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Fig. 1

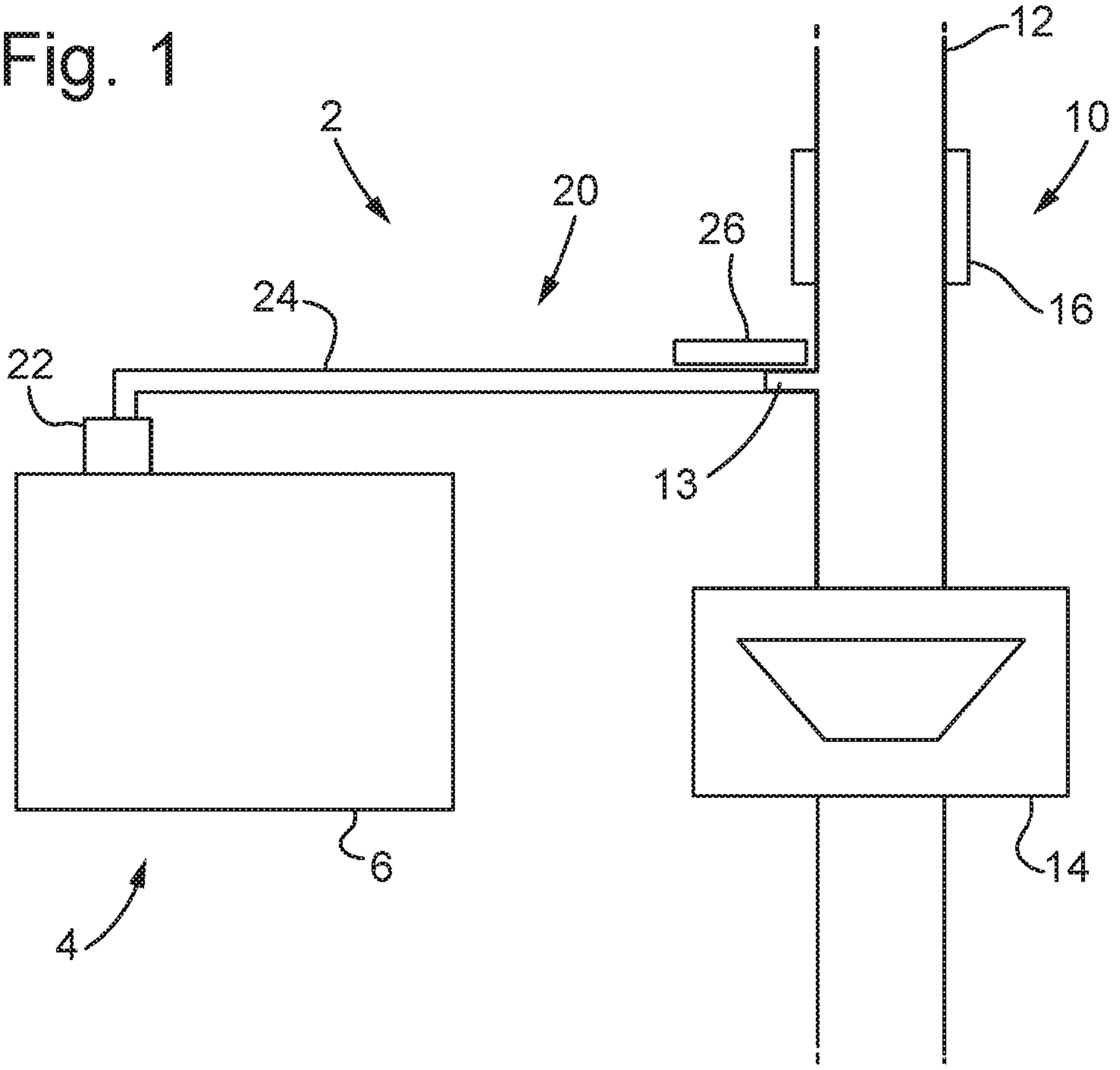

