



(11) **EP 2 110 522 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
21.10.2009 Bulletin 2009/43

(51) Int Cl.:
F01N 1/00 ^(2006.01) **F01N 1/08** ^(2006.01)
F01N 7/02 ^(2006.01)

(21) Application number: **08425254.3**

(22) Date of filing: **15.04.2008**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT
RO SE SI SK TR**
Designated Extension States:
AL BA MK RS

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(54) **Silencer for high suppression of exhaust noise**

(57) Silencer comprising an outside containing body (3), an inside chamber (5) with holes onto the inside wall, roving (4) placed into the inside chamber (5) and separators (6) with connection pipes (7). The silencer consist of a V-shaped pipe (8) connected to the central separators (6) having its inside part (9) with an area 40% smaller

than the inside part (2) of the exhaust gas inlet pipe (1) and of a final exhaust pipe (10) having its inside part (11) with an area 10% bigger of the inside part (2) of the exhaust gas inlet pipe (1).

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Description

"Silencer for high suppression of exhaust noise".

[0001] The invention refers to a new and original silencer able to considerably suppress the exhaust noise. In the art the conventional silencers, i.e. providing separators connected each others with openings, determine a exhaust noise suppression on an average of 35 or 38 decibels in comparison with the 100 decibels gave out to an engine without silencer. The invented silencer is able to suppress the exhaust noise from the 100 decibels to the 50 or 55 decibels. It is known in the previous art the apparatus described in the Italian patent BO2004A000701 where roving is used, like heat insulator and to suppress the noise, together with sharp edges obtained to the direction change of the exhaust pipe to muffle the pressure wave of the exhaust gasses. In said Italian patent BO2004A000701 the gasses flow in U-shaped or Z-shaped pipe to act like silencer. In the invented silencer the suppression of the pressure gradient of the exhaust gasses is obtained with set placing of silencers with median connection element between the silencers able to further suppress the exhaust noise. Aims and advantages of the invention are better pointed out to the detailed description of a preferred but not exclusive embodiment, together with the enclosed drawings of the sheets 1 and 2 which show for an example the invention. In detail in sheet 1 figure 1 is longitudinal section view of the invention. Figure 2 is transversal section view of a silencer with oval-shaped section. Figure 3 is transversal section view of a silencer with round-shaped section. In sheet 2 figure 4 is perspective view of the invented silencer with cutaway of the central part. The invented silencer consists of an exhaust gas inlet pipe 1 having an inside part 2 of dimension suitable to the exhaust engine pipe to which is connected. The inlet pipe 1 is connected to the outside containing body 3 of the oval-shaped or round-shaped silencer. Said outside containing body 3 has an inside chamber 5 in which the roving 4 is placed, where the inside chamber 5 is realized in metal perforated onto the inside wall. In the inside part of the silencer, further, separators 6 are provided with connection pipes 7 placed between the separators having inside diameter of five millimetres smaller than the diameter of the inlet pipe 1. Centrally to the outside containing body 3 and connected to the two central separators 6 a V-shaped pipe 8 is provided with inside part 9 having an area 40% smaller than the inside part 2 of the exhaust gas inlet pipe 1. On the other end the invented silencer provides a final exhaust pipe 10 with inside part 11 having an area 10% bigger in comparison with the inside part 2 of the exhaust gas inlet pipe 1. In working the exhaust gasses coming from an engine enter in the inlet pipe 1 and, into the outside containing body 3, the pressure gradient of the exhaust gas is suppressed by means of the passage inside the chambers obtained with the separators 6 in connection with the connection pipes 7. In this first part

of the silencer, that consists of a first silencer placed in set connection with a second silencer by the V-shaped pipe 8, the exhaust noise is in part suppressed. The noise is then further suppressed and in higher manner by the forcing passage inside the V-shaped pipe 8. At the end the exhaust gasses flow in the second silencer placed over the V-shaped pipe 8 to be further slowed and get out to the final exhaust pipe 10 with reduced noise. Also the roving 4 helps the noise reduction and the silencer head insulation such as it resists to the high temperatures with low thermal conductivity and it has in its inside air trapped in its structure placed inside the chamber 5, so further increasing the noise reduction action. The layout of the silencers in set connected by V-shaped pipe 8 is repeatable also more times for other applications and with higher exhaust noise suppression. Infact, placing in set more of two silencers connected to the V-shaped pipe 8 is possible to suppress the exhaust noise to the value suitable, considering that the embodiment with two silencers connected with V-shaped pipe 8 is able to suppress the decibels at the exhaust of about a half in comparison with the noise gave out to an engine without silencer. While the preferred embodiment of the invention has been described in detail, the invention is not limited to the specific embodiment described above. Further modifications and extensions of the present invention may be developed, and all such modifications are deemed to be within the scope of the present invention as defined by the appended claims.

