

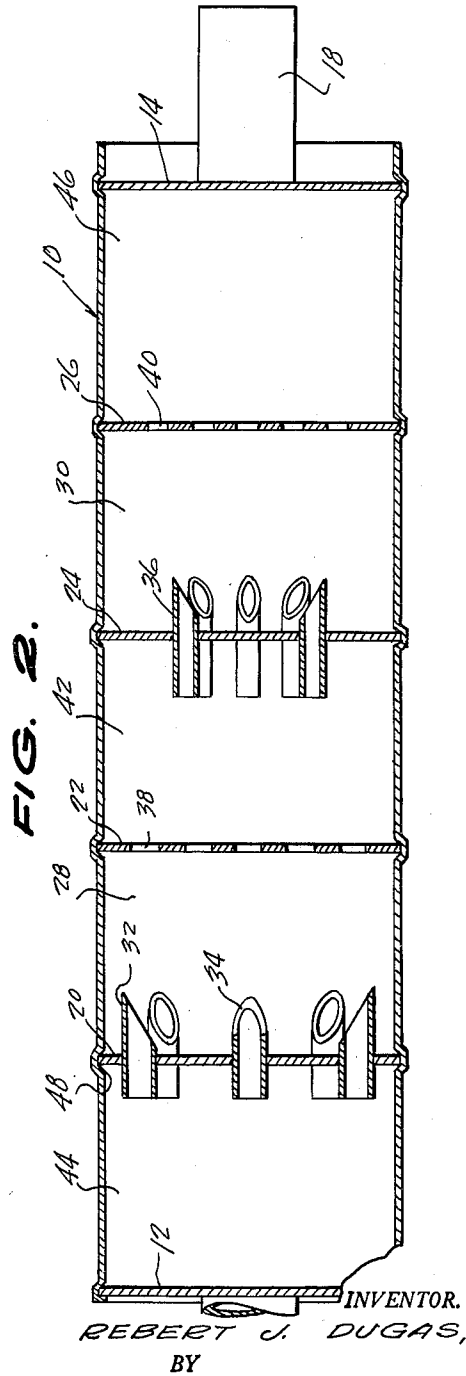
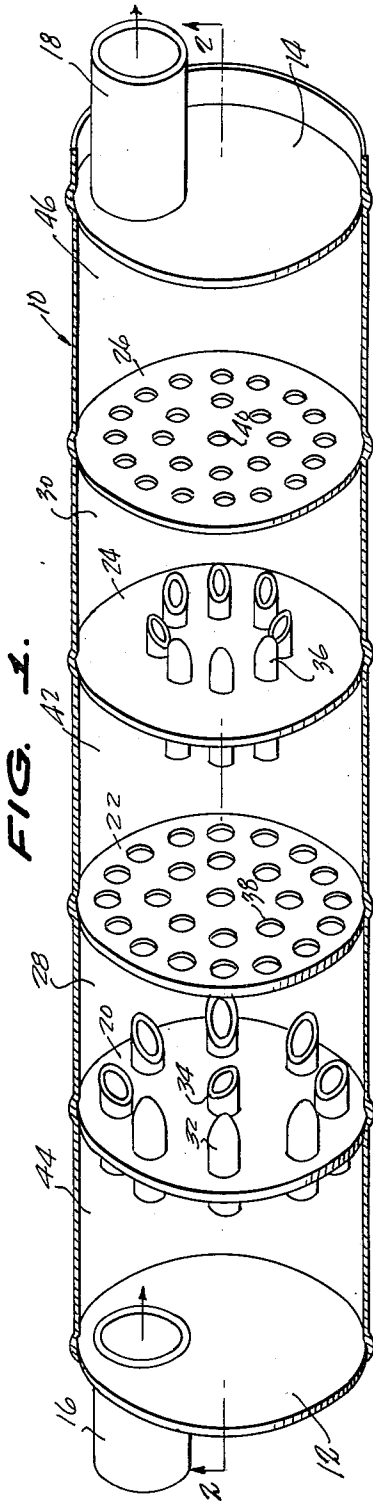
Jan. 16, 1962

R. J. DUGAS

3,016,972

MUFFLER FOR AN INTERNAL COMBUSTION ENGINE

Filed April 10, 1959



McMorrow, Berman & Davidson
ATTORNEYS.

