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(54) **STRUCTURE OF A MUFFLER AT THE REAR OF EXHAUST PIPE**

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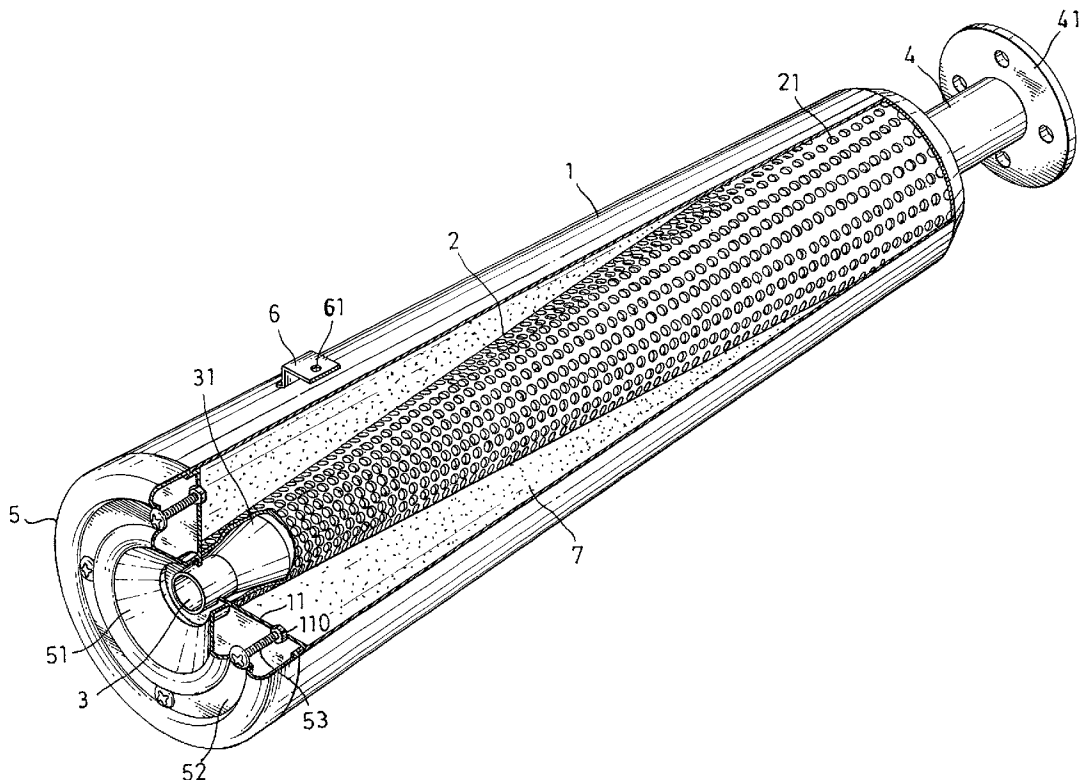
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(57) **ABSTRACT**

The present invention discloses an improved structure of a muffler at the rear end of an exhaust pipe, mainly comprising a tapered inner pipe inside a tapered conical outer pipe, and a plurality of silencing holes being disposed on the wall of the inner pipe, and a silencing cotton wrappers around and covers the external rim of the inner pipe, and a sleeve being disposed in the inner pipe proximate to the rear end of the inner pipe. The front end of such sleeve is a tapered conical pipe, and the rear end slight extends to the outside of the rear end of the external pipe. A decorative lid covers the rear end surface of the external pipe, and a gas-receiving pipe having a French connector being soldered to the front end of the external pipe, and an n-shaped fixing bracket having a fixing hole on it being soldered to an appropriate position on the external surface of the external pipe proximate to the rear end. The assembly of the foregoing components enables the muffler to increase the output torque of the engine, reduce the noise, and provides an easy installation for all sorts of vehicles.



