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BAFFLE TYPE MUFFLER HAVING A PLURALITY OF HELICAL PASSAGES

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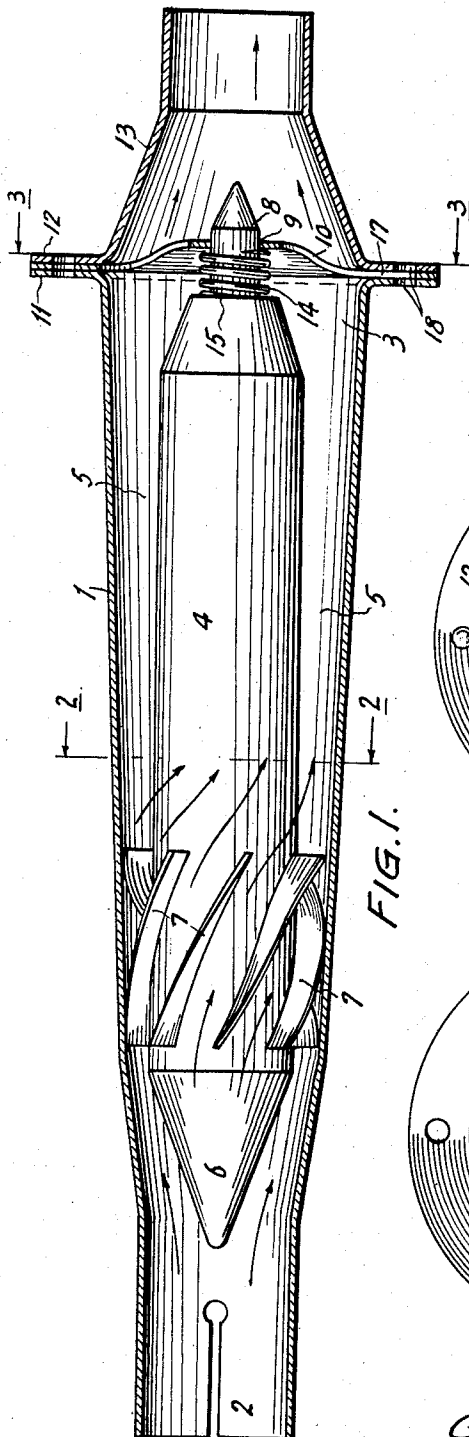


FIG. 1.

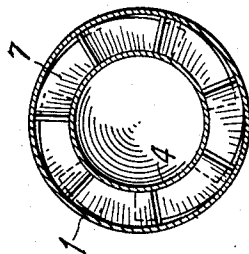


FIG. 2.

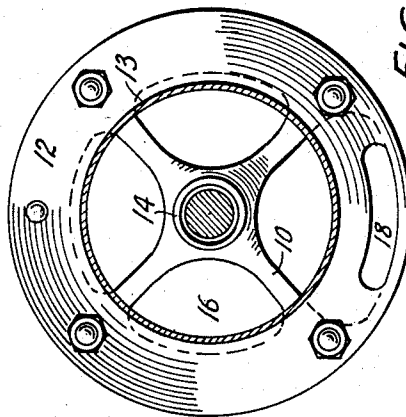


FIG. 3.

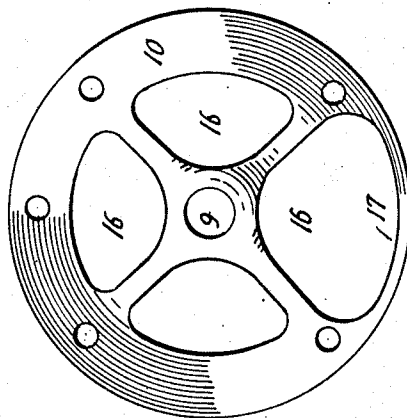


FIG. 4.

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BAFFLE TYPE MUFFLER HAVING A PLURALITY OF HELICAL PASSAGES

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4 Claims. (Cl. 181-67)

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This invention relates to an improved silencer or muffler intended mainly for the exhausts of internal combustion engines, but suitable also for other purposes.

The principal object of the invention is to provide an exhaust gas silencer or muffler of relatively simple and inexpensive construction which, in use, has low back pressure and otherwise will be found very efficient.

According to the invention, the improved silencer or muffler comprises a casing and a central core member coacting to form an annular expansion space or chamber which progressively increases in diameter from the inlet end to the outlet end so that the exhaust gases are allowed to expand as they travel through said space or chamber and are thus greatly reduced in pressure when they escape at the outlet end.

Preferably the casing is of tapered formation increasing in diameter from the inlet end to the outlet end while the core member is in the form of a cylinder. Helical vanes are also provided to impart a swirling or helical motion to the gases as they pass through the expansion space or chamber.

The invention is more fully described aided by reference to the accompanying drawings wherein:

Fig. 1 is a longitudinal sectional view of a representative construction of the improved silencer or muffler.

Fig. 2 is a cross-section on the line 2-2, and

Fig. 3 a cross-section on the line 3-3 of Fig. 1.

Fig. 4 is a detail view of the supporting ring or spider for the central core member.

As is shown in these views, the silencer or muffler comprises the casing 1 of tapered formation increasing in diameter from the inlet end 2 to the outlet end 3 and having a core member in the form of a cylinder 4 arranged concentrically within it to form the annular expansion space or chamber 5 for the exhaust gases. The cross-sectional area of the expansion space or chamber increases progressively from the inlet end 2 to the outlet end 3 as shown clearly in Fig. 1.

