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(54) **TIKHO**

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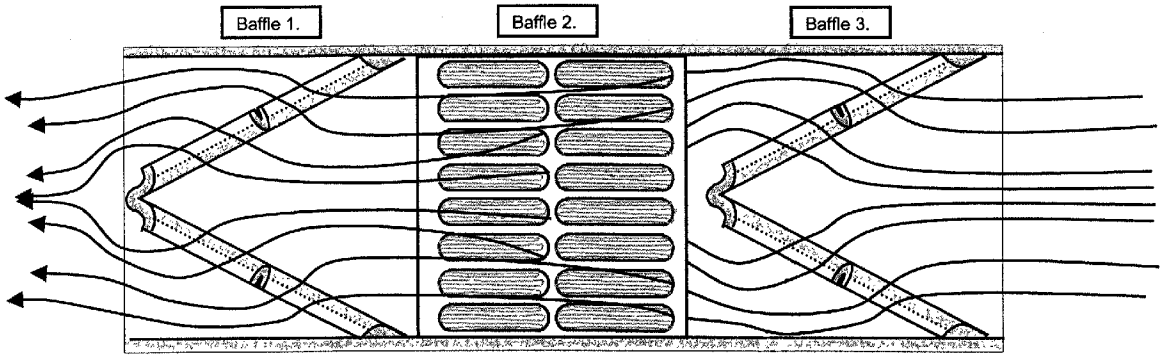
(57) **ABSTRACT**

A muffler assembly, for use in the exhaust systems of vehicles or machinery using internal combustion engines, particularly piston or Wankel rotary types, consisting of either a square or round(ed) tube, with perforated baffles folded at angles, affixed within it.



