

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 897 060 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

22.01.2003 Bulletin 2003/04

(51) Int Cl.7: **F02M 35/12**

(21) Application number: **98114749.9**

(22) Date of filing: **05.08.1998**

(54) **Intake silencer system**

Einlassgeräuschkämpfer

Silencieux d'admission

(84) Designated Contracting States:
DE FR GB

(30) Priority: **13.08.1997 JP 21841697**
13.08.1997 JP 21841897

(43) Date of publication of application:
17.02.1999 Bulletin 1999/07

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Description

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

[0001] The present invention relates to an intake silencer system including an intake duct which communicates at opposite ends thereof with the atmospheric air and an engine, respectively, and whose intermediate portion opens into an intake silencing chamber.

2. DESCRIPTION OF THE RELATED ART

[0002] An intake silencer system is known, for example, from Japanese Patent Application Laid-open No. 8-158965. As shown in Fig.9, in the known intake silencer system, a first silencing chamber 02 and a second silencing chamber 03 are defined in a case 01 by division of the inside of the case 01. A first intake duct 04 communicating with an engine and a second intake duct 05 communicating the atmospheric air are opposed to each other within the first silencing chamber 02. The second intake duct 05 communicates with the second silencing chamber 03 through a communication pipe 06.

[0003] The above known system suffers from the following problem: Each of the first and second silencing chambers 02 and 03 exhibits a silencing effect only in a single frequency band. For this reason, to ensure that the silencing effect is exhibited in a wider frequency range, it is necessary to further increase the number of the silencing chambers, or to add a side branch. This is complicated and increases the size of the structure of an intake silencer system, resulting in an increased cost. Particularly, if the intake silencer system having the complicated structure and the large size is to be disposed in a narrow engine room, the following problems are encountered: a required large space hinders the disposition of other auxiliaries, and the workability of attachment and detachment of the intake silencer system is reduced due to the interference with other members.

[0004] WO 97 17 531 A discloses an intake silencer system according to the preamble of claim 1. There, a plurality of silencing chambers are separated by a plurality of complicated bent walls or ribs extending between opposed side walls of the chamber.

SUMMARY OF THE INVENTION

[0005] Accordingly, it is an object of the present invention to provide an intake silencer system which is capable of exhibiting a silencing effect over a wide frequency range while maintaining a simple and compact structure, and moreover, which can be easily disposed in a narrow space such as an engine room in an automobile.

[0006] To achieve the above object, according to claim 1, there is provided an intake silencer system comprising an intake duct which communicates at opposite ends thereof with the atmospheric air and an engine, respectively, and whose intermediate portion opens into an intake silencing chamber. The intake silencer system further includes a plurality of subsidiary silencing chambers which are defined within the intake silencing chamber by integrally connecting the opposed wall surfaces of the intake silencing chamber to each other with a plurality of ribs, the subsidiary silencing chambers being closed at one end thereof and opened at the other end directly into the intake silencing chamber. The silencing chambers have different resonance frequencies. All ribs are connected to three side walls of the intake silencer chamber and are all straight.

[0007] With the above arrangement, the plurality of subsidiary silencing chambers having the different resonance frequencies, can be formed in a simple and compact structure in which the opposed wall surfaces of the intake silencing chamber are only integrally connected to each other by the plurality of ribs. Therefore, a silencing effect over a wide frequency range can be obtained by the resonance effect of each of the subsidiary silencing chambers, each functioning as a side branch. Moreover, the rigidity of the wall surfaces of the intake silencing chamber is enhanced by the plurality of ribs and hence, it is possible to effectively inhibit the generation of a radiated sound due to the vibration of the wall surfaces. As the ribs are straight and are connected to three side walls, the rigidity of the silencer is increased in a simplified construction.

[0008] If some of the wall surfaces have an area larger than that of other wall surfaces of the intake silencing chamber, the wall surface rigidity which would have been decreased because of its larger area can be reinforced by the ribs to further effectively inhibit the generation of the radiated sound, and also the size of the ribs can be maintained to the minimum.

[0009] The intake silencing chamber may comprise a first case half and a second case half with mating faces thereof coupled to each other to clamp the intake duct, and the plurality of subsidiary silencing chambers defined in the first case half may open toward the mating faces. With the above arrangement, when the first case half is formed in a mold, the plurality of subsidiary silencing chambers can be formed simultaneously, leading to an enhanced productivity.

[0010] The plurality of subsidiary silencing chambers are disposed on one side of the intake silencing chamber and the intake duct is disposed on the other side of the intake silencing chamber, in a horizontal direction, respectively. With the above arrangement, the intake duct is prevented from interfering with the ribs and hence, the size of the ribs is not limited, leading to an increased freedom in determining of the sizes and shapes of the subsidiary silencing chambers.

[0011] Preferably, the engine is mounted in a vehicle,

wherein at least a portion of the intake silencing chamber is formed by a slant surface inclined with respect to a center plane of a vehicle body and extending along a wall surface of the vehicle body, and said plurality of subsidiary silencing chambers having different resonance frequencies by said ribs formed integrally with the slant surface in parallel to one another toward the intake duct.

[0012] With the above arrangement, it is possible to prevent a dead space from being produced between the intake silencing chamber and the wall surface of the vehicle body by extending the slant surface of the intake silencing chamber along the wall surface of the vehicle body to effectively utilize a space. Moreover, the slant surface enables the plurality of subsidiary silencing chambers to have different sizes and shapes and different resonance frequencies. Therefore, it is possible to obtain a silencing effect over a wider frequency range by a resonance effect of each of the subsidiary silencing chambers each functioning as a side branch. Additionally, the plurality of ribs enhance the rigidity of the intake silencing chamber and hence, it is possible to effectively inhibit the generation of a radiated sound due to the vibration.

[0013] The plurality of subsidiary silencing chambers are disposed on one side of the intake silencing chamber and the intake duct is disposed on the other side of the intake silencing chamber, in a horizontal direction, and tip ends of the plurality of ribs are trued up in a longitudinal direction of the vehicle body. With the above arrangement, the interference of the intake duct with the ribs is prevented and hence, the size of the ribs is not limited, leading to an increased freedom in determining the sizes and shapes of the subsidiary silencing chambers. Moreover, the wall surface for forming the ribs in the intake silencing chamber can be ensured, enhancing the rigidity of the intake silencing chamber.

[0014] In addition, if the shape of the cross section of the intake duct is an elliptic shape with a short diameter in a direction of extension of the ribs, the interference of the intake duct with the ribs is further effectively prevented, leading to a further increased freedom in determining the sizes and shapes of the subsidiary silencing chambers.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The above and other objects, and advantages of the invention will become apparent from the following description of the preferred embodiment taken in conjunction with the accompanying drawings.

[0016] Figs.1 to 7 show a first embodiment of the present invention, wherein

Fig.1 is a side view of a front portion of a vehicle body of an automobile having an intake silencer system mounted therein;

Fig.2 is a view taken in a direction of an arrow 2 in Fig.1;

Fig.3 is a sectional view taken along a line 3-3 in Fig.1;

Fig.4 is a perspective view of the entire intake silencer system;

Fig.5 is a view taken along a line 5-5 in Fig.4;

Fig.6 is a sectional view taken along a line 6-6 in Fig.5;

Fig.7 is a graph for explaining a silencing effect;

Fig.8 is a view similar to Fig.6, but according to a second embodiment of the present invention; and

Fig.9 is a view showing the prior art intake silencer system.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0017] The present invention will now be described by way of embodiments with reference to the accompanying drawings.

[0018] As shown in Figs.1 to 3, a right side frame 22 constituting a vehicle body frame according to a first embodiment of the present invention is disposed in a longitudinal direction of a vehicle body of an automobile at a front and right portion of an engine room 21 provided at a front portion of the vehicle body. As can be seen from Fig.2, a fender 23 constituting a wall surface of the vehicle body according to the first embodiment of the present invention is disposed on the right of the side frame 22, and an intake silencer system R is disposed between a left side of the fender 23 and a right side of the side frame 22. The intake silencer system R comprises a case 14 which is made of a synthetic resin. The case 14 comprises a right first case half 11 and a left second case half 12 integrally coupled to each other at mating faces 13 extending in a vertical direction. An intake duct 15 which is made in a J-shape of a synthetic resin, is clamped between the mating faces 13 of the first case half 11 and the second case half 12.

