

April 13, 1937.

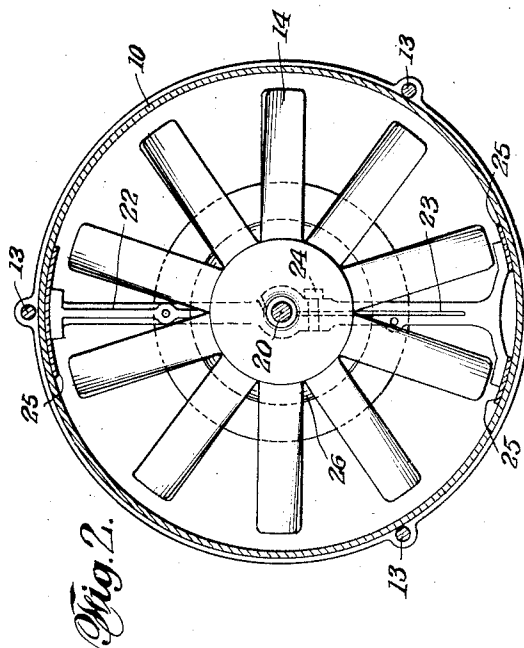
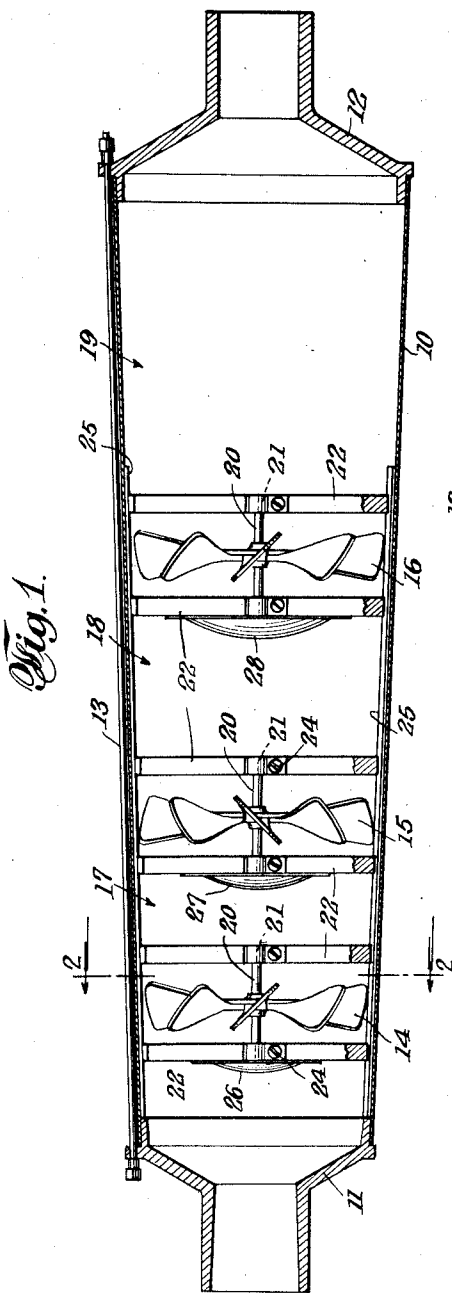
R. W. ROSS

