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(54) STRUCTURALLY IMPROVED VEHICLE EXHAUST GAS DILUTION AND DISTRIBUTION DEVICE EXHAUST GRILLE

STRUKTURELL VERBESSERTES ABLUFTGITTER FÜR FAHRZEUGABGASVERDÜNNUNGS- UND -VERTEILUNGSVORRICHTUNG

GRILLE D'ÉCHAPPEMENT STRUCTURELLEMENT AMÉLIORÉE DE DISPOSITIF DE DISPERSION ET DE DILUTION DE GAZ D'ÉCHAPPEMENT DE VÉHICULE

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Description

Field of the Invention

[0001] The present invention relates to an exhaust outlet system which is adapted to discharge exhaust gas flow of an internal combustion engine and which comprises exhaust gas dilution and distribution components.

Background of the Invention

[0002] In general manner, an exhaust system enables discharge of exhaust gases resulting from a controlled combustion taking place in the engine of a vehicle. Diesel engines differ from ignition petrol engines in that fuel is compressed and ignited with high temperature. Typically, there are dangerous chemical components such as nitrogen oxides (NO_x), carbon monoxide and hydrocarbons in diesel exhaust gas.

[0003] The main function of the exhaust system is to reduce noise level to a desired acceptable level and to lower the CO, (NO_x) and hydrocarbon component ratios to allowable limits. Therefore, in order to fulfill the above mentioned functions, it is very important to enable the exhaust system to have an adequate performance.

[0004] Exhaust gases and related health and environmental problems constitute a common problem in modern societies, and hence, the gases emitted from the engines and their amounts should comply with the legal regulations. In diesel engine vehicles, in order to reduce exposure to the exhaust gases emitted in accordance with the legislation, components such as exhaust gas filtering (SCR) and degassing systems including diesel particle filters (DPF), diesel oxidation catalysts (DOC) and selective catalytic reduction (SCR) are used and thus poisonous effect of the exhaust gas is aimed to be reduced.

[0005] The exhaust gas outlet pipe structurally constitutes the outer part of the exhaust system through which the exhaust gases are discharged to the outer environment after the emission is reduced. Temperature of the free exhaust gas is extremely important in order to prevent the released gases having high temperature from harming the outer environment and causing a fire. Furthermore, it should also be noted that animals and humans can be affected by these gases. Another risk that needs to be taken into consideration for the structural parts of the vehicle around the exhaust system is that these parts that are near the exhaust system may burn or melt at high temperatures. In the case that burning or melting does not occur, there is a possibility that the parts cause security problems by expanding uncontrollably due to the rapid air wave coming from the exhaust outlet.

[0006] In the state of the art, the problem of the exhaust pipes raising dust is present in most of the designs. The primary reason for this is the fact that the exhaust outlets are generally positioned parallel to the ground level or at angles close to parallel position. In such cases, the dust raised by the exhaust gas is discharged through the rear part of the vehicle and may cause problems such as obstructing the field of view of the rear-view mirror or the rear vehicle.

[0007] However, various guidance methods are used in the exhaust pipes, which should face downwards due to design restrictions. When the exhaust gas having high flow rate, which comes out of the vehicle during operation of the engine, hits the ground with a right angle or at an angle close to right angle, it may raise lightweight substances with small particles such as dust and cement thereby causing an unpractical situation.

[0008] One of the publications that can be referred to for the field of invention of the present invention is the patent document no. EP 2 750 575 B1, which discloses an exhaust grille having a plurality of vanes. The said document discloses an exhaust grille comprising a series of vanes spaced apart defining nonlinear air flow passages. The grille is configured so as to damp the sound waves coming to the grille. Various designs of the exhaust grille are disclosed in the related publication. For example, it discloses about reduction of allowable noise levels when the exhaust grille configuration is placed on the exhaust such as the case in the exhaust gas outlet of an electric vacuum cleaner. Other exhaust outlets are disclosed in the documents GB1012056A, US2011/151760A1, EP0469277A1 or WO2014/056686A1.

[0009] The present invention is devised on the basis of the fact that improving the exhaust outlet structure in order to provide a more effective and reliable exhaust gas dilution and distribution device continues to be a necessity. The exhaust dilution and distribution device of the present invention protects the vehicle parts surrounding the exhaust dilution and distribution device while it also aims to eliminate the safety risks that may arise due to flying of various objects such as hay, debris or wooden pieces or smaller particles located on the ground or road. Moreover, the speed of the exhaust gases released from the exhaust tail pipe may have the impact of raising dust to an extent of restricting visibility of a driver of a rear vehicle in the traffic.

[0010] The present invention enables the exhaust gas to be discharged to the atmosphere in a more reliable manner by means of communication with a wider and more effective discharge plane.

[0011] The present invention enables to prevent undesired particle scattering by diverting the exhaust gas at a specific angle by means of its special grille structure whose vanes are designed at specific angles.

[0012] At the same time, structural efficiency of the outlet pipe provides a slower discharge rate for the same exhaust gas mass amount, which in turn effectively eliminates the impact of the exhaust gases raising dust during discharge.

Summary of the Invention

[0013] The main objective of the present invention is to provide an exhaust dilution and distribution device which is structurally improved to prevent any harm in the outer environment caused by the dust or other particles which are rapidly moved from the ground by the exhaust gas flow to unpredictable places.

[0014] Another objective of the present invention is to protect the vehicle parts surrounding the exhaust dilution and distribution device while also eliminating the safety risks that may arise due to flying of various objects such as hay, debris or wooden pieces or smaller particles located on the ground or road.

[0015] A further objective of the present invention is to ensure that the speed of the exhaust gases released from the exhaust tail pipe do not have the impact of raising dust to an extent of restricting visibility of a driver of a rear vehicle in the traffic.

[0016] Another objective of the present invention is to enable the exhaust gas to be discharged to the atmosphere in a more reliable manner by means of communication with a wider and more effective discharge plane.

[0017] A further objective of the present invention is to enable preventing undesired particle scattering by diverting the exhaust gas at a specific angle by means of its special grille structure whose vanes are designed at specific angles.

Brief Description of the Figures

[0018] The attached technical drawings are provided to facilitate better understanding of the inventive exhaust dilution and distribution device comprising an outlet pipe. The technical drawings are briefly explained below and they illustrate the examples of the structure of the present invention whose advantages over the prior art are described above.

[0019] The technical drawings are neither provided with the purpose of limiting the scope of the invention described in the claims, nor are they included for use in interpretation of the claims without the description.

[0020] A system developed to fulfill the objective of the present invention is illustrated in the accompanying figures, and brief explanations of these figures are given below:

Figure 1 illustrates a view of the outer part of the exhaust dilution and distribution device.

Figure 2 shows a view of the grille unit welded (a) or mounted removably (b) to the surface of the exhaust dilution and distribution device facing outwards.