[0019] Mounting brackets 12₁₀ and 12₁₁ are integrally formed at a front end and a rear end of the second case half 12, respectively, and fastened to the side frame 22 by bolts 24, 24. A rubber cushion 25 is mounted at a central portion of the left side of the second case half 12 to abut against a right side of a plate member 22₁ pending downwards from a front portion of the side frame 22, whereby the leftward and rightward deflections of the case 14 are limited. As can be seen from Fig.2, the intake silencing system R is supported to protrude rightwards from the side frame 22 by fastening the second case half 12 to the side frame 22, but the intake duct 15 heavy in weight is disposed at a location near the side frame 22 and hence, the rigidity of supporting of the intake silencer system R is enhanced. A battery 26 is supported at a front and left portion of the side frame 22.

[0020] As can be seen from Fig.2, a front portion of the fender 23 in a direction of the vehicle body as view in a plane is inclined in a direction toward a center plane P of the vehicle body, and a right case sidewall 11₈ of

the first case half 11 is formed so that it is inclined along an inner surface of the fender 23. As a result, the inner surface of the fender 23 and the case sidewall 11₈ of the first case half 11 are opposed to each other though a small gap α . By the fact that the case sidewall 11₈ extends along the fender 23 in the above manner, a dead space can be prevented from being produced within the narrow engine room 21 to effectively utilize a space.

[0021] A recess 11₁₃ (see Figs.2 and 4) is defined at a front lower portion of the first case half 11, and a turning signal lamp 27 mounted at a right end of a front bumper (not shown) is accommodated in the recess 11₁₃.

[0022] A pair of mounting brackets 28₁ and 28₂ are mounted at front and rear portions of an air cleaner 28 and fixed to upper ends of a pair of front and rear stays 29 and 30 risen on an upper surface of the side frame 22 by bolts 31, 31, respectively. As a result, the air cleaner 28 is supported at a location above the side frame 22 and between a rear portion of the right-side intake silencer system R and a rear portion of the left-side battery 26. At this time, the air cleaner 28 is disposed in an inclined manner, so that its upper surface is parallel to a bonnet 32 to prevent the interference with the bonnet 32 declining forward (see Fig.1).

[0023] An intake introducing duct 33 extending upwards toward a lower surface of the bonnet 32 is connected to an air inlet 15₅ of the intake duct 15 protruding from an upper surface of the case 14, and an air outlet 15₆ of the intake duct 15 protruding from the upper surface of the case 14 is connected directly to an air inlet 28₃ protruding from a lower surface of the air cleaner 28. An air outlet 28₅ is provided in an upper portion of the air cleaner 28, i.e., on an opposite side from the air inlet 28₃ with an element 28₄ interposed between the air outlet 28₅ and the air inlet 28₃, and is connected to the engine (not shown) through an air flow tube 34.

[0024] The structure of the intake silencer system R will be described below in detail with reference to Figs. 3 to 6.

[0025] The first case half 11 has a volume larger than that of the second case half 12 and includes a wedge-shaped recess 16 which is defined at a location spaced one third of the way down from an upper surface of the first case half 11 and which extends toward the mating face 13. A first partition wall 11₁ extends horizontally from the tip end of the wedge-shaped recess 16 toward the mating face 13. The tip end of the first partition wall 11₁ is coupled to a tip end of a second partition wall 12₁ extending horizontally from an inner surface of the second case half 12 toward the mating face 13. As a result, a first resonant chamber 17 forming an intake silencing chamber of the present invention is defined between lower-side case upper walls 11₂ and 12₂ and a lower-side recess upper wall 16₁ as well as the first and second partition walls 11₁ and 12₁, and a second resonant chamber 18 is defined between lower-side case lower walls 11₃ and 12₃ and an upper-side recess lower wall

16₂ as well as the first and second partition walls 11₁ and 12₁.

[0026] A pair of annular projections 15₁ and 15₂ are formed around an outer periphery of an upper portion of the intake duct 15 and interposed between a pair of notches 11₄ and 11₅ defined in the case upper wall 11₂ of the first case half 11 and a pair of notches 12₄ and 12₅ defined in the case upper wall 12₂ of the second case half 12 (see Figs.4 and 5). A pair of annular recesses 15₃ and 15₄ are defined around an outer periphery of a lower portion of the intake duct 15 and interposed between a pair of notches 11₆ and 11₇ defined in the first partition wall 11₁ of the first case half 11 and a pair of notches 12₆ and 12₇ defined in the second partition wall 12₁ of the second case half 12 (see Figs.5 and 6). The intake duct 15 is firmly clamped between the first case half 11 and the second case half 12, and the air inlet 15₅ and the air outlet 15₆ protrude upwards from the case upper walls 11₂ and 12₂.

[0027] The J-shaped intake duct 15 has portions located within the first resonant chamber 17, connected to each other by a connecting wall 15₇, and a slit-shaped opening 15₈ is formed therein for permitting the inside of the intake duct 15 to communicate with the inside of the first resonant chamber 17, the opening 15₈ being formed by cutting a portion near the air outlet 15₆ up to a location reaching the connecting wall 15₇. The intake duct 15 includes a communication pipe 15₉ at a portion located within the second resonant chamber 18, so that the inside of the intake duct 15 communicates with the inside of the second resonant chamber 18 through the communication pipe 15₉.

[0028] Three ribs 11₉, 11₁₀ and 11₁₁ are formed in parallel to one another within the first resonant chamber 17. The ribs 11₉, 11₁₀ and 11₁₁ are connected to the case upper walls 11₂, the recess upper wall 16₁ and a case sidewall 11₈ and extend toward the mating faces 13. Four subsidiary silencing chambers 19a, 19b, 19c and 19d are defined in a divided manner within the first resonant chamber 17 and open toward the mating faces 13. The sizes and shapes of the four subsidiary silencing chambers 19a, 19b, 19c and 19d are different from one another, so that they each have different resonance frequencies. A plurality of ribs 11₂ are provided in the wedge-shaped recess 16 of the first case half 11 to connect the recess upper wall 16₁ and the recess lower wall 16₂ to each other.

[0029] As can be seen from Figs.4 and 5, the second case half 12 has two water scupper bores 12₈ and 12₉ for discharging water from the first and second resonant chambers 17 and 18. The water scupper bore 12₈ in the first resonant chamber 17 is provided in a front portion of the first resonant chamber 17 and hence, a sufficient distance can be ensured between the water scupper bore 12₈ and the opening 15₈ in the intake duct 15 to prevent the suction of water through the opening 15₈. Similarly, the water scupper bore 12₉ in the second resonant chamber 18 is provided in a rear portion of the

second resonant chamber 18 and hence, a sufficient distance can be ensured between the water scupper bore 12_g and the communication pipe 15_g of the intake duct 15 to prevent the suction of water through the communication pipe 15_g. In a state in which the intake silencer system has been mounted in a vehicle, the four subsidiary silencing chambers 19a, 19b, 19c and 19d open laterally (horizontally) and hence, the single water scupper bore 12_g may be provided in the first resonant chamber 17.

[0030] The operation of the embodiment of the present invention having the above-described arrangement will be described below.

[0031] The open air drawn by a negative intake pressure generated by the operation of the engine is supplied to the engine through the air cleaner 28, the intake silencer system R and the throttle body (not shown). At this time, the inside of the intake duct 15 of the intake silencer system R communicates with the inside of the first resonant chamber 17 through the opening 15_g and with the inside of the second resonant chamber 18 through the communication pipe 15_g and hence, noises of two different frequency bands can be damped by the first and second resonant chambers 17 and 18 each functioning as a resonant-type silencer. As can be seen from Fig.7, the second resonant chamber 18 having a large volume, dampens the noise of a relatively low frequency band, and the first resonant chamber 17 having a smaller volume than that of the second resonant chamber 18, dampens the noise of a higher frequency band.

