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• **Verbeeck, Jos**
4735 Petange (LU)
• **Frisch, Claude**
3933 Mondercange (LU)

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(74) Representative: **Beissel, Jean et al**
Office Ernest T. Freylinger S.A.
234, route d'Arlon
B.P. 48
8001 Strassen (LU)

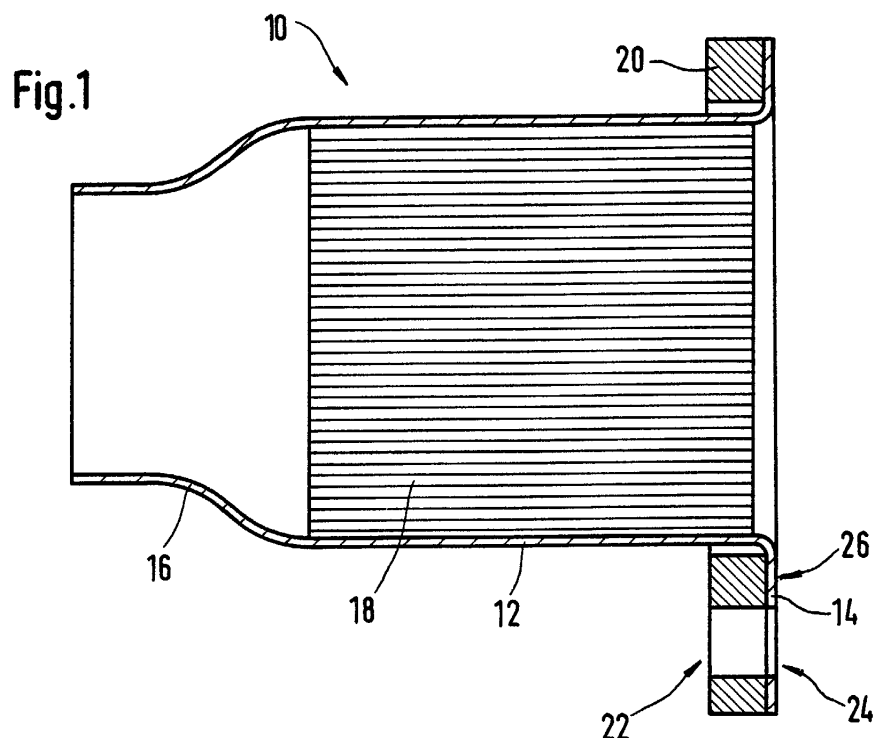
(71) Applicant: **Delphi Technologies, Inc.**
Troy, MI 48007 (US)

(72) Inventors:
• **Leterre, Michel**
95270 Chaumontel (FR)

(54) **Housing for catalytic converter**

(57) A catalyst housing (10) comprises a tubular middle portion (12), and first and second end portions, wherein said middle portion (12) and said first and second end portions are formed by an integral stamped

part. The first end portion is stamped so as to form a reducing end cap (16) for fitting said catalyst housing to an exhaust tubing and said second end portion is bend outwardly so as to form an outwardly extending flange (18).



Description

[0001] The present invention relates to a catalytic converter and more specifically to a housing for a catalytic converter.

[0002] A catalytic converter block for internal combustion engine is usually arranged inside a specific housing specially adapted for mounting the catalyst block into the exhaust system of the internal combustion engine.

[0003] It is known in the art relating to catalytic converters to provide a housing of the clamshell type formed by two half shells joined along longitudinally extending flanges to form an enclosure for a catalytic element or substrate. The housing may have a cylindrical interior of, for example, circular or oval cross section, depending on the shape of the enclosed element. A supporting mat may be provided to allow for expansion while holding the catalyst element firmly in place. The clamshell housings are easy to assemble but have a longitudinal seam along both sides, which must be welded or otherwise sealed. Alternatively, a tubular or cylindrical body may be provided with separately formed end pieces that are welded on the ends of the tubular body. The end pieces include generally conical walls, which connect the tubular portion enclosing the catalytic element with a smaller end opening for connection with an exhaust system pipe. A catalyst housing of this type is e.g. disclosed in EP-A-0 263 893.

[0004] It is clear, that the assembly of several parts in order to form a catalyst housing is expensive and requires several testing steps in order to insure, that the catalyst housing is leak free. It follows that the manufacture of the housing is expensive and very time consuming.

Object of the invention

[0005] The object of the present invention is to provide a catalyst housing, which is less expensive.

General description of the invention

[0006] In order to achieve the above-mentioned object, the present invention provides a catalyst housing, comprising a tubular middle portion, and first and second end portions, wherein said middle portion and said first and second end portions are formed by an integral stamped part. The first end portion is stamped so as to form a reducing end cap for fitting said catalyst housing to an exhaust tubing and said second end portion is bend outwardly so as to form an outwardly extending flange.

