

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) Publication number:

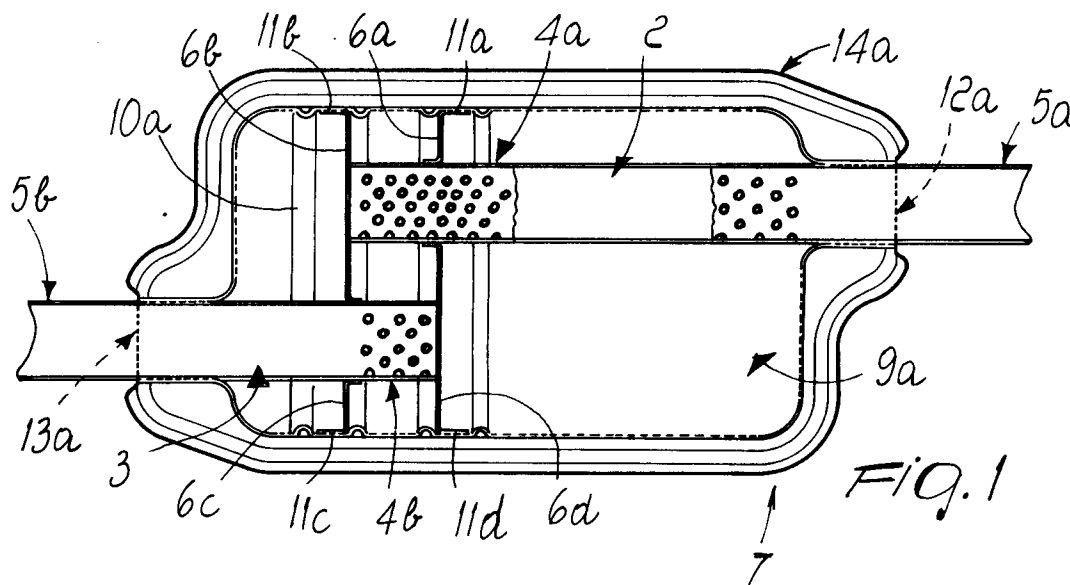
0 563 843 A1

(12)

EUROPEAN PATENT APPLICATION(21) Application number: **93105139.5**(51) Int. Cl.⁵: **F01N 7/18**(22) Date of filing: **29.03.93**(30) Priority: **31.03.92 IT TV920045**(43) Date of publication of application:
06.10.93 Bulletin 93/40(84) Designated Contracting States:
AT BE DE ES FR GB IT(71) Applicant: **MARMITTE ZARA S.p.A.**
Via Crevada 67
I-31020 Refrontolo (Treviso)(IT)(72) Inventor: **Zara, Renato**
Via Oslavia 22
I-31015 Conegliano (Treviso)(IT)(74) Representative: **Modiano, Guido, Dr.-Ing. et al**
Modiano & Associati S.r.l.
Via Meravigli, 16
I-20123 Milano (IT)(54) **Method for manufacturing mufflers for motor vehicles and mufflers obtained thereby.**

(57) The method for obtaining mufflers for motor vehicles entails the steps of manufacturing pipes (2,3) each provided with a perforated end (4a,4b) clamped to separator endplates (6a,6b,6c,6d); manufacturing a first half-shell (7) and a second half-shell (8) provided with first and second half-sleeves (12a,12b) for the exit of the imperforate and appropriately shaped

end of the pipes (2,3); assembling, by seaming, the first and second half-shells (7,8) so as to define a container, and; sealing the container at the first and second half-sleeves (12a,12b) and at the seam defined between the half-shells (7,8). The method thus allows to obtain a muffler which has no welds.

**EP 0 563 843 A1**

The present invention relates to a method for manufacturing mufflers or exhausts for motor vehicles and to mufflers obtained with said method.

The manufacture of some mufflers for motor vehicles entails the assembly of numerous sub-components, constituted by external pipes, internal pipes, endplates and others, by employing connecting systems which are partially mechanical, and thus based on seaming and/or clamping or other methods, and are partially welded.

