

July 10, 1962

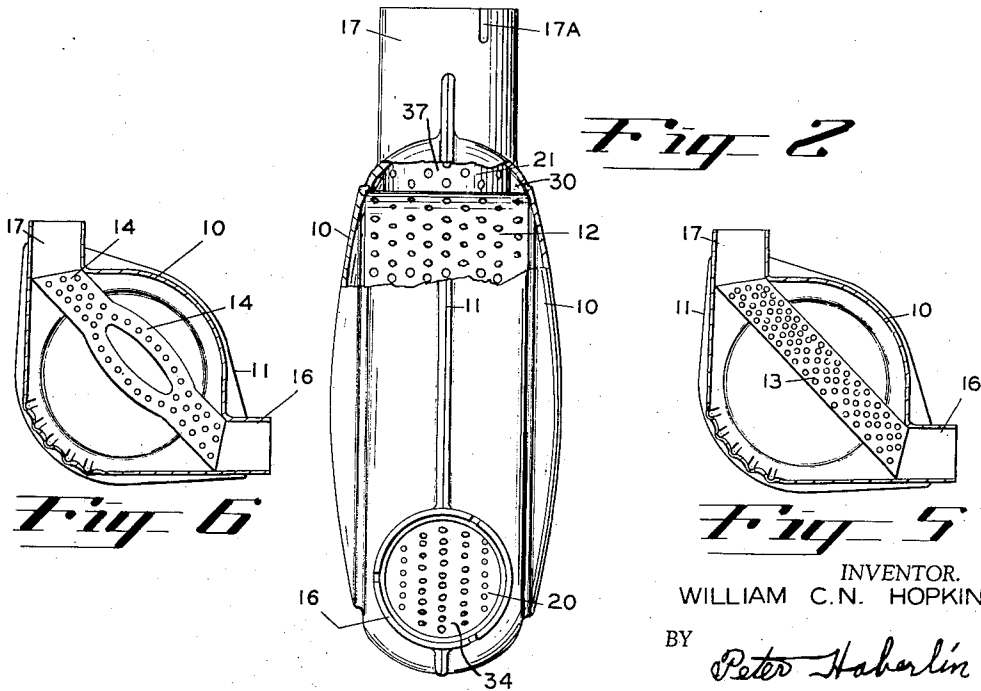
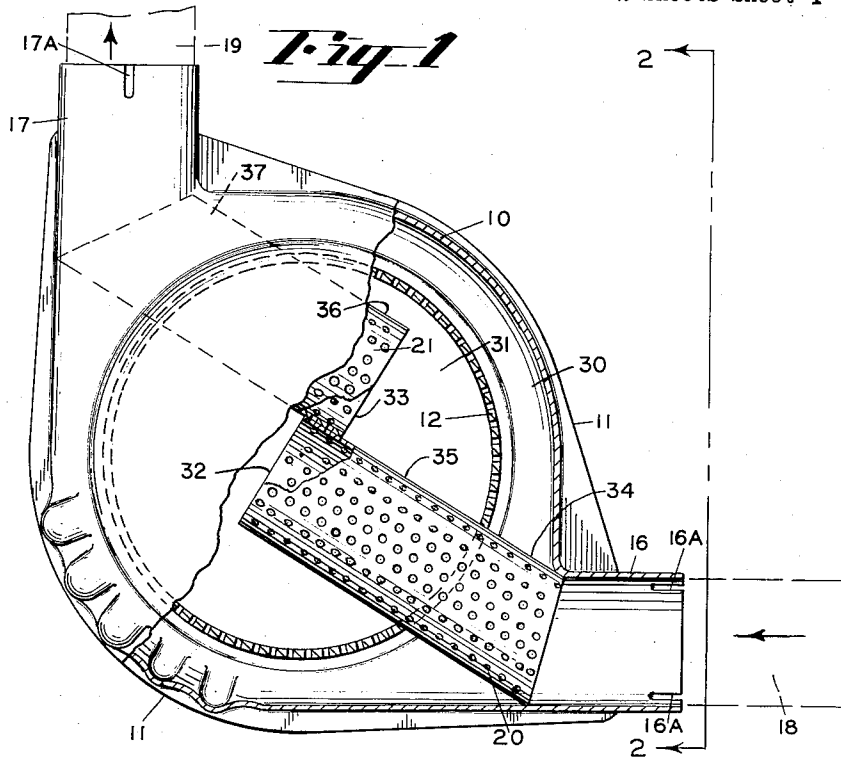
W. C. N. HOPKINS