[0032] At the same time, each of the four subsidiary silencing chambers 19a, 19b, 19c and 19d separated from one another by the three ribs 11_g, 11₁₀ and 11₁₁ within the first resonant chamber 17 functions as a side branch having a resonant effect and is capable of damping noise of a frequency band depending upon the size and shape thereof. As can be seen from Fig.2, the case sidewall 11_g of the first case half 11 is formed to extend along the fender 23 inclined with respect to the center plane P (see Fig. 2) of the vehicle body and hence, if the tip ends of the three ribs 11_g, 11₁₀ and 11₁₁ extending from the case sidewall 11_g toward the center plane P of the vehicle body are trued up in a longitudinal direction of the vehicle body, the length of each of the ribs 11_g to 11₁₁ is automatically and gradually decreased. As a result, the four subsidiary silencing chambers 19a, 19b, 19c and 19d are decreased in volume in the order of 19a → 19b → 19c → 19d and hence, are capable of damping the noises of a lower frequency band to a higher frequency band in the above-described order, respectively, as shown by a solid line in Fig.7. A dashed line in Fig.7 shows a silencing effect provided when the first resonant chamber 17 does not have the ribs 11_g, 11₁₀ and 11₁₁ (namely, the subsidiary silencing chambers 19a, 19b, 19c and 19d). If the silencing effect shown by the dashed line is compared with that shown by the solid line, the noise damping effects (see obliquely lined are-

as) provided by the subsidiary silencing chambers 19a, 19b, 19c and 19d can be confirmed.

[0033] In this way, it is possible to effectively dampen the noise of a frequency band wider than that of the prior art without an increase in size of the intake silencer system R using a simple structure in which the plurality of ribs 11_g, 11₁₀ and 11₁₁ are formed only within the first resonant chamber 17. Moreover, the ribs 11_g, 11₁₀ and 11₁₁ integrally connect the three wall surfaces of the first resonant chamber 17, i.e., the case upper wall 11₂, the recess upper wall 16₁ and the case sidewall 11_g, and hence, it is possible to remarkably enhance the rigidity of the first case half 11, and prevent the generation of a radiated sound due to the vibration of the wall surfaces 11₁, 11₈ and 16₁.

[0034] Particularly, the ribs 11_g to 11₁₁ integrally connect the two largest opposed wall surfaces of the first resonant chamber 17 (namely, the upper-side case upper wall 11₂ and the lower-side recess upper wall 16₁) and hence, it is possible to effectively inhibit the radiated sound from the case upper wall 11₂ which is liable to be vibrated because of its large area, and the radiated sound from the recess upper wall 16₁. Further, because the distance between the case upper wall 11₂ and the recess upper wall 16₁ is relatively small, the height of the ribs 11_g to 11₁₁ can be reduced. Thus, the rigidity of the ribs 11_g to 11₁₁ themselves can be enhanced, and also the thickness of the ribs 11_g to 11₁₁ can be reduced to minimize an increase in weight. Moreover, the ribs 11_g to 11₁₁ are disposed at substantially equal distances, which is convenient for enhancement in rigidity of the first case half 11.

[0035] The first case half 11 and the second case half 12 are made from a synthetic resin by an injection molding, wherein the ribs 11_g to 11₁₁ and 11₁₂ are formed in a direction perpendicular to the mating face 13 corresponding to a parting face of a mold for forming the first case half 11. Therefore, it is easy to release the formed first case half 11 from the mold, and the structure of the mold can be simplified. Also the four subsidiary silencing chambers 19a, 19b, 19c and 19d can be formed without subjecting the formed first case half 11 to a special treatment.

[0036] By the fact that the intake duct 15 is clamped between and fixed to the mating faces 13 of the first case half 11 and the second case half 12, a special member such as a bolt and the like is not required for such fixing. Moreover, as can be seen from Fig.6, the mating faces 13 clamping the intake duct 15 are offset remotely from the ribs 11_g to 11₁₁ with respect to the central portion of the intake silencer system R. Therefore, the subsidiary silencing chambers 19a to 19d having a sufficient volume can be formed without consideration of the interference of the ribs 11_g to 11₁₁ with the intake duct 15.

[0037] A second embodiment of the present invention will now be described with reference to Fig.8.

[0038] As can be seen from the comparison of Figs.6 and 8 with each other, the cross section of the intake

duct 15 in the first embodiment (see Fig. 6) is formed into a circular shape at its upstream portion and into an elliptic shape having a longer diameter in a direction parallel to the ribs 11₉ to 11₁₁ at its downstream portion, whereas the cross section of the intake duct 15 in the second embodiment (see Fig. 8) is formed into an elliptic shape having a shorter diameter in a direction parallel to the ribs 11₉ to 11₁₁ at both of its upstream and downstream portions. As a result, the length of the ribs 11₉ to 11₁₁ can be prolonged without interference with the intake duct 15, leading to a further increased freedom in determining of the size and shape of the subsidiary silencing chambers 19a, 19b, 19c and 19d.

[0039] Although the embodiment of the present invention has been described in detail, it will be understood that the present invention is not limited to the above-described embodiments, and various modifications in design may be made without departing from the spirit and scope of the invention defined in claims.

[0040] For example, the four subsidiary silencing chambers 19a, 19b, 19c and 19d are defined by the three ribs 11₉, 11₁₀ and 11₁₁ in the embodiment, but the number of the ribs may be two or more. The inclined wall surface of the vehicle body is not limited to the fender 23 illustrated in the embodiments and may be another wall surface of the vehicle body such as a bonnet and the like. The cross sectional shape of the intake duct 15 need not be a mathematically precise elliptic shape, and may be a shape having both of a longer diameter and a shorter diameter.

[0041] The case of an intake silencer system includes a first case half and a second case half coupled to each other at mating faces, with an intake duct clamped between the mating faces. The intake duct opens into a resonant chamber within the case, so that noise is damped by a resonant effect. Three ribs are provided on an inner surface of the first case half, thereby defining four subsidiary silencing chambers each functioning as a side branch for producing a resonant effect to obtain a silencing effect in a wide frequency range. The ribs also contribute to an enhancement in rigidity of the wall surfaces of the case.

Claims

1. An intake silencer system for an engine comprising an intake silencing chamber (17), an intake duct (15) communicating at one end thereof with the atmosphere and at the other end thereof with the engine, said intake duct (15) having an intermediate portion (15_g) opening into said intake silencing chamber (17), a plurality of ribs (11₉-11₁₁), and a plurality of subsidiary silencing chambers (19a-19d) defined within said intake silencing chamber (17) wherein opposed wall surfaces (11₂, 16₉) of said intake silencing chamber (17) are integrally connected to each other by said plurality of ribs (11₉-11₁₁),

said subsidiary silencing chambers (19a-19d) being closed at one end (11₈) thereof and opened at the other end directly into said intake silencing chamber (17), and wherein said subsidiary silencing chambers (19a-19d) have different resonance frequencies,

characterized in that

all the ribs (11₉-11₁₁) are connected to three side walls (11₂, 16₁, 11₈) of the intake silencing chamber (17) and are all straight.