2
20
26
24
22
13
10
12
16
6
4
14

Fig. 2

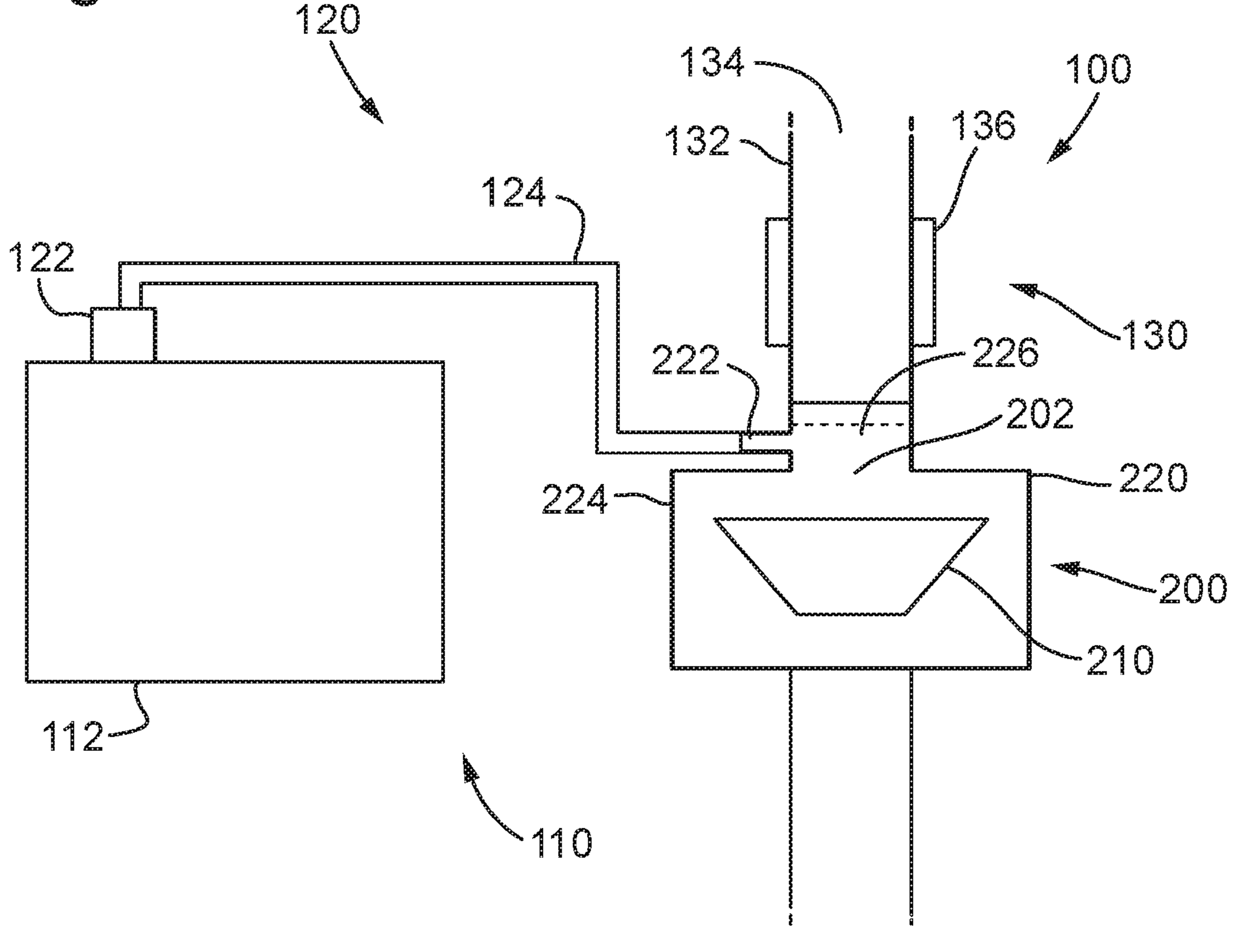

120
134
100
132
136