As regards welding, since it is performed on reduced thicknesses, one observes an alteration in the chemical-physical characteristics of the material which affect its resistance to the corrosive action of the chemical agents which are present in the exhaust gas.

This causes significant deterioration of the muffler, which soon becomes unusable, for example due to the formation of holes.

Therefore, the use of welds reduces the quality of the product, in terms of the ability of the muffler to maintain its sound-absorbing characteristics.

One possible solution is to use materials, such as for example stainless steel, but this approach is excessively expensive and adversely affects production costs.

The aim of the present invention is therefore to eliminate the problems described above in known types by providing a method which allows to obtain, at modest costs, mufflers which are uniform in the chemical, physical and mechanical characteristics of their various components and are less susceptible to the corrosive action of the chemical agents which are present in exhaust gases and consequently have a longer life.

Within the scope of the above aim, an important object of the invention is to provide a muffler which is reliable and safe in use and has low manufacturing costs.

A further object of the invention is to provide a muffler which can be industrialized by means of known machines and equipment.

According to one aspect of the invention, this aim, these objects and others which will become apparent hereinafter are achieved by a method for obtaining mufflers for motor vehicles, characterized in that it comprises the following steps:

- a) manufacture of pipes provided with a single perforated end which is assembled, by clamping, to one or more separator endplates;
- b) manufacture of a first half-shell and of a second half-shell which are approximately mutually symmetrical and are provided with first and second half-sleeves for the exit of the imperforate and appropriately shaped end of said pipes;
- c) assembly, by seaming, of said first and second half-shells so as to define an external con-

tainer which is sealed at said first and second half-sleeves and at said seam.

According to another aspect of the invention, the above-mentioned aim and objects are achieved by a muffler, characterized in that it is constituted by a first half-shell and by a second half-shell, which are mutually seamed so as to perimetricaly define a sealed container, and by at least two pipes which have one perforated end arranged inside said container and one imperforate end which protrudes outside said container and is appropriately shaped.

Further characteristics and advantages of the invention will become apparent from the detailed description of a particular but not exclusive embodiment, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

- figure 1 is a plan view of the pipes, already assembled by clamping together with the endplates and arranged at the first half-shell;
- figure 2 is a plan view of the second half-shell;
- figure 3 is a front view of the muffler in an assembled condition;
- figure 4 is a side view of the second half-shell.

With reference to the above figures, the method for obtaining mufflers, generally designated by the reference numeral 1, particularly but not exclusively for motor vehicles, comprises various manufacturing steps which initially entail the manufacture of at least one first pipe 2 and of a second pipe 3, each of which has a first perforated end, designated by the reference numerals 4a and 4b, and a second intact and thus imperforate end, designated by the reference numerals 5a and 5b; said ends are appropriately shaped according to the specific motor vehicle model with which they must be associated, and means for coupling to supports defined below the chassis of the motor vehicle are associated with said ends.

The first ends 4a and 4b of the first pipe 2 and of the second pipe 3 are mutually assembled by clamping by means of the interposition of one or more separator endplates which, in the particular embodiment, are constituted by one or more walls or wall regions designated by the reference numerals 6a, 6b, 6c and 6d.

The method entails, subsequently or simultaneously with respect to the preceding steps, the manufacture of a first half-shell 7 and of a second half-shell 8, for example by pressing metal plates; said half-shells are substantially mutually symmetrical.

Each one of said first and second half-shells is provided with a half-cavity, designated by the reference numerals 9a and 9b, within which the first pipe and the second pipe, already assembled at the separator endplates, can be arranged.

Advantageously, ridges 10a and 10b are defined at the half-cavities 9a and 9b, and shaped wings 11a, 11b, 11c and 11d of the walls 6a, 6b, 6c and 6d can be arranged between said ridges.

Each one of said first and second half-shells is furthermore provided respectively with first half-sleeves 12a and 12b and with second half-sleeves 13a and 13b which can be mutually superimposed during the coupling between said first and second half-shells.

Said first and second half-sleeves have such a shape as to surround, during the subsequent step of the assembly of said first and second half-shells, part of the second ends 5a and 5b of the first pipe 2 and of the second pipe 3 so as to form a mechanical seal.