[0007] The catalyst housing according to the present invention thus consists of an integral shell, suitable to serve as containment for a catalyst and which can be used as a warm-up converter to be bolted directly onto the engine manifold, a downpipe or a turbo. The shell comprises a tubular part in which the catalyst will be en-

closed, a flange to seal said tubular part onto the upstream part of the exhaust system and an outlet cone to serve as attachment for the exhaust tubing.

[0008] In contrast to the prior art catalyst housings, the catalyst housing of the present invention is made of one stamped part so that the cost of purchased parts is significantly lower as with state of the art housings. Furthermore, due to the one part design, the assembly and test steps are eliminated. Finally the one part design of the housing guarantees that there is no leakage due to leaking welds, no deformation of the housing due to heat input during welding, no weld spatter or contamination inherent in the welding process and no risk of dimensional non-conformities due to the assembly process. It follows that the quality of the catalyst housing according to the present invention is highly improves with respect to prior art housings.

[0009] The outwardly extending flange comprises a front surface and an opposing rear surface, the rear surface being directed towards the middle portion of said housing. According to a preferred embodiment of the invention said front surface comprises a sealing surface surrounding the opening of said tubular middle portion. This sealing surface is beneficial for a leakproof assembly of the housing onto the engine manifold or the downpipe. The sealing surface can simply consist of an region of the front surface having well defined surface characteristics, such as roughness and/or planarity. This region may have an annular form or any other suitable form surrounding the opening of the catalyst housing. The sealing surface is preferably created during the stamping process of the shell, so that no further machining of the housing is required.

[0010] In a preferred embodiment of the invention, the housing further comprises a ring shaped fastening element, said fastening element having an inner opening substantially equal to the outer form of said middle portion of said stamped part. This fastening element is preferably arranged around said tubular middle portion and abuts against said outwardly extending flange for mounting said catalyst housing onto a corresponding flange of an exhaust tubing or an engine manifold. The ring shaped fastening element acts as reinforcing element for providing the required sealing force between the flange and the upstream exhaust system. In fact, since the housing is formed of a tubular sheet metal, the outwardly extending flange does hardly provide the necessary stiffness for securely mounting the catalyst to the upstream exhaust system. The use of a ring shaped fastening element can compensate for the lack of stiffness of the flange. It has to be noted, that the fastening element only has a reinforcing function and does not contribute in the tightness of the connection between the housing and the upstream exhaust system. It follows that the fastening element is not subject to specific surface quality and accordingly can be produced at very low cost. It has to be noted, that the fastening element may have any suitable outer shape which allows to

clamp it to the upstream exhaust system.

[0011] The mounting of the housing can be done by clamping means for clamping the fastening element and the flange onto an associated flange of the engine manifold. In a preferred embodiment, the fastening element and the outwardly extending flange comprise matching openings for bolting said fastening element and said outwardly extending flange onto a corresponding flange of an exhaust tubing or an engine manifold.

[0012] In order to align the matching openings of the fastening element and the flange, the facing surfaces of said outwardly extending flange and said fastening element preferably comprise means for positioning said fastening element with respect to said outwardly extending flange. These means for positioning may comprise a groove arranged in one of said facing surfaces of said outwardly extending flange and said fastening element and an associated key arranged in the respective other one of said facing surfaces. Alternatively said means for positioning comprise a bead on said openings of said outwardly extending flange, said bead extending towards said fastening element for engaging into said openings of said fastening element.

[0013] In an other embodiment, said fastening element is fixed to said outwardly extending flange. The fastening element can e.g. be fixed to the outwardly extending flange by spot welding, soldering, and the like. It has to be noted, that the connection of the fastening element and the outwardly extending flange does not need to be of a high quality. In fact, this connection is for positioning purposes only and does not bear any connecting forces between the catalyst housing and the upstream exhaust system.

[0014] It has to be noted, that said tubular middle portion can have a circular or an oval cross section or any other suitable form.

Detailed description with respect to the figures

[0015] The present invention will be more apparent from the following description of a not limiting embodiment with reference to the attached drawings, wherein

- Fig.1: shows a longitudinal section of a catalytic converter inside a catalyst housing,
 Fig.2: shows a front view (flange) of the catalyst housing of Fig. 1.