124
122
130
222
226
202
220
224
200
210
112
110

Fig. 3a

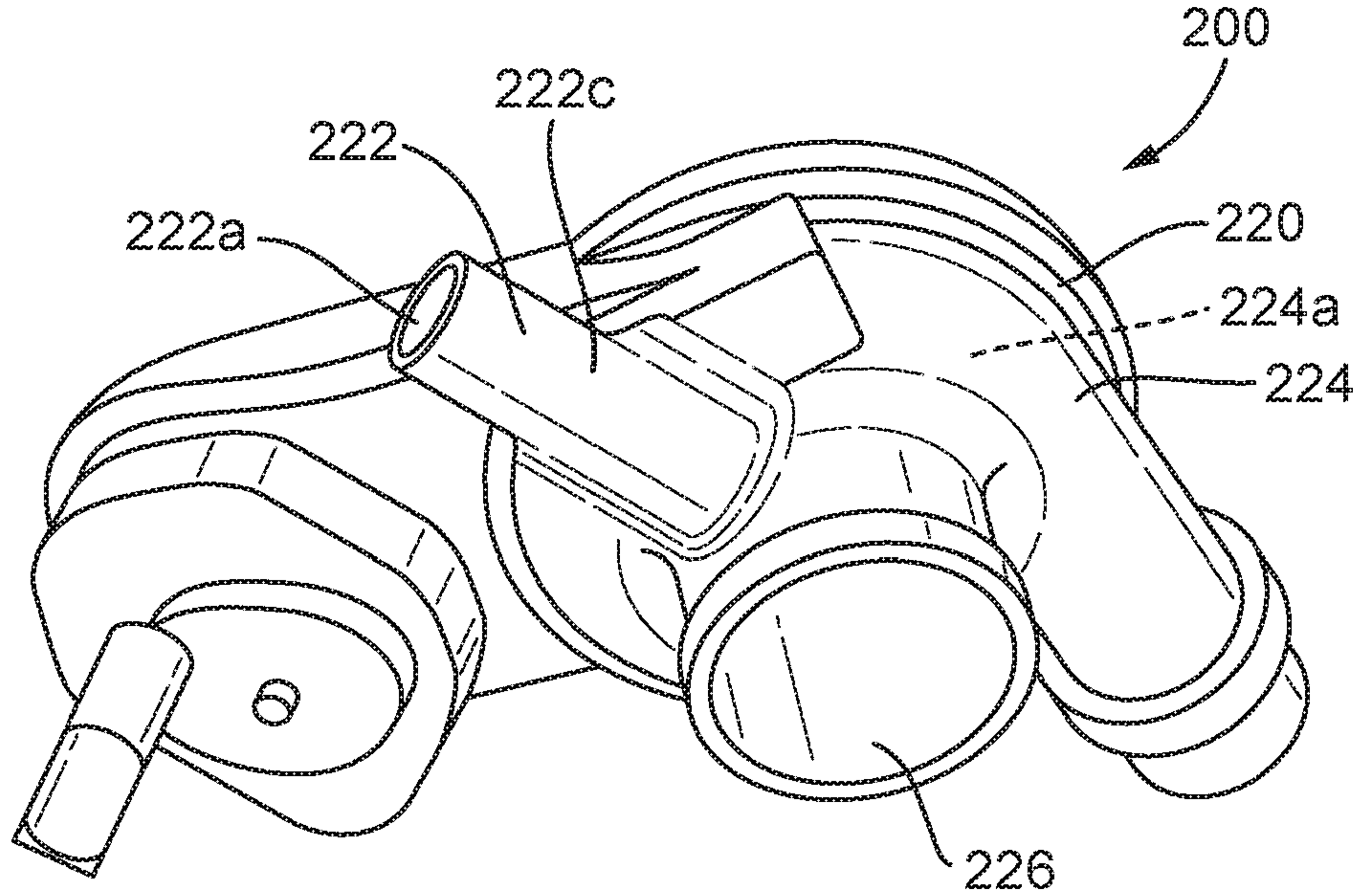

200