The method then entails the assembly, by seaming at the perimetric edges 14a and 14b, of the first and second half-shells so as to define a container 15 which contains the first ends 4a and 4b of the first pipe and of the second pipe and any other acoustic insulation devices which may be provided; the appropriately shaped second ends 5a and 5b protrude outside the container 15 and are provided with means for coupling to supports defined below the chassis of the motor vehicle, for connection for example to the exhaust manifolds of the engine or to other devices.

The shape of the first and second half-sleeves in fact allows to seal the inside of the container 15 during the seaming of the perimetric edges 14a and 14b.

One thus obtains a muffler 1 which, once assembled, has no welds.

It has thus been observed that the method and the product obtained thereby have achieved the intended aim and objects, a muffler having been obtained which has no welds and thus has a longer life than known mufflers, optimally withstanding the corrosive action of the chemical agents present in exhaust gases.

Furthermore, the method for obtaining the muffler allows to use non-noble materials with possibly modest thicknesses, since all the connections are mechanical, and this allows to considerably reduce manufacturing costs.

The cost of manufacturing equipment is also reduced, since welding stations controlled by specific personnel or by highly expensive robotized structures are not necessary.

The method and the muffler obtained thereby are naturally susceptible to numerous modifications and variations, all of which are within the scope of the same inventive concept.

The materials and the components which constitute the product may naturally also be the most pertinent according to the specific requirements.

The sequence of the method steps may also be changed according to the specific requirements.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Method for obtaining mufflers for motor vehicles, characterized in that it comprises the following steps:
 - a) manufacture of pipes provided with a single perforated end which is assembled, by clamping, to one or more separator end-plates;
 - b) manufacture of a first half-shell and of a second half-shell which are substantially mutually symmetrical and are provided with first and second half-sleeves for the exit of appropriately shaped ends of said pipes;
 - c) assembly, by seaming, of said first and second half-shells so as to define an external container which is sealed at said first and second half-sleeves and at said seam.
2. Method according to claim 1, characterized in that it comprises the manufacture of at least one first pipe and at least one second pipe, each pipe having a first perforated end and a second imperforate end, said second ends having appropriate dimensions and shapes according to the specific motor vehicle model with which they are to be associated.
3. Method according to claims 1 and 2, characterized in that it comprises the step of mutually assembling said first ends of said first and second pipes by clamping and interposing one or more separator endplates.
4. Method according to claims 1 and 3, characterized in that it comprises, a step of manufacturing at least one first half-shell and at least one second half-shell, both preferably manufactured by pressing a metal plate, said first and second half-shells being approximately mutually symmetrical.
5. Method according to claims 1 and 4, characterized in that it comprises the step of providing each one of said first and second half-shells with a half-cavity within which said first and second pipes, already assembled to said

one or more separator endplates, can be arranged.

which protrudes outside said container.

6. Method according to claims 1 and 5, characterized in that it comprises the step of arranging an acoustic insulation device within said half-cavities. 5

7. Method according to claims 1 and 5, characterized in that it comprises the steps of forming ridges at said half-cavities and shaped wings on said one or more separator endplates, and arranging said wings between said ridges. 10
15

8. Method according to one or more of the preceding claims, characterized in that it comprises the step of forming on each one of said first and second half-shells, first and second half-sleeves, and mutually superimposing said half-sleeves when coupling said first and second half-shells. 20