[0016] Fig. 1 represents a preferred embodiment of a catalyst housing 10 with integrated catalyst block. The catalyst housing consists of an integral stamped part, which comprises a tubular section 12, a flange 14 to seal said tubular part 12 onto the upstream part of the exhaust system (not shown) and an reducing end cap 16 to serve as attachment for the exhaust tubing. A catalyst block 18 is arranged inside the tubular section 12, the block being simply inserted from the flange end of the tubular section 12. A supporting mat (not shown) may

be provided to allow for expansion while holding the catalyst element firmly in place. Alternatively in case of a metallic catalytic element, the catalytic element may be brazed to the tubular section.

[0017] A ring shaped fastening element 20 is arranged around the tubular section 12 and abuts against flange 14. This fastening element is used for mounting, e.g. bolting, the flange 14 of the catalyst housing 10 onto an upstream exhaust system, thereby providing the required stiffness of the connection. The flange of the catalyst housing can e.g. be bolted directly on an associated flange of an engine manifold, a downpipe or a turbo. For this purpose, matching bolting openings 22 and 24 are provided in the fastening element 20 and the flange 14. In order to align the bolting openings 22 and 24 of the fastening element 20 and the flange 14, means may be provided for positioning said fastening element 20 and the flange 14. Alternatively the fastening element 20 and the flange 14 can be connected by means of spot welding, soldering or the like.

[0018] In order to provide a leakproof connection between the catalyst housing and the engine manifold, the front surface of the flange comprises preferably a region having well defined surface characteristics, such as roughness and/or planarity. This region defines a sealing surface for cooperating with a matching surface of the flange of the manifold. The region having specific surface characteristics may have an annular form (see Fig. 2) or any other suitable form surrounding the opening of the catalyst housing.

[0019] While the shown embodiment of the catalyst housing has a circular cross section, it will be apparent for the one skilled in the art, that depending on the shape of the enclosed catalytic element 18, any other form of housing, e.g. oval, will be possible. It will also be clear, that independent of the form of the housing, the outer end of the reducing end cap will have a form matching the one of the exhaust pipe. It will further be noted, that the outer shape of the flange is not limited to the generally triangular form as show in Fig.2.

Reference List

[0020]

- | | |
|--------|-------------------|
| 10 | catalyst housing |
| 12 | tubular section |
| 14 | flange |
| 16 | reducing end cap |
| 18 | catalyst block |
| 20 | fastening element |
| 22, 24 | bolting openings |