1

3,016,972

MUFFLER FOR AN INTERNAL COMBUSTION ENGINE

Robert J. Dugas, 608 Lewis St., New Iberia, La.

Filed Apr. 19, 1959, Ser. No. 805,571

3 Claims. (Cl. 181-56)

The present invention relates to a muffler for an internal combustion engine.

Presently in use and previously proposed are mufflers for internal combustion engines of various constructions. All the mufflers have for their main consideration the suppression of the noise created by the explosion of a fuel-air mixture within the cylinders of the internal combustion engine. Suppression of noise may be accomplished by absorption of the sound waves created by the explosions or by canceling out of the sound waves by producing identical sound waves in opposite phase and impinging the out of phase waves on each other. Such mufflers have not been wholly successful for the reason that generally the structures proposed or provided increase the back pressure of the combustion gases, resulting in a lowering of the horsepower available in the respective engine.

An object of the present invention is to provide, in a muffler for an internal combustion engine, means for suppressing the noises of the explosions of fuel-air mixtures in the engine without increasing back pressure gases flowing from the engine.

Another object of the present invention is to provide a muffler for an internal combustion engine which provides as short as possible a route or passage for the flow of exhaust gases from the engine to atmosphere, with efficient suppression of noise of the gases emitted to atmosphere.

A further object of the present invention is to provide a muffler for an internal combustion engine which permits an engine to operate at a lower operating temperature by providing means for dissipating the heat to atmosphere rapidly and efficiently, with little or no condensation of water vapor in the muffler, and with substantially total suppression of the noise of the exhaust gases emitted to atmosphere.

These and other objects and advantages of the present invention will be fully apparent from the following description when taken in conjunction with the annexed drawing, in which:

FIGURE 1 is an isometric view of the muffler of the present invention with a portion of the wall cut away to show the interior of the muffler; and

FIGURE 2 is a view taken on the line 2-2 of FIGURE 1.

Referring in greater detail to the drawing in which like numerals indicate like parts throughout the several views, in FIGURE 1 the reference numeral 10 designates the shell, constituting a tunnel member, of the muffler of the present invention. The tunnel member or shell 10 has a plate 12 closing one of its ends and another plate 14 closing the other of its ends. The end plate 12 is provided with a tubular inlet 16 for receiving exhaust gases from an internal combustion engine and for attachment to the exhaust pipe of such engine. The plate 14 is provided with a tubular outlet 18 for attachment to a vehicle tail pipe or other means of discharging exhaust gases from the shell 10.

Partitions 20 and 22, and partitions 24 and 26, subdivide the interior of the shell 10 into two constraining chambers 28 and 30 with the chamber 28 adjacent and inwardly of the end plate 12 and with the chamber 30 adjacent and inwardly of the end plate 14.

The chamber 28 has ingress means embodying a plu-

2

ality of nipples 32 arranged in a ring and supported intermediate their ends in the partition 20. Another nipple 34 is supported in the partition 20 centrally thereof. The ends of the nipples 32 and 34 within the chamber 28 are formed at an acute angle with the cut ends or angled ends of the nipples 32 disposed so as to face the nipple 34.

The partition 24 is similarly provided with a plurality of nipples 36 arranged in a ring and in spaced relation with each nipple 36 having a cut end within the chamber 30. The cut ends of the nipples 36 face toward the center of the ring that they form and constitute ingress means for the chamber 30. The nipples 36 are supported intermediate their ends in the partition 24.

The open ended nipples 32, 34, and 36, are supported in their respective partitions 20 and 24 by welding or other suitable means, not shown. It is to be noted that the nipples 32, 34 and 36 of their respective partitions 20 and 24 are disposed in spaced relation with the parts contiguous to the acute angles being adjacent the perimeter of the partitions and the acute angles being remote from the perimeter of the partitions.

Each of the chambers 28 and 30 has egress means. This means, in the chamber 28, embodies spaced apertures 38 in the partition 22. Apertures 40 in the partition 26 are arranged in spaced relation and constitute the egress means for the chamber 30. The nipples 32 and 34 in the partition 20 are of a larger inside diameter than the nipples 36 of the partition 24. Likewise, the apertures 38 of the partition 22 are of a larger diameter than the apertures 40 of the partition 26.