Figure 3 shows the case (a) wherein gas flow does not separate when the incoming flow and the flow reception vane part are of the same angle and the case (b) wherein flow separation occurs when there is a different angle between the above.

Figure 4 shows a section of the vanes in the exhaust grille unit of the present invention (a) and the flow guidance in the section (b).

Figure 5 shows the vane orientation angle of the vanes in the exhaust grille unit of the present invention.

Figure 6 shows dismounted view of the heat shield on the outlet housing, the exhaust outlet housing and the exhaust grille of the present invention.

Detailed Description of the Invention

[0021] The components in the figures given in the enclosure of this specification in order to facilitate understanding of the present invention are given reference numbers as follows:

11) Exhaust dilution and distribution device

12) Exhaust grille

13) Grille vane

14) Outlet plane

15) Outlet housing

16) Grille fixing screw

17) Grille fixing screw

18) Inner pipe

19) First lobe

20) Second lobe

21) First lobe opening

22) Second lobe opening

23) Tangent wall

24) Diverter part

25) Connecting member

26) Heat shield

[0022] The references given below are referred to in the technical figures used in the description of the invention.

R1: First lobe radius

R2: Second lobe radius

R: Radius of the vane bending

α: Vane orientation angle

β: Vane flow reception angle

γ: Vane flow trailing angle

[0023] The present invention relates to an exhaust dilution and distribution device (11) for a combustion engine, wherein the said exhaust dilution and distribution device (11) comprises, as will be described below in detail, an inner pipe (18) in the form of an exhaust passage component which is in flow communication with the combustion engine components going to an outlet housing (15).

[0024] The combusted gas is received via the cylindrical inner pipe (18), which generally extends longitudinally, and transferred to the outlet housing (15). For this purpose, while the two components, i.e. the said inner pipe (18) and the said outlet housing (15), form an air flow connection so as to establish a flow connection therebetween via a connecting member (25), they contribute to the decrease in the exhaust gas flow rate as will be described in detail later, and again as will be described below, flow orientation parallel to the ground is established by means of an exhaust grille (12). Between the said inner pipe (18) and the said outlet housing (15), the diametrical ratios of the outlet housing (15) inlet and the inner pipe (18) are determined preferably as 0.9, and a structure wherein the cylindrical forms are engaged to each other is configured.

[0025] It should be noted that, by means of the structural performance of the outlet housing (15), the discharged exhaust gas is allowed to interact with free air flow and the exhaust gas flow is adequately blended with free air and the gas flow is effectively directed towards a single outlet plane (14).

[0026] The semi closed form of the outlet housing (15) according to the invention reaches the outlet plane (14) which extends parallel to the ground. In other words, the exhaust gases mixing with the atmospheric air are directly discharged towards the surface of the road on which the vehicle is moving. The closed volume of the outlet housing (15) effectively transmits the exhaust gas to the outlet plane (14) of the housing. The outlet housing (15) comprises a first lobe (19) and a second lobe (20), and each of the lobes comprises a first lobe and a second lobe opening (21, 22) respectively. The outlet opening formed by the first lobe and second lobe openings (21, 22) enables the exhaust gas to leave the system directly towards the ground and with a decreased flow rate. The air, whose flow rate is decreased by means of the first lobe and second lobe openings (21, 22), is directed parallel to the ground by means of the exhaust grille (12). Below is described in detail how the said exhaust grille (12) fulfills the mentioned function.

[0027] The closed structure of the outlet housing (15) extends between the inlet and outlet plane (14). Therefore, the outlet housing (15) is adapted such that it will communicate with the longitudinal axis of the inner pipe (18) and that it will extend along the surface normal of the outlet housing (14) perpendicular to the longitudinal axis of the inner pipe (18). In the words, the outlet plane (14) is perpendicular to the inlet plane of the outlet housing (15). While the first and second lobes (19, 20) are separated by a diverting part (24) protruding inwards and expanding downwards, the outlet housing (15), in a general manner, structurally expands towards the outlet plane (14). The diverting part (24) seen in Figure 1 is configured to directly receive thereon the gas flows coming to the inner pipe (18) via the inlet pipe, and by means of the asymmetry of the first and the second lobes (19, 20) relative to each other, it enables to form discrete swirls and reduces the flow rate of the discharged gas.

[0028] According to the present invention, the outlet housing (15) is designed to include tangent walls (23) which receive the exhaust flow coming directly from the top and which create swirls by directing the gases tangentially by means of the asymmetrical form of the first and the second lobes (19, 20). To put it more clearly, the exhaust gas hits the tangent walls (23) of the first and the second lobes (19, 20), and orientation of the gas mass flow in an asymmetrical manner causes formation of a higher pressure flow region along the tangent wall (23) of the first lobe (19) whose projective diameter is bigger than that of the second lobe (20). Momentum of the exhaust gas flow is used by dividing the exhaust gas flow in order to improve mixing process and to reduce the flow rate of the discharged gas; and by creating asymmetrical separated swirling areas at the side of the tangent walls (23) of the first and the second lobes (19, 20).

[0029] As can be seen in Figure 2, the exhaust grille (12) installation can be carried out by two different ways, namely by direct welding and by mounting with the help of grille fixing screws (16).

[0030] In Figure 3, the flow coming to the outlet plane (14) and the grille vanes (13) receiving the flow are viewed. The said grille vanes (13) are in a specific orientation relative to the incoming flow. In order to direct the flow effectively, characteristic of the flow coming to the grille vane (13) should be known well. By means of the analyses conducted for this purpose, the way the flow comes to the vane installation region is modelled and thus the grille of the present invention is designed.

[0031] In the light of this modelling, the grille vanes (13) can be designed to receive the incoming flow accurately instead of being designed as being disposed at equal intervals. According to the present invention, with a suitable combination of the angles α, β and γ, the flow is received accurately thereby leaving the system more parallel to the ground. An example of the flow reception form of the angle β is given in Figure 3. Accordingly, the angle between the flow coming direction and a plane parallel

to the outlet plane (14) is defined as the vane flow reception angle (β), and β is less than 82 degrees. The flow received by the said coming angle is directed by the grille vane (13) such that it will have a trailing angle (γ) parallel to the ground.

[0032] The guides, wherein the surface perpendicular to the coming flow is as low as possible, perform guidance with less loss compared to the ones which receive the flow perpendicularly inhibiting the flow. An example to the flow separation phenomena is given in Figure 3.

[0033] In Figure 4, a section of the grille vane (13) and guidance of the flow in the section can be seen.

[0034] In Figure 5, orientation angle of the grille vane (13) can be seen.

[0035] In Figure 6, an exhaust grille (12), an outlet housing (15) and a heat shield (26) can be seen. The said heat shield (26) is disposed on a dirty part pipe which is one of the air intake components of passenger vehicles. By means of the grille fixing slots (17) placed on the heat shield (26), the exhaust grille (12) can be fixed to the slots by using grille fixing screws ((16).