3,043,393

MUFFLERS

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2 Sheets-Sheet 1



INVENTOR.
WILLIAM C. N. HOPKINS

BY *Peter Haberlin*

ATTORNEY

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W. C. N. HOPKINS

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Fig. 3

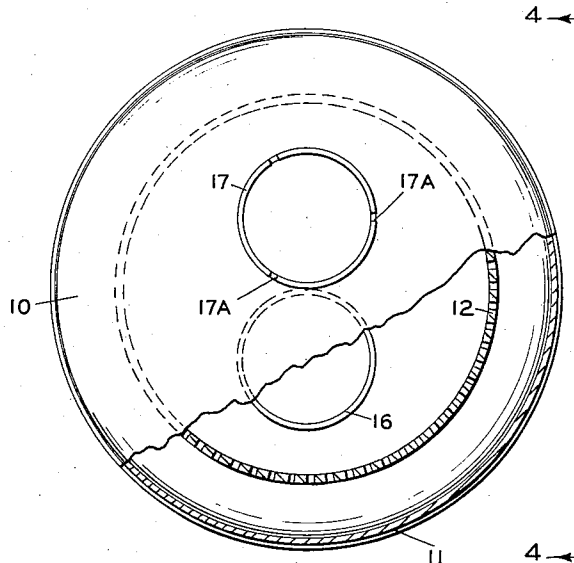


Fig. 4

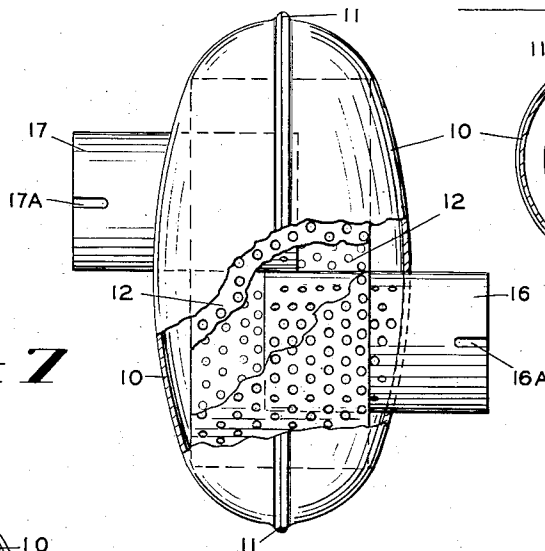


Fig. 5

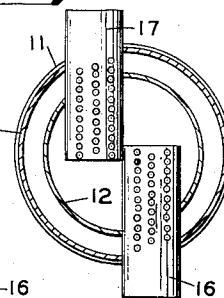
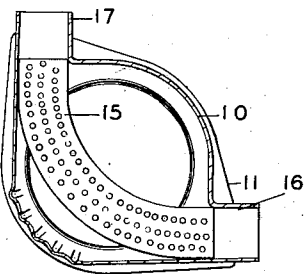


Fig. 7



INVENTOR.
WILLIAM C. N. HOPKINS

BY

Peter Haberlin

ATTORNEY

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3,043,393

MUFFLERS

William C. N. Hopkins, 1532 SE. 3rd Ave.,
Portland, Oreg.

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4 Claims. (Cl. 181—57)

This invention relates to mufflers for automotive vehicles, but more particularly to commercial vehicles, such as trucks which are propelled by internal combustion motors.