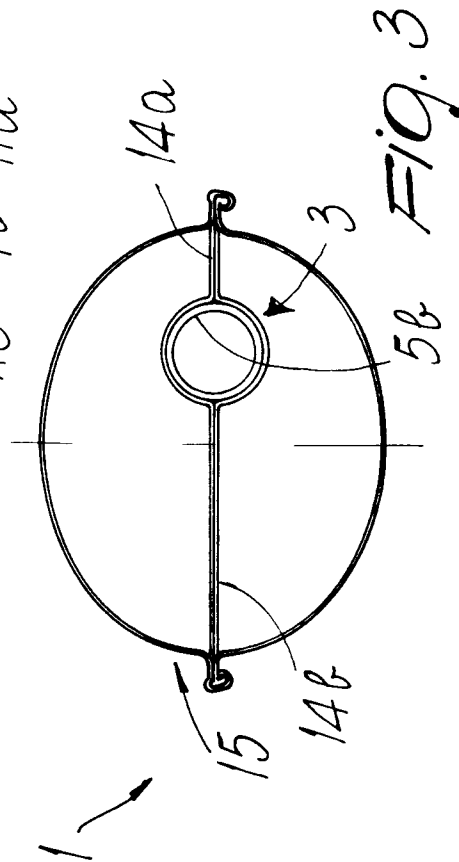
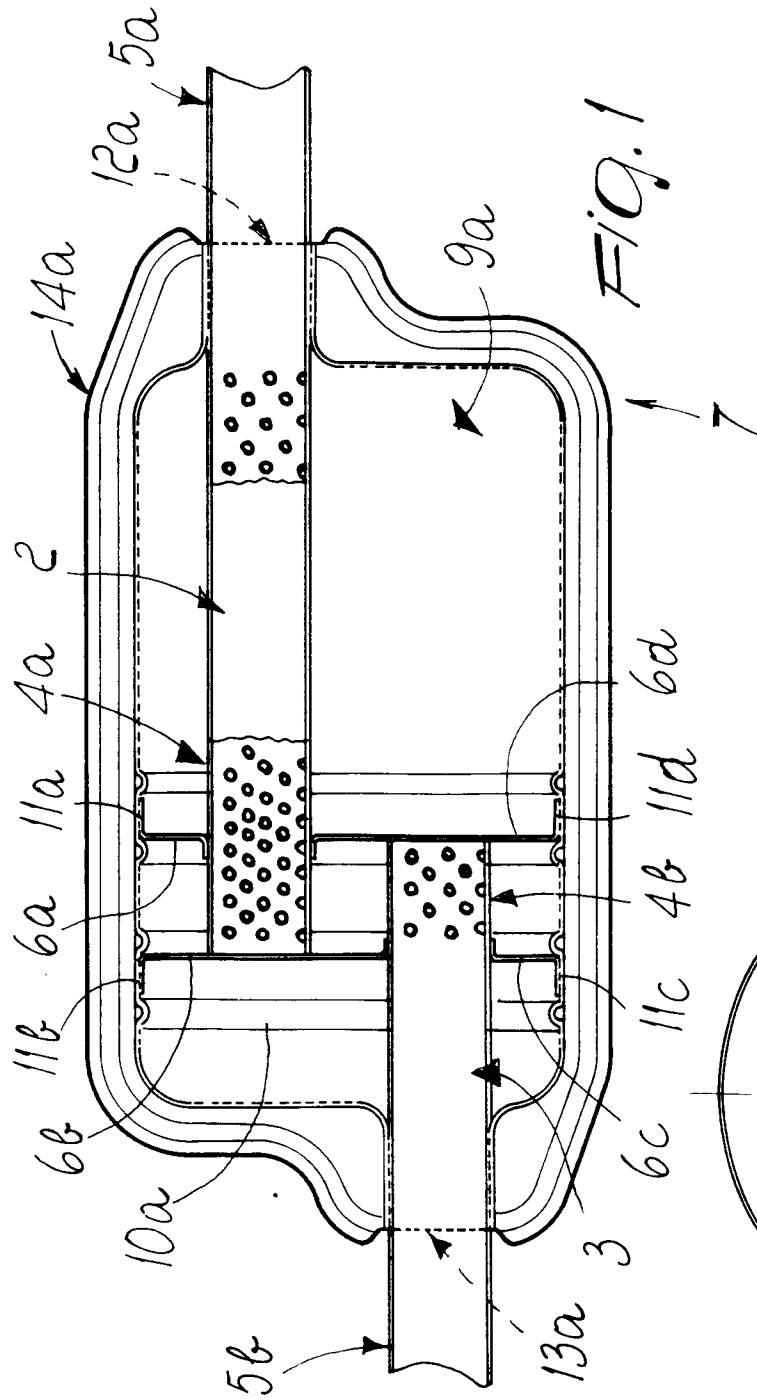
9. Method according to claims 1 and 8, characterized in that it comprises the step of forming said first and second half-sleeves with a shape which surrounds, during assembly of said first and second half-shells, part of said second ends of said first and second pipes, whereby to form a mechanical seal. 25
30

