June 10, 1958 E. A. KLIEWER, SR 2,838,128

ENGINE EXHAUST MUFFLER

Filed Aug. 30, 1955

FIG. 1

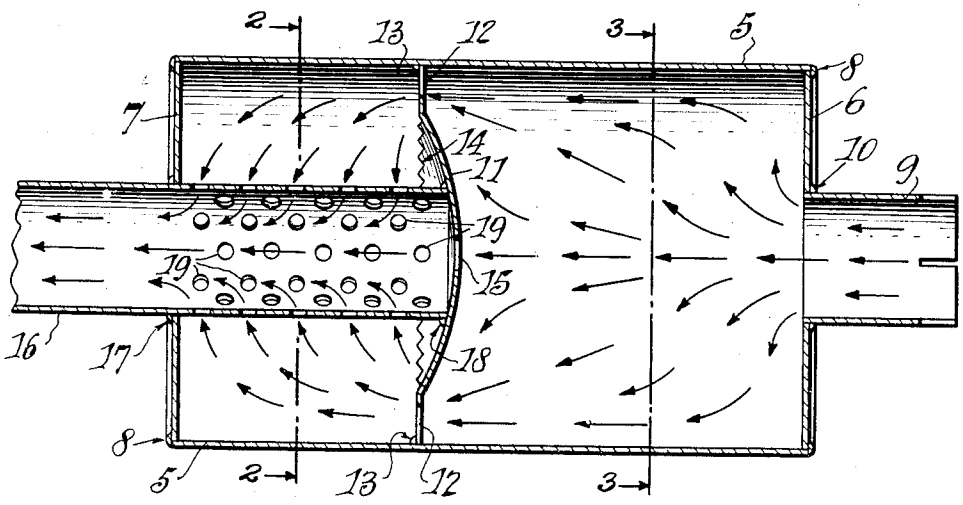


FIG. 2

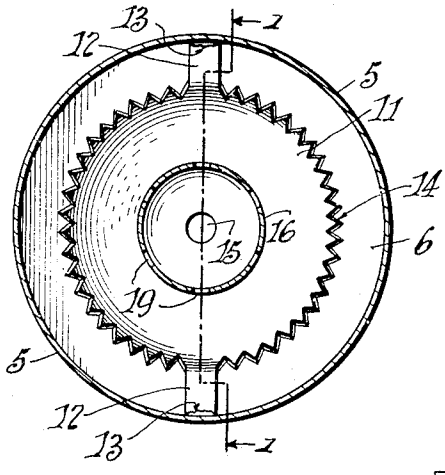


FIG. 3

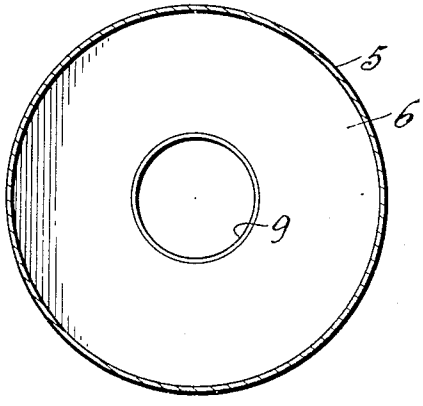
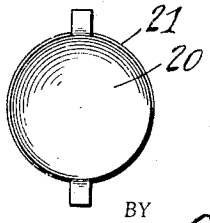


FIG. 4



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ENGINE EXHAUST MUFFLER

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4 Claims. (Cl. 181—57)

The invenion relates generally to sound controlling devices and primarily seeks to provide a novel muffler structure for use in connection with internal combustion engines of gasoline and diesel types, especially mufflers of the heavy duty type employed on trucks or buses.

An object of the invention is to provide a muffler structure which is simple in construction and subject to being economically manufactured, and which is efficient in muffling the noises normally resulting from the exhausting of burnt gases from internal combustion engines by permitting rapid and yet controlled expansion of the exhaust gases as they enter the muffler in a manner for substantially eliminating any appreciable setting up of back-pressure at the engine to which the muffler is attached, thereby to aid in assuring efficient and economical running of the engine, and also long life of both the engine and the muffler structure.

In its more detailed nature the invention resides in providing a muffler structure of the character stated including an imperforate outer shell closed at its ends except for the provision of an entrance tube opening centrally into the casing at one end, and a discharge or outlet tube opening centrally out of the tube at the other end and extending a considerable distance into the casing where it is traversed by a baffle disk spaced at its periphery from the inner wall of the casing, the portion of the outlet tube extending into the casing being perforated so that exhaust gases passing about the peripheral edge of the baffle can pass inwardly into the outlet tube and exhaust therethrough.

Another object of the invention is to provide a muffler structure of the character stated wherein the baffle disk is dished to present a smooth convex surface in opposition to the exhaust gases entering and expanding in the casing.

A further object of the invention is to provide a muffler structure of the character stated wherein the peripheral edge portion of the baffle disk is notched or serrated.

A still further object of the invention is to provide a muffler structure of the character stated wherein the baffle disk is provided with a central opening through which exhaust gases may pass directly into the outlet tube.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims, and the several views illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a central longitudinal sectional view illustrating the improved muffler structure, the section being taken on the line 1—1 on Figure 2.

Figure 2 is a vertical cross section taken on the line 2—2 on Figure 1.

Figure 3 is a vertical cross section taken on the line 3—3 on Figure 1.

Figure 4 is a detailed face view illustrating a modified form of baffle disk.