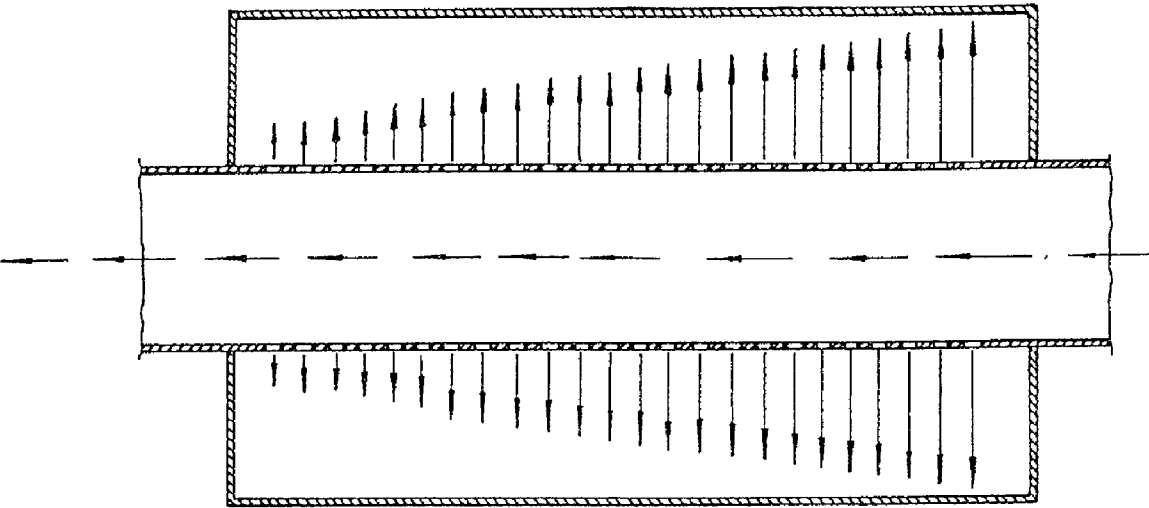


Fig . 1    PRIOR ART

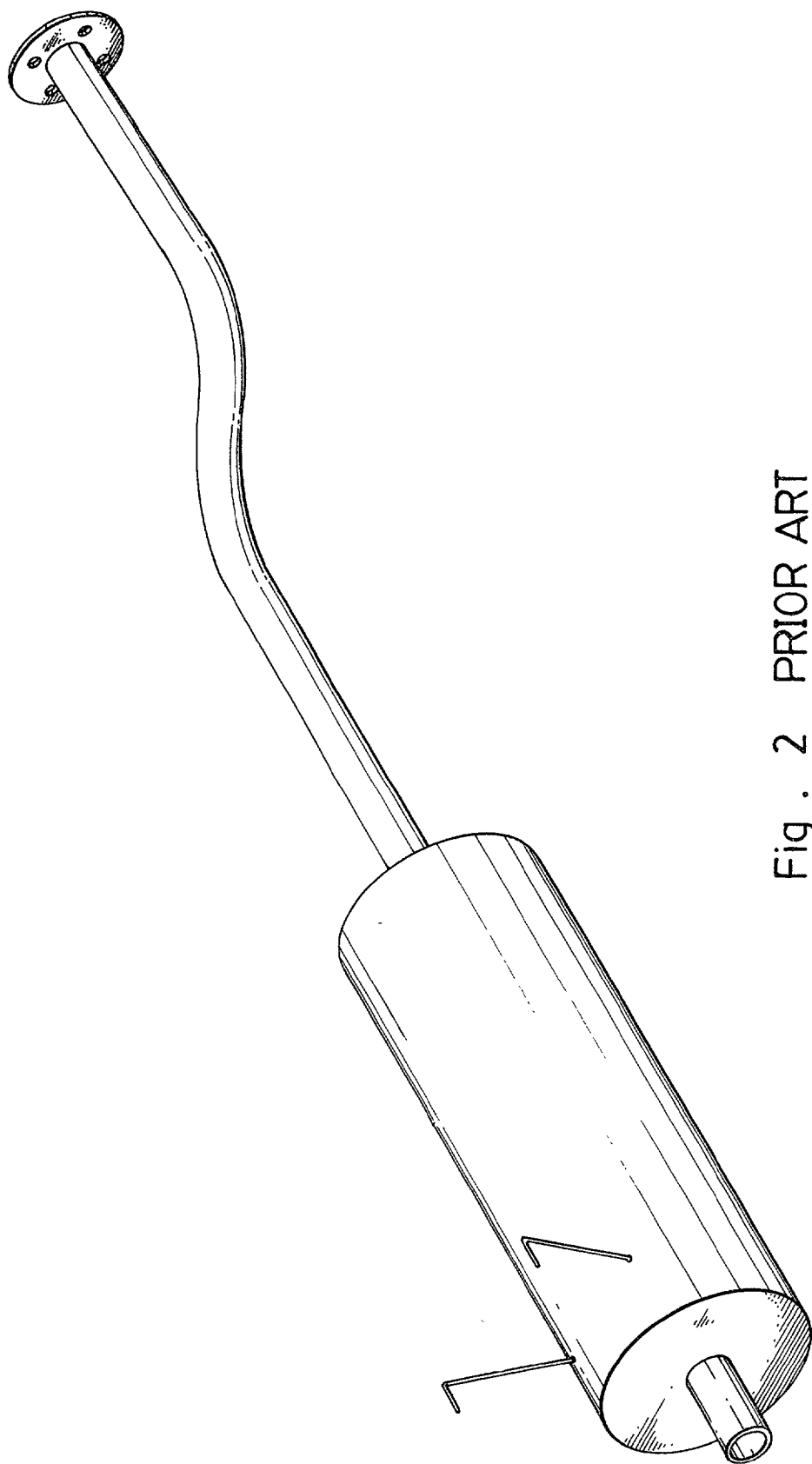


Fig . 2    PRIOR ART

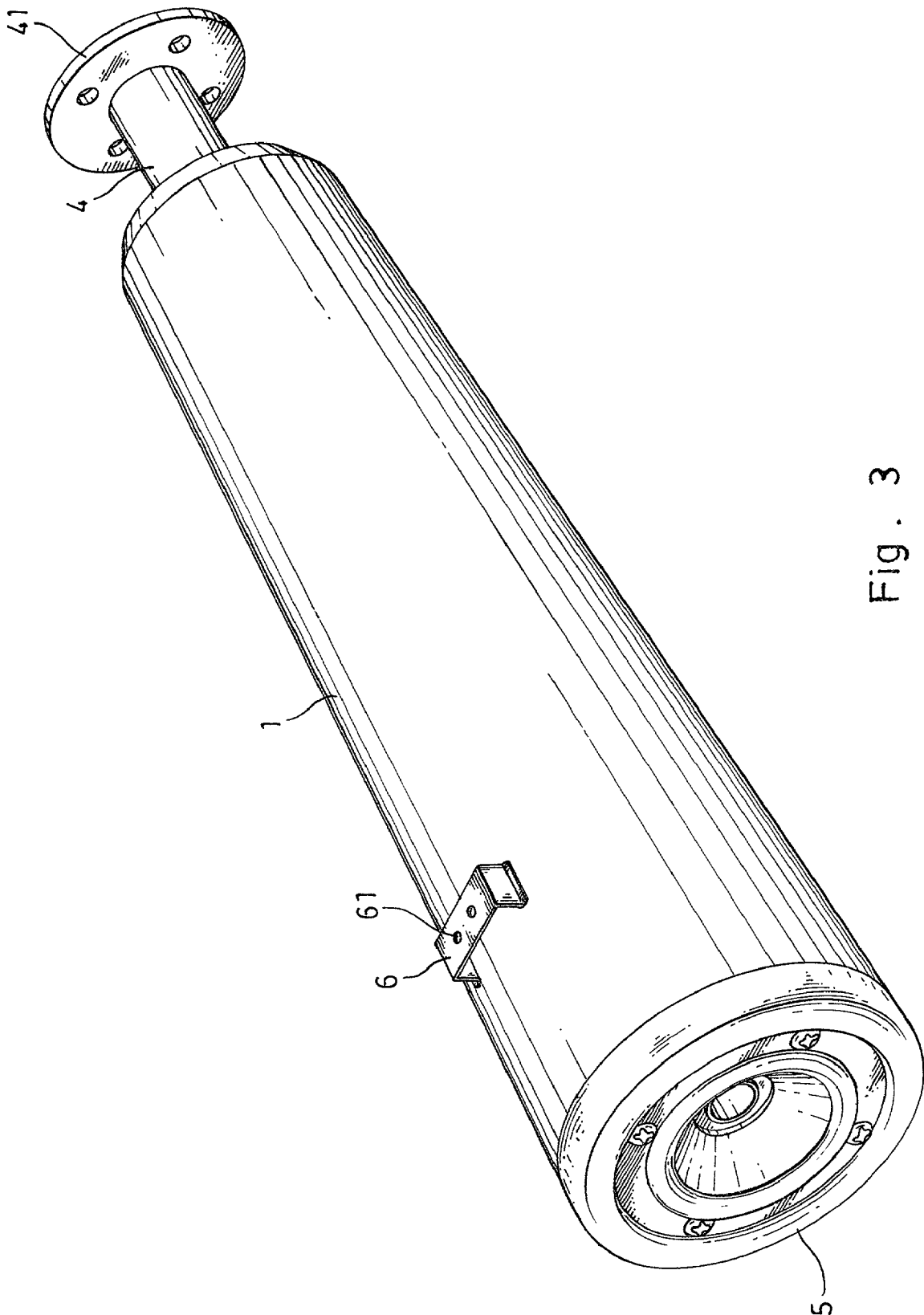


Fig. 3

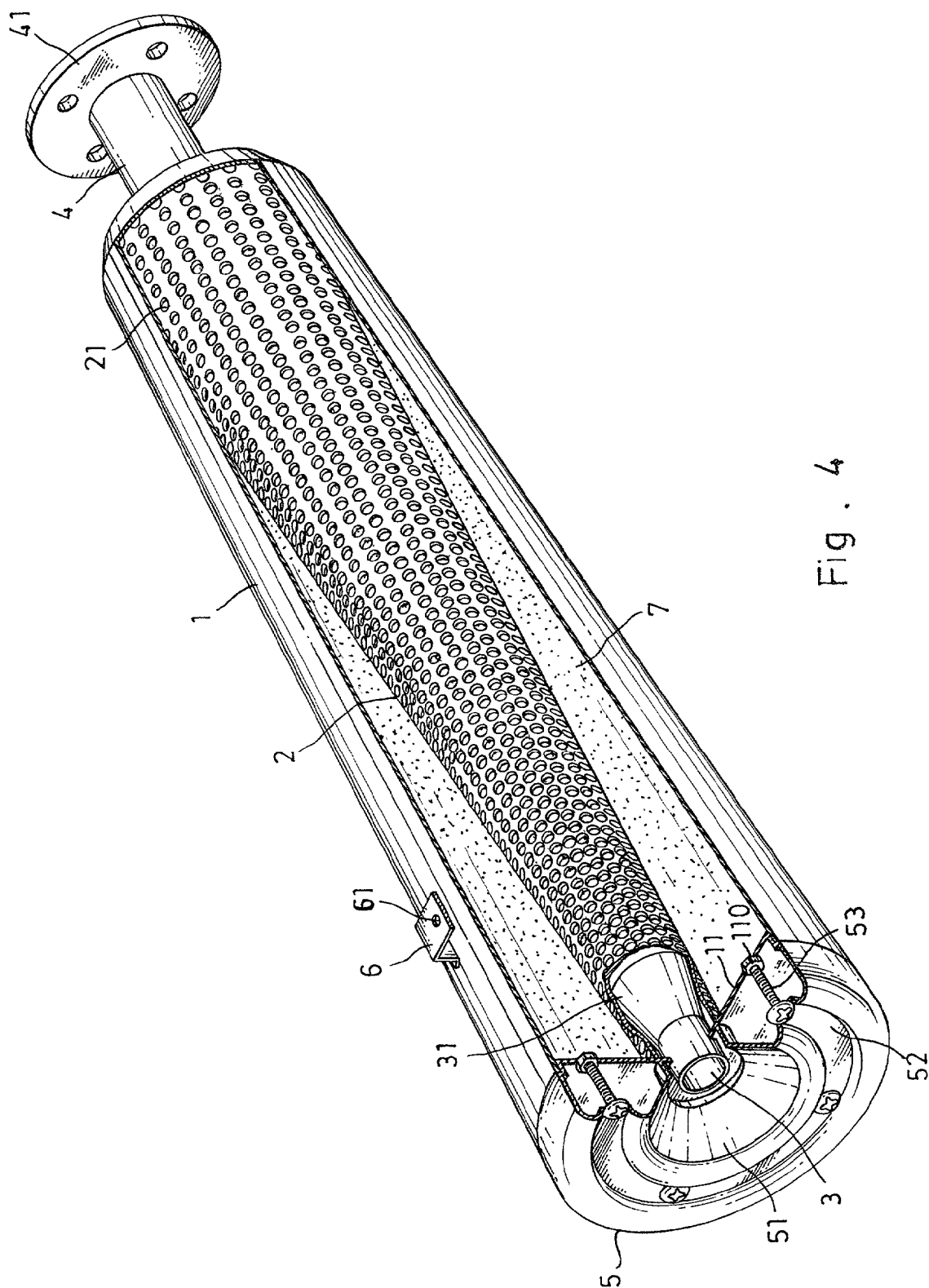