2. An intake silencer system according to Claim 1, wherein at least one (11₂, 16₁) of said wall surfaces of said intake silencing chamber (17) has a surface area larger than the surface area of at least one other wall surface (11₈) of said intake silencing chamber.
3. An intake silencer system according to Claim 1 or 2, wherein said intake silencing chamber comprises a first case half (11) and a second case half (12) having mating faces (13), wherein said mating faces (13) thereof are coupled to each other to clamp said intake duct (15), and the plurality of subsidiary silencing chambers (19a-19d) are defined in said first case half (11) and open toward said mating faces (13).
4. An intake silencer system according to Claim 1, 2 or 3, wherein said plurality of subsidiary silencing chambers (19a-19d) are disposed on one side of said intake silencing chamber (17) and said intake duct (15) is disposed on the other side of said intake silencing chamber (17) in a horizontal direction.
5. An intake silencer system according to Claim 1, wherein said engine is mounted in a vehicle, and wherein at least a portion of said intake silencing chamber (17) is formed by a slant surface (11₈) inclined with respect to a center plane (P) of a vehicle body and extending along a wall surface (23) of the vehicle body, and said subsidiary silencing chambers (19a-19d) have different resonance frequencies by said ribs (11₉-11₁₁) being formed integrally with said slant surface (11₈) to extend parallel to one another toward said intake duct (15).
6. An intake silencer system according to claim 5, wherein said plurality of subsidiary silencing chambers (19a-19d) are disposed on one side of said intake silencing chamber (17) and said intake duct (15) is disposed on the other side of said intake silencing chamber (17) in a horizontal direction, and tip ends of said plurality of ribs (11₉-11₁₁) are trued up in a longitudinal direction of the vehicle body.
7. An intake silencer system according to claim 6, wherein the cross sectional shape of said intake

duct (15) is an elliptic shape having a shorter diameter in a direction of extension of said ribs (11_g-11₁₁).

Patentansprüche

1. Einlassgeräuschkämpfsystem für einen Motor, das eine Einlassgeräuschkämpfkammer (17), eine Einlassleitung (15), die an ihrem einen Ende mit der Atmosphäre in Verbindung steht und an ihrem anderen Ende mit dem Motor, wobei die Einlassleitung (15) einen sich in die Einlassgeräuschkämpfkammer (17) öffnenden Zwischenabschnitt (15_g) aufweist, eine Mehrzahl von Rippen (11_g-11₁₁) und eine Mehrzahl von in der Einlassgeräuschkämpfkammer (17) definierten Nebengeräuschkämpfkammern (19a-19d), worin die gegenüberliegenden Wandflächen (11₂, 16_g) der Einlassgeräuschkämpfkammer (17) durch die Mehrzahl der Rippen (11_g-11₁₁) integral miteinander verbunden sind, wobei die Nebengeräuschkämpfkammern (19a-19d) an ihrem einen Ende (11_g) geschlossen sind und sich an dem anderen Ende direkt in die Einlassgeräuschkämpfkammer (17) öffnen, und worin die Nebengeräuschkämpfkammern (19a-19d) unterschiedliche Resonanzfrequenzen haben,
dadurch gekennzeichnet, dass
alle Rippen (11_g-11₁₁) mit den drei Seitenwänden (11₂, 16₁, 11_g) der Einlassgeräuschkämpfkammer (17) verbunden sind und alle gerade sind.
2. Einlassgeräuschkämpfsystem nach Anspruch 1, worin zumindest eine (11₂, 16₁) der Wandflächen der Einlassgeräuschkämpfkammer (17) eine größere Oberflächenausdehnung hat als die Oberflächenausdehnung zumindest einer anderen Wandfläche (11_g) der Einlassgeräuschkämpfkammer.
3. Einlassgeräuschkämpfsystem nach Anspruch 1 oder 2, worin die Einlassgeräuschkämpfkammer eine erste Gehäusehälfte (11) und eine zweite Gehäusehälfte (12) aufweist, die Passflächen (13) aufweisen, wobei deren Passflächen (13) zum Einklemmen der Einlassleitung (15) miteinander gekoppelt sind, und die Mehrzahl der Nebengeräuschkämpfkammern (19a-19d) in der ersten Gehäusehälfte (11) definiert sind und sich zu den Passflächen (13) hin öffnen.
4. Einlassgeräuschkämpfsystem nach Anspruch 1, 2 oder 3, worin die Mehrzahl der Nebengeräuschkämpfkammern (19a-19d) in horizontaler Richtung an einer Seite der Einlassgeräuschkämpfkammer (17) angeordnet sind und die Einlassleitung (15) an der anderen Seite der Einlassgeräuschkämpfkammer (17) angeordnet ist.

5. Einlassgeräuschkämpfsystem nach Anspruch 1, worin der Motor in einem Fahrzeug angebracht ist und worin zumindest ein Abschnitt der Einlassgeräuschkämpfkammer (17) durch eine Schrägfläche (11_g) gebildet ist, die in Bezug auf eine Mittelebene (P) einer Fahrzeugkarosserie abgeschrägt ist und sich entlang einer Wandfläche (23) der Fahrzeugkarosserie erstreckt, und wobei die Nebengeräuschkämpfkammern (19a-19d) unterschiedliche Resonanzfrequenzen durch die Rippen (11_g-11₁₁) haben, die integral mit der Schrägfläche (11_g) geformt sind, um sich parallel zueinander zu der Einlassleitung (15) hin zu erstrecken.
6. Einlassgeräuschkämpfsystem nach Anspruch 5, worin die Mehrzahl der Nebengeräuschkämpfkammern (19a-19d) in horizontaler Richtung an einer Seite der Einlassgeräuschkämpfkammer (17) angeordnet ist und die Einlassleitung (15) an der anderen Seite der Einlassgeräuschkämpfkammer (17) angeordnet ist, und Endspitzen der Mehrzahl der Rippen (11_g-11₁₁) in Längsrichtung der Fahrzeugkarosserie ausgerichtet sind.
7. Einlassgeräuschkämpfsystem nach Anspruch 6, worin die Querschnittsform der Einlassleitung (15) eine elliptische Form ist, die einen in Erstreckungsrichtung der Rippen (11_g-11₁₁) kürzeren Durchmesser hat.

Revendications

1. Silencieux d'admission destiné à un moteur comprenant une chambre de silencieux d'admission (17), un conduit d'admission (15) en communication atmosphérique à une de ses extrémités et avec le moteur à l'autre de ses extrémités, ledit conduit d'admission (15) comportant une partie intermédiaire (15_g) s'ouvrant à l'intérieur de ladite chambre de silencieux d'admission (17), une pluralité de nervures (11_g - 11₁₁), et une pluralité de chambres de silencieux auxiliaires (19a - 19d) définies à l'intérieur de ladite chambre de silencieux d'admission (17) dans lequel des surfaces de paroi opposées (11₂, 16_g) de ladite chambre de silencieux d'admission (17) sont connectées de manière intégrale l'une à l'autre par ladite pluralité de nervures (11_g, 11₁₁), lesdites chambres de silencieux auxiliaires (19a - 19d) étant fermées à une de leurs extrémités (11_g) et ouvertes à l'autre extrémité directement à l'intérieur de ladite chambre de silencieux d'admission (17), et dans lequel lesdites chambres de silencieux auxiliaires (19a - 19d) ont des fréquences de résonance différentes,
caractérisé en ce que
toutes les nervures (11_g - 11₁₁) sont connectées aux trois parois latérales (11₂, 16₁, 11_g) de la

chambre de silencieux d'admission (17) et sont toutes rectilignes.

2. Silencieux d'admission selon la revendication 1, dans lequel au moins une (11_2 , 16_1) desdites surfaces de paroi de ladite chambre de silencieux d'admission (17) a une surface plus grande que la surface d'au moins l'autre surface de paroi (11_8) de ladite chambre de silencieux d'admission. 5
10
3. Silencieux d'admission selon la revendication 1 ou la revendication 2, dans lequel ladite chambre de silencieux d'admission comprend une première moitié de carter (11) et une seconde moitié de carter (12) comportant des faces de contact (13), dans lequel lesdites faces de contact (13) de celles-ci sont accouplées l'une avec l'autre afin de maintenir ledit conduit d'admission (15), et la pluralité de chambres de silencieux auxiliaires (19a - 19d) sont définies dans la première moitié de carter (11) et ouvertes vers lesdites faces de contact (13). 15
20
4. Silencieux d'admission selon les revendications 1, 2 ou 3, dans lequel ladite pluralité de chambres de silencieux auxiliaires (19a - 19d) est disposée sur un côté de ladite chambre de silencieux d'admission (17) et ledit conduit d'admission (15) est disposé sur l'autre côté de ladite chambre de silencieux d'admission (17) dans une direction horizontale. 25
30
5. Silencieux d'admission selon la revendication 1, dans lequel ledit moteur est monté dans un véhicule, et dans lequel au moins une partie de ladite chambre de silencieux d'admission (17) est formée par une surface en pente (11_8) inclinée par rapport à un plan central (P) d'un corps de véhicule et s'étendant le long d'une surface de paroi (23) du corps de véhicule, et dans lequel lesdites chambres de silencieux auxiliaires (19a - 19d) ont des fréquences de résonance différentes en raison desdites nervures (11_9 - 11_{11}) qui sont formées intégralement avec ladite surface en pente (11_8) afin de s'étendre de manière parallèle les unes par rapport aux autres vers ledit conduit d'admission (15). 35
40
45
6. Silencieux d'admission selon la revendication 5, dans lequel ladite pluralité de chambres de silencieux auxiliaires (19a - 19d) est disposée sur un côté de ladite chambre de silencieux d'admission (17) et ledit conduit d'admission (15) est disposé sur l'autre côté de ladite chambre de silencieux d'admission (17) dans une direction horizontale, et des extrémités de pointe de ladite pluralité de nervures (11_9 - 11_{11}) sont ajustées dans une direction longitudinale du corps de véhicule. 50
55
7. Silencieux d'admission selon la revendication 6, dans lequel la coupe transversale dudit conduit