In the example of embodiment of the invention herein disclosed the muffler structure includes an imperforate cylindrical outer casing 5 to which end closure rings 6 and 7 are secured, by welding or otherwise, as at 8.

An entrance duct or tube 9 is welded or otherwise secured as at 10 in the central opening in the casing end closure 6 so that exhaust gases received in the tube 9 may enter the receiving end of the casing 5 and rapidly expand therein in the manner clearly indicated by the arrows on Figure 1.

Intermediately of the ends 6 and 7 of the casing 5 there is provided a dished baffle plate 11, the same being provided with radially extending support members 12 which may be welded or otherwise secured at 13 to the interior wall of the casing 5 in the manner clearly illustrated in Figures 1 and 2. It will be apparent by reference to these figures that the plate 11 is so dimensioned that its peripheral edge portion is spaced inwardly from the casing 5 so as to provide an annular passage surrounding said plate and inwardly of the interior wall of the casing. It will also be noted that the plate 11 is so placed that it traverses the casing intermediately of the ends thereof with its smooth convex surface directed toward the incoming exhaust gases so as to smoothly divert them outwardly toward the annular space surrounding the plate. If desired, the peripheral edge portion of the baffle plate 11 may be notched or serrated as at 14, and the plate may also be provided with a central aperture 15 through which exhaust gases may pass directly through the center of said plate.

An outlet tube 16 is welded or otherwise secured at 17 at the central opening of the discharge end closure 7 of the casing, and this tube extends a considerable distance into the casing and is welded or otherwise secured at 18 to the concave face of the baffle plate 11. It will also be apparent by reference to Figures 1 and 2 that the portion of the outlet tube 16 extending axially into the interior of the casing 5 is provided with a great number of apertures 19 opening inwardly from the annular space surrounding the tube 16 within the casing 5 into the interior of the tube.

The arrows applied on Figure 1 make it clearly apparent that the exhaust gases entering the receiving tube 9 expand rapidly in the casing 5, some thereof passing directly through the central aperture 15 in the baffle plate 11, and the remainder passing about the peripheral edge of the baffle plate into the discharge end of the casing, and thence inwardly through the tube apertures 19, and then axially along and out of the discharge tube 16 to the atmosphere. In this tortuous passage through the improved muffler structure the exhaust gases are efficiently silenced without any appreciable building up of back-pressure in the receiving tube 9 and the passages connecting the same with the engine being served.

In Figure 4 of the drawing there is illustrated a modified form of baffle plate 20 which is devoid of any central aperturing and which has a continuous, smooth edged periphery 21, as distinguished from the notched or serrated peripheral edge of the previously described baffle plate. It should therefore be apparent that baffle plates with or without central aperturing and the peripheral edge notching can be employed, and it should also be understood that variations in the size and length of the casing 5 and the spacing of the peripheral edge of the baffle plate within said casing may be resorted to without departing from the spirit and scope of the invention as outlined in the appended claims.

I claim:

1. An engine exhaust muffler consisting of a generally cylindrical casing, having an entrant end and a discharge end, an exhaust gas receiving tube delivering axially into the casing, an exhaust gas discharging tube delivering

axially from the discharge end of the casing and extending axially in the casing to a point intermediately of the length thereof to provide an annular space surrounding the discharging tube within the casing, and a baffle plate rigidly secured to and traversing and abutting the end of the discharging tube within the casing and dividing the casing into an expanding chamber extending throughout at least half of the length of the casing into which the receiving tube delivers and the before mentioned annular space, said plate being dimensioned to leave a clear annular space surrounding the plate within the casing, and the discharging tube portion within the casing having apertures therein throughout the length thereof between the portion thereof abutting the baffle and the portion thereof extending through the casing discharge end whereby exhaust gases entering the casing through the receiving tube will expand in the expanding chamber then pass through the clear annular space surrounding the baffle plate into the annular space surrounding the apertured portion of the discharge tube then inwardly into the discharge tube through its apertures to be discharged axially through the discharge tube.

2. A muffler structure as defined in claim 1 wherein the baffle plate portion traversing the discharge tube is apertured so that some of the gases received in the expanding chamber can pass directly into the discharge tube.

3. A muffler structure as defined in claim 1 wherein the baffle plate is concavo-convex in shape and is placed with its convex face opposed to gases expanding in the expanding chamber and with its concave face against the tube end abutted by the baffle plate.

4. An engine exhaust muffler consisting of a generally cylindrical casing, having an entrant end and a discharge

end, an exhaust gas receiving tube delivering axially into the casing, an exhaust gas discharging tube delivering axially from the discharge end of the casing and extending axially in the casing to a point intermediately of the length thereof to provide an annular space surrounding the discharging tube within the casing, and a baffle plate rigidly secured to and traversing and abutting the end of the discharging tube within the casing and dividing the casing into an expanding chamber extending throughout at least half of the length of the casing and into which the receiving tube delivers and the before mentioned annular space, said plate being dimensioned to leave a clear annular space surrounding the plate within the casing, and the discharging tube portion within the casing having apertures therein throughout the length thereof between the portion thereof abutting the baffle and the portion thereof extending through the casing discharge end whereby exhaust gases entering the casing through the receiving tube will expand in the expanding chamber then pass through the clear annular space surrounding the baffle plate into the annular space surrounding the apertured portion of the discharge tube then inwardly into the discharge tube through its apertures to be discharged axially through the discharge tube, said baffle plate being circular and equidistantly spaced about its periphery from the inner wall of the casing, the peripheral edge of said plate being serrated.

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