Side View Cross-Section and air flow

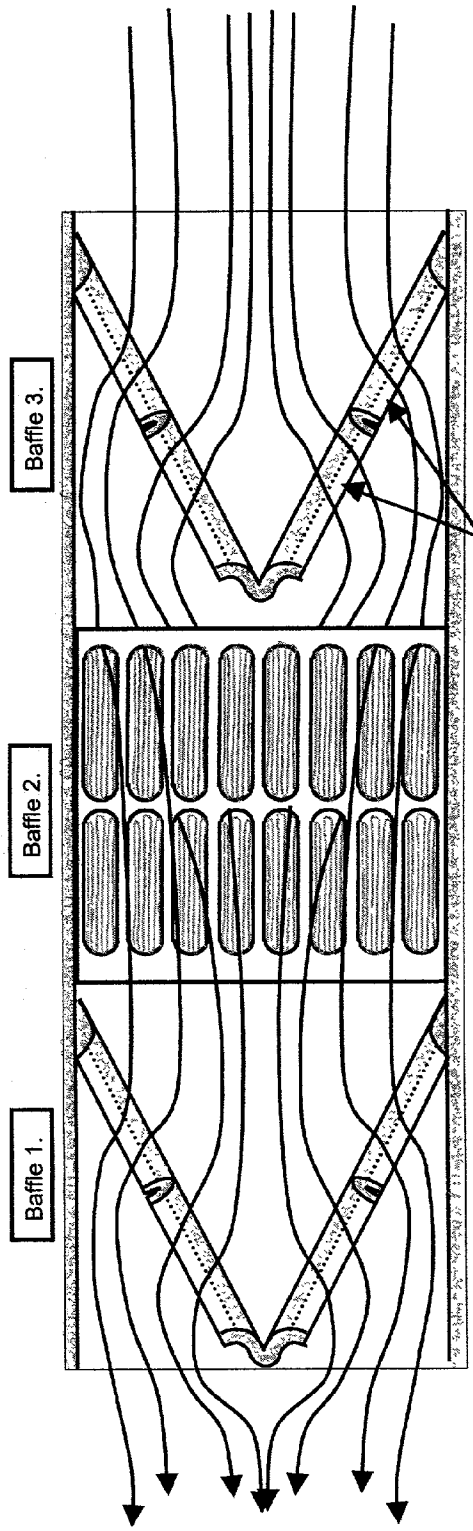


Fig. 1 - Side View Cross-Section and air flow

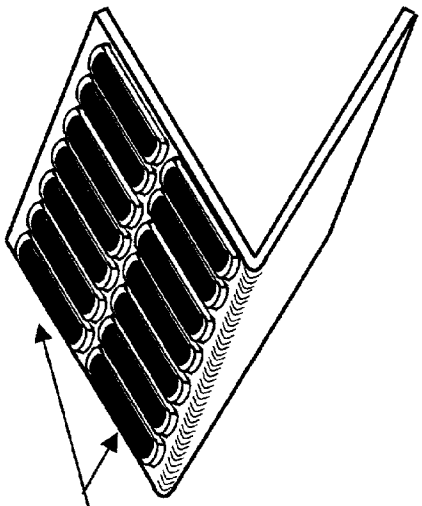


Fig. 3 – Angle view of baffle

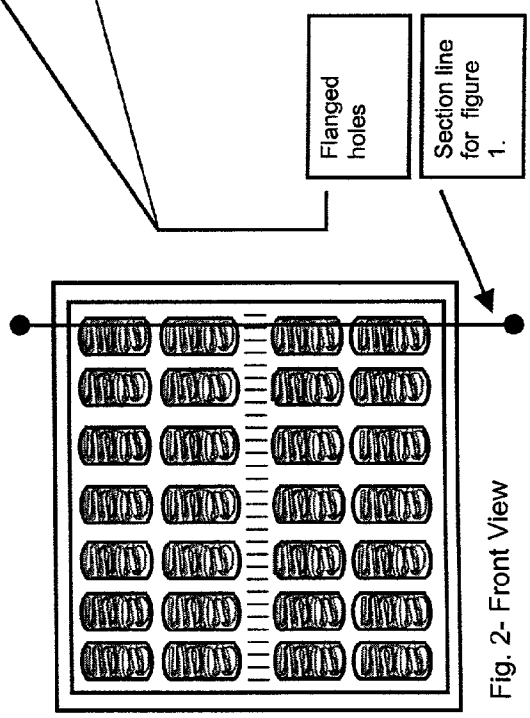


Fig. 2- Front View

TIKHO

BACKGROUND OF THE INVENTION

[0001] Exhaust emanating from a piston or Wankel rotary engine is in the form of gas pulses, resulting from the rapidly opening and closing of exhaust valves. These gas pulses are still expanding from the combustion that produced them, and carry sound energy that must be muffled to allow an acceptable level of tolerated use.

[0002] The muffler will use the concept of dissipating sound energy by having gas pulses within the muffler bounce against the walls of the tube, into each other, as well as forcing them to swirl. These actions will cause the gas pulsations to lose their sound energy by transferring the motive energy into heat, and would not need the increased volume that typical mufflers need to achieve the same result.

[0003] Normal mufflers use the concept of resonance and wave cancellation, which requires a volume within it, the size of which to be tuned to a range of operable frequencies. By having a similar cross-sectional area to the rest of the exhaust system, the "TIKHO" will be able to maintain gas velocity, useful for scavenging the exhaust through the system. By not having its external dimensions deviate too greatly from the rest of the exhaust system, this muffler can more easily be fitted into today's tightly confined automotive undercarriages.

[0004] This design will allow flexibility of application, as well as economy of parts. The muffler will have simplified construction, consisting of a length of tube with a collection of identically sized and shaped baffles, affixed at various points and orientations. The length of the tube and number of baffles within it may vary according to the application in which it will be used.

[0005] The baffles would be, in the case of the square tube, rectangular sheets of suitable metallic material, such as stainless steel, folded in the middle, such that the fold line bisects the rectangle through its longer dimension. The baffles are folded so that they may fit inside the tube, with their edges contacting the sides of the tube. A round tube will use oval shaped baffles, folded in half. Rounded tubes can use rectangular shaped sheets, with rounded edges. The baffles would allow a surface area equal or greater than the cross-section of the tube, such that the baffles would not represent an appreciable resistance, hence the tube may remain at the same diameter or relative cross-sectional area as the rest of the exhaust system.

[0006] The baffles are perforated with slots, punched in such a way that the remaining holes are flanged. This flange will allow the slots to behave in a similar manner to louvers, in that they can aim the flow of gas going through them. A series of baffles, within the tube, can be orientated such that one is rotated relative to another one, next to it. This will induce a swirling effect to the flow of gas. In the case of a square tube, a baffle may be rotated, so that it sits 90 degrees relative to the baffle next to it. A round tube will allow an infinite amount of degree change, but aggregations of 45 degrees may provide the most efficient design.

[0007] The baffles may be welded in place, thus becoming a solid unit with the tube.

[0008] The objects of the invention may be further understood from the following descriptions given in connection with the accompanying drawings, in which:

[0009] **FIG. 3** shows an angled view of a rectangular baffle, intended for a square tube. This baffle shows the form in which the baffles are intended to take. The rectangular baffle is folded down its middle, to form a V-shape in profile, as seen in side views of baffles **1** and **3**, in **FIG. 1**. Note that one shape and size baffle is need for a given muffler of this design, and that it's effectiveness can be increased by using more than one baffle, within the tube.

[0010] **FIG. 1** shows a cross-section of a square tube with three baffles, each orientated 90 degrees from each other, so that every other baffle is in the same orientation (in this case, the first and third baffles). This figure should not limit the extent of the number of baffles that can be used, depending on application. Note that the baffles are perforated with slots, the edges of which are flanged outwards, along the flow of gas. These flanges will help to aim the flow of gas, and help to prevent reversion (the reverse flow of gasses, caused by the slight pause between each pulse of gas). Baffles-**1** and **3**, in particular, show the flanged nature of the slots, in cross-section. The flow of gas is intended to hit the walls of the tube, and swirl in such a way that the sound energy is dissipated away.

[0011] **FIG. 2** shows a front view of the square tube, along with baffle-**1**. Due to the angles of the baffle, the slots appear to be foreshortened, however, the cross-section **(FIG. 1)** shows that the slots actually have a great amount of area, so as to not restrict flow.

1. An exhaust muffler of simplified design, comprising a tube with gang of folded, angled and perforated baffles affixed in it. The angled design of the baffles allowing more surface area to be exposed to the cross-sectional area of the tube, such that they do not represent an appreciable resistance.

2. Folded angled baffles in claim 1, in which the perforations are flanged slots, allowing the pulsations of gas traveling through them to be aimed.

3. Folded angled baffles in claim 1, in which they are modular, such that once a size and shape is determined for a given tube, the same dimensions may be used for all the baffles used in that tube.

4. Folded angled baffles in claim 1, in which their orientation can be rotated, in relation to each other, such that the flow of gasses through them may swirl in conjunction with the rotation of orientation.

5. Folded angled baffles in claim 1, in which they may be used in differing numbers, spacings and orientations, to allow flexibility within the design, to allow use for a wide range of applications.

6. The tube in claim 1, which may not deviate greatly from the overall size of the exhaust system, allowing flexiblity in placement, within the undercarriage of an automobile, for example.

7. The tube in claim 1, which may be square or round in cross-section, or any range of shapes that allow the use of the folded angled baffles, such that the resulting design flexibility is a benefit to the designers of the overall exhaust system.

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