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TRIFLOW MUFFLER FOR EXHAUST GASES

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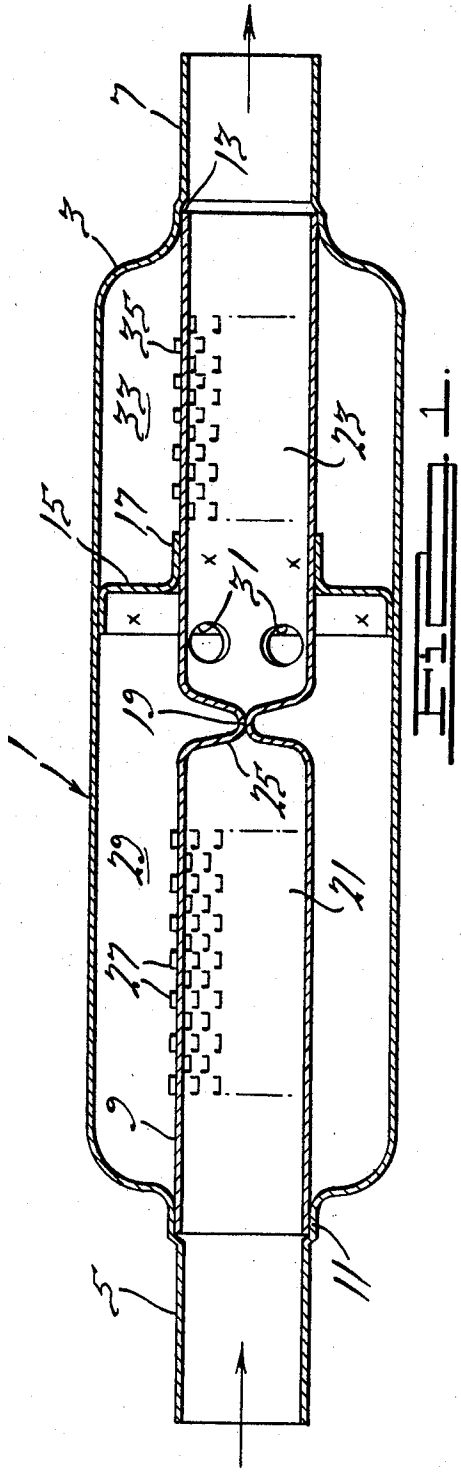


Fig. 1.

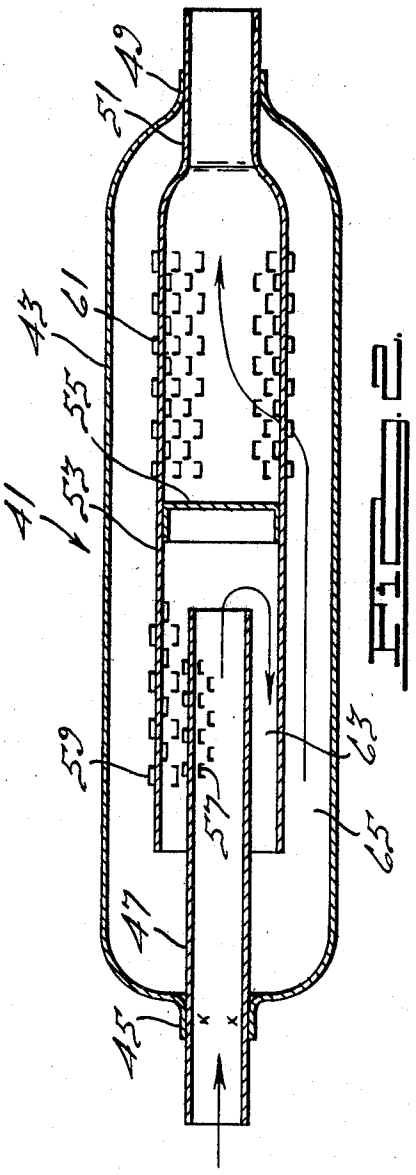


Fig. 2.

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TRIFLOW MUFFLER FOR EXHAUST GASES

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ABSTRACT OF THE DISCLOSURE

A very small diameter and simple muffler construction has aligned inlet and outlet tubes with means to block straight-through communication between them so that gas flows transversely from the inlet point and then longitudinally through the muffler outside of the tubes and then transversely into the outlet tube.

Brief summary of the invention

The lack of available space beneath modern automobiles for mufflers has prompted a search for small silencing components which, for their size, are highly efficient in extracting sound energy from gas flowing through them. The present invention provides such a small muffler by means of a very small unit having aligned inlet and outlet pipes which are prevented by a barrier from directly communicating with each other. Gas therefore flows radially and longitudinally through the muffler casing in what may be described generally as a tri-flow pattern.

Description of the drawings

FIGURE 1 is a longitudinal cross-section through one form of muffler embodying the invention; and

FIGURE 2 is a longitudinal cross-section through a second embodiment of the invention.