d'admission (15) a une forme elliptique ayant un diamètre plus court dans une direction d'extension desdites nervures (11_9 - 11_{11}).

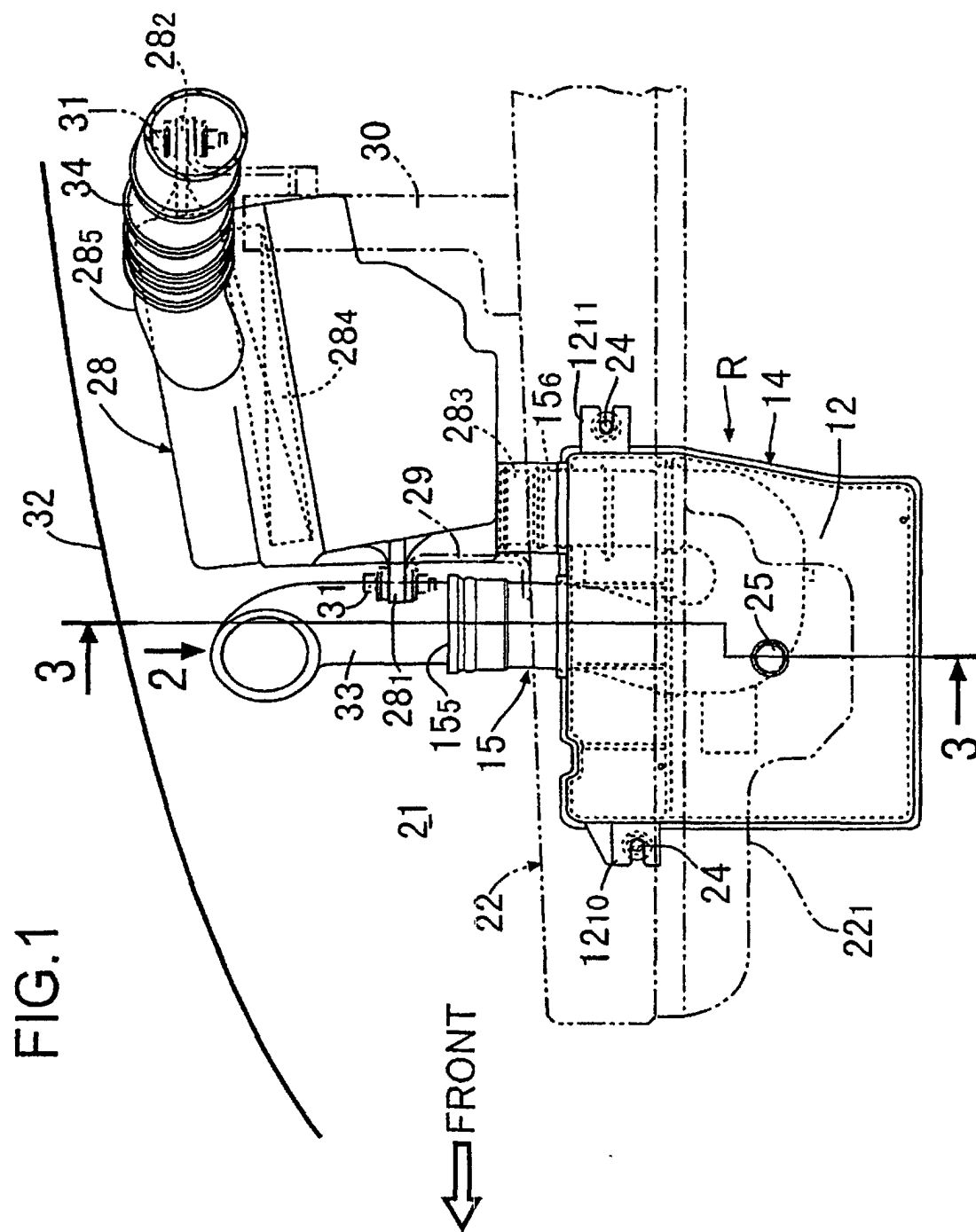


FIG.2