The space between the partitions 22 and 24 constitutes a collection chamber, designated by the numeral 42, separating the constraining chambers 28 and 30. The space between the end plate 12 and the partition 20 constitutes a receiving chamber 44 and the space between the partition 26 and the other end plate 14 constitutes an exit chamber 46.

The tunnel member or shell 10 is provided with annular grooves as at 48 in FIGURE 2 receiving the peripheral portions of the partitions 20, 22, 24, and 26, and also other similar grooves receiving the peripheral portions of the end plates 12 and 14. The transversely arranged partitions and end plates are fixedly secured by welding or other suitable means, not shown, to the inner wall of the shell 10.

In use, the tubular inlet 16 is connected to the exhaust pipe of an internal combustion engine and the outlet 18 connected to a tail pipe or other means for venting exhaust gases to atmosphere at a suitable location. Gases received into the tubular member or shell 10 through the inlet 16 pass into the receiving chamber 44 and then through the nipples 32 and 34 into the first constraining chamber 28. The gases then pass through the apertures 38 in the partition 22 into the collection chamber 42 and then through the nipples 36 into the other constraining chamber 30. Finally, the gases flow through the apertures 40 in the partition 26 and into the exit chamber 46 from whence they are discharged through the outlet 18 to atmosphere. Sound waves entering the shell 10 from the inlet 16 are substantially canceled out by out of phase sound waves generated by the portions of the partitions 20 and 24 exteriorly of the nipples 32, 34, and 36, and by portions of the partitions 22 and 26 exteriorly of the apertures 38 and 40.

Although specific dimensions are not here included, it is to be noted that the internal diameters of the nipples 32 and 34 are larger than the internal diameters of the nipples 36. Also, the size of the apertures 38 and 40 bear the same relationship to each other as the nipples 32 and 34 bear to the nipples 36.

The end plates 12 and 14, and partitions 20, 22, 24, and

3

26 may be secured within the elongated shell 10 by welding, crimping, or by pressed fitting if found to be practical. The spacing of the partitions relative to each other and to the end plates is not to be limited to the spacing shown in FIGURES 1 and 2 but may be varied to any other spacing if desired and the size of the apertures 38 and 40 and the size of the nipples 32, 34 and 36 may be altered to accommodate the gases of any type of internal combustion engine with which the muffler of the present invention is to be employed.

What is claimed is:

1. In a muffler, an open-ended elongated tunnel member, an end plate closing one end of said member and having an inlet for receiving exhaust gases from an internal combustion engine, another end plate closing the other end of said member and having an outlet for discharging the exhaust gases from said member, a pair of partitions extending transversely of said member inwardly of and adjacent each of said end plates and fixedly attached to said member, each of said partitions and the portions of said member therebetween forming a constraining chamber, one of the partitions of each chamber being provided with ingress means embodying a plurality of open-ended nipples and the other of the partitions of said chamber being provided with egress means embodying a plurality of apertures, the nipples of each partition being disposed so that the intermediate portions are supported in said partition with one end within the adjacent chamber and facing toward the apertured partition of said chamber and the other end exteriorly of said

4

chamber and facing toward the adjacent end plate of said member, said one end of each nipple being formed at an acute angle, the nipples of each partition being arranged in spaced relation thereabout with the angles being adjacent the perimeter of said partition and the parts contiguous to the acute angles being remote from the perimeter of said partition, the apertures and nipples of the ingress and egress means of said one chamber being of a larger diameter than the apertures and nipples of the ingress and egress means of said other chamber.

2. The muffler according to claim 1, wherein the nipples in the partition of the chamber adjacent the outlet containing end plate are disposed in a ring and each having the acute angles facing toward the center of the ring.

3. The muffler according to claim 1, wherein the nipples in the partition of the chamber adjacent the inlet containing end plate are disposed so that one of the nipples is centrally of the partition with the remaining nipples being disposed in a ring and each having the acute angle facing toward said one nipple.

References Cited in the file of this patent

UNITED STATES PATENTS

25	1,004,195	Porter	Sept. 26, 1911
	1,539,595	Powell	May 26, 1925
	1,810,252	Noonan	June 16, 1931
	2,194,550	Hector et al.	Mar. 26, 1940
	2,624,418	Bourne	Jan. 6, 1953
30	2,919,761	Smith	Jan. 5, 1960