Description of the invention

The muffler **1** of FIGURE 1 comprises three parts. First, there is an outer shell **3** which is reduced in diameter at opposite ends **5** and **7** to form bushings for attachment to exhaust and tailpipes in an exhaust system. Second, there is an internal gas flow tube **9** which has opposite ends nested in recesses **11** and **13** formed in the bushings **5** and **7**. This fitting may be done during assembly and eliminates the need for spot welding the tube **9** to the shell as can be seen. Third, there is partition **15** having a flange that is welded to the shell **3** and a neck **17** which may or may not be welded to the tube **9**.

The tube **9** is pinched together at **19** to divide it into an inlet section **21** and an outlet section **23** which are out of direct communication with each other by virtue of the imperforate barrier **25** provided by the necked or pinched section **19**. The inlet section **21** is provided with a bank of louvers or openings **27** through which gas can flow from tube **21** into the chamber **29** that is defined by the partition **15** and the inlet end of the shell **3**. Within the chamber **29** the outlet section **23** has several large openings **31** through which gas can flow into the outlet section and then out of the muffler through bushing **7**. The space between the partition and the end of the shell **3** comprises a closed chamber **33** and the louvers **35** connect the gas in the tube **23** to this chamber so that relatively high frequency sounds in the gas are attenuated thereby.

In operation of the muffler **1**, gas entering the muffler bushing **5** is forced by partition **15** to flow radially through the louvers **27** into the chamber **29**. Silencing occurs as the gas flows through the short necks of the louvers **27** and as it expands into the relatively large volume of chamber **29**. The gas in chamber **29** flows longitudinally towards partition **15** which forces it radially into the reduced diameter openings **31** where silencing occurs as it does again when the gas expands inside of the outlet section **23**. High frequency noises, roughness, and spit are attenuated by the action of louvers **35** in conjunction with the closed chamber **33** as the gas flows down through the tube **9**.

In the muffler **41** of FIGURE 2, there is an outer shell **43** which is necked down in an inlet bushing **45** which supports an inlet tube **47**. It is necked down in an outlet bushing **49** which receives and supports the reduced diameter end **51** of an outlet tube **53** which is larger in diameter and telescopes over the down-stream end of the inlet tube **47**. Imperforate partition **55** in tube **53** blocks direct communication between the tube **47** and the interior of the tube **53** downstream of the partition **55**. The co-extensive sections of the tubes **47** and **53** are louvered as seen at **57** and **59** and the portion of the outlet tube **53** located downstream of the partition **55** is louvered as seen at **61**.

Gas entering the inlet tube **47** is forced by the partition **55** to reverse its flow and pass backwardly through the annular chamber **63** between the co-extensive portions of the inlet and outlet tubes. Some cross-flow occurs through the louvers **57** and **59** to minimize back pressure and these louvers also act to attenute high frequency noises. The gas leaves chamber **63** near the front of the muffler and reverses its flow so that it is again directed toward the outlet end of the muffler as it enters the annular chamber **65** between the outlet tube **51** and the shell **43**. It then enters the interior of the tube **51** by passing through the louvers **61** where silencing occurs.

In both forms of the invention the outer shell **3** or **43** can be made very small in diameter (for example 3" to 4") thus enabling the device to be fitted into positions underneath an automobile that would not accept a normal muffler.

Modifications may be made in the structure shown without departing from the spirit and scope of the invention.

What is claimed is:

1. A triflow type muffler for silencing sound in flowing gases comprising a small diameter shell, substantially aligned inlet and outlet tubes in the shell, the space between said tubes and shell forming a longitudinally extending chamber, transverse partition means blocking direct gas flow from the inlet to the outlet tube, said inlet tube having an outlet opening located on one side of the partition means and said outlet tube having an inlet opening located on the opposite side of said partition means, both said openings communicating with said chamber and gas flowing from one to the other through said chamber, said outlet tube being telescoped over the inlet tube and said partition means being provided in said outlet tube, overlapping sections of said telescoped tubes each having louver patches therein.

2. A triflow type muffler for silencing sound in flowing gas comprising a small diameter shell having an inlet opening at one end and an outlet opening at the other end, said openings being substantially aligned, an inlet tube open at both ends and mounted in said inlet opening, an outlet tube open at both ends and mounted in said

outlet opening, said tubes being substantially coaxial and one of said tubes being larger in diameter than the other and having a transverse partition in it located at an intermediate point along its length and blocking flow through it, said larger tube having perforations in the wall thereof located between said partition and the end of the tube which is mounted in said shell opening, the smaller of said tubes extending inside the larger tube and terminating a spaced axial distance from said partition, the space between said tubes and said shell providing a longitudinally extending chamber into which said perforations open, the space inside the larger tube between the overlapped portions of said tubes comprising a longitudinal passage opening into said chamber and providing a path for flow of gas between the smaller tube and the chamber.

3. A muffler as set forth in claim **2** wherein the wall of at least one of the tubes in the sections thereof forming said longitudinal passage is perforated.

4. A muffler as set forth in claim **3** wherein the walls of both tubes in the sections thereof forming said longitudinal passage are perforated.

5. A muffler as set forth in claim **4** wherein all of said perforations are in the form of louver patches.

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