(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 370 676 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
09.03.2016 Bulletin 2016/10

(21) Application number: **09764679.8**

(22) Date of filing: **02.12.2009**

(51) Int Cl.:
F01N 1/08 *(2006.01)* ***F01N 3/28*** *(2006.01)*

(86) International application number:
PCT/US2009/066410

(87) International publication number:
WO 2010/065637 (10.06.2010 Gazette 2010/23)

(54) BAFFLE FOR DISTRIBUTION OF EXHAUST FLOW

LEITBLECH ZUR VERTEILUNG VON ABGASSTROM

DÉFLECTUER POUR LA DISTRIBUTION DES GAZ D'ÉCHAPPEMENT

(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 MK MT NL NO PL PT RO SE SI SK SM TR

(30) Priority: **02.12.2008 US 119243 P**

(43) Date of publication of application:
05.10.2011 Bulletin 2011/40

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EP 2 370 676 B1

Description

Technical Field

[0001] The present disclosure relates generally to an exhaust flow distribution device. More particularly, the disclosure relates to a device capable of altering the exhaust gas velocity profile upstream of an exhaust aftertreatment device.

Background

[0002] Vehicle exhaust components for treating diesel engine exhaust often include a housing (e.g., a muffler body) containing an exhaust aftertreatment substrate (e.g., a catalytic converter substrate, a lean NOx catalyst substrate, an selective catalytic reduction (SCR) substrate , a NOx trap substrate or a diesel particulate filter substrate). The housing often includes either a side inlet or an axially in-line inlet. A side inlet is generally aligned perpendicular to a central axis of the housing, while an axially in-line inlet is generally co-axially aligned with a central axis of the housing.

[0003] The natural velocity profile of exhaust gas at the upstream face of an exhaust aftertreatment substrate positioned within a housing having an axial in-line inlet resembles a parabolic curve with the velocity maximum at the center of the flow distribution and decreasing significantly outwardly towards the periphery of the flow distribution. The natural velocity profile of exhaust gas at the upstream face of an exhaust aftertreatment substrate positioned within a side inlet housing has a maximum velocity at the half of the substrate located opposite from the inlet side of the housing.

[0004] Non-uniform velocity flow distribution shortens the useful lives of the aftertreatment substrates and reduces their operational efficiency.

[0005] Various flow distribution devices have been used to create a more uniform velocity flow profile. United States Patent Nos. 5,355,973; 5,732,555; 5,185,998; and 4,797,263 disclose exemplary flow distribution devices that can be used to prolong the useful life and efficiency of exhaust aftertreatment devices. However, these flow distribution devices typically either impede fluid flow causing an undesirable increase in backpressure or do not adequately distribute flow across the face of their corresponding exhaust aftertreatment device. Consequently, there is a need for improved flow distribution devices that provide an effective flow distribution without substantially increasing backpressure. Further background art is disclosed in FR-A-2,718,188 and JP-A-60169619.

Summary

[0006] One aspect of the present disclosure is to provide a flow distribution device that is constructed such that it effectively distributes flow without generating unacceptable levels of backpressure. In one embodiment, the flow distribution device is adapted to distribute flow effectively in a side inlet vehicle exhaust component.

Brief Description of the Drawings

[0007]

FIG. 1 is a schematic view of a vehicle exhaust system component assembly having a flow distributor that includes features that are examples of inventive aspects in accordance with the principles of the present disclosure; and

FIG. 2 is a cross-sectional view taken along section line 2-2.

Detailed Description

[0008] FIG. 1 is a schematic illustration of a vehicle exhaust system component 20 (e.g., a muffler or other enclosure in which one or more exhaust aftertreatment devices are contained) having features that are examples of inventive aspects in accordance with the principles of the present disclosure. The component 20 includes a main body 22 (e.g., a shell, housing, conduit, tube, etc.) having a side inlet 24 and a co-axial outlet 26. The main body 22 can be constructed of one or more pieces. The side inlet 24 has an axis 30 that is generally perpendicular to a central axis 32 of the main body 22. The outlet 26 and the main body 22 are depicted sharing the same axis 32. Aftertreatment devices are shown mounted within the main body 22. For example, a catalytic converter 36 and a diesel particulate filter 38 are shown mounted within the main body 22. A flow distribution element 40 is shown positioned upstream from the catalytic converter 36. Flow arrows 42, 44, and 46 illustrate that the direction of exhaust gas flow is from the inlet 24 to the outlet 26. As used herein, the term "generally perpendicular" means perpendicular or close to perpendicular.

[0009] The flow distribution element 40 is preferably configured to improve exhaust flow uniformity across an upstream face 48 of the catalytic converter 36 without generating significant backpressure in the exhaust system 10. In alternative embodiment, the flow distribution device can be used to distribute flow provided to other types of aftertreatment devices such as diesel particulate filters, deNOx catalysts, lean NOx catalyst devices, selective catalytic reduction (SCR) catalyst devices, lean NOx traps, or other devices for removing pollutants from the exhaust stream.