222c
222
222a
220
224a
224
226

Fig. 3b

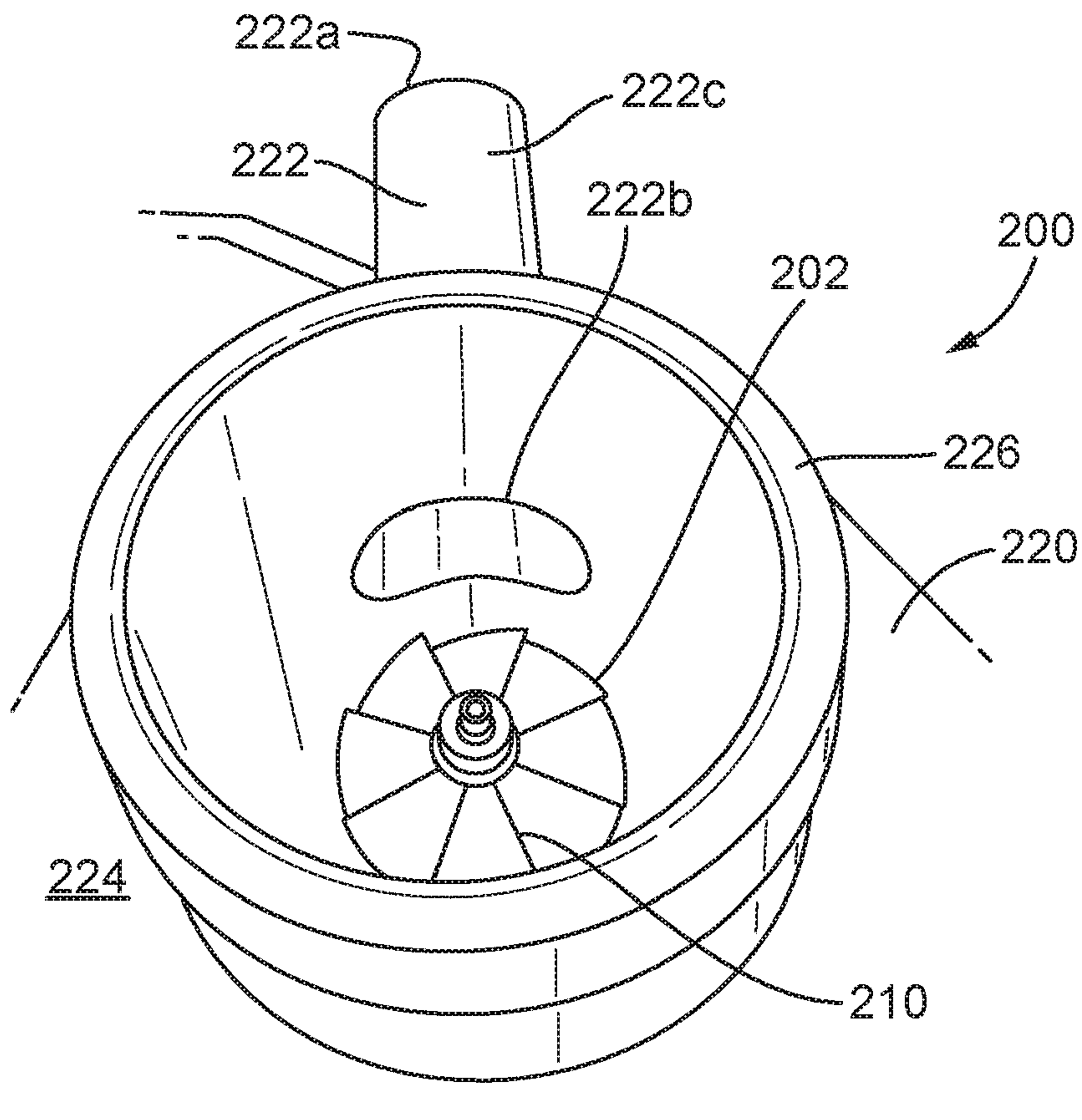

222a
222c
222
222b
200