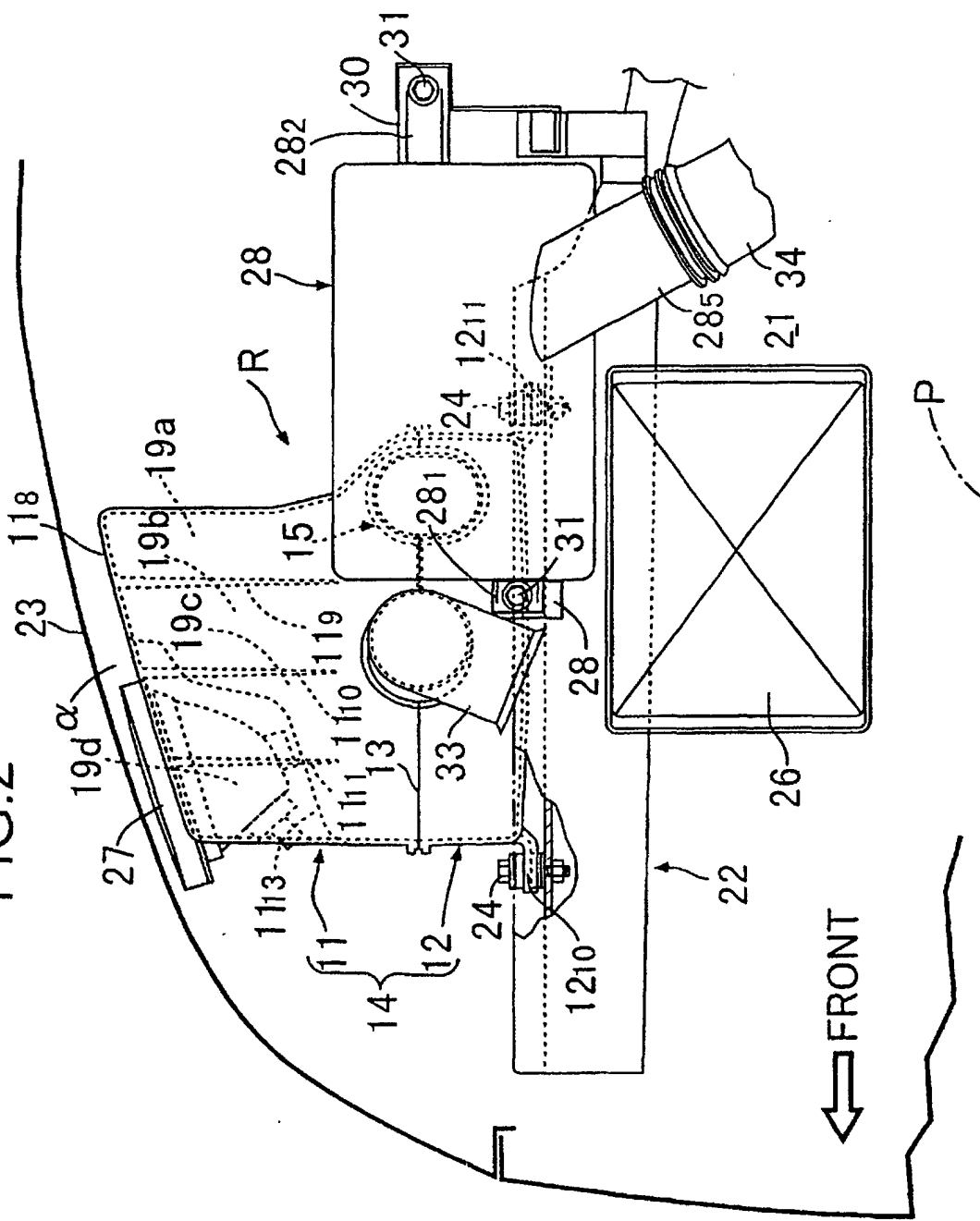


FIG.3

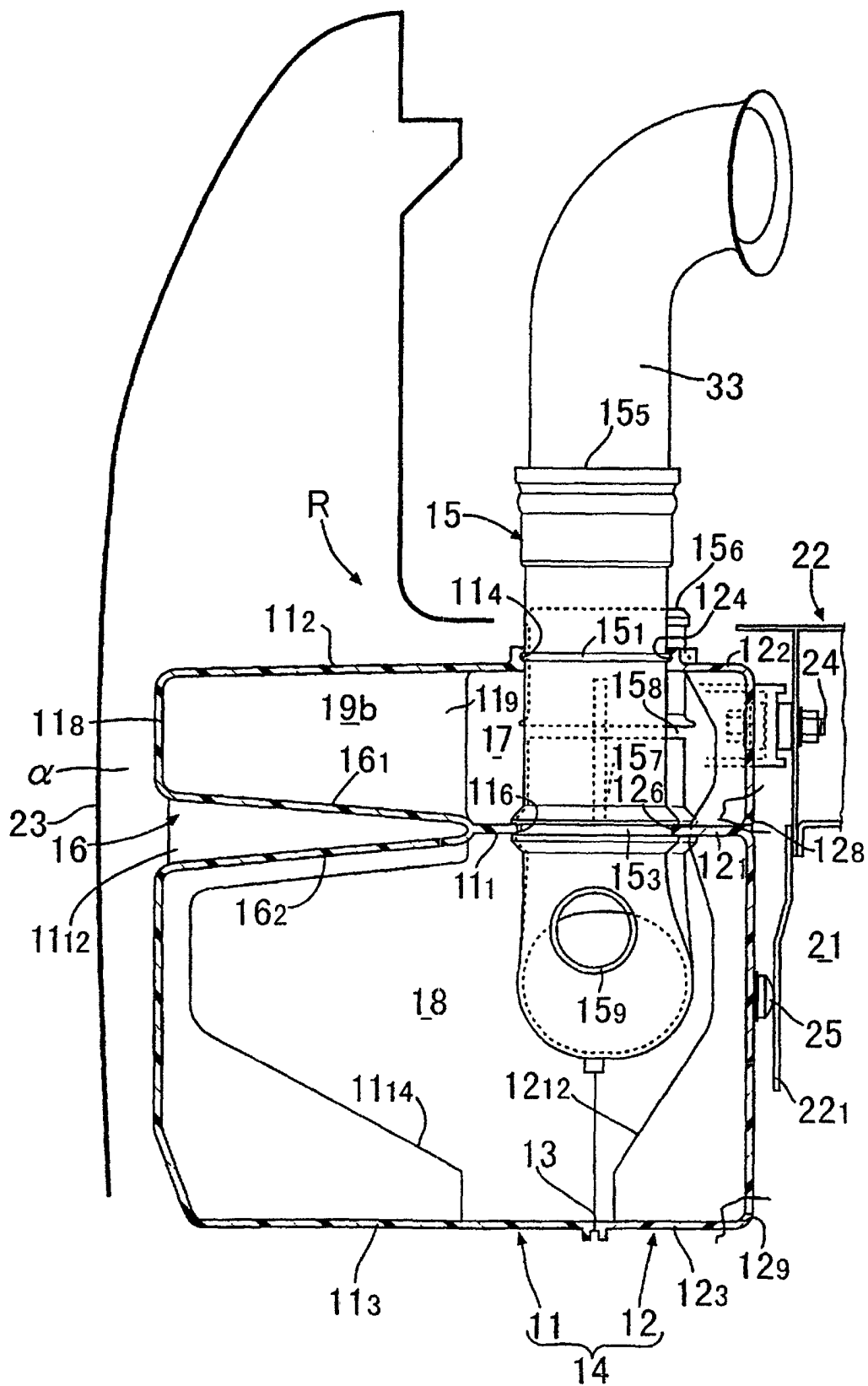


FIG.4

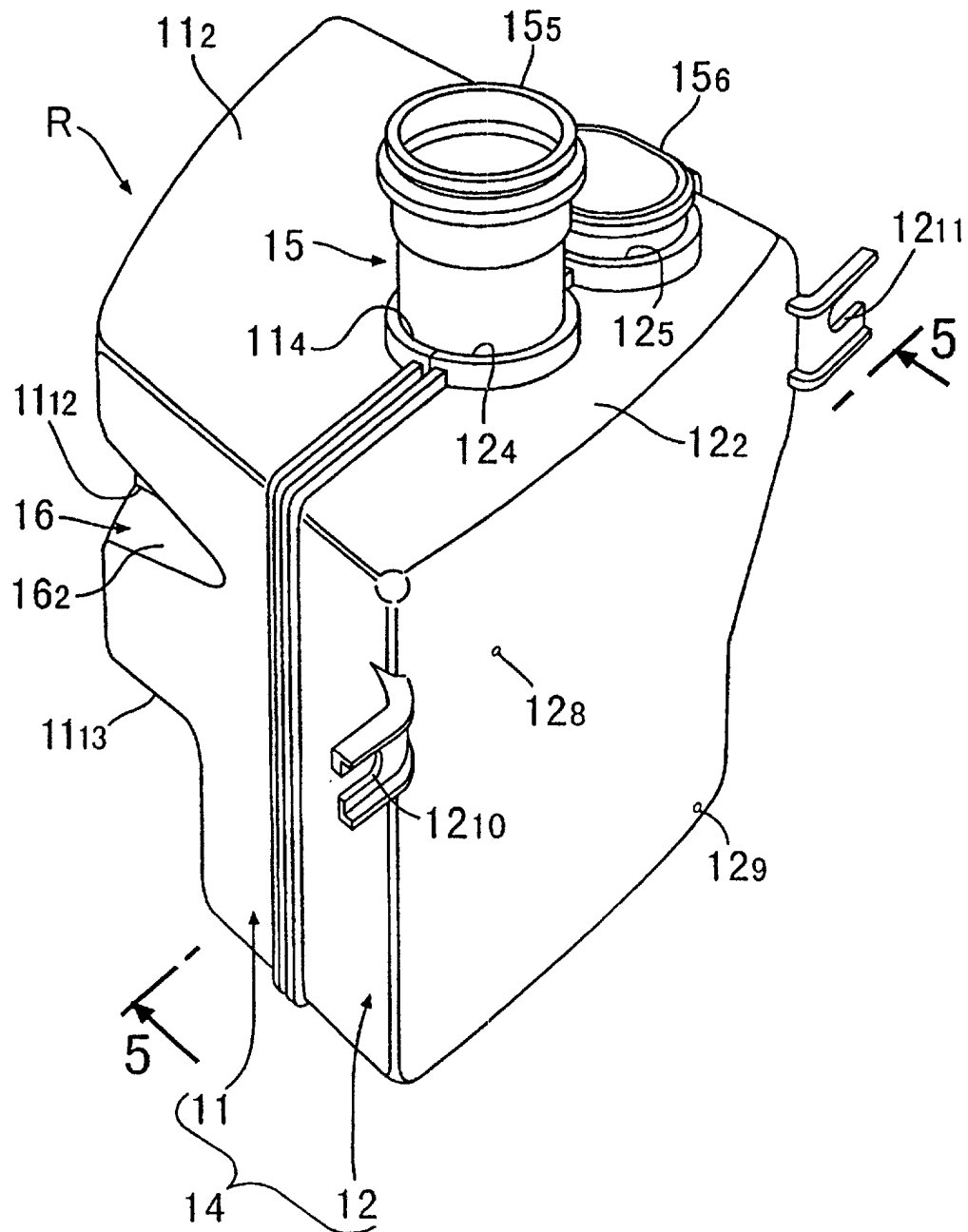
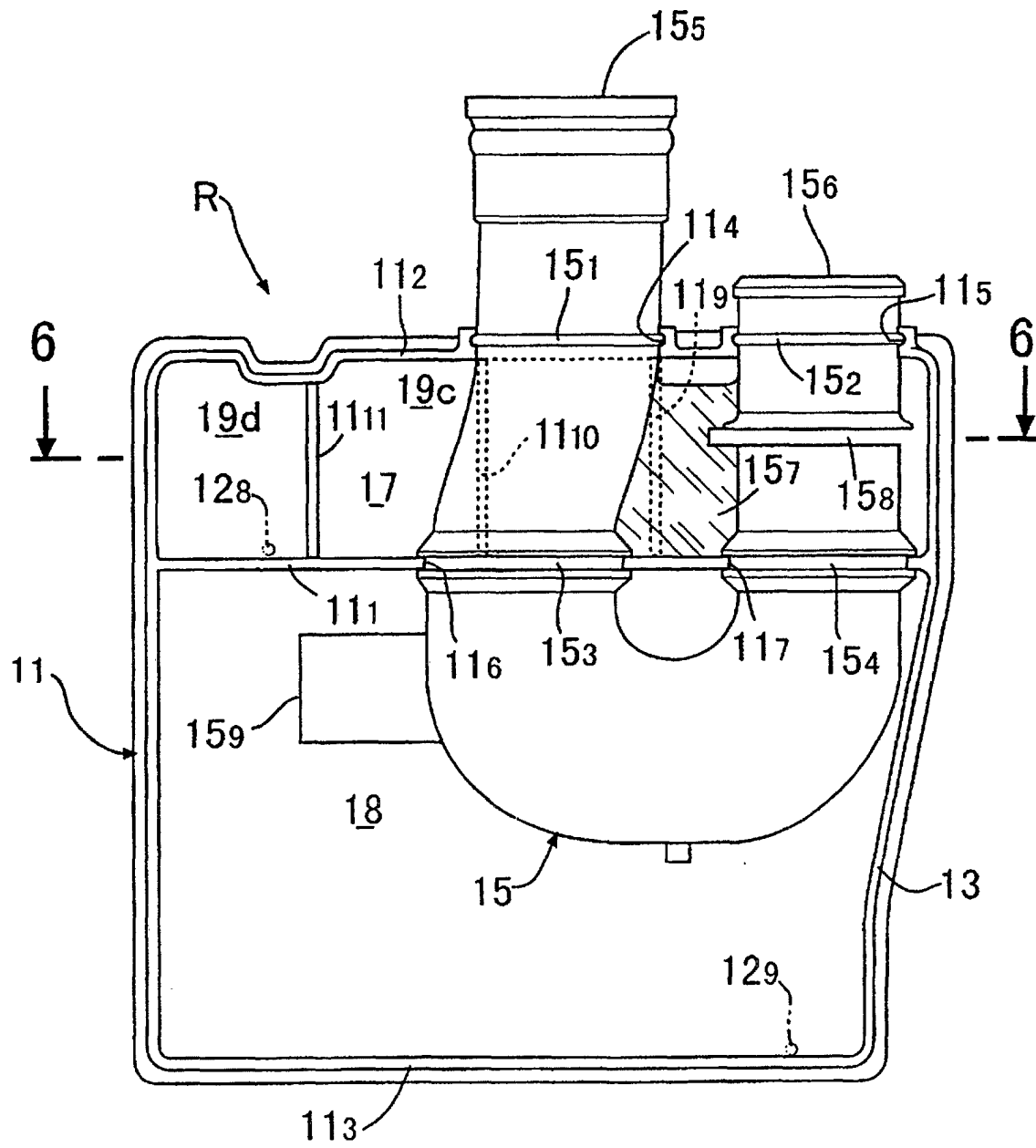