[0036] As can be seen in Figure 7, in another embodiment of the present invention, the grille vanes (13) in the first lobe (19) and the grille vanes (13) in the second lobe (20) transfer the incoming exhaust gas to directions opposite to each other.

[0037] According to a preferred embodiment of the present invention, while the sectional profile of the said grille vanes (13) can be in an arc form having a radius of curvature as shown in Figure 4, it can also be in the form of linear segments having a plurality of levels. In a structure having a plurality of segments, the angle of each consecutive segment relative to a plane parallel to the said outlet plane (14) will decrease respectively. On the other hand, again according to a preferred embodiment of the present invention, the number of leveled linear segments in the section of the said grille vane (13) can be preferably three. Figure 7 shows at least one grille vane with at least one pair of segments.

[0038] According to another preferred embodiment of the present invention, the grille vanes (13), which remain within the outlet plane (14) sections located at the projection of both of the lobes in accordance with the asymmetrical lobe structure, are symmetric according to an imaginary line separating the two lobes on the outlet plane (14). In other words, curvature centers of the grille vanes (13) in each lobe are at opposite sides. This situation points out to the asymmetrical structure wherein the exhaust grille (12) is designed to discharge exhaust gas parallel to the ground.

[0039] According to a further preferred embodiment of the present invention, the grille vanes (13), which extend such that they will correspond to the outlet plane (14) remaining in the projection of each lobe, extend in a curved manner on a plane parallel to the outlet plane (14) of the lobe. Accordingly, while one of the two ends of a grille vane (13) is located on the edge line where the diverting part (24) is located, the other end thereof extends on the edge line at the opposite side of the diverting part (24). This way, the grille vanes (13) having different lengths which are arranged consecutively at certain intervals are placed between two edge lines. According to a further preferred embodiment of the present invention, the distance between each two neighboring grill vanes (13) is preferably different. As it is stated before, this enables to discharge the exhaust gas, which is released from between the vanes to the atmosphere at a specific trailing angle, parallel to the ground however with an asymmetrical flow rate, i.e. in a manner wherein its power is dissipated.

[0040] In brief, the present invention is an exhaust dilution and distribution device (11) for an internal combustion engine and the exhaust dilution and distribution device (11) comprises an exhaust grille (12) which enables the exhaust gases to flow parallel to the ground via an outlet housing (15) which directs and transfers the exhaust gases resulting from combustion towards an outlet plane (14).

[0041] The present invention suggests an outlet housing (15) wherein an exhaust grille (12) having a plurality of grille vanes (13) fulfills the function of direction during discharge of the exhaust gases on an outlet plane (14).

[0042] According to the present invention, the grille vanes (13) of the said exhaust grille (12) at least partially extend along the said outlet housing (15) outlet plane (14) and in a plane parallel to the said outlet plane (14).

[0043] According to the present invention, the exhaust gas reception angles of the grille vanes (13) of the said exhaust grille (12) are different from the trailing angle through the grille vanes (13) after the exhaust gas passes through the said grille vanes (13).

[0044] According to the present invention, the said grille vanes (13) make the exhaust gas grille vane's (13) trailing angle parallel to the outlet plane (14).

[0045] In another embodiment of the present invention, the vane flow reception angle between the exhaust gas flow coming direction and the grille vane (13) is at least 8 degrees.

[0046] In another embodiment of the present invention, the sectional profile of the said grille vanes (13) is in the form of an arc having a radius of curvature.

[0047] In another embodiment of the present invention, the sectional profile of the said grille vanes (13) is in the form linear segments having a plurality of levels.

[0048] In another embodiment of the present invention, in the said structure with a plurality of segments, the angle of each consecutive segment relative to a plane parallel to the said outlet plane (14) gets smaller towards the said outlet plane (14).

[0049] In another embodiment of the present invention, the number of leveled linear segments in the said grille vane (13) section is at least two.

[0050] According to the present invention, the said outlet plane (14) comprises outlet plane (14) first and second lobe projections formed by an asymmetrical first and second lobe (19, 20) of the outlet housing (15).

[0051] Another embodiment of the present invention comprises a diverting part (24) which extends between the said first and second lobe (19, 20) towards the outlet plane (14) and which is configured to decrease the flow rate of the exhaust gas by creating asymmetrical separate swirls of the divided exhaust gas flow within the first and second lobes (19, 20).

[0052] Another embodiment of the present invention comprises tangent walls (23) of the first and second lobes (19, 20) to which the exhaust gas hits and which produce a tangent and asymmetrical high pressure area within the first lobe (19) by mass flow.

[0053] In another embodiment of the present invention, the projective diameter of the first lobe (19) on the plane wherein the exhaust gas hits the tangent walls (23) of the first and second lobes (19, 20) is greater than the projective diameter of the second lobe (20).

[0054] In another embodiment of the present invention, the consecutive diameters of the first and second lobes (19, 20) of the outlet housing (15) on the planes parallel to the outlet plane (14) gradually and proportionately expand towards the outlet plane (14).

[0055] In another embodiment of the present invention, the width of the said diverting part (24) increases towards the outlet plane (14).

[0056] In another embodiment of the present invention, the diametrical ratio between the projections of the first and second lobes (19, 20) on the outlet housing (15) outlet plane (14) is within the range of 0.8 to 0.85.

[0057] In another embodiment of the present invention, the grille vanes (13), which remain within the outlet plane (14) projections of the outlet housing (15) first and second lobes (19, 20), are symmetric according to an imaginary line separating the two lobes on the outlet plane (14).

[0058] In another embodiment of the present invention, the curvature centers of the grille vanes (13) in the first and second lobe (19, 20) are at opposite sides.

[0059] In another embodiment of the present invention, the grille vanes (13), which extend such that they will correspond to the outlet plane (14) area remaining in the projection of the first and second lobe (19, 20), extend in a curved manner on a plane parallel to the outlet plane (14) of the concerned lobe.

[0060] In another embodiment of the present invention, while one of the two ends of a grille vane (13) is located on the edge line where the diverting part (24) is located, the other end thereof extends on the edge line at the opposite side of the diverting part (24).

[0061] In another embodiment of the present invention, the grille vanes (13) which are arranged consecutively at certain intervals are placed between the edge line where the diverting part (24) is located and the edge line at the opposite side such that they will have different lengths.

[0062] In another embodiment of the present invention, the distance between each two neighboring grill vanes (13) is different.

[0063] Another embodiment of the present invention provides an exhaust dilution and distribution device (11) comprising an outlet housing (15).

[0064] Another embodiment of the present invention suggests a vehicle comprising an exhaust dilution and distribution device.