[0010] Catalytic converters are commonly used to convert carbon monoxides and hydrocarbons in the exhaust stream into carbon dioxide and water. Diesel particulate filters are used to remove particulate matter (e.g., carbon based particulate matter such as soot) from an exhaust stream. SCR systems are systems that selectively catalytically promote the reduction of NOx to N_2. Lean NOx catalysts are catalysts capable of selectively catalytically promoting the reduction of NOx to N_2 in an oxygen rich environment with the use of hydrocarbons as reductants. For diesel engines, hydrocarbon emissions are too low to provide adequate NOx conversion, thus hydrocarbons are typically required to be injected into the exhaust stream upstream of the lean NOx catalysts. Other SCR's use reductants such as urea or ammonia that are injected into the exhaust stream upstream of the SCR's and that react with NOx at catalyzed surfaces of the SCR's to cause the reduction of NOx to N_2 and H_2O. NOx traps use a material such as barium oxide to absorb NOx during lean burn operating conditions. During fuel rich operations, the NOx is desorbed and the selective reduction of NOx to N_2 in the presence of hydrocarbons is promoted via catalysts within the NOx traps.

[0011] Diesel particulate filters can have a variety of known configurations. An exemplary configuration includes a monolith ceramic substrate having a "honeycomb" configuration of plugged passages as described in United States patent No. 4,851,015. Wire mesh configurations can also be used. In certain embodiments, the substrate can include a catalyst. Exemplary catalysts include precious metals such as platinum, palladium and rhodium, and other types of components such as base metals or zeolites.

[0012] For certain embodiments, diesel particulate filters can have a particulate mass reduction efficiency greater than 75%. In other embodiments, diesel particulate filters can have a particulate mass reduction efficiency greater than 85%. In still other embodiments, diesel particulate filters can have a particulate mass reduction efficiency equal to or greater than 90%. For purposes of this specification, the particulate mass reduction efficiency is determined by subtracting the particulate mass that enters the filter from the particulate mass that exits the filter, and by dividing the difference by the particulate mass that enters the filter.

[0013] Catalytic converters can also have a variety of known configurations. Exemplary configurations include substrates defining channels that extend completely therethrough. Exemplary catalytic converter configurations having both corrugated metal and porous ceramic substrates/cores are described in United States patent No. 5,355,973. The substrates preferably include a catalyst that promotes an oxidation reaction at the catalytic converter. For example, the substrate can be made of a catalyst, impregnated with a catalyst or coated with a catalyst. Exemplary oxidation catalysts include precious metals such as platinum, palladium and rhodium, and other types of components such as base metals or zeolites.

[0014] In one non-limiting embodiment, a catalytic converter can have a cell density of at least 31 cells/cm^2 (200 cells per square inch), or in the range of 31-62 cells/cm^2 (200-400 cells per square inch). A preferred catalyst for a catalytic converter is platinum with a loading level greater than 0,001 g/cm^3 (30 grams/cubic foot) of substrate. In other embodiments the precious metal loading level is in the range of 0,001-0,0035 g/cm^3 (30-100 grams/cubic foot) of substrate. In certain embodiments, the catalytic converter can be sized such that in use, the catalytic converter has a space velocity (volumetric flow rate through the catalytic converter/ volume of the catalytic converter) less than 150,000/hour or in the range of 50,000-150,000/hour.

[0015] Referring to FIGS. 1 and 2, the flow distribution element 40 of the component 20 is positioned adjacent a portion 50 of the main body 22 that is opposite from the inlet 24. The flow distribution element 40 is depicted as a baffle 41 having a curved first edge 52 that matches the inner diameter of the main body 22. The baffle 41 also includes a second edge 54 that extends from one end 56 of the first edge 52 to an opposite end 58 of the first edge 52. In the depicted embodiment, the second edge 54 has a concave curvature while the first edge 52 has a convex curvature, and the edges cooperate to provide the baffle 41 with a crescent shaped outline/profile. In certain embodiments, the second edge 54 is defined by a radius that is in the range of 1.1 to 1.3 times as large as the inner radius of the main body 22.

[0016] When mounted in the main body 22, the first edge 52 matches the inner diameter of the main body 22 and extends from a first side 23 of the main body 22 to a second side 25 of the main body 22. The first and second sides 23, 25 are positioned on opposite sides of a central reference plane 27 that bisects the main body 22 along its length and also bisects the inlet pipe 24. The second edge 54 traverses an interior region of the main body 22 and extends from the first side 23 of the main body 22 across the central reference plane 27 to the second side 25 of the main body 22. The second edge 54 intersects with the first edge 52 at the first and second sides 23, 25 of the main body 22.

