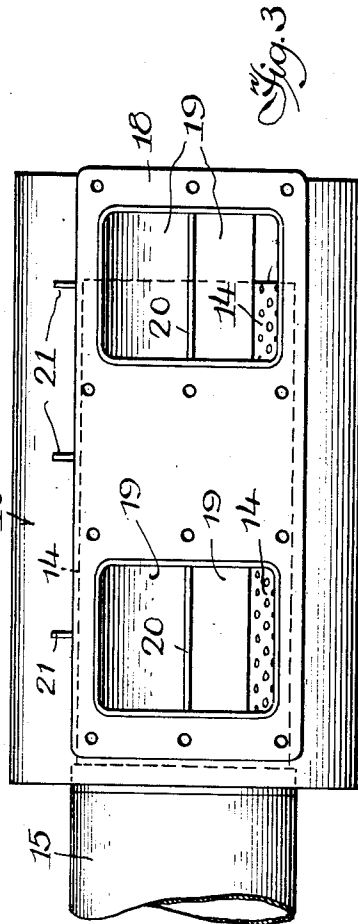


Fig. 3

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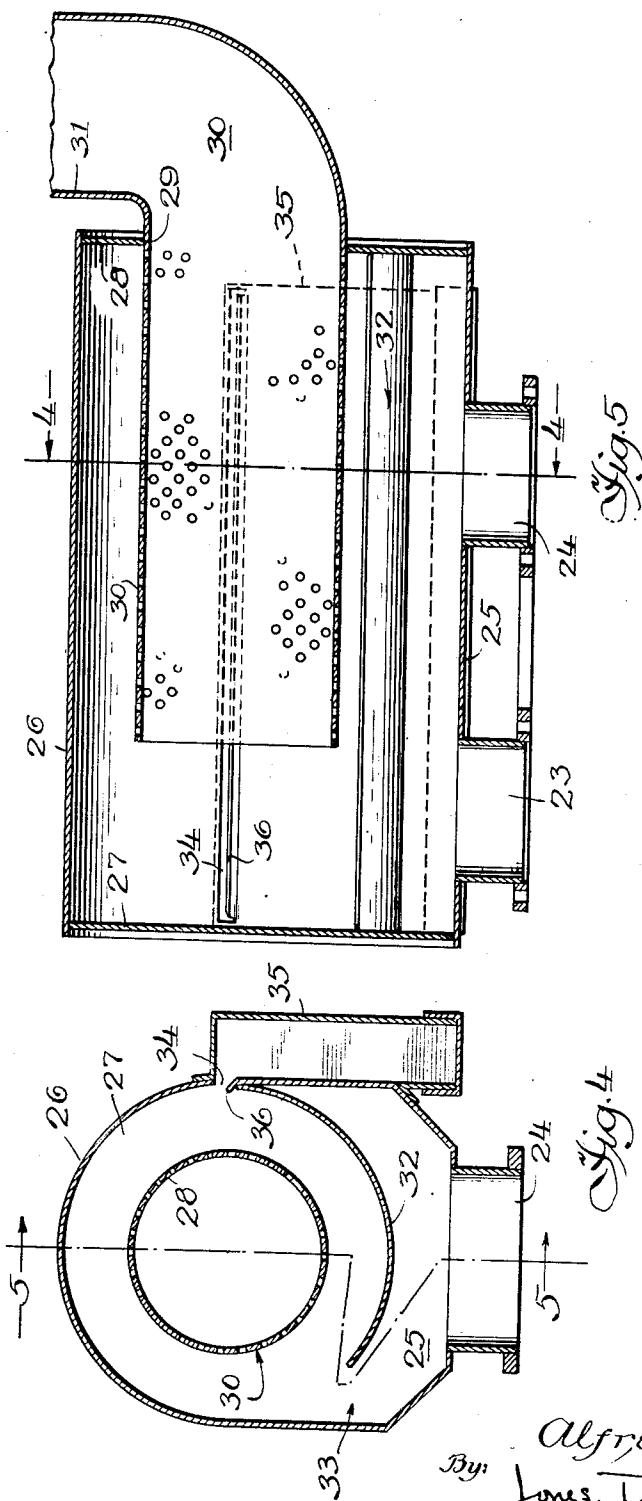
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SPARK ARRESTING MANIFOLD SNUBBER

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2 Claims. (Cl. 181-40)

This invention relates to snubbers for engine exhausts, and more particularly to manifold snubbers for diesel engine, a stationary and locomotive, for smoothing the flow of the exhaust gases and, at the same time, preventing the exhausting of sparks to the atmosphere.

The principal object of the invention is to provide a compact unit for collecting the exhaust gases from the exhaust ports of a multi-cylinder engine, smoothing the flow of the exhaust gases to minimize the engine exhaust noise, and either remove particles including carbon which may be incandescent and thus create a fire hazard, or at least disintegrate such incandescent carbon particles to render them harmless upon ejection from the engine exhaust system.

In the accompanying drawing,

Fig. 1 is a longitudinal section taken at line 1-1 of Fig. 2 of an improved spark arresting manifold snubber according to the invention;

Fig. 2 is a cross-sectional view taken at the line 2-2 of Fig. 1;

Fig. 3 is a side view of the device of Figs. 1 and 2 looking into the exhaust gas inlets of the unit;

Fig. 4 is a cross-sectional view taken at the line 4-4 of Fig. 5 of a modified form of the invention, and

Fig. 5 is a longitudinal sectional view of the device of Fig. 4 and taken at the line 5-5 thereof.