FIG.5



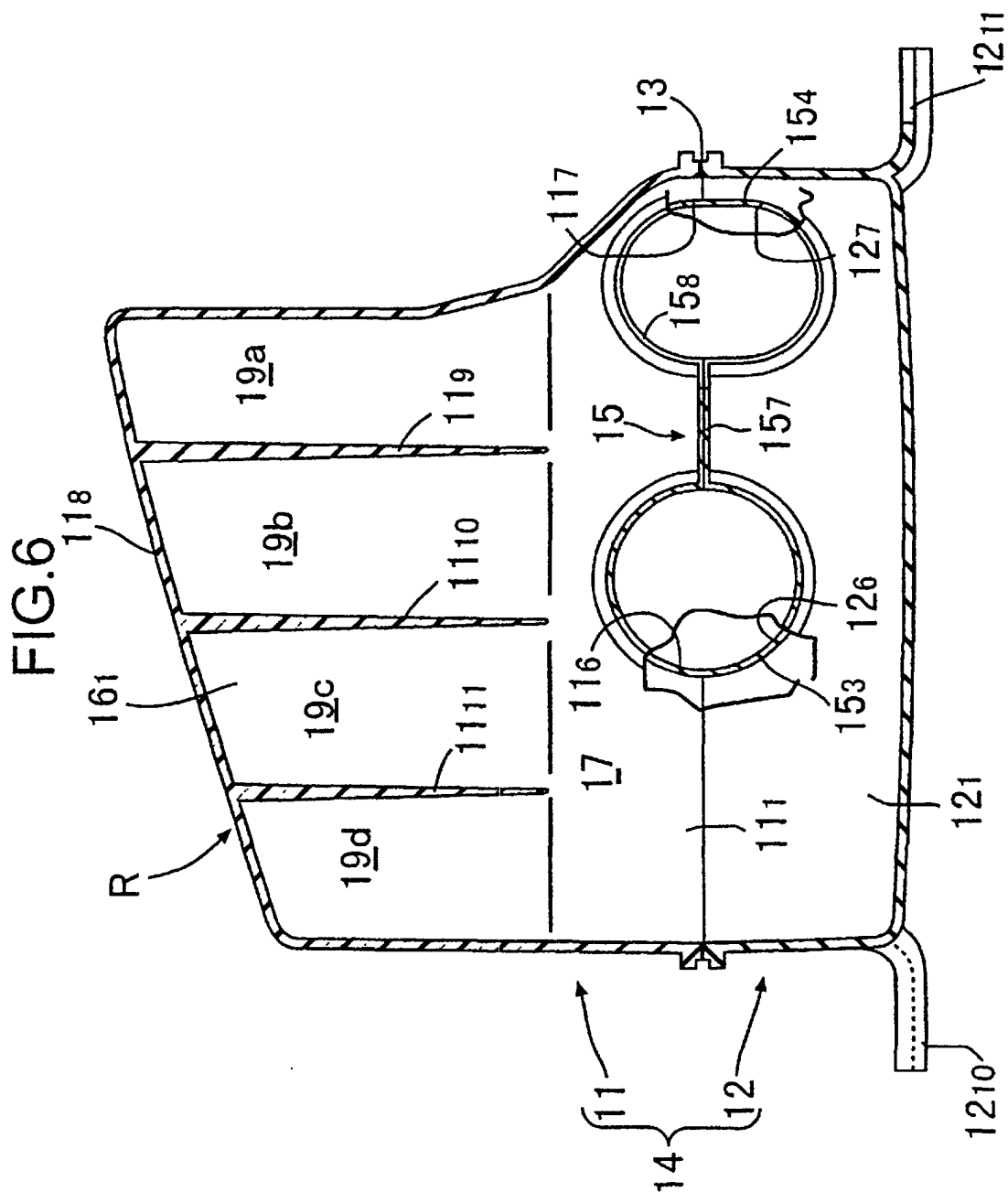
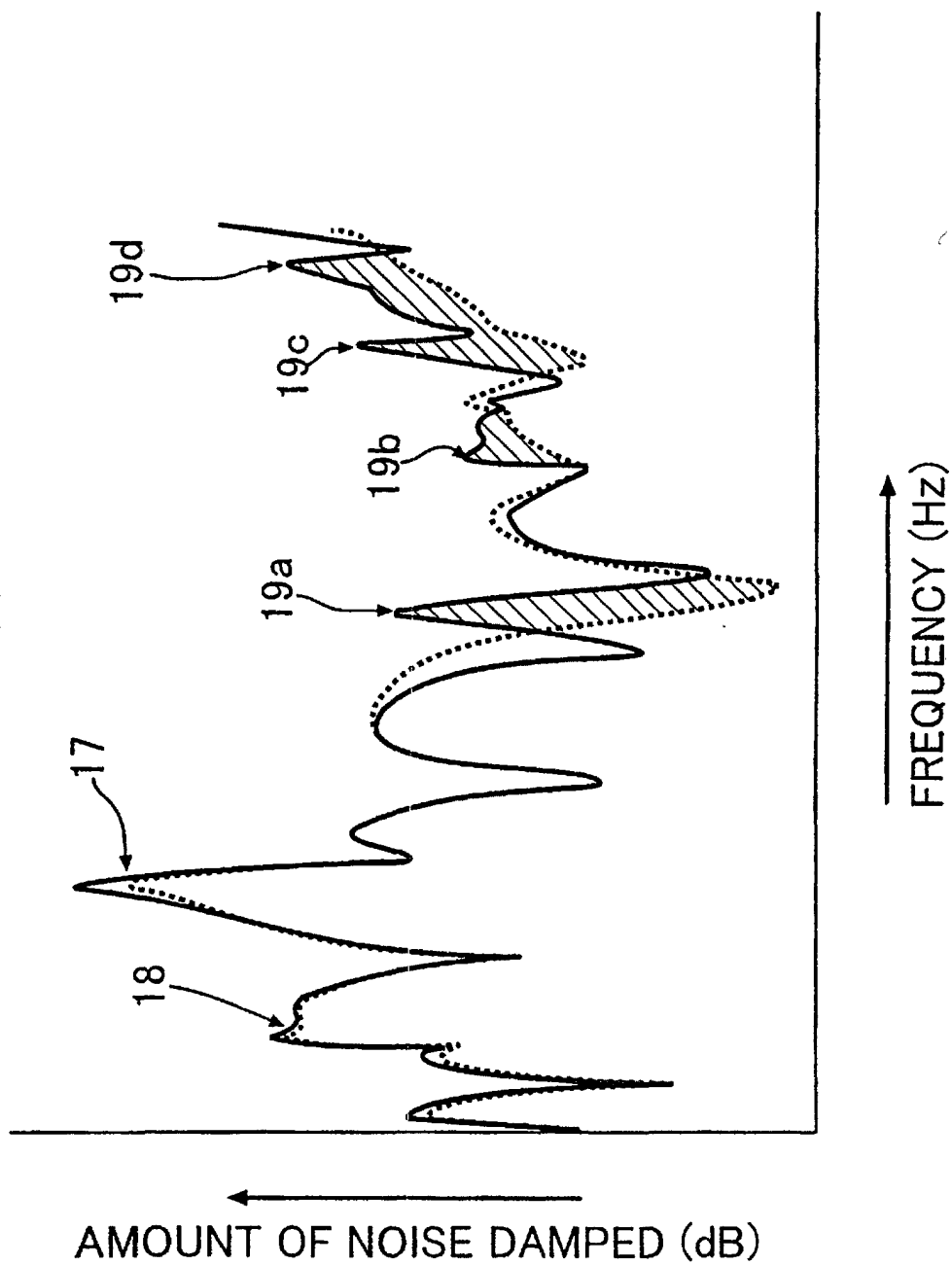