[0017] The first edge 52 of the baffle 41 preferably seats against the inner diameter of the main body 22 at the portion 50 of the main body 22 that is opposite from the location of the inlet 24. The reference plane 27 is shown passing through portion 50 at location 51. As shown at Figures 1 and 2, the baffle 41 is located at the bottom of the main body 22 and the inlet is located at the top of the main body 22. The baffle 41 is shown having a height that extends upwardly from the bottom of the main body 22 toward the top of the main body 22 (e.g., the height dimension extends generally toward the inlet). The baffle 41 is shown aligned along a plane that is generally perpendicular to the central axis 32 of the main body 22. While the baffle 41 is shown as a flat plate, the baffle 41 could also be curved.

[0018] In use, the exhaust gases are directed into the main body 22 through the inlet 24. Upon entering the main body 22, the exhaust flow encounters the flow distribution device 40. The flow distribution element 40 forms a mixing wall/barrier positioned at the portion 50 of the main body 22 upon which flow from the inlet 24 impinges. The exhaust gases then flow over/through the flow distribution device 40 to the catalytic converter 36. At the upstream face of the catalytic converter, flow is fairly evenly distributed by virtue of the flow distribution element 40. Upon exiting the catalytic converter, the exhaust flow travels through the diesel particulate filter and exits the main body 22 through the outlet 26.

[0019] The flow distribution element 40 can also be referred to as a flow distribution plate, a flow distributor, a flow distribution member, a flow distribution structure or like terms. The main body 22 can also be referred to as a housing, an aftertreatment device housing, an enclosure, a conduit, or like terms.

[0020] In certain embodiments, the inlet 24 can include a cylindrical inlet pipe, and the main body 22 can also be cylindrical in shape. In one example embodiment, the inlet 24 can have a diameter in the range of 102-152 mm (4-6 inches) and the main body can have a diameter in the range of 229-305 mm (9-12 inches).

[0021] The flow distribution element 40 is preferably configured to provide generally uniform flow distribution across the upstream face of the catalytic converter 36 without causing additional backpressure. In one example embodiment, the flow distribution element 40 is configured to provide a γ value greater than or equal to 0.95. γ is a calculated value representative of flow speed uniformity across the upstream area/face of a substrate (e.g., a catalytic converter substrate, a DPF substrate, an SCR substrate, a NOx absorber substrate, a lean NOx catalyst substrate, etc.). When γ is equal to 1, perfect flow uniformity exists across the entire upstream face/area of the substrate. γ is calculated according to the following formula:

$$\gamma = 1 - \frac{\sum_{i=1}^{n} \sqrt{(V_i - V_A)^2} \times A}{2 \times A \times V_A}$$

[0022] In the above formula, A is the total area of the upstream face of the substrate. The total area A is formed by n discrete/localized areas. Vi is the exhaust flow velocity at each of the n discrete/localized areas, and V_A is the average exhaust flow velocity across the total area A.

[0023] A variety of factors control the effectiveness of the distribution element 40 for providing substantially uniform flow. Example factors include a spacing S defined between the distribution element 40 and the upstream face of the catalytic converter 36 and dimensions d1 and d2 of the distribution element. The dimensions d1, d2 are measured relative to a reference line 31 that is tangent to the inner diameter of the main body 22 at the location 50. The dimension d1 corresponds to the dimension of the distribution element 40 measured along the central reference plane 27 of the main body from the reference line 31 to the second edge 54 (i.e., at the center of the distribution element 40). The dimension d2 corresponds to the dimension of the distribution element 40 measured from the reference line 31 to the second edge 54 at locations that are laterally farthest from the central reference plane 27 (e.g., at peripheral/side portions of the distribution element 40 such as intersection points 56 and 58). The dimensions defined between the reference line 31 and the second edge 54 preferably gradually increase as the second edge extends away from the central reference plane 27. In the depicted embodiment, maximum dimensions are defined at the intersections between the edges 52, 54 of the distribution element 40 at the sides of the main body 22 and a minimum dimension is defined at the central reference plane 27. It has been determined by the inventors that the larger dimensions provided at the peripheral portions of the distribution element 40 assist in reducing the likelihood or magnitude of "hot-spots" caused by disproportionate amounts of flow at the lower peripheral regions of the catalytic converter.