In coping with the problem of preventing fires caused by the emission of live sparks from the exhaust of diesel locomotive engines, it has been found to be possible to so disintegrate the incandescent carbon particles by mechanical means that the fine fragments cool sufficiently before emission to the atmosphere that they are entirely harmless to materials and structures along the railroad right of way. The device illustrated in Figs. 1-3 is constructed to achieve its objective in this manner, while the unit illustrated in Figs. 4 and 5 incorporates a trap designed to substantially completely remove the particles themselves as the exhaust gases pass through the unit.

Referring particularly to Figs. 1-3, the body of the manifold therein illustrated comprises a cylindrical casing 10 having a solid end closure plate 11 on one end and a similar plate 12 having a central opening 13 therein on the other end of the casing. An open-ended perforated tube 14 extends inwardly from opening 13 in plate 12, this tube stopping short of plate 11, as shown. A suitable tail pipe 15 completes the manifold outlet assembly.

A side inlet into casing 10 is provided by elongated openings 16 extending lengthwise of the casing. A manifold inlet assembly including a body 17 and attachment flange 18 is provided to conduct the exhaust gases to the openings 16. As shown in Fig. 2, the manifold body is shaped to direct the exhaust gases into the cylindrical casing 10 in a direction substantially tangential to the inner cylindrical surface of the casing. Inlet openings 19, formed in part by partitions 20, are adapted to receive the exhaust gases from the exhaust ports of the engine. The particular unit shown is designed to receive the gases from four cylinders. Partitions 20 extend a short distance into the body of the manifold to prevent undesirable interference between the engine cylinders which exhaust into the inlets on the respective sides of the partitions.

Gusset plates 21 may be welded into position between casing 10 and the manifold inlet body 17 to

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strengthen the structure. Struts 22 support the inner end of tube 14.

In the operation of the device thus described, exhaust gases projected into the inlet openings 19 from the exhaust ports of the engine pass at high speed through slots 16 and into the cylindrical casing 10. Incandescent particles of carbon emitted from the engine cylinders with the exhaust gases are carried with the gases into the snubber casing. By reason of the direction and velocity of the gases as they enter the casing, a circumferential swirling of the gases and particles takes place within the casing with the result that entrained particles project against the interior surface of the casing and are broken up into smaller particles by such impact and rubbing and rebounding. The gases and, eventually, fine particles pass into outlet tube 14 either through the perforations in the wall thereof or through the open inner end. The impedance of the perforated tube is such that the exhaust pulsations are greatly damped as the gases pass through the unit to tail pipe 15 and thence to the atmosphere. The gases thus exhausted to the atmosphere are free from dangerous sparks and create relatively little noise.

The device illustrated in Figs. 4 and 5 differs somewhat in construction from that of Figs. 1-3 and, in addition, incorporates a trap to receive and remove entrained particles from the exhaust gases. Two inlets 23 and 24 open into casing 25 at longitudinally spaced points. The upper half 26 of casing 25 is cylindrical. Plates 27 and 28 close the ends of the casing, plate 28 being provided with an opening 29 to receive one end of perforated open-ended tube 30. A tail pipe 31 connects with tube 30 at this point to conduct the exhaust gases to the atmosphere. A baffle 32, which may be a continuation of the cylindrical upper portion 26 of the casing, divides the interior of the casing into a cylindrical space surrounding perforated outlet tube 30 and an inlet chamber into which inlets 23 and 24 open. A gap 33, which extends substantially throughout the distance between plates 27 and 28, is left between the edge of baffle 32 and the casing 25. A second and narrower slot 34 is provided lengthwise in casing 25 and a trap 35 is welded to the casing at gap 34. Preferably, a lip 36 extends somewhat into the cylindrical space within casing 25 to assist in the diversion of solid particles from the gases and into the trap.

The operation of the device of Figs. 4 and 5 is similar to that of the simpler embodiment of Figs. 1-3. Exhaust gases with entrained sparks and particles enter the unit through the two inlets of the manifold and are directed by baffle 32 to pass through gap 33 into the cylindrical space within the casing and baffle. In this space, solid particles are carried around the interior surface of casing 25 and pass into trap 35 through gap 34. The exhaust gases, freed from all sparks and most solid particles, pass into tube 30 through the perforations therein or the open end thereof and thence to the atmosphere.

It will be understood that the device of Figs. 4 and 5 may be used satisfactorily without the slot and trap for collecting solid particles. Incandescent carbon fragments are broken up and cooled by impact with and rubbing against the casing as described above.

Invention is claimed as follows:

1. A spark arresting manifold snubber comprising an elongated horizontal casing the upper half of which is cylindrical, end closure plates for said casing, one of said plates having an opening therein concentric with the cylindrical part of said casing, a perforated open-ended tube extending coaxially with said cylindrical part of said casing from said opening in said plate into said casing, a cylindrical baffle in the lower part of said casing forming substantially an extension of said cylindrical part of said casing, said baffle depending from one side of said casing and stopping short of the opposite side to divide the space within said casing into two chambers connected at the gap between the terminal edge of said baffle and said casing, and a plurality of inlet openings in the bottom of said casing opening into the chamber under said baffle, the

structure being so arranged that exhaust gases entering said casing through said inlet openings are projected tangentially into the chamber above said baffle in a relatively thin stream spread over the length of said chamber.

2. A spark arresting manifold snubber in accordance with claim 1 wherein a cylindrical wall of the chamber above the cylindrical baffle is provided with a narrow slot lengthwise therein and an enclosure forming a trap is mounted upon the casing at said slot to receive solid particles passing through said slot from within said chamber.

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1,388,554
2,138,510
2,511,713
2,513,229
2,520,756

10

References Cited in the file of this patent

UNITED STATES PATENTS

Dubben et al.	Aug. 23, 1921
Rauen	Nov. 29, 1938
Hoyle et al.	June 13, 1950
Bourne et al.	June 27, 1950
Bryant	Aug. 29, 1950