One object of the embodiment of this invention is to provide a combined elbow and muffler adapted to be attached to the exhaust pipe of an internal combustion motor at one end thereof, and to a vertically disposed pipe at its opposite end, and further—

To provide means of causing the gases from the exhaust pipe to be expelled in a vertical direction for the purpose of dissipating the air pollutants from the gases at an altitude higher than the heads of pedestrians, and again—

To provide a muffler that reduces the noises caused by exhausts from the conventional, horizontal type of muffler to be reduced to a minimum.

Other objects and advantages of the disclosed embodiment of this invention will become apparent in the following specification and appended claims, which taken in connection with the accompanying drawings, form part of this application; in which:

FIG. 1 is a side elevation of an embodiment of the invention, with parts broken away to show portions of the inner structure;

FIG. 2 is an end elevation of the structure looking in the direction of arrows at line 2—2 of FIG. 1 with a portion of the casing broken away;

FIG. 3 is a side elevation of another modification of the invention, partly broken away to show the foraminous baffle;

FIG. 4 is an end elevation of FIG. 3, looking in direction of arrows 4—4, with a portion broken away to show the foraminous pipes;

FIGS. 5, 6, 7 and 8 are longitudinal sections of alternative forms of FIG. 1.

Referring now with more detail reference to the drawings, in which like numerals of reference indicate similar parts, in FIGS. 1, 2 and 5—7 a casing 10 of the elbow type and having a circular chamber is shown, and in FIGS. 3, 4 and 8 a circular casing 10 is shown. In both forms, the casing is constructed in two like dished sections which are welded together at their longitudinal central flanges 11, and a foraminated annular baffle 12 is inserted substantially concentrically into the structures as shown in FIGS. 1—4 and 8. The casings 10 are each provided with inlet and outlet pipes 16 and 17, respectively, and these pipes have foraminous tubular extensions within the casing and extending into the central chamber surrounded by the baffle 12. According to the modifications of FIGS. 1—4 and 8, the foraminous tubular extensions are constituted by individual extensions 20 and 21 which extend substantially to the center of the casing and terminate with open ends in side-by-side relation, whereas in the modifications of FIGS. 5—7 such extensions are constituted by a single pipe, the pipe 13 in FIG. 5 being straight and extending diagonally of the casing, the pipe 14 in FIG. 6 also being straight but being divided into two branches intermediate its length, and the pipe 15 in FIG. 7 being curved or arcuate.

In the elbow type casings 10 of FIGS. 1, 2 and 5—7, the inlet and outlet pipes 16 and 17 are substantially at right angles to each other, whereas in the circular casings 10 of FIGS. 3, 4 and 8, these pipes are arranged on axes substantially parallel to each other with the pipes in

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FIGS. 3 and 4 extending through the sides of the casing and the pipes in FIG. 8 extending through the flanged peripheral portion. The foraminous pipes 20 and 21, which constitute the foraminous tubular extensions in the modifications in FIGS. 1, 2 and 8, pass through openings of coordinate outer diameter to said pipes defined in the baffle 12, and in both these modifications and also that of FIGS. 3 and 4, their free ends are integral with or welded to the inner perimeter of pipes 16 and 17. In all three of the modifications, the pipes 20—21 are arranged within casing 10 with their free ends in side-by-side relation and overlapping each other a sufficient distance to be secured together by welding or other convenient means.

Pipe 16 is provided with circumferentially spaced slots 16A by means of which the free end portion of the pipe 16 is readily deformable by any conventional exhaust pipe clamp, not shown, after the exhaust pipe 18 of an internal combustion engine has been inserted thereinto, such connection being of a conventional nature. The pipe 17 is likewise provided with circumferentially spaced slots 17A by means of which the free end of this pipe is also readily deformable by any conventional clamp means to grip upon the extension pipe or tail pipe 19. In this fashion, it will be appreciated that the muffler is operatively interposed in the exhaust system of an associated internal combustion engine. The exhaust pipe 18 extends horizontally from the engine and the vertical pipe 19 conventionally extends upwardly, usually above the cab of the vehicle to discharge into the atmosphere at this point.