FIG. 7



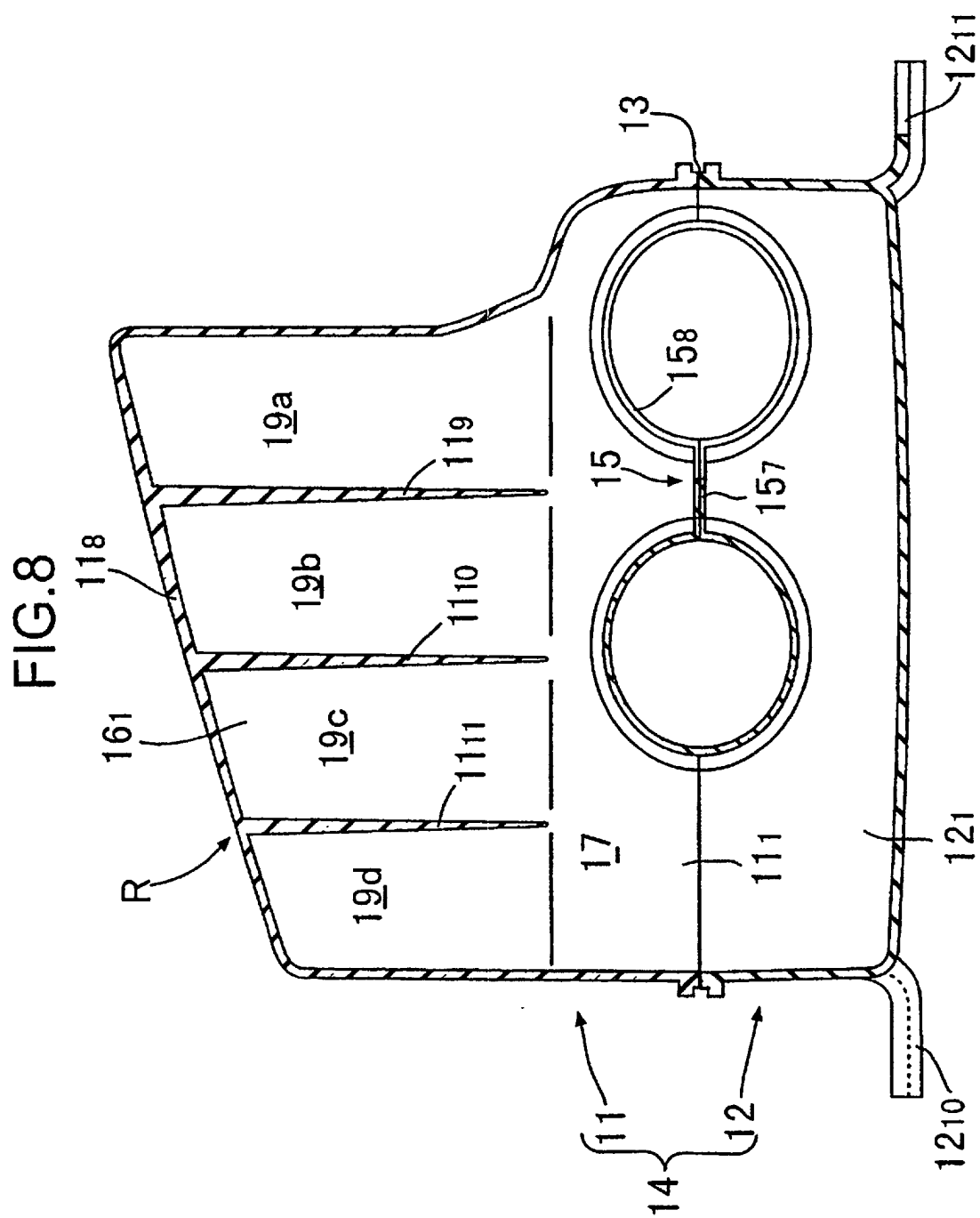


FIG.9
PRIOR ART