2,076,827

EXHAUST MUFFLER

Filed April 21, 1936

2 Sheets-Sheet 1



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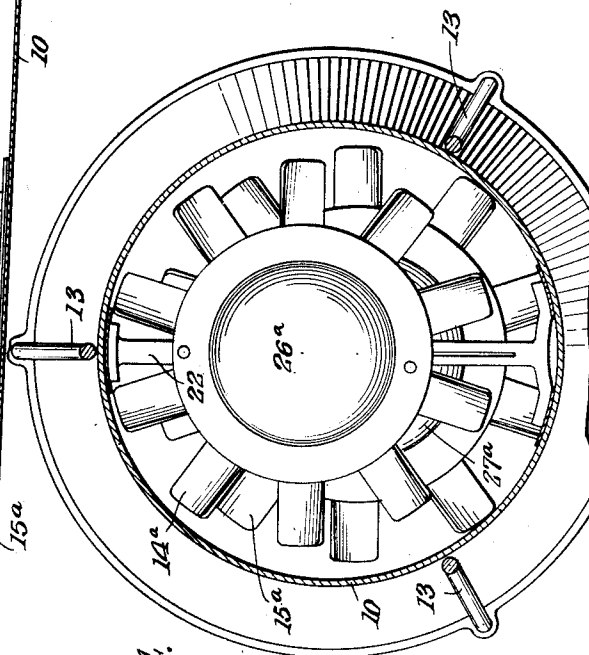
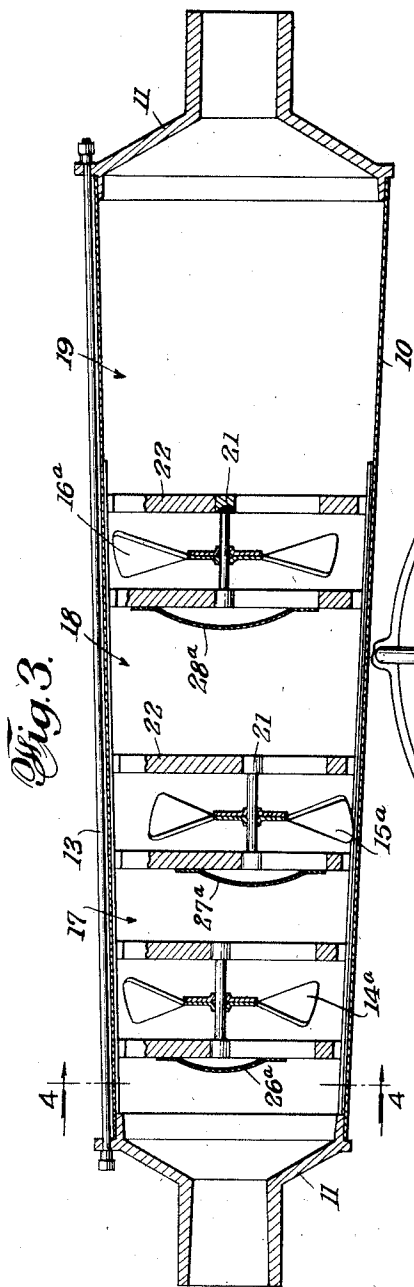
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EXHAUST MUFFLER

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EXHAUST MUFFLER

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4 Claims. (Cl. 181—64)

This invention relates to improvements in mufflers for the exhaust gases of internal combustion engines and deals more particularly to that type of device which employs exhaust gas impelled means for reducing back pressure within the muffler.

The invention contemplates the provision of an improved form of muffler in which a plurality of fans, each associated with a gas deflector, are positioned within a casing or housing in a manner to provide a series of chambers of progressively increasing volume whereby the exhaust gases are in continuous expansion upon entrance into said casing.

The invention also contemplates the provision of an increasingly tapered muffler casing for enhancing the expansibility of the exhaust gases therein.

Another feature of the invention resides in the provision of gas impelled wheels or fans, each member being adapted for rotation in a direction opposite to an adjacent wheel or fan.

With the above objects, advantages and features in mind, and others hereinafter disclosed, the invention resides in the novel combination and arrangement of the parts as hereinafter described, said description being based on the accompanying drawings for part of this disclosure.

In the drawings, which are illustrative only:

Fig. 1 is a longitudinal sectional view of a preferred form of muffler.

Fig. 2 is an enlarged transverse sectional view as taken on the line 2—2 of Figure 1.

Figs. 3 and 4 are respectively similar views of an alternate preferred form of the invention.

Referring to the drawings in greater detail, the muffler generally comprises a shell or casing 10, an intake head 11 and an exhaust head 12 at opposite ends of the shell. In the present instance, it is preferred to taper the shell 10 from a relatively small diameter at the intake head to a relatively greater diameter at the exhaust head.

Divers means may be employed for retaining the muffler heads in assembly. However, a preferred means for accomplishing this, is to provide a plurality of longitudinal stay wires 13 for holding said heads in non-displaceable position.

The heads 11 and 12 are preferably conically formed as shown so the gases entering the muffler may not become lodged in blind pockets.