Claims

1. An outlet housing (15) adapted to discharge the exhaust gas flow of an internal combustion engine, wherein an exhaust grille (12) having a plurality of grille vanes (13) fulfills the function of guidance during discharge of the exhaust gases on an outlet plane (14), wherein

   the grille vanes (13) of the said exhaust grille (12) at least partially extend along the said outlet housing (15) outlet plane (14) and in a plane parallel to the said outlet plane (14),
   the exhaust gas reception angles of the grille vanes (13) of the said exhaust grille (12) are different from the trailing angle relative to the grille vanes (13) after the exhaust gas passes through the said grille vanes (13),
   said grille vanes (13) make the exhaust gas grille vane's (13) trailing angle parallel to the outlet plane (14), the outlet housing being **characterized in that** the vane flow reception angle (β) between the exhaust gas flow coming direction and a plane parallel to the outlet plane (14) is at most 82 degrees, and
   in that said outlet plane (14) comprises outlet plane (14) first and second lobe projections formed by an asymmetrical first and second lobe (19, 20) of the outlet housing (15).

2. An outlet housing (15) according to Claim 1, **characterized in that** the sectional profile of the said grille vanes (13) is in the form of an arc having a radius of curvature.

3. An outlet housing (15) according to Claim 1, **characterized in that** the sectional profile of the said grille vanes (13) is in the form of linear segments comprising a plurality of levels.

4. An outlet housing (15) according to Claim 3, **characterized in that**, in the said structure with a plurality of linear segments, the angle of each consecutive segment relative to a plane parallel to the said outlet plane (14) gets smaller towards the said outlet plane (14).

5. An outlet housing (15) according to Claim 4, **characterized in that** the number of leveled linear segments in the said grille vane (13) section is at least two.

6. An outlet housing (15) according to Claim 1, **characterized in that** it comprises a diverting part (24) which extends between the said first and second lobe (19, 20) towards the outlet plane (14) and which is configured to decrease the flow rate of the exhaust gas by creating asymmetrical separate swirls of the divided exhaust gas flow within the first and second lobes (19, 20).

7. An outlet housing (15) according to Claim 1 or 6, **characterized in that** it comprises tangent walls (23) of the first and second lobes (19, 20) to which the exhaust gas hits and which produce a tangent and asymmetrical high pressure area within the first lobe (19) by mass flow.

8. An outlet housing (15) according to Claim 1, **characterized in that** the projective diameter of the first lobe (19) on the plane wherein the exhaust gas hits the tangent walls (23) of the first and second lobes (19, 20) is greater than the projective diameter of the second lobe (20).

9. An outlet housing (15) according to Claim 7, **characterized in that** the consecutive diameters of the first and second lobes (19, 20) of the outlet housing (15) on the planes parallel to the outlet plane (14) gradually and proportionately expand towards the outlet plane (14).

10. An outlet housing (15) according to Claim 6, **characterized in that** the width of the said diverting part (24) increases towards the outlet plane (14).

11. An outlet housing (15) according to Claim 1, **characterized in that** the diametrical ratio between the projections of the first and second lobes (19, 20) on the outlet housing (15) outlet plane (14) is within the range of 0.8 to 0.85.

12. An outlet housing (15) according to Claim 1, **characterized in that** the grille vanes (13), which remain within the outlet plane (14) projections of the outlet housing (15) first and second lobes (19, 20), are symmetric according to an imaginary line separating the two lobes on the outlet plane (14).

13. An outlet housing (15) according to Claim 12, **characterized in that** the curvature centers of the grille vanes (13) in the first and second lobe (19, 20) are at opposite sides.

14. An outlet housing (15) according to Claim 13, **characterized in that** the grille vanes (13), which extend such that they will correspond to the outlet plane (14) area remaining in the projection of the first and second lobe (19, 20), extend in a curved manner on a plane parallel to the outlet plane (14) of the concerned lobe.

15. An outlet housing (15) according to Claim 6, **characterized in that**, while one of the two ends of a grille vane (13) is located on the edge line where the diverting part (24) is located, the other end thereof extends on the edge line at the opposite side of the diverting part (24).

16. An outlet housing (15) according to Claim 15, **characterized in that** the grille vanes (13) which are arranged consecutively at certain intervals are placed between the edge line where the diverting part (24) is located and the edge line at the opposite side such that they will have different lengths.

17. An outlet housing (15) according to Claim 1, **characterized in that** the distance between each two neighboring grill vanes (13) is different.

18. An exhaust dilution and distribution device (11) comprising an outlet housing (15) according to Claim 1.

19. A vehicle comprising an exhaust dilution and distribution device according to Claim 18.

Patentansprüche

1. Ein Auslassgehäuse (15) zum Ableiten des Abgasstroms einer Brennkraftmaschine, wobei ein Abgasgitter (12) mit einer Vielzahl von Gitterlamellen (13) die Funktion der Führung beim Ableiten der Abgase auf einer Auslassebene (14) erfüllt, wobei die Gitterlamellen (13) des Abgasgitters (12) sich zumindest teilweise entlang der Auslassebene (14) des Auslassgehäuses (15) und in einer Ebene parallel zu der Auslassebene (14) erstrecken,

   die Abgasaufnahmewinkel der Gitterlamellen (13) des Abgasgitters (12) sich von dem hinteren Winkel in Bezug auf die Gitterlamellen (13) unterscheiden, nachdem das Abgas die Gitterlamellen (13) passiert hat,
   die Gitterlamellen (13) den Nachlaufwinkel der Gitterlamellen (13) des Abgases parallel zur Auslassebene (14) machen,
   das Gehäuse **dadurch gekennzeichnet ist, dass** der Schaufelströmungs-Aufnahmewinkel (β) zwischen der Richtung der Abgasströmung und einer Ebene parallel zur Auslassebene (14) höchstens 82 Grad beträgt, und dass
   die Auslassebene (14) erste und zweite Vorsprünge der Auslassebene (14) umfasst, die durch einen asymmetrischen ersten und zweiten Flügel (19, 20) des Auslassgehäuses (15) gebildet werden.

2. Das Auslassgehäuse (15) nach Anspruch 1, **dadurch gekennzeichnet, dass** das Querschnittsprofil der Gitterlamellen (13) die Form eines Bogens mit einem Krümmungsradius aufweist.

3. Das Auslassgehäuse (15) nach Anspruch 1, **dadurch gekennzeichnet, dass** das Querschnittsprofil Profil der Gitterlamellen (13) die Form von linearen Segmenten mit mehreren Ebenen aufweist.

4. Das Auslassgehäuse (15) nach Anspruch 3, **dadurch gekennzeichnet, dass** in der Struktur mit einer Vielzahl von linearen Segmenten der Winkel jedes aufeinanderfolgenden Segments relativ zu einer Ebene parallel zur Auslassebene (14) in Richtung der Auslassebene (14) kleiner wird.

5. Das Auslassgehäuse (15) nach Anspruch 4, **dadurch gekennzeichnet, dass** die Anzahl der nivellierten linearen Segmente in dem Abschnitt der Gitterlamelle (13) mindestens zwei beträgt.