[0024] The sizes of the spacing S and the dimensions d1 and d2 are dependent on the flow distribution desired and the size and arrangement of the inlet 24 and the main body 22. In certain embodiments, the spacing S is less than 3 inches, or less than 51 mm (2 inches), or less than 25,4 mm (1 inch), or lest than 19 mm (3/4 inch) or about 159 mm (5/8 inch). In other embodiments, the dimension d1 is less than 50, 40 or 30 percent of a cross-dimension d3 measured along the central reference plane 27. In the depicted embodiment, the cross-dimension d3 corresponds to the inner diameter of the main body 22 or the outer diameter of the catalytic converter 36. In other embodiments, the dimension d1 is in the range of 10-40 percent, or 10-30 percent, or 20-40 percent, or 20-30 percent of the cross-dimension d3. In certain embodiments, the dimension d1 is less than 127 mm (5 inches), or less than 102 mm (4 inches), or less than 76 mm (3 inches), or in the range of 25,4-127 mm (1-5 inches), or in the range of 25,4-102 mm (1-4 inches), or in the range of 51-102 mm (2-4 inches) or in the range of 51-76 mm (2-3 inches). In still other embodiments, the spacing S is less than 20 percent of the cross-dimension d3, or less than 15 percent of the cross-dimension d3, or less than 10 percent of the cross-dimension d3, or less than 5 percent of the cross-dimension d3. The dimension d2 is preferably greater than the dimension d1. In certain embodiments, the dimension d2 is at least 1.25 times, or at least 1.5 times, or at least 1.75 times, or at least 2 times, or at least 2.5 times or at least 3 times as large as the dimension d1. In one embodiment, the dimension d1 is in the range of 10-30 percent of the cross-dimension d3, and the dimension d2 is in the range of 40-60 percent of the cross-dimension d3.

[0025] To further enhance flow distribution, the distribution element 40 can define a plurality of openings 90 (e.g., perforations) that allow exhaust to flow through the distribution element. In one embodiment, the openings 90 each have a diameter of about 6,4 mm (.25 inches) and are spaced apart from one another by 9,5 mm (.375 inch) measured center-to-center.

[0026] In certain embodiments, no portion of the flow distribution element 40 extends past a mid-line 100 of the main body 22, and the flow distribution element 40 is shaped such that a central portion 102 of the flow distribution element 40 is spaced farther from the mid-line 100 than side portions 104 of the flow distribution element.

[0027] It will be appreciated that flow distribution elements in accordance with the principles of the present disclosure can also be used in conduits having non-round (e.g., oval) cross-sectional shapes.

Claims

1. A diesel exhaust treatment device comprising:

   a main body (22) having a central longitudinal axis (32) that extends between first and second ends of the main body (22);
   a catalyzed substrate (36) positioned within an interior of the main body (22), the substrate (36) having an upstream face (48); and
   a side inlet (24) positioned at a side of the main body (22) for directing exhaust gas into the interior of the main body (22); wherein
   a flow distribution element (40) is positioned within the interior of the main body (22) at a location between the side inlet (24) and the upstream face (48) of the substrate (36), said device being **characterized by** the flow distribution element (40) extending across a direction of exhaust flow through the main body (22), the flow distribution element (40) being positioned at a portion of the main body (22) that is opposite the side inlet (24), the flow distribution element (40) including a first edge (52) that contacts the main body (22) and a second edge (54) that traverses an interior region of the main body (22), the flow distribution element (40) having a central portion (102) defining a first dimension (d1) measured along a reference plane (27) that bisects the main body (22) along a length of the main body (22) and the side inlet (24), the first dimension (d1) being less than 50 percent of a cross-dimension of the main body (22) measured along the reference plane (27), the first dimension (d1) being measured from the second edge (54) to the first edge (52), the flow distribution element (40) also including side portions (23, 25) that define second dimensions (d2) that are larger than the first dimension (d1), the second dimensions (d2) being measured in an orientation parallel to the reference plane (27), the second dimensions (d2) being measured from a reference line (31) tangent to a location wherein the first edge (52) intersects the reference plane (27) to the second edge (54).

2. The diesel exhaust treatment device of claim 1, wherein the flow distribution element (40) is crescent-shaped.

3. The diesel exhaust treatment device of claim 1, wherein the flow distribution element (40) is perforated.

4. The diesel exhaust treatment device of claim 1, wherein the first edge (52) has a convex curvature that matches a curvature of the side of the main body (22), and the second edge (54) has a concave curvature.

5. The diesel exhaust treatment device of claim 4, wherein the first and second edges (52, 54) intersect at opposite sides of the reference plane (27).

6. The diesel exhaust treatment device of claim 1, wherein the first dimension (d1) is less than 40 percent of the cross-dimension of the main body (22).

7. The diesel exhaust treatment device of claim 1, wherein the first dimension (d1) is less than 30 percent of the cross-dimension of the main body (22).

8. The diesel exhaust treatment device of claim 1, wherein the first dimension (d1) is in the range of 10-40 percent of the cross-dimension of the main body (22).

9. The diesel exhaust treatment device of claim 1, wherein the first dimension (d1) is in the range of 10-30 percent of the cross-dimension of the main body (22).

10. The diesel exhaust treatment device of claim 1, wherein a spacing (S) between the flow distribution element (40) and the upstream face (48) of the substrate (36) is less than 25,4 mm (1 inch).

11. The diesel exhaust treatment device of claim 1, wherein the second dimensions (d2) are measured at lateral-most locations of the second edge (54) where the second edge (54) intersects with the first edge (52).