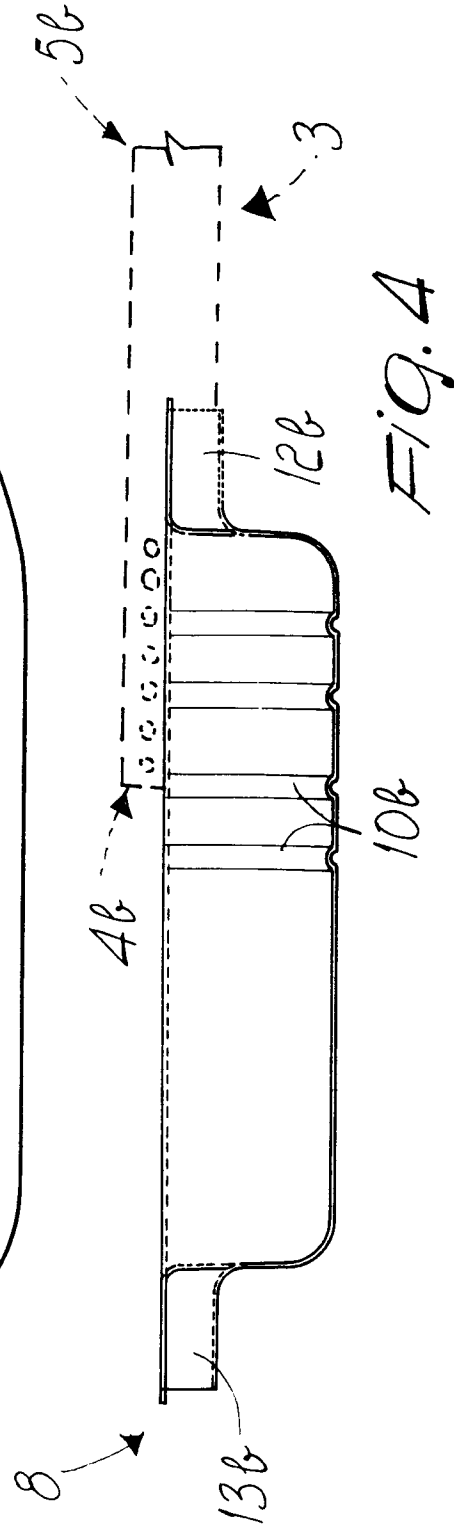
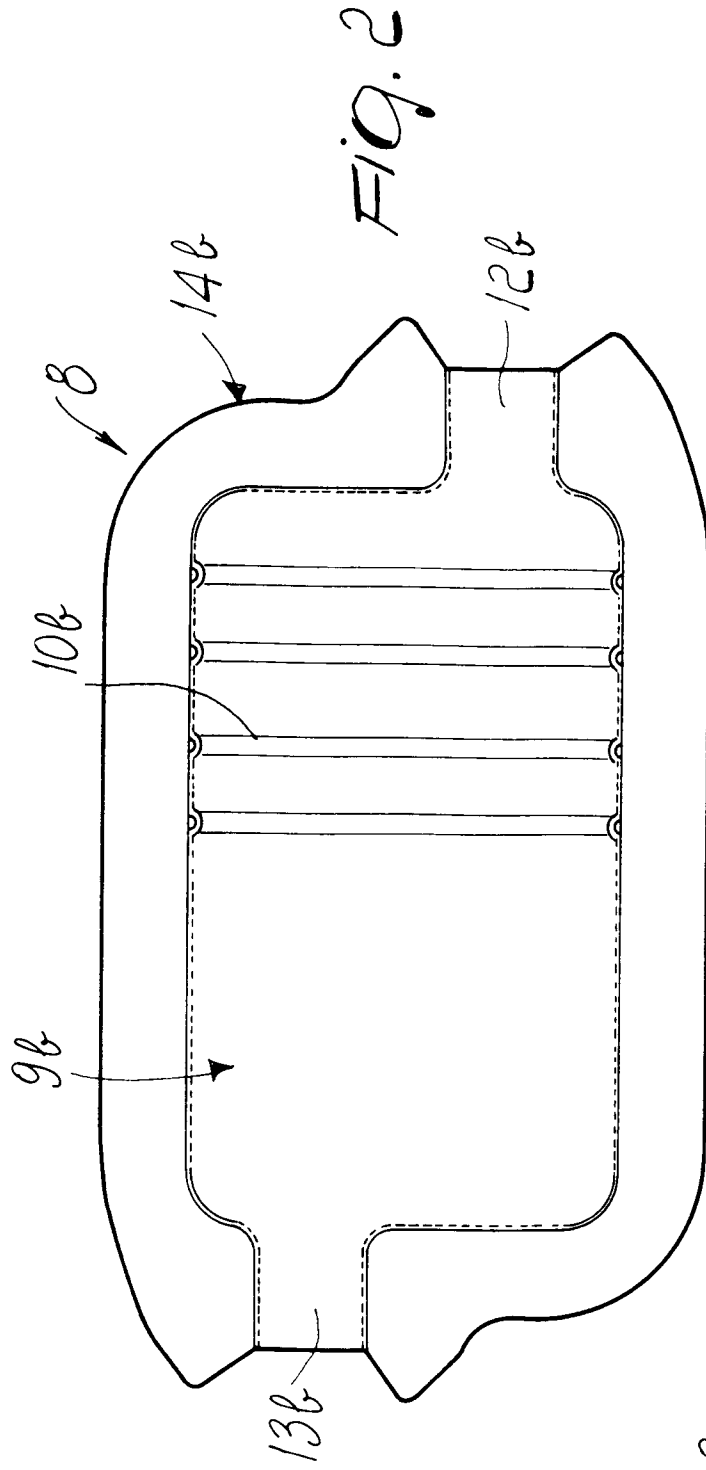
10. Method according to claims 1 and 9, characterized in that it comprises the step of assembling said first and second half-shells by seaming at the perimetric edges, whereby to define a container which contains said first ends of said first and second pipes. 35