6. Das Auslassgehäuse (15) nach Anspruch 1, **dadurch gekennzeichnet, dass** es ein Umlenkteil (24) umfasst, das sich zwischen dem ersten und dem zweiten Flügel (19, 20) in Richtung der Auslassebene (14) erstreckt und das so konfiguriert ist, dass es die Strömungsrate des Abgases verringert, indem es asymmetrische separate Wirbel des geteilten Abgasstroms innerhalb des ersten und des zweiten Flügels (19, 20) erzeugt.

7. Das Auslassgehäuse (15) nach Anspruch 1 oder 6, **dadurch gekennzeichnet, dass** es tangentiale Wände (23) des ersten und zweiten Flügels (19, 20) aufweist, auf die das Abgas auftrifft und die durch Massenströmung einen tangentialen und asymmetrischen Hochdruckbereich innerhalb des ersten Flügels (19) erzeugen.

8. Das Auslassgehäuse (15) nach Anspruch 1, **dadurch gekennzeichnet, dass** der projizierte Durchmesser des ersten Flügels (19) in der Ebene, in der das Abgas auf die tangentialen Wände (23) des ersten und zweiten Flügels (19, 20) trifft, größer ist als der projizierte Durchmesser des zweiten Flügels (20).

9. Das Auslassgehäuse (15) nach Anspruch 7, **dadurch gekennzeichnet, dass** sich die aufeinanderfolgenden Durchmesser des ersten und zweiten Flügels (19, 20) des Auslassgehäuses (15) in den zur Auslassebene (14) parallelen Ebenen allmählich und proportional zur Auslassebene (14) erweitern.

10. Das Auslassgehäuse (15) nach Anspruch 6, **dadurch gekennzeichnet, dass** die Breite des Umlenkteils (24) in Richtung der Auslassebene (14) zunimmt.

11. Das Auslassgehäuse (15) nach Anspruch 1, **dadurch gekennzeichnet, dass** das diametrale Verhältnis zwischen den Vorsprüngen des ersten und des zweiten Flügels (19, 20) auf der Auslassebene (14) des Auslassgehäuses (15) im Bereich von 0.8 bis 0.85 liegt.

12. Das Auslassgehäuse (15) nach Anspruch 1, **dadurch gekennzeichnet, dass** die innerhalb der Auslassebene (14) verbleibenden Vorsprünge der ersten und zweiten Flügel (19, 20) des Auslassgehäuses (15) des Gitters (13) symmetrisch zu einer imaginären Linie sind, die die beiden Schaufeln in der Auslassebene (14) trennt.

13. Das Auslassgehäuse (15) nach Anspruch 12, **dadurch gekennzeichnet, dass** die Krümmungsmittelpunkte der Gitterlamellen (13) im ersten und zweiten Flügel (19, 20) auf gegenüberliegenden Seiten liegen.

14. Das Auslassgehäuse (15) nach Anspruch 13, **dadurch gekennzeichnet, dass** die Gitterflügel (13), die sich so erstrecken, dass sie dem in der Projektion des ersten und zweiten Flügels (19, 20) verbleibenden Bereich der Auslassebene (14) entsprechen, in einer Ebene parallel zur Auslassebene (14) des betreffenden Flügels gebogen verlaufen.

15. Das Auslassgehäuse (15) nach Anspruch 6, **dadurch gekennzeichnet, dass** sich eines der beiden Enden eines Gitterflügels (13) an der Kantenlinie befindet, an der das Umlenkteil (24) angeordnet ist, während sich das andere Ende desselben an der Kantenlinie auf der gegenüberliegenden Seite des Umlenkteils (24) erstreckt.

16. Das Auslassgehäuse (15) nach Anspruch 15, **dadurch gekennzeichnet, dass** die in bestimmten Abständen hintereinander angeordneten Gitterlamellen (13) zwischen der Randlinie, an der sich das Umlenkteil (24) befindet, und der Randlinie auf der gegenüberliegenden Seite so angeordnet sind, dass sie unterschiedliche Längen aufweisen.

17. Das Auslassgehäuse (15) nach Anspruch 1, **dadurch gekennzeichnet, dass** der Abstand zwischen jeweils zwei benachbarten Gitterflügeln (13) unterschiedlich ist.

18. Die Abgasverdünnungs- und -verteilungsvorrichtung (11) mit einem Auslassgehäuse (15) nach Anspruch 1.

19. Ein Fahrzeug mit einer Abgasverdünnungs- und -verteilungsvorrichtung nach Anspruch 18.

Revendications

1. Boîtier de sortie (15) adapté pour évacuer l'écoulement de gaz d'échappement d'un moteur à combustion interne, dans lequel une grille d'échappement (12) ayant une pluralité d'ailettes de grille (13) remplit la fonction de guidage pendant la décharge des gaz d'échappement sur un plan de sortie (14), dans lequel

   les ailettes de grille (13) de ladite grille d'échappement (12) s'étendent au moins partiellement le long du plan de sortie (14) dudit boîtier de sortie (15) et dans un plan parallèle audit plan de sortie (14),
   les angles de réception des gaz d'échappement des ailettes de grille (13) de ladite grille d'échappement (12) sont différents de l'angle de queue par rapport aux ailettes de grille (13) après que les gaz d'échappement aient traversé lesdites ailettes de grille (13),
   lesdites ailettes de grille (13) rendent l'angle de queue de l'ailette de grille (13) de gaz d'échappement parallèle au plan de sortie (14),
   le boîtier de sortie étant **caractérisé en ce que** l'angle de réception (β) de l'écoulement de l'ailette entre la direction d'arrivée de l'écoulement de gaz d'échappement et un plan parallèle au plan de sortie (14) est au maximum de 82 degrés, et **en ce que** ledit plan de sortie (14) comprend des première et deuxième saillies de lobe du plan de sortie (14) formées par un premier et un deuxième lobe asymétrique (19, 20) du boîtier de sortie (15).

2. Boîtier de sortie (15) selon la revendication 1, **caractérisé en ce que** le profil de section desdites ailettes de grille (13) se présente sous la forme d'un arc ayant un rayon de courbure.

3. Boîtier de sortie (15) selon la revendication 1, **caractérisé en ce que** le profil de section desdites ailettes de grille (13) se présente sous la forme de segments linéaires comprenant une pluralité de niveaux.

4. Boîtier de sortie (15) selon la revendication 3, **caractérisé en ce que** dans ladite structure avec une pluralité de segments linéaires, l'angle de chaque segment consécutif par rapport à un plan parallèle audit plan de sortie (14) devient plus petit vers ledit plan de sortie (14).

5. Boîtier de sortie (15) selon la revendication 4, **caractérisé en ce que** le nombre de segments linéaires nivelés dans ladite section de l'ailette de grille (13) est d'au moins deux.

6. Boîtier de sortie (15) selon la revendication 1, **caractérisé en ce qu'**il comprend une partie de déviation (24) qui s'étend entre lesdits premier et deuxième lobes (19, 20) vers le plan de sortie (14) et qui est configurée pour diminuer le débit des gaz d'échappement en créant des tourbillons séparés asymétriques de l'écoulement des gaz d'échappement divisés dans les premier et deuxième lobes (19, 20).