12. The diesel exhaust treatment device of claim 1, wherein the second dimensions (d2) are at least 1.25 times as large as the first dimension (d1).

13. The diesel exhaust treatment device of claim 1, wherein the second dimensions (d2) are at least 1.5 times as large as the first dimension (d1).

14. The diesel exhaust treatment device of claim 1, wherein the second dimensions (d2) are at least 2 times as large as the first dimension (d1).

15. The diesel exhaust treatment device of claim 1, wherein no portion of the flow distribution element (40) extends past a mid-line (100) of the main body (22), and wherein the flow distribution element (40) is shaped such that a central portion (102) of the flow distribution element (40) is spaced farther from the mid-line (100) than side portions (104) of the flow distribution element (40).

Patentansprüche

1. Dieselabgas-Behandlungsvorrichtung, umfassend:

einen Hauptkörper (22), der eine zentrale Längsachse (32) aufweist, die sich zwischen ersten und zweiten Enden des Hauptkörpers (22) erstreckt;
ein katalysiertes Substrat (36), das innerhalb eines Inneren des Hauptkörpers (22) positioniert ist, wobei das Substrat (36) eine stromaufwärts liegende Seite (48) aufweist; und
einen Seiteneinlass (24), der an einer Seite des Hauptkörpers (22) positioniert ist, um Abgas in das Innere des Hauptkörpers (22) zu leiten; wobei ein Flussverteilungselement (40) innerhalb des Inneren des Hauptkörpers (22) an einem Ort zwischen dem Seiteneinlass (24) und der stromaufwärts liegenden Seite (48) des Substrats (36) positioniert ist, wobei die Vorrichtung **dadurch gekennzeichnet ist, dass**
das Flussverteilungselement (40) sich quer zu einer Richtung eines Abgasflusses durch den Hauptkörper (22) erstreckt, wobei das Flussverteilungselement (40) an einem Bereich des Hauptkörpers (22) positioniert ist, der dem Seiteneinlass (24) gegenüberliegt, wobei das Flussverteilungselement (40) eine erste Kante (52), die den Hauptkörper (22) kontaktiert, und eine zweite Kante (54), die eine innere Region des Hauptkörpers (22) durchquert, enthält, wobei das Flussverteilungselement (40) einen zentralen Bereich (102) aufweist, der eine erste Dimension (d1) definiert, die entlang einer Referenzebene (27), die den Hauptkörper (22) entlang einer Länge des Hauptkörpers (22) und des Seiteneinlasses (24) halbiert, gemessen ist, wobei die erste Dimension (d1) weniger als 50 Prozent einer Querdimension des Hauptkörpers (22), gemessen entlang der Referenzebene (27), beträgt, wobei die erste Dimension (d1) von der zweiten Kante (54) zu der ersten Kante (52) gemessen wird, wobei das Flussverteilungselement (40) auch Seitenbereiche (23, 25) enthält, die zweite Dimensionen (d2) definieren, die größer sind als die erste Dimension (d1), wobei die zweiten Dimensionen (d2) in einer Orientierung parallel zu der Referenzebene (27) gemessen werden, wobei die zweiten Dimensionen (d2) von einer Referenzlinie (31), die tangential zu einem Ort verläuft, an dem die erste Kante (52) die Referenzebene (27) schneidet, zu der zweiten Kante (54) gemessen werden.

2. Dieselabgas-Behandlungsvorrichtung nach Anspruch 1, wobei das Flussverteilungselement (40) sichelförmig geformt ist.

3. Dieselabgas-Behandlungsvorrichtung nach Anspruch 1, wobei das Flussverteilungselement (40) perforiert ist.

4. Dieselabgas-Behandlungsvorrichtung nach Anspruch 1, wobei die erste Kante (52) eine konvexe Krümmung aufweist, die zu einer Krümmung der Seite des Hauptkörpers (22) passt und die zweite Kante (54) eine konkave

Krümmung aufweist.

5. Dieselabgas-Behandlungsvorrichtung nach Anspruch 4, wobei die ersten und zweiten Kanten (52, 54) sich an gegenüberliegenden Seiten der Referenzebene (27) schneiden.

6. Dieselabgas-Behandlungsvorrichtung nach Anspruch 1, wobei die erste Dimension (d1) weniger als 40 Prozent der Querdimension des Hauptkörpers (22) beträgt.

7. Dieselabgas-Behandlungsvorrichtung nach Anspruch 1, wobei die erste Dimension (d1) weniger als 30 Prozent der Querdimension des Hauptkörpers (22) beträgt.

8. Dieselabgas-Behandlungsvorrichtung nach Anspruch 1, wobei die erste Dimension (d1) im Bereich von 10-40 Prozent der Querdimension des Hauptkörpers (22) liegt.

9. Dieselabgas-Behandlungsvorrichtung nach Anspruch 1, wobei die erste Dimension (d1) im Bereich von 10-30 Prozent der Querdimension des Hauptkörpers (22) liegt.