Since the invention contemplates the transition of exhaust gases through the muffler in as smooth a manner as possible, the entire design of the casing and heads are along streamline lines as shown.

The gas impelled devices, in the form of fans 14, 15 and 16 are preferably placed athwart the muffler, the fan 14, nearest the intake head being smallest, and the fan 16, nearest the exhaust head being largest. Also, the fans 14 and 15 are placed relatively near each other to provide a relatively small expansion chamber 17, while the fans 15 and 16 are somewhat further apart to form a relatively larger expansion chamber 18 and finally the fan 16 is positioned in relation to the exhaust head 12 to form the largest expansion chamber 19, the three expansion chambers, in this manner, being successively located in progressively larger portions of the shell 10.

Each fan is mounted by means of a pivot pin 20, in bearing blocks 21, each fixedly held in a bracket or stanchion 22. A preferred means, for holding the bearing blocks in adjusted position, comprises slitting a portion of each stanchion as at 23 and providing a clamp screw 24 for urging the free portion of the clamp thus formed towards the rigid portion.

To facilitate mounting the stanchions within the shell 10, they are first preferably mounted on rails 25 which may then be secured as by welding to said shell.

The fans 14, 15 and 16 are each associated with a deflector, respectively designated 26, 27 and 28 and arranged in front of each respective fan for the purpose of deflecting the oncoming gases to the more efficient portions of the fans.

While all the several fans may be arranged to be rotated in the same direction, it is preferred to have the center fan 15 rotate in a direction opposite to that of the other two fans to afford greater turbulence to the gases in their passage through the muffler casing.

From the foregoing it may be seen that the exhaust gases, in passing through the muffler, are first deflected by the deflector 26 towards the walls of the shell and their substantially straight through motion is translated into a swirling motion by reaction from the blades of the fan 14. The swirling gases in the chamber 17 are then deflected by the deflector 27 before acting on and being motivated by the fan 15, but in this instance the gas particles are further agitated by the reverse rotation of said latter fan. The gases in the chamber 18, now in a great state of turbulence, may expand in this larger chamber before passing by the deflector 28 and fan 16 for further swirling etc. The gases finally discharge into the chamber 19 where further expansion is afforded before passing into atmosphere through the exhaust head 12.

In this manner, not only is the noise of explosion effectively muffled, but back pressure of the exhaust gases is entirely eliminated, hence improving the efficiency and reducing the fuel consumption of an internal combustion engine.

While it is preferred to taper the muffler shell as shown, good results may be attained by employing a cylindrical shell with the progressively increasing expansion chambers as described.

Another manner of accomplishing the desired results is shown in Figures 3 and 4, wherein the middle fan 15^a is positioned to one side of the center line of the muffler, and the other fans 14^a and 16^a are positioned to the other side of the center line, with the respective deflectors 26^a, 27^a and 28^a each located on the center of rotation of the fans, and as so arranged they will impose a circuitous route upon the products of combustion passing through the casing and thus attain the usual muffling action upon said products.

More or less fans and deflectors may be employed and other changes in the arrangement of the parts may be made within the meaning of this disclosure.

What I claim as new and desire to secure by Letters Patent, is:

1. A muffler comprising a casing having intake and exhaust heads, and at least two fans

rotatably mounted in said casing and so spaced from the heads and from each other that increasingly larger chambers are formed between the intake head and the first fan, between the first fan and the second fan, and between the second fan and the exhaust head, and one of said fans being out of axial alignment with respect to one of the other fans.

2. A muffler comprising a casing having intake and exhaust heads, said casing being increasingly tapered towards said exhaust head and two or more fans rotatably mounted in said casing in non-axial alignment.

3. A muffler comprising a casing, said casing being increasingly tapered from its intake end towards its exhaust end, one or more fans rotatably mounted in said casing, and one or more deflectors axially arranged in front of said fan or fans, at least one of said fans and deflectors being non-axial with said other fan or fans.

4. A muffler comprising a casing, said casing being increasingly tapered from its intake end towards its exhaust end, one or more fans rotatably mounted in said casing, and one or more deflectors axially arranged in front of said fan or fans, the centers of said fans spaced from the center line of said casing.

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