202
226
220
224
210

Fig. 4a

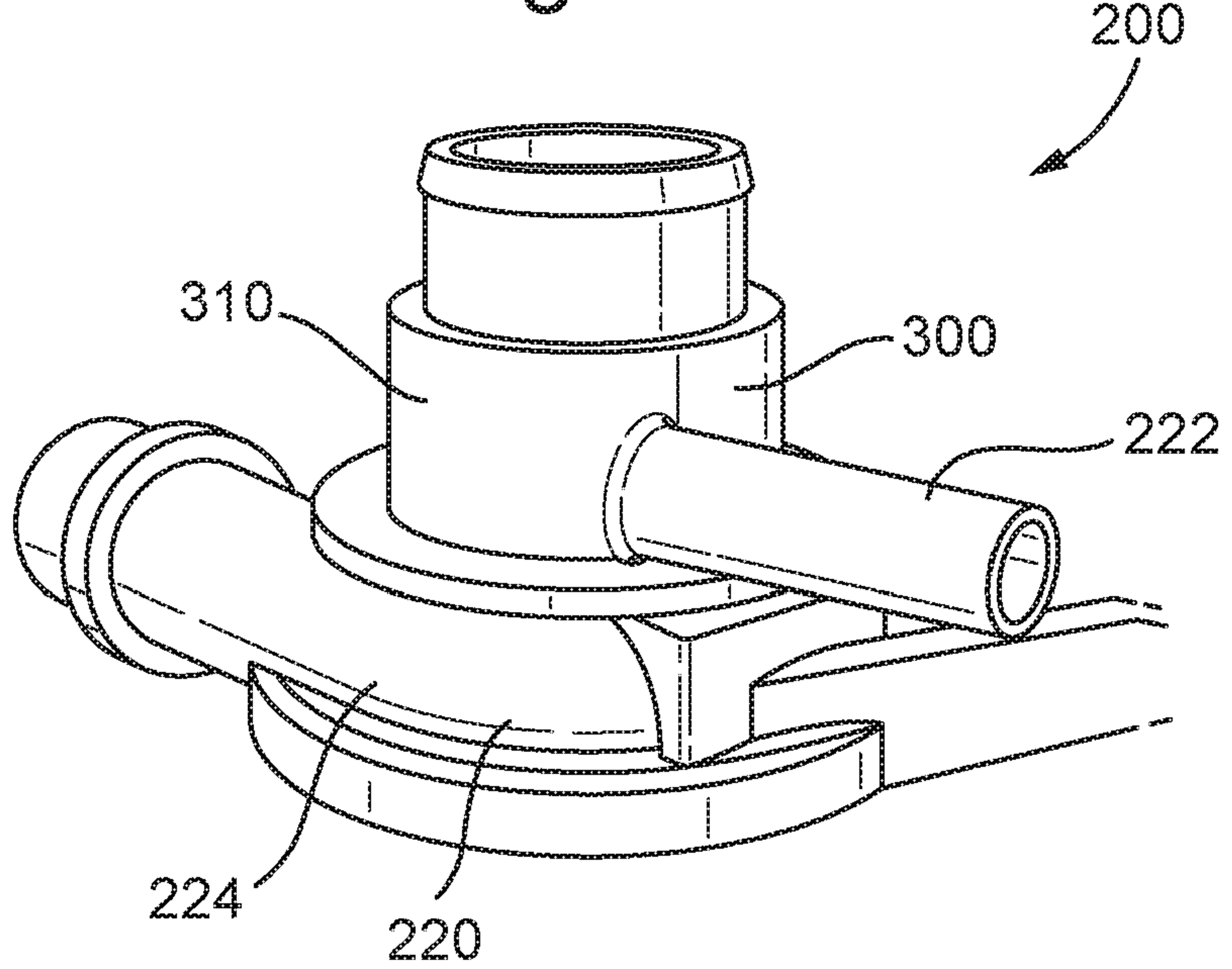

200
310
300
222
224
220

Fig. 4b