10. Dieselabgas-Behandlungsvorrichtung nach Anspruch 1, wobei eine Beabstandung (S) zwischen dem Flussverteilungselement (40) und der stromaufwärts liegenden Seite (48) des Substrats (36) weniger als 25,4 mm (1 inch) beträgt.

11. Dieselabgas-Behandlungsvorrichtung nach Anspruch 1, wobei die zweiten Dimensionen (d2) an den lateralsten Orten der zweiten Kante (54) gemessen sind, wo sich die zweite Kante (54) mit der ersten Kante (52) schneidet.

12. Dieselabgas-Behandlungsvorrichtung nach Anspruch 1, wobei die zweiten Dimensionen (d2) mindestens 1,25-mal so groß sind wie die erste Dimension (d1).

13. Dieselabgas-Behandlungsvorrichtung nach Anspruch 1, wobei die zweiten Dimensionen (d2) mindestens 1,5-mal so groß sind wie die erste Dimension (d1).

14. Dieselabgas-Behandlungsvorrichtung nach Anspruch 1, wobei die zweiten Dimensionen (d2) mindestens 2-mal so groß sind wie die erste Dimension (d1).

15. Dieselabgas-Behandlungsvorrichtung nach Anspruch 1, wobei sich kein Bereich des Flussverteilungselements (40) über eine Mittellinie (100) des Hauptkörpers (22) hinweg erstreckt und wobei das Flussverteilungselement (40) so geformt ist, dass ein zentraler Bereich (102) des Flussverteilungselements (40) weiter von der Mittellinie (100) beabstandet ist als Seitenbereiche (104) des Flussverteilungselements (40).

Revendications

1. Dispositif de traitement d'échappement diesel comprenant :

un corps principal (22) ayant un axe longitudinal central (32) qui s'étend entre des première et seconde extrémités du corps principal (22) ;
un substrat catalysé (36) positionné dans un intérieur du corps principal (22), le substrat (36) ayant une face en amont (48) ; et
une entrée latérale (24) positionnée au niveau d'un côté du corps principal (22) pour diriger les gaz d'échappement dans l'intérieur du corps principal (22) ; dans lequel
un élément de distribution d'écoulement (40) est positionné dans l'intérieur du corps principal (22) à un emplacement situé entre l'entrée latérale (24) et la face en amont (48) du substrat (36), ledit dispositif étant **caractérisé par**
l'élément de distribution d'écoulement (40) s'étendant sur une direction de l'écoulement d'échappement à travers le corps principal (22), l'élément de distribution d'écoulement (40) étant positionné au niveau d'une partie du corps principal (22) qui est opposée à l'entrée latérale (24), l'élément de distribution d'écoulement (40) comprenant un premier bord (52) qui est en contact avec le corps principal (22) et un second bord (54) qui traverse une région intérieure du corps principal (22), l'élément de distribution d'écoulement (40) ayant une partie centrale (102) définissant une première dimension (d1) mesurée le long d'un plan de référence (27) qui coupe le corps

principal (22) le long d'une longueur du corps principal (22) et l'entrée latérale (24), la première dimension (d1) étant inférieure à 50 pour cent d'une dimension transversale du corps principal (22) mesurée le long du plan de référence (27), la première dimension (d1) étant mesurée du second bord (54) au premier bord (52), l'élément de distribution d'écoulement (40) comprenant également des parties latérales (23, 25) qui définissent des secondes dimensions (d2) qui sont supérieures à la première dimension (d1), les secondes dimensions (d2) étant mesurées dans une orientation parallèle au plan de référence (27), les secondes dimensions (d2) étant mesurées à partir d'une ligne de référence (31) tangente à un emplacement dans lequel le premier bord (52) coupe le plan de référence (27) jusqu'au second bord (54).

2. Dispositif de traitement d'échappement diesel selon la revendication 1, dans lequel l'élément de distribution d'écoulement (40) est en forme de croissant.

3. Dispositif de traitement d'échappement diesel selon la revendication 1, dans lequel l'élément de distribution d'écoulement (40) est perforé.

4. Dispositif de traitement d'échappement diesel selon la revendication 1, dans lequel le premier bord (52) a une courbure convexe qui correspond à une courbure du côté du corps principal (22), et le second bord (54) a une courbure concave.

5. Dispositif de traitement d'échappement diesel selon la revendication 4, dans lequel les premier et second bords (52, 54) se coupent au niveau des côtés opposés du plan de référence (27).

6. Dispositif de traitement d'échappement diesel selon la revendication 1, dans lequel la première dimension (d1) est inférieure à 40 pour cent de la dimension transversale du corps principal (22).

7. Dispositif de traitement d'échappement diesel selon la revendication 1, dans lequel la première dimension (d1) est inférieure à 30 pour cent de la dimension transversale du corps principal (22).