Fig . 4

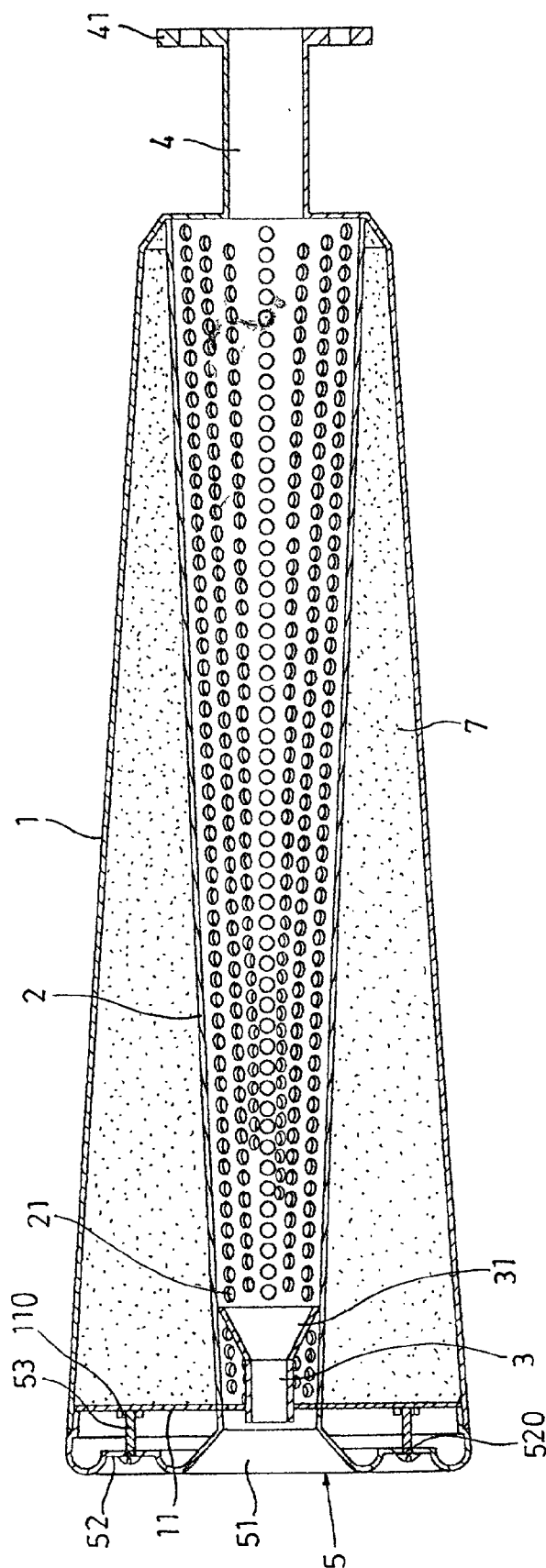


Fig. 5

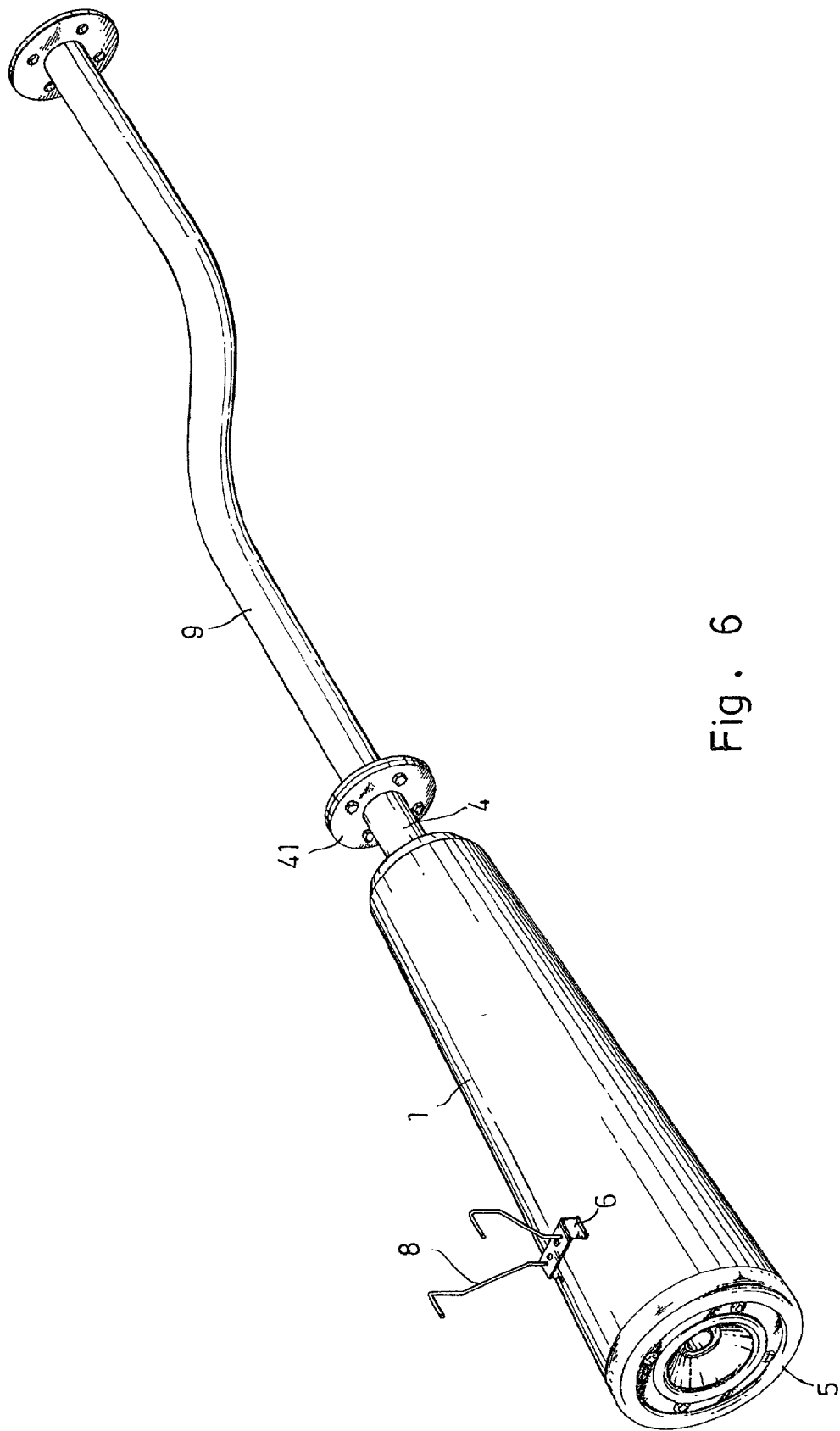


Fig . 6

## STRUCTURE OF A MUFFLER AT THE REAR OF EXHAUST PIPE

### BACKGROUND OF THE INVENTION

#### [0001] 1. Field of the Invention

[0002] The present invention relates to an improved structure of a muffler at the rear end of an exhaust pipe, more particularly to a muffler comprising a tapered inner pipe inside a tapered conical outer pipe, and further having a tapered sleeve being disposed in the inner pipe proximate to the rear end of the inner pipe to increase the output torque of the engine and reduce the noise, and by the design of a gas-receiving pipe with a French connector being soldered to the front end of the external pipe, and an n-shaped fixing bracket being soldered to the external pipe to provide an easy installation for all sorts of vehicles.