Claims

1. Silencer for high suppression of exhaust noise comprising an outside containing body (3), an inside chamber (5) with holes onto the inside wall, roving (4) placed into the inside chamber (5) and separators (6) with connection pipes (7) **characterized in that** to have a V-shaped pipe (8) connected to the central separators (6); and **in that** the inside part (9) of the V-shaped pipe (8) has an area 40% smaller than the inside part (2) of the exhaust gas inlet pipe (1); and **in that** the final exhaust pipe (10) has inside part (11) with an area 10% bigger in comparison with the inside part (2) of the exhaust gas inlet pipe (1).
2. Silencer for high suppression of exhaust noise, as per claim 1, **characterized in that** to consist of more of two silencers placed in set and connected each others by a V-shaped pipe (8) to suppress the exhaust noise to the suitable value.

FIG.1

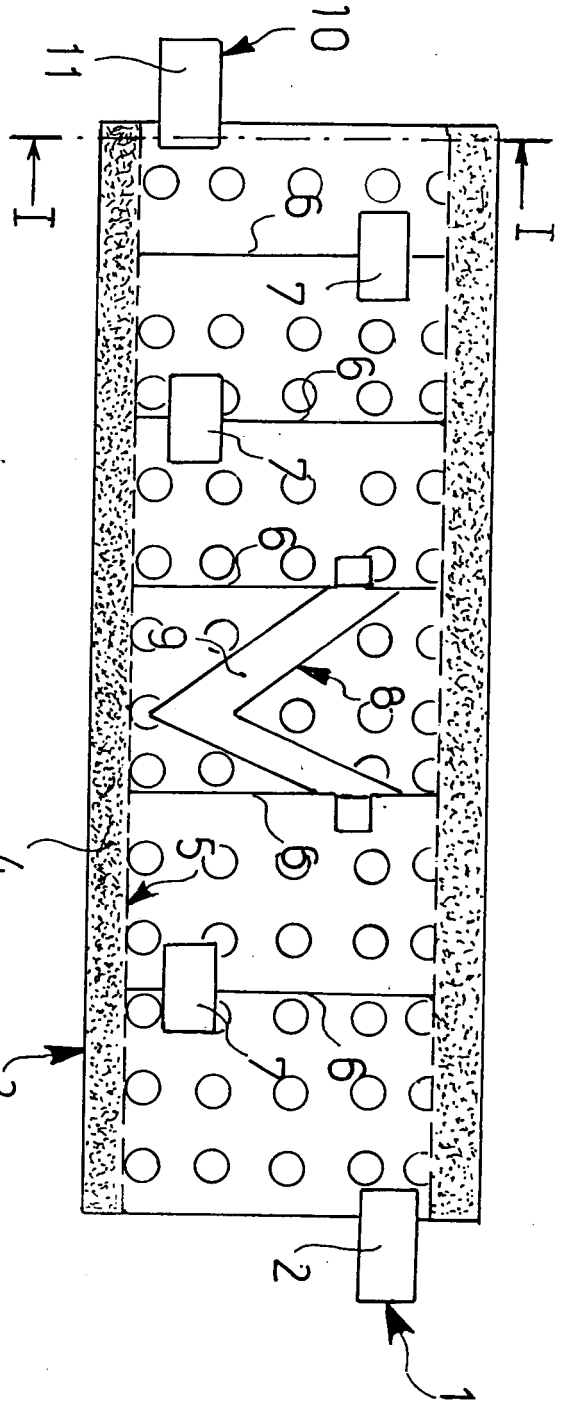


FIG.2

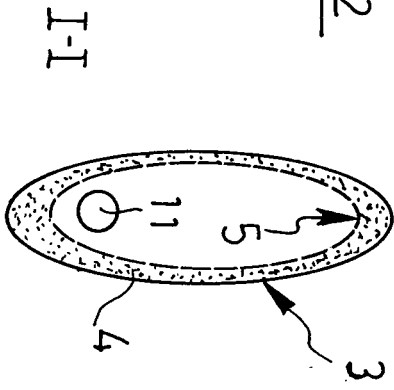


FIG.3

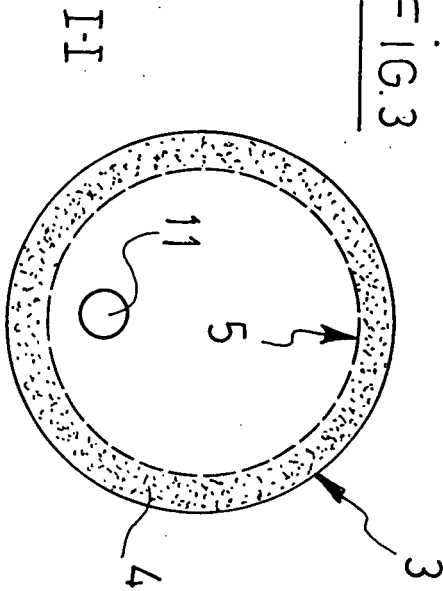
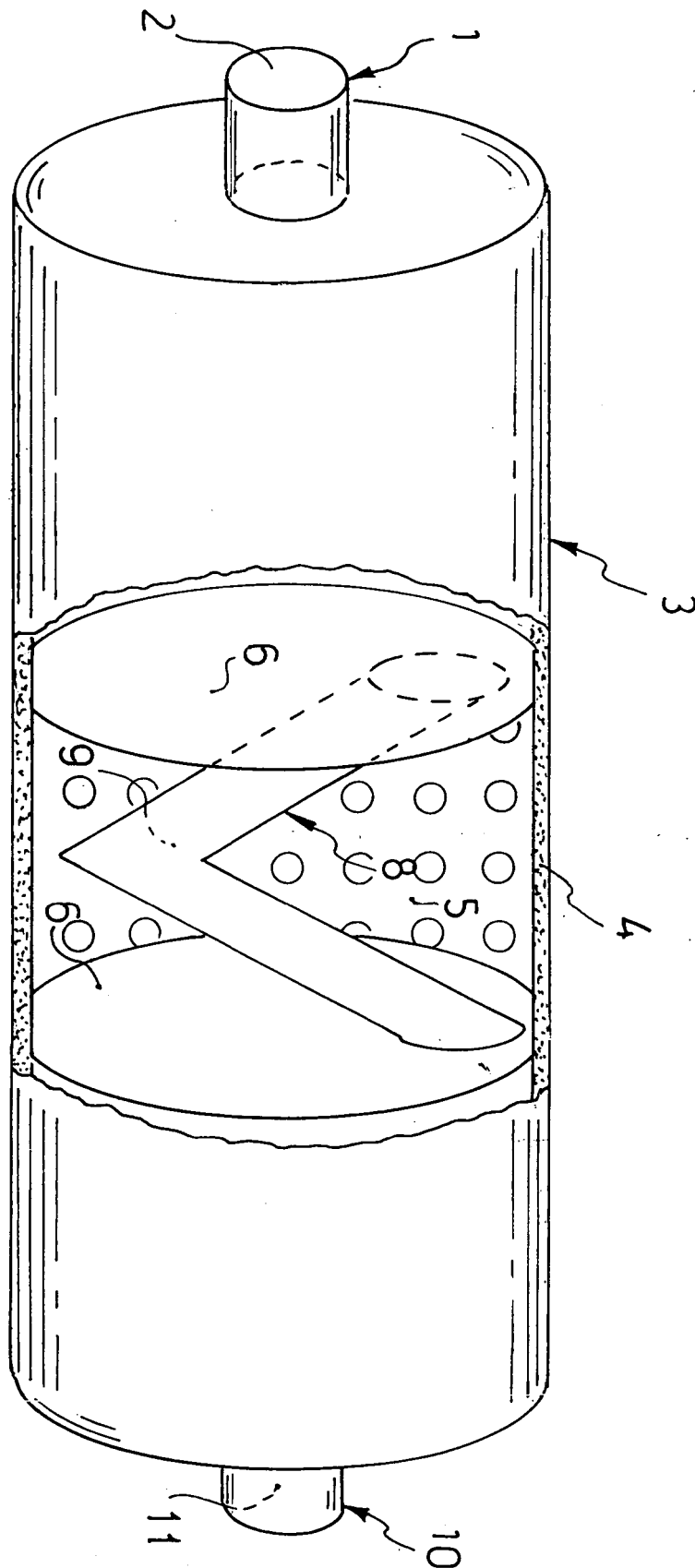


FIG. 4





EUROPEAN SEARCH REPORT

Application Number
EP 08 42 5254

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	GB 619 105 A (MAXIM SILENCER CO) 3 March 1949 (1949-03-03) * the whole document *	1,2	
A	DE 29 30 668 A1 (DOLMAR MASCHFAB) 12 February 1981 (1981-02-12) * page 16, paragraph 2 - page 17; figure 6 *	1,2	
			TECHNICAL FIELDS SEARCHED (IPC)
			F01N
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 13 October 2008	Examiner Louchet, Nicolas
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 08 42 5254

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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13-10-2008

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