8. Dispositif de traitement d'échappement diesel selon la revendication 1, dans lequel la première dimension (d1) est dans la plage de 10 à 40 pour cent de la dimension transversale du corps principal (22).

9. Dispositif de traitement d'échappement diesel selon la revendication 1, dans lequel la première dimension (d1) est dans la plage de 10 à 30 pour cent de la dimension transversale du corps principal (22).

10. Dispositif de traitement d'échappement diesel selon la revendication 1, dans lequel un espacement (S) entre l'élément de distribution d'écoulement (40) et la face en amont (48) du substrat (36) est inférieur à 25,4 mm (1 pouce).

11. Dispositif de traitement d'échappement diesel selon la revendication 1, dans lequel les secondes dimensions (d2) sont mesurées au niveau des emplacements les plus latéraux du second bord (54) où le second bord (54) coupe le premier bord (52).

12. Dispositif de traitement d'échappement diesel selon la revendication 1, dans lequel les secondes dimensions (d2) sont au moins 1,25 fois plus grandes que la première dimension (d1).

13. Dispositif de traitement d'échappement diesel selon la revendication 1, dans lequel les secondes dimensions (d2) sont au moins 1,5 fois plus grandes que la première dimension (d1).

14. Dispositif de traitement d'échappement diesel selon la revendication 1, dans lequel les secondes dimensions (d2) sont au moins 2 fois plus grandes que la première dimension (d1).

15. Dispositif de traitement d'échappement diesel selon la revendication 1, dans lequel aucune partie de l'élément de distribution d'écoulement (40) ne s'étend au-delà d'une ligne centrale (100) du corps principal (22) et dans lequel l'élément de distribution d'écoulement (40) est formé de sorte qu'une partie centrale (102) de l'élément de distribution d'écoulement (40) est plus éloigné de la ligne centrale (100) que les parties latérales (104) de l'élément de distribution d'écoulement (40).