7. Boîtier de sortie (15) selon la revendication 1 ou 6, **caractérisé en ce qu'**il comprend des parois tangentes (23) des premier et deuxième lobes (19, 20) sur lesquelles les gaz d'échappement frappent et qui produisent une zone de haute pression tangente et asymétrique à l'intérieur du premier lobe (19) par écoulement massique.

8. Boîtier de sortie (15) selon la revendication 1, **caractérisé en ce que** le diamètre en projection du premier lobe (19) sur le plan dans lequel les gaz d'échappement frappent les parois tangentes (23) des premier et deuxième lobes (19, 20) est supérieur au diamètre en projection du deuxième lobe (20).

9. Boîtier de sortie (15) selon la revendication 7, **caractérisé en ce que** les diamètres consécutifs des premier et deuxième lobes (19, 20) du boîtier de sortie (15) sur les plans parallèles au plan de sortie (14) s'élargissent progressivement et proportionnellement vers le plan de sortie (14).

10. Boîtier de sortie (15) selon la revendication 6, **caractérisé en ce que** la largeur de ladite partie de déviation (24) augmente vers le plan de sortie (14).

11. Boîtier de sortie (15) selon la revendication 1, **caractérisé en ce que** le rapport diamétral entre les projections des premier et deuxième lobes (19, 20) sur le plan de sortie (14) du boîtier de sortie (15) est compris entre 0.8 à 0.85.

12. Boîtier de sortie (15) selon la revendication 1, **caractérisé en ce que** les ailettes de grille (13), qui restent à l'intérieur des projections du plan de sortie (14) des premier et deuxième lobes (19, 20) du boîtier de sortie (15), sont symétriques selon une ligne imaginaire séparant les deux lobes sur le plan de sortie (14).

13. Boîtier de sortie (15) selon la revendication 12, **caractérisé en ce que** les centres de courbure des ailettes de grille (13) dans les premier et deuxième lobes (19, 20) se trouvent sur des côtés opposés.

14. Boîtier de sortie (15) selon la revendication 13, **caractérisé en ce que** les ailettes de grille (13), qui s'étendent de manière à correspondre à la zone du

plan de sortie (14) restant dans la projection des premier et deuxième lobes (19, 20), s'étendent de manière incurvée sur un plan parallèle au plan de sortie (14) du lobe concerné.

15. Boîtier de sortie (15) selon la revendication 6, **caractérisé en ce que** tandis que l'une des deux extrémités d'une ailette de grille (13) est située sur la ligne de bord où se trouve la partie de déviation (24), son autre extrémité s'étend sur la ligne de bord du côté opposé de la partie de déviation (24).

16. Boîtier de sortie (15) selon la revendication 15, **caractérisé en ce que** les ailettes de grille (13) qui sont disposées consécutivement à certains intervalles sont placées entre la ligne de bord où la partie de déviation (24) est située et la ligne de bord du côté opposé de sorte qu'elles auront des longueurs différentes.

17. Boîtier de sortie (15) selon la revendication 1, **caractérisé en ce que** la distance entre chaque deux ailettes de grille (13) voisines est différente.

18. Dispositif de dilution et de distribution de gaz d'échappement (11) comprenant un boîtier de sortie (15) selon la revendication 1.