As can be seen in FIG. 1, the annular baffle 12 divides the interior of the casing 10 into an outer chamber 30, and an inner chamber 31, which chambers are interconnected through the individual openings of this foraminous baffle. The inlet pipe 20 discharges at its open end 32 directly into the inner chamber 31 and the open end 33 of the outlet pipe 21 is in direct communication with the inner chamber 31. At the same time, that portion 34 of the inlet pipe 20 which extends from the pipe 16 to the baffle 12 by virtue of the openings therein, is in communication with the outer chamber 30 although not as directly as such pipe is to the inner chamber. Exhaust gases passing through the pipe 20 in this region 34 are thus subjected to a baffle effect.

Likewise, the inner end of the inlet pipe 20 between baffle 12 and the end 32 of pipe 20 is also effective as a baffle and muffler for the exhaust gases which may pass therethrough by virtue of the openings in this region 35. Generally speaking, the same situation prevails with respect to the outlet pipe 21, the same having one region or portion 36 within the confines of the baffle 12 and a further portion 37 within the confines of the outer chamber 30 so that the openings provide regions connecting the pipe 21 indirectly to both the inner and outer chambers.

Consequently, the muffling effect is manifold. Some of the exhaust gases entering through the pipe 16 and inlet pipe 20 pass through the openings in this foraminous pipe 20 both into the inner and outer chambers 30 and 31 but the majority of the gas is discharged directly through the open end 32 into the inner chamber. The pulsating character of the exhaust gases effects an internal flow within the muffler back and forth through the baffle 12 and also back and forth through the openings in the inlet pipe 20 as well as the outlet pipe 21. The majority of the exhaust gases passing out the pipe 21 will pass through the open end 33 thereof but some will enter this pipe both in regions 36 and 37 thereof. The net effect will be that the exhaust gases do not pass directly between the open ends 32 and 33 but will pass through at least one foraminous baffle member before being dis-

charged through the pipe 17. Actually, at least one passage through the foraminous members will be effected and usually several so that although the muffler is of compact design, it will be fully effective to achieve a baffling or muffling effect. This, of course, is attained by virtue of the fact that the exhaust gases are entering in pulses. Consequently, the pressure within the muffler is sinusoidal in character, causing the back and forth flowing of the exhaust gases many times through the foraminous elements contained within the muffler.

While this invention has been described in detail and with specific illustrations, it is understood that other modifications in construction and arrangements of parts may be devised without departing from the spirit and scope of the invention. The present embodiment is illustrative but not restrictive, since the scope and purview of the invention is indicated by the appended claims rather than by the foregoing description.

Having thus fully illustrated and described an embodiment of the invention and a method of producing the same, in a manner that may enable others skilled in the art to which it appertains to construct and use the same, what is claimed and desired to be secured by Letters Patent, is:

1. A muffler for internal combustion engines comprising a generally circular casing comprised of a pair of like dished sections secured together at their peripheral edges, a circular, foraminous baffle extending between casing sections substantially concentrically therewithin to divide the interior of the casing into an inner chamber surrounded by an annular outer chamber, an inlet pipe rigid with the casing and an outlet pipe rigid with said casing, said inlet and outlet pipes having foraminous tubular exten-

sions within said casing and terminating in open end portions disposed closely adjacent the center of the inner chamber and with such open end portions in side by side relationship.

2. The assembly as defined in claim 1 wherein said inlet and outlet pipes are connected to said casing at substantially diametrically opposed points and are tangentially disposed relative to the casing, the extensions of the inlet and outlet pipes projecting through said cylindrical baffle.

3. The assembly as defined in claim 1 wherein said inlet and outlet pipes extend through said respective sections of the casing along lines parallel to the axis of said cylindrical baffle.

4. The assembly as defined in claim 1 wherein said inlet and outlet pipes extend from the periphery of said casing along substantially parallel lines substantially perpendicular to the axis of said cylindrical baffle, the foraminous extensions of said pipes projecting through said cylindrical baffle.

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