11. Method according to claims 1 and 10, characterized in that it comprises the step of assembling said first and second pipes such that said second ends protrude externally from said container. 40

12. Method according to claims 1 and 11, characterized in that it comprises the step of shaping said first and second half-sleeves whereby to seal the inside of said container during assembly of said first and second half-shells and during the step of seaming said perimetric edges. 45
50

13. A muffler, characterized in that it comprises a first half-shell and a second half-shell, which are mutually seamed so as to perimetrically define a sealed container, and by at least two pipes which have one perforated end arranged inside said container and one imperforate end 55







European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 93 10 5139

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	AU-B-533 827 (C.T.E. TOOLING PTY. LIMITED)	13	F01N7/18
Y	* the whole document *	1-6,8-12	

Y	EP-A-0 057 142 (ÉTABLISSEMENTS LETANG ET REMY) * page 2, line 1 - line 17 * * page 3, line 14 - page 4, line 26; figures 1,5,6 *	1-6,8-12	

X	DE-A-3 911 244 (MERTINS)	13	
A	* column 2, line 65 - column 3, line 18; figures 1,2 *	1,3-6, 8-12	

A	US-A-3 262 189 (NORDQUEST) * column 1, line 58 - column 2, line 43 * * column 3, line 36 - line 43; figures 1,2 *	1-5	

A	DE-A-1 924 298 (EBERSPÄCHER) * page 5, line 1 - line 7; figure 1 *	7	

A	BE-A-511 898 (MANGE)		TECHNICAL FIELDS SEARCHED (Int. Cl.5)

A	EP-A-0 337 877 (REGIE NATIONALE DES USINES RENAULT)		F01N

A	US-A-4 486 932 (HALL)		

The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 23 JUNE 1993	Examiner FRIDEN C.M.
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	