19. Véhicule comprenant un dispositif de dilution et de distribution des gaz d'échappement selon la revendication 18.

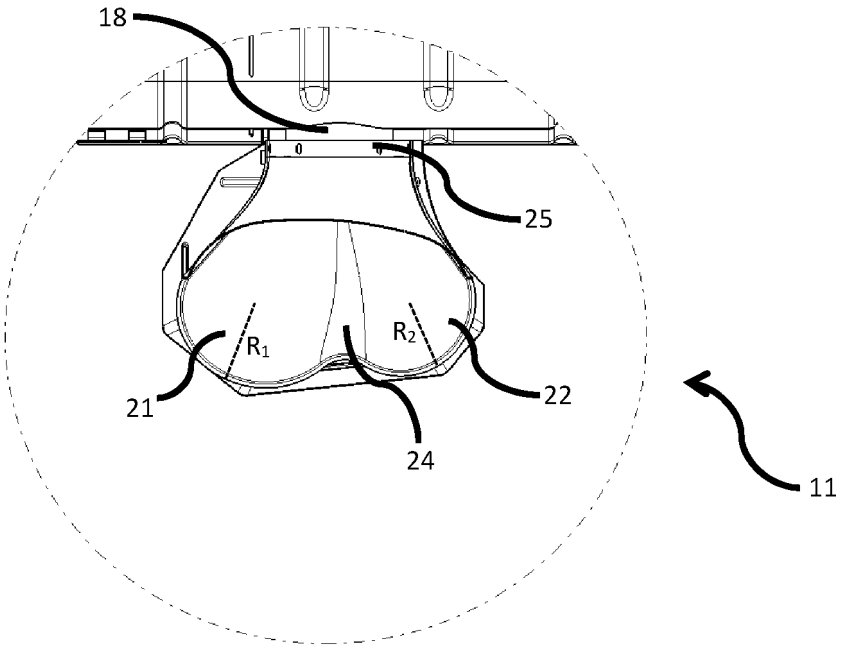


Figure 1

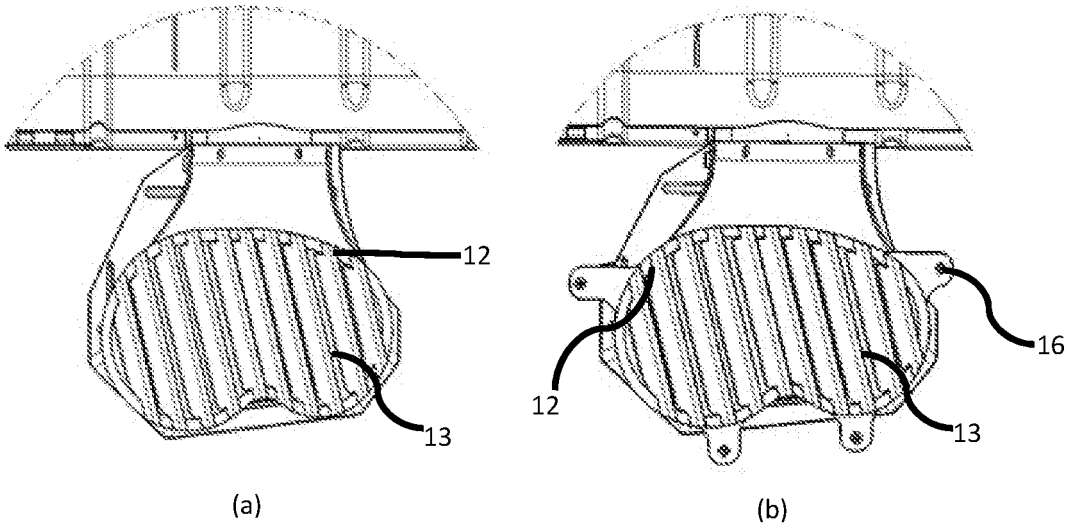
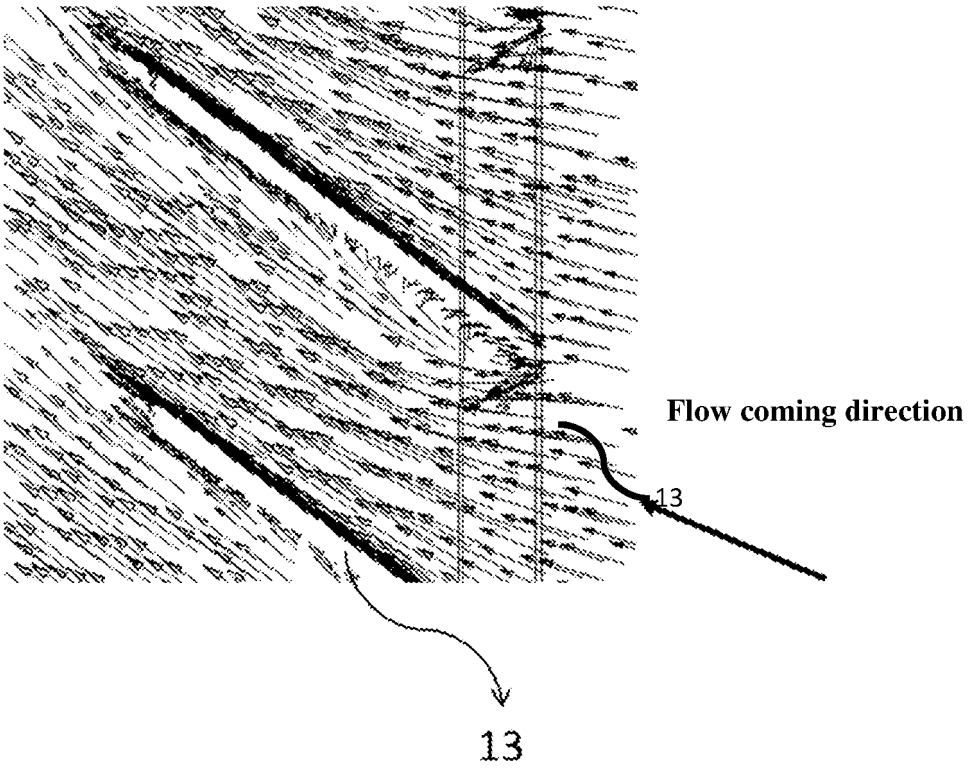
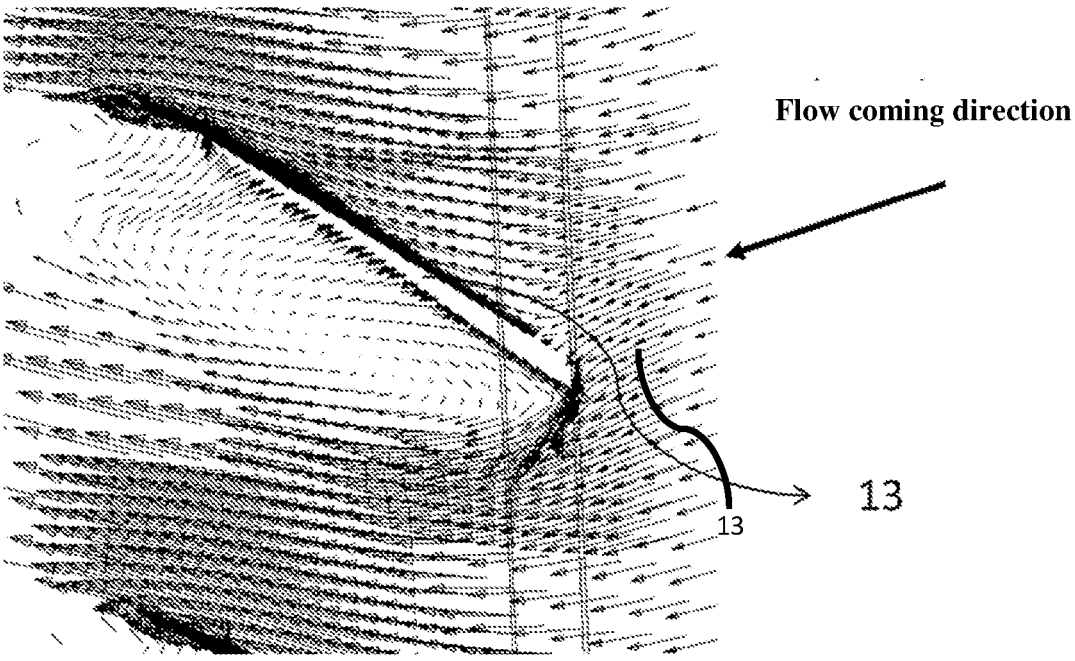


Figure 2

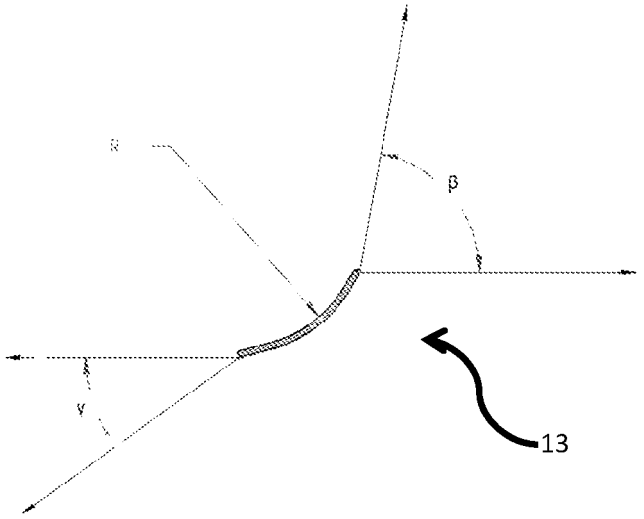


(a)

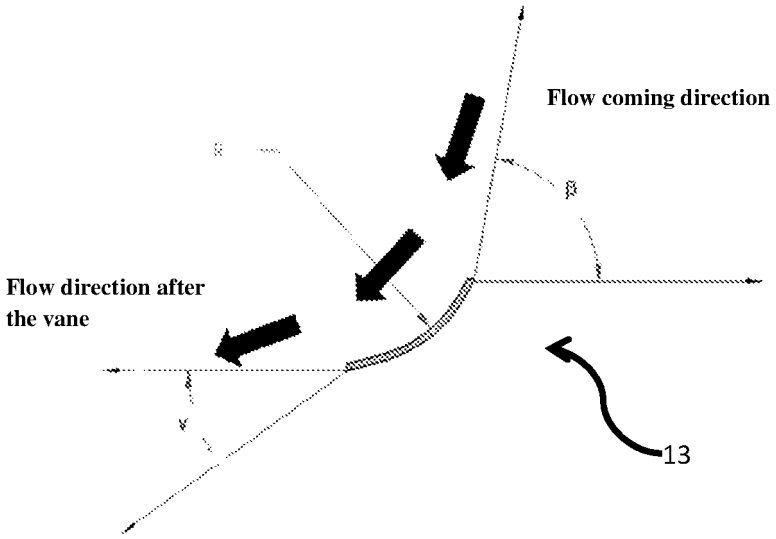


(b)