Claims

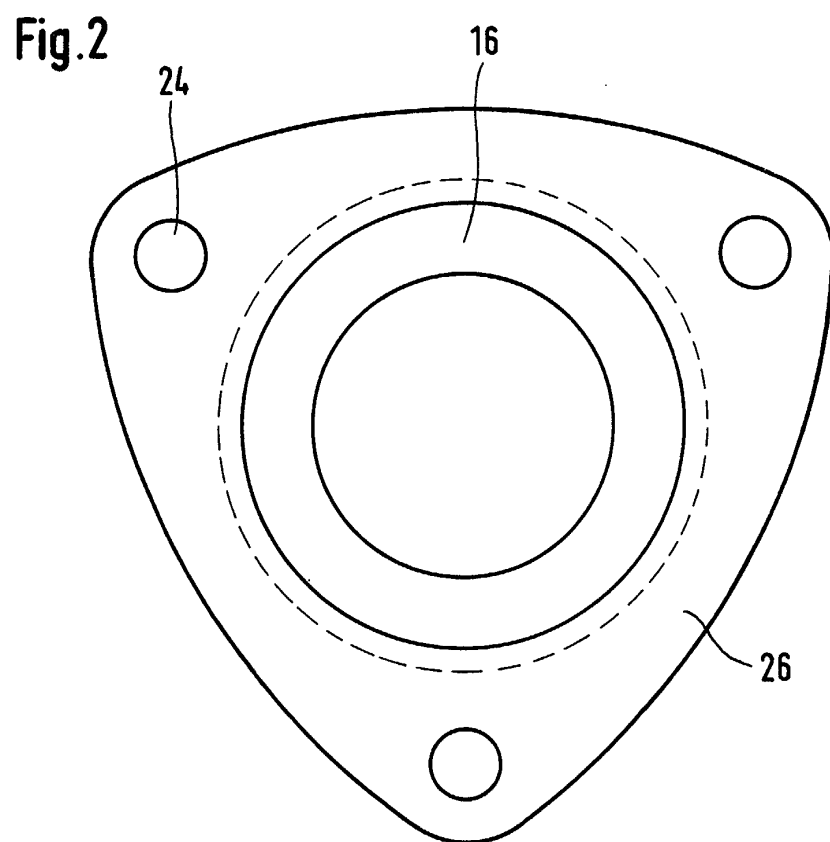
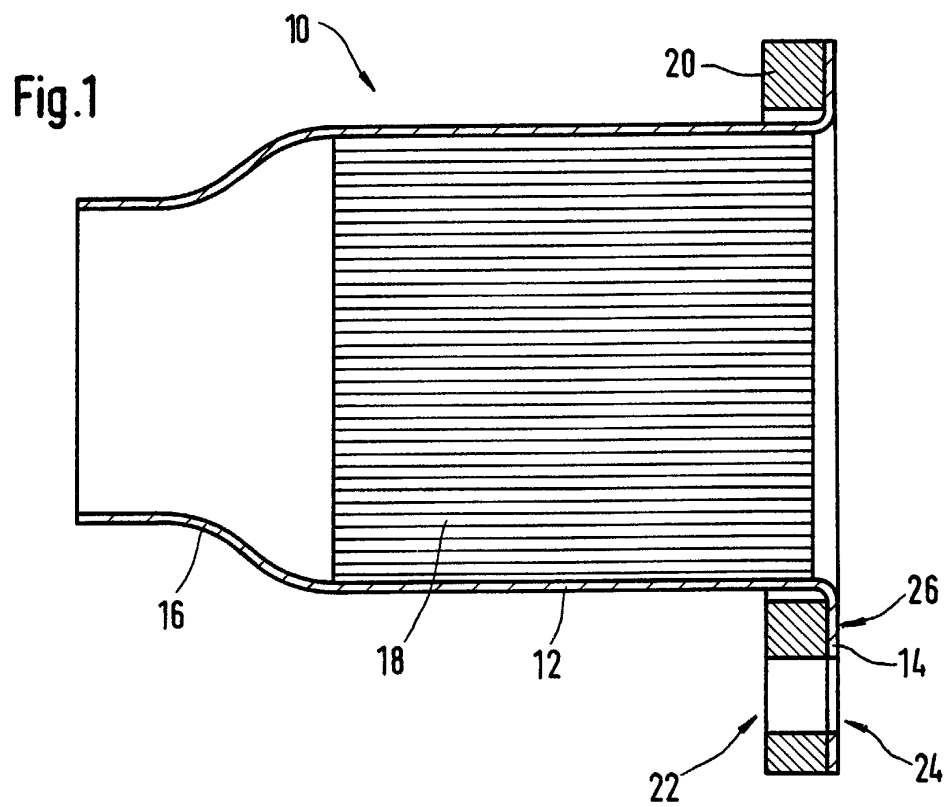
1. Catalyst housing, comprising a tubular middle portion, and first and second end portions, **character-**

ised in that said middle portion and said first and second end portions are formed by an integral stamped part, wherein the first end portion is stamped so as to form a reducing end cap for fitting said catalyst housing to an exhaust tubing and said second end portion is bend outwardly so as to form an outwardly extending flange.

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2. Catalyst housing according to claim 1, wherein said outwardly extending flange comprises a front surface and an opposing rear surface, said rear surface being directed towards the middle portion of said housing, **characterised in that** said front surface comprises a sealing surface surrounding the opening of said tubular middle portion. 10
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3. Catalyst housing according to claim 1 or 2, **characterised by** a ring shaped fastening element, said fastening element having an inner opening substantially equal to the outer form of said middle portion of said stamped part, said fastening element being arranged around said tubular middle portion and abutting against said outwardly extending flange for mounting said catalyst housing onto a corresponding flange of an exhaust tubing or an engine manifold. 20
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4. Catalyst housing according to claim 3, wherein said fastening element and said outwardly extending flange comprise matching openings for bolting said fastening element and said outwardly extending flange onto a corresponding flange of an exhaust tubing or an engine manifold. 30
5. Catalyst housing according to claim 3, wherein the facing surfaces of said outwardly extending flange and said fastening element comprise means for positioning said fastening element with respect to said outwardly extending flange. 35
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6. Catalyst housing according to claim 5, wherein said means for positioning comprise a groove arranged in one of said facing surfaces of said outwardly extending flange and said fastening element and an associated key arranged in the respective other one of said facing surfaces. 45
7. Catalyst housing according to claim 5, wherein said means for positioning comprise a bead on said openings of said outwardly extending flange, said bead extending towards said fastening element for engaging into said openings of said fastening element. 50
8. Catalyst housing according to claim 3, wherein said fastening element is fixed to said outwardly extending flange. 55

9. Catalyst housing according to any one of the preceding claims, **characterised in that** said tubular middle portion has a circular or an oval cross section.





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EUROPEAN SEARCH REPORT

Application Number
EP 01 12 8406

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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 6 March 2002	Examiner Friden, C
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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EUROPEAN SEARCH REPORT

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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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**ANNEX TO THE EUROPEAN SEARCH REPORT
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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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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