#### [0003] 2. Description of the Related Art

[0004] The conventional muffler used for the exhaust pipe of vehicles has existing shortcomings or inferior designs. Please refer to **FIG. 1** for the prior art mufflers. The inner pipe having silencing holes is disposed inside the outer pipe, and the silencing cotton is being wrapped around the wall of the inner pipe. However, the shortcoming of this design is not able to enhance the torque of the engine, and since the airflow directly collides on the pipe wall to generate a larger noise. Furthermore, it needs to preinstall by soldering a connecting pipe and positioning bar according to the specification of a specific vehicle model at the front end and external surface of the external pipe. It makes the installation difficult, time-consuming, and waste of labor.

[0005] In summation of the above description about the prior art waiting for a breakthrough, the present inventor herein enhances the performance of the conventional structure by performing research and development to increase the torque output of the engine, reduce the noise, and provides easy installation for all sorts of vehicles.

### SUMMARY OF THE INVENTION

[0006] The main objective of this invention is to provide an improved structure of a muffler at the rear of the exhaust pipe, which utilizes the coupling of the tapered conical shape of the external pipe and the tapered inner tape and the densely distributed silencing holes on the wall of the inner pipe, in addition to the silencing cotton wrapped around the external side, and a tapered sleeve being installed to the internal rim at the rear end of the inner pipe to form an appropriate backpressure in order to enhance the torque output of the engine.

[0007] The secondary objective of the present invention is to provide an improved structure of a muffler at the rear of the exhaust pipe, which utilizes a tapered inner pipe and a tapered sleeve at the internal rim proximate to the rear end of the inner pipe to accelerate the airflow. The distance between the inner pipe and the external pipe gradually increases thereby reduce the noise generated by airflow collision on the external pipe.

[0008] Another objective of the present invention is to provide an improved structure of a muffler at the rear of the exhaust pipe, which uses a design of a gas-receiving pipe with a French connector and an n-shaped bracket located at

an appropriate position on the external side at the rear end of the external pipe to facilitate the installation for different types of vehicles.

[0009] To make it easier for our examiner to understand the objective of the invention, its structure, innovative features, and its performance, we use a preferred embodiment together with the attached drawings for the detailed description of the invention.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Other objects, features, and advantages of the invention will become apparent from the following detailed description of the preferred but non-limiting embodiment. The description is made with reference to the accompanying drawings, in which:

[0011] **FIG. 1** illustrates the cross-section of the conventional muffler at the rear of the exhaust pipe.

[0012] **FIG. 2** illustrates the three-dimensional appearance of the conventional muffler at the rear of the exhaust pipe.

[0013] **FIG. 3** illustrates the three-dimensional appearance of the muffler at the rear of the exhaust pipe according to the present invention.

[0014] **FIG. 4** is a three-dimensional diagram illustrating a part of the cross-section of the muffler at the rear of the exhaust pipe according to the present invention.

[0015] **FIG. 5** is a three-dimensional diagram illustrating the cross-section of the muffler at the rear of the exhaust pipe according to the present invention.

[0016] **FIG. 6** is a three-dimensional diagram illustrating the installation of a preferred embodiment according to the present invention.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0017] Please refer to **FIGS. 4 and 5** for an improved structure of a muffle at the rear of the exhaust pipe according to the present invention. The muffler at the rear of the exhaust pipe comprises an external pipe **1**, an inner pipe **2**, a sleeve **3**, a gas-receiving pipe **4**, a decorative lid **5**, and an n-shaped fixing bracket **6**. The detailed structure is described below:

[0018] The external pipe **1** is a hollow ascending tapered pipe, having a gas-receiving pipe **4** with a French connector **41** soldered to the front end of the external pipe **1**. The internal rim of the external pipe **1** has an opening equal in internal diameter with that of the tapered inner pipe **2**. The wall of the inner pipe **2** has a plurality of densely distributed silencing holes **21**, and a silencing cotton **7** being wrapped around the external edge of the inner pipe **2**. A sleeve **3** having a conical pipe opening **31** is disposed at the internal edge proximate to the rear end of the inner pipe **2**, and the diameter of the opening of the sleeve **3** exactly fits into wall hole at the inner edge surface of the inner pipe **2**. The end of the sleeve **3** slightly passes through the edge surface **11** at the rear end of the external pipe **1**, and a decorative lid **5** covers the rear edge surface **11** of the external pipe **1**. The center of such decorative lid **5** forms a diverging conical hole **51** that exactly fits the rear end of the sleeve **3** into the



central conical hole **51**, and an appropriate part of the decorative lid **5** being latched into a ringed groove **52**. The ringed groove **52** has penetrating holes **520** for mounting the rear edge surface **11** of the external pipe **1** to the corresponding position of the soldered nuts **110** by the screws **53**.

[0019] Please refer to **FIG. 5** for the structural function of the present invention. When the waste gas enters the gas-receiving pipe **4** having a French connector **41** of the inner pipe **2**, due to the larger cross-sectional area of the front end opening of the inner pipe **2**, the airflow will slow down to fill up and then accelerate according to the tapered shape of the inner pipe **2**. The airflow is affected by the tapered end of the sleeve **3** proximate to its rear end opening; it produces an appropriate backpressure to increase the torque output of the engine. Furthermore, the airflow in the inner pipe **2** accelerating in the external pipe **1** with opposite tapered direction can reduce the noise produced by the airflow collision on the external pipe **1**.

[0020] The assembly of the present invention as shown in **FIG. 6** has an n-shaped fixing bracket **6** being soldered to an appropriate position at the rear section proximate to the external side of the external pipe **1**. Such n-shape fixing bracket **6** has a plurality of fixing holes **61** to mount the bar **8** onto the fixing bracket **6**. The gas-receiving pipe **4** having a French connector **41** at the front end of the external pipe can be coupled to different types of connecting pipes **9**. It makes the installation of the present invention much easier, and is unlike the inconvenient prior art technology that needs to solder the fixing bar and connecting pipe **9** to the muffler.

[0021] In summation of the above description, the present invention herein overcomes the shortcomings of the conventional mufflers and further complies with the patent application requirements and is submitted to the Patent and Trademark Office for review and granting of the commensurate patent rights.

[0022] While the invention has been described by way of example and in terms of a preferred embodiment, it is to be

understood that the invention is not limited thereto. To the contrary, it is intended to cover various modifications and similar arrangements and procedures, and the scope of the appended claims therefore should be accorded the broadest interpretation so as to encompass all such modifications and similar arrangements and procedures.

What is claimed is:

1. A muffler structure at the rear end of an exhaust pipe, mainly comprising a converging tapered external pipe disposed in a diverging tapered inner pipe; a plurality of densely distributed silencing holes being disposed on the wall of said inner pipe; a silencing cotton being wrapped around the external edge of the inner pipe; a sleeve being coupling to the internal edge proximate to the rear end of the inner pipe; and a converging tapered conical pipe opening at the front end of said sleeve; and the rear end slightly extends outside the rear edge surface of the external pipe.

2. A muffler structure at the rear end of an exhaust pipe as claimed in claim 1, wherein the front end of said external pipe being mounted to a gas-receiving pipe with a French connector, and the diameter of the opening of the gas-receiving pipe is smaller than the diameter of the opening at the front end of the inner pipe.

3. A muffler structure at the rear end of an exhaust pipe as claimed in claim 1, wherein the external wall of said external pipe proximate to an appropriate position at its rear end being soldered with an n-shaped fixing bracket.

4. A muffler structure at the rear end of an exhaust pipe as claimed in claim 1, wherein the rear edge surface of said external pipe being coupled to a decorative lid, and the center of said decorative lid forming an diverging conical hole, and a ringed groove being disposed in an appropriate depressed position of the decorative lid, and the ringed groove having a penetrating hole, thereby a screw being mounted to the soldered nut at the rear edge of the external pipe.

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