Figure 3


β
13

(a)


Flow coming direction
β
Flow direction after
the vane
13

(b)

Figure 4

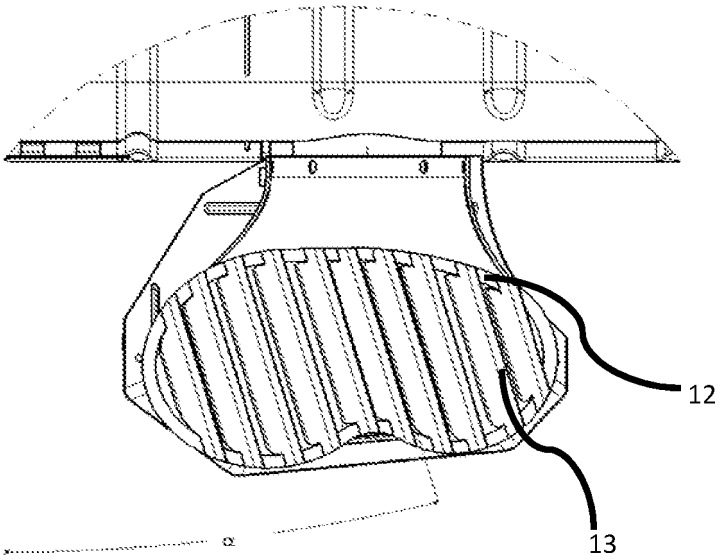


Figure 5

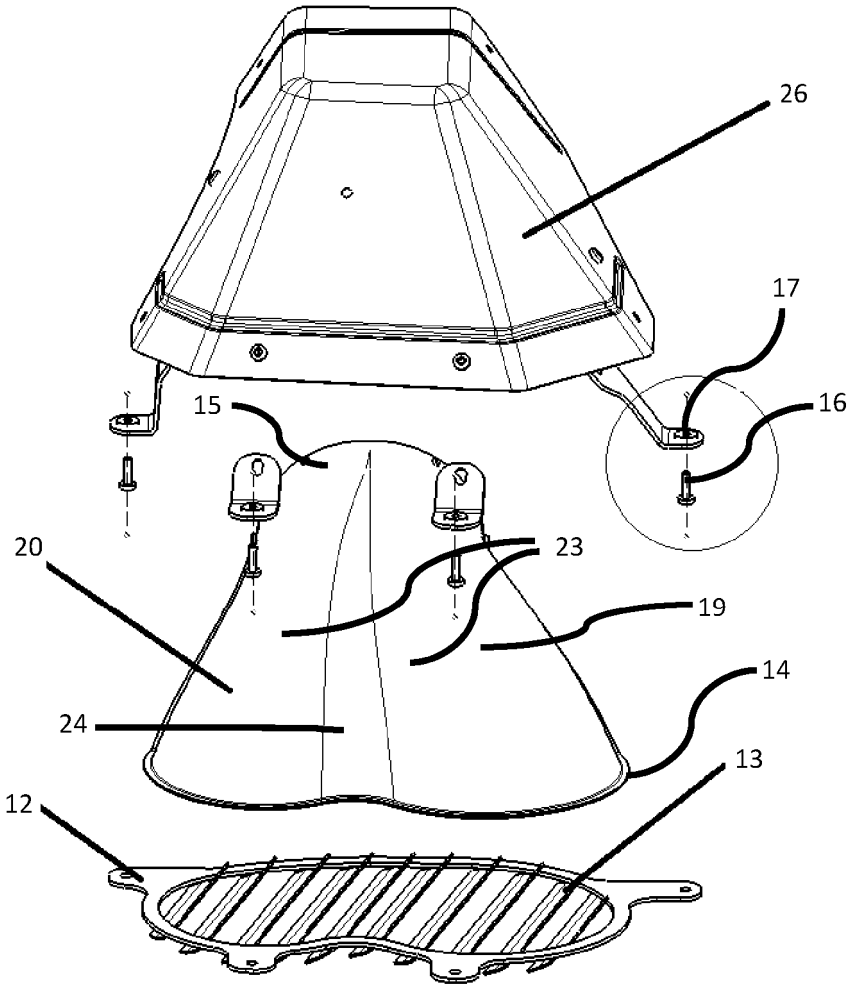


Figure 6

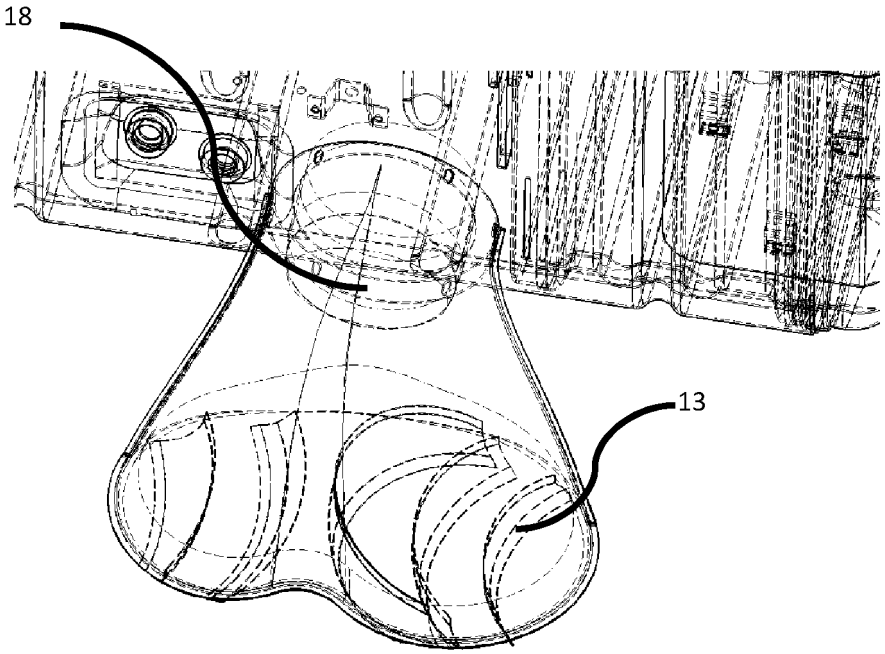


Figure 7

REFERENCES CITED IN THE DESCRIPTION

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