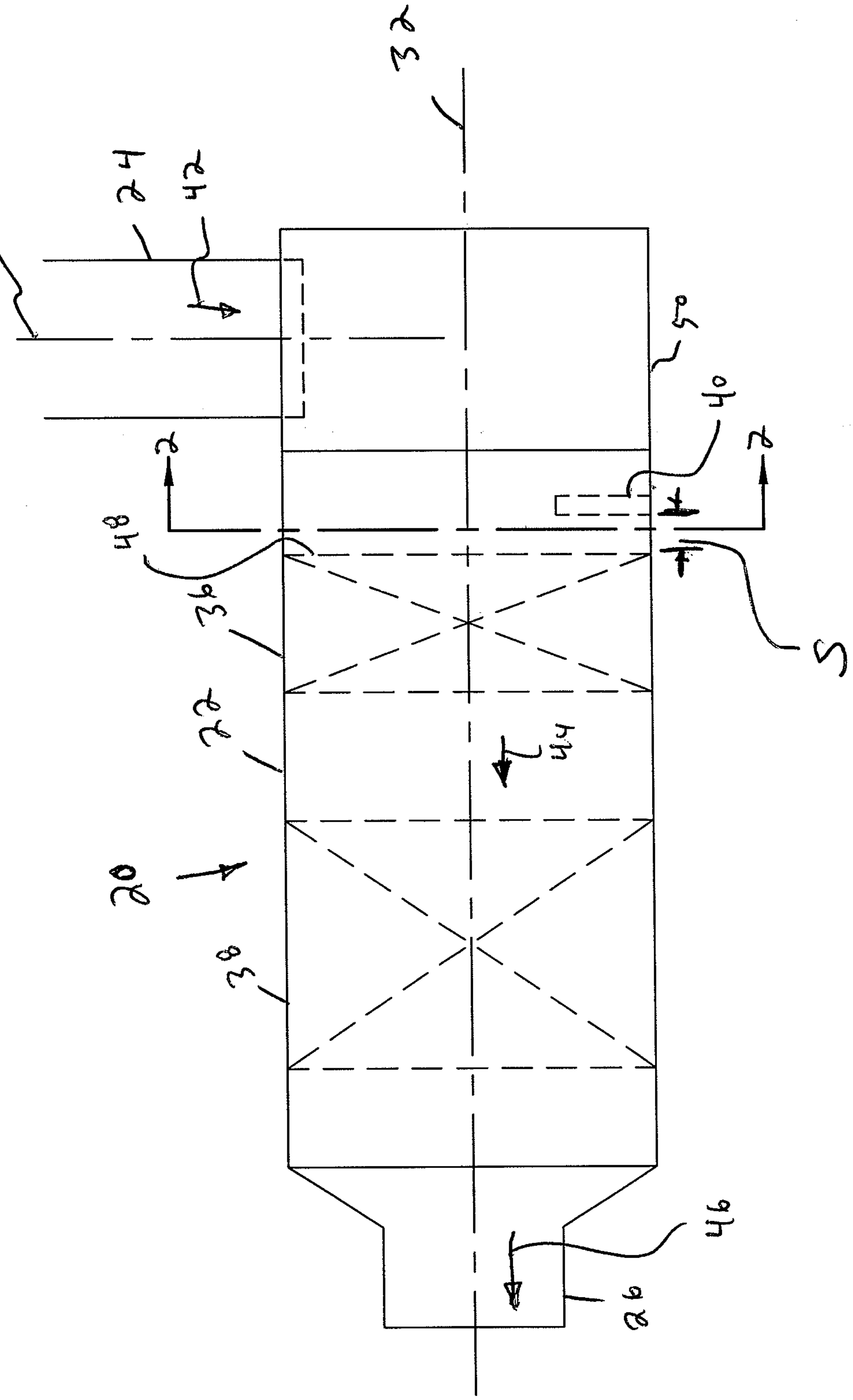
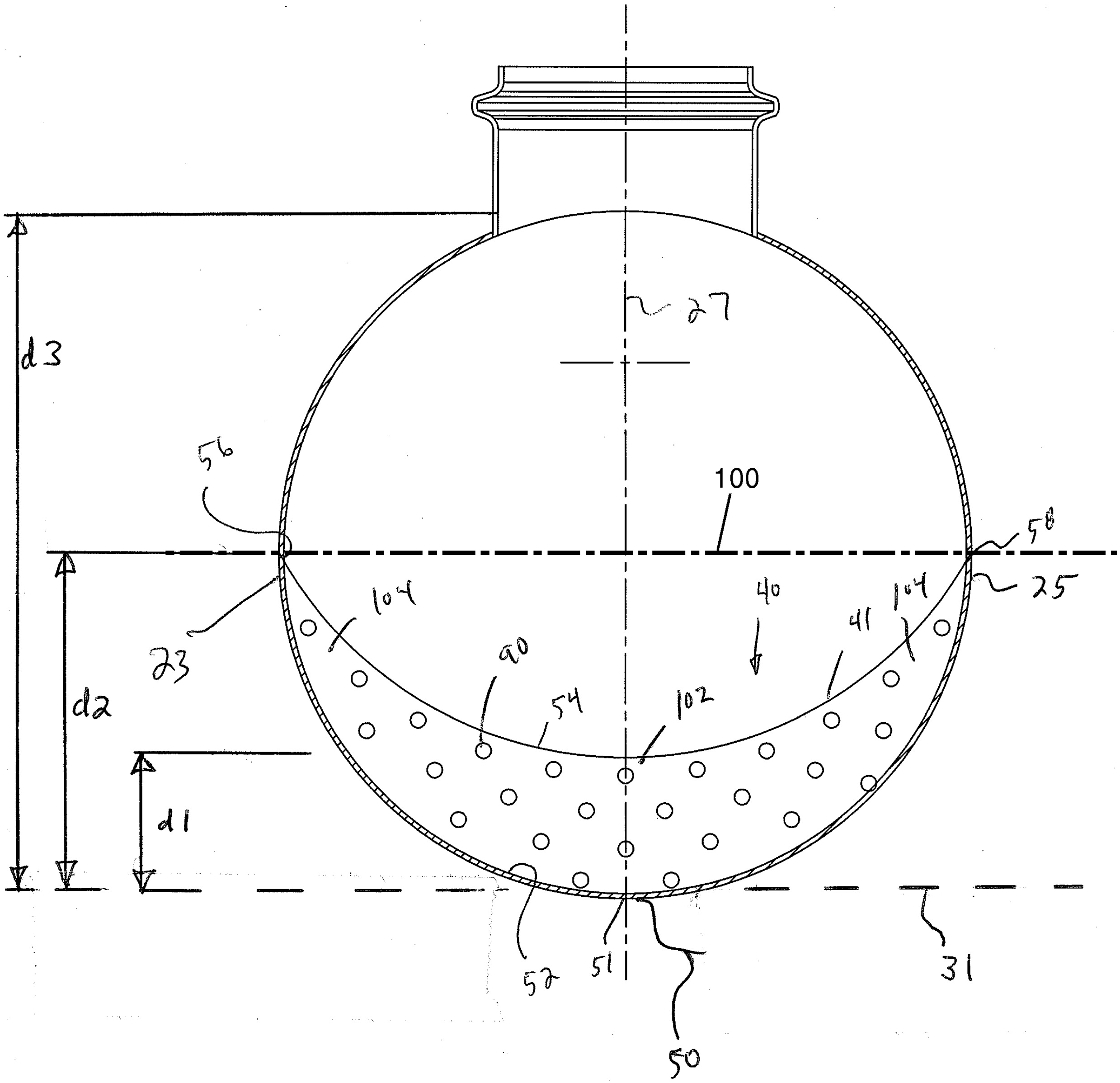


FIG. 1

FIG. 2



REFERENCES CITED IN THE DESCRIPTION

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