The inlet end of the cylinder 4 has a tapered or conical nose 6 against which the entering exhaust gases impinge. Said nose divides the gases into an annular stream and uniformly distributes them to the expansion space of chamber 5.

At the inlet end of the expansion space or chamber 5 there are arranged a plurality of helical vanes 7 which cause a swirling motion to be imparted to the gases as they pass along the

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chamber 5. Said vanes may, for convenience in manufacture, be secured to the cylinder 4 and act to space the front end of said cylinder.

The rear end of the cylinder may be supported in any desired manner. In the construction shown in Fig. 1, the cylinder has a reduced rear end 8 which is supported in a central hole 9 in a spider 10. The spider is supported between a flange 11 on the end of the casing 1 and a similar flange 12 on an end member 13 which connects to the usual exhaust pipe.

To avoid rattling, but yet permit some resiliency in the mounting of the cylinder 4, a coiled spring as 14 may be fitted between the spider 10 and the end wall 15 of the cylinder.

The spider 10 has openings 16 through which the exhaust gases pass and the lower of said openings has a downwardly extended portion 17, see Fig. 4, which registers with slots 18 in the flanges 11 and 12. The passage formed by the portion 17 and the slots 18 allows any water condensing in the silencer to readily drain away.

In use, the high pressure exhaust gases from the exhaust manifold of the engine enter at the inlet end 2 and impinge against the tapered or conical nose 6 of the cylinder 4. The gases are thus divided into an annular stream which passes through the helical vanes 7 into the expansion chamber 5. The vanes give the gases a swirling or helical motion as shown by the arrows in Fig. 1 and the gases, while so moving, travel towards the outlet end 3 and through the openings 16 in the spider 10 and the end member 13 to the exhaust pipe.

The gradually increasing diameter of the expansion space or chamber 5 allows the gases to expand as they travel towards the outlet end so that, when they escape through the end member 13 to the exhaust pipe, they are greatly reduced in pressure and pulsations smoothed out. Noise is thus practically eliminated. The swirling motion imparted to the gases by the vanes 7 has the effect of reducing back pressure.

The casing 1 and the cylinder 4 may be constructed from sheet metal of relatively heavy gauge while the tapered or conical nose 6 against which the hot gases first impinge may be of cast metal to withstand the heat.

In a modification, the cylinder 4 may be somewhat tapered or streamlined towards its rear end and other variations may be made within the ambit of the invention.

The construction, as described, can be manufactured at comparatively low cost and, as previously mentioned, the silencer or muffler will

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be found to have low back pressure, a desideratum of considerable importance in silencers or mufflers used on the exhaust of internal combustion engines.

What I claim is:

1. A silencer or muffler for engine exhausts or the like, comprising a casing having a relatively small inlet at one end and a relatively large outlet at the other end and of tapered formation therebetween, a central cylindrical core within said casing and substantially the full length thereof to cooperatively form an annular expansion chamber which progressively increases in diameter from the inlet end to the outlet end so that the exhaust gases expand as they travel through said chamber and are greatly reduced in pressure when they escape at the outlet end, a conical nose on said core at the inlet end and against which the entering gases impinge and are divided into an annular stream, a plurality of helical vanes on said central core adjacent the nose end and having tapered outer edges coincidingly engaging said tapered casing to support said core at its front end and define substantially closed helical passages through a portion of the chamber to give the gases a helical motion, and a spider in the outer end of said casing and supporting the rear end of the central core member.

2. A silencer or muffler for engine exhausts or the like, comprising a casing of tapered formation, a central core member of cylindrical form supported therein and coacting to form an annular expansion chamber which progressively increases in diameter from the inlet end to the outlet end so that the exhaust gases expand as they travel through said chamber and are greatly reduced in pressure when they escape at the outlet end, a tapered nose on the core member against which the entering gases impinge and are divided into an annular stream, a plurality of helical vanes on the central core member to give the gases a helical motion, an end member on the outlet end of said casing, said casing and end member having flanges and means securing said flanges together, a spider supporting the rear end of the central core member and clamped between said flanges, said spider having an enlarged opening at its lower side, and said flanges having slots registering with the enlarged spider opening to provide a drain for condensate.

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3. A silencer or muffler for engine exhausts or the like, comprising a casing of tapered formation, a central core member of cylindrical form supported therein and coacting to form an annular expansion chamber which progressively increases in diameter from the inlet end to the outlet end so that the exhaust gases expand as they travel through said chamber and are greatly reduced in pressure when they escape at the outlet end, a tapered nose on the core member against which the entering gases impinge and are divided into an annular stream, a plurality of helical vanes on the central core member adjacent said nose to give the gases a helical motion, said vanes extending to engagement with said casing to support the front end of said core member substantially axially of said casing, a spider supporting the rear end of the central core member, and a coiled spring between said spider and the end wall of the core member to retain said core member in position with said vanes engaging said casing.

4. A silencer or muffler for engine exhausts or the like, comprising a casing, a central core member supported therein and coacting therewith to form an annular expansion chamber, means between the inlet end of said core member and said casing to centrally support said member, an end member on the outlet end of said casing, said casing and end member having flanges and means securing said flanges together, a spider supporting the rear end of the central core member and clamped between said flanges, said spider having an enlarged opening at its lower side, and said flanges having slots registering with the enlarged spider opening to provide a drain for condensate.

GEORGE BROMHEAD WALKER.

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