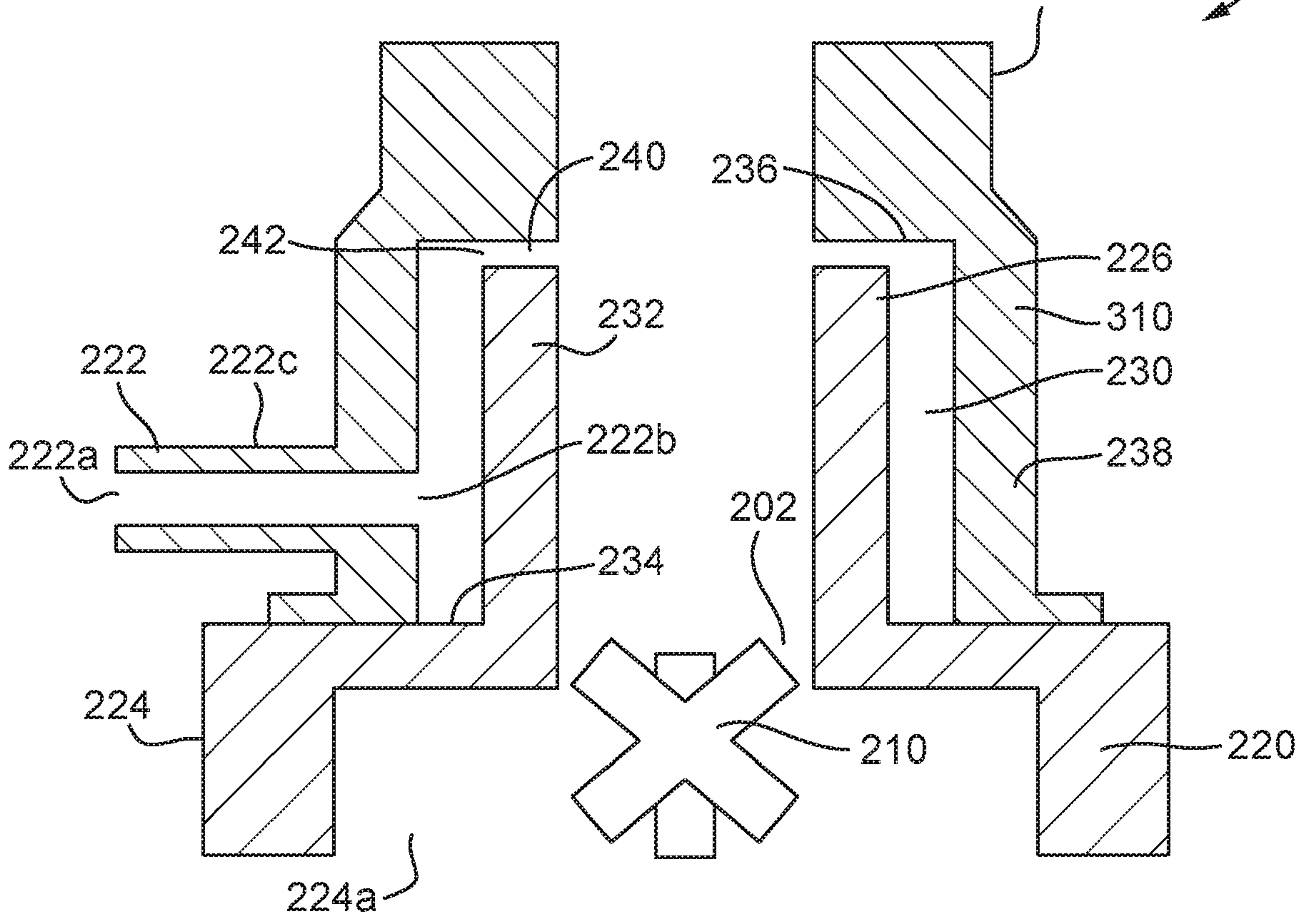

200
300
240
236
242
226
232
310
222
222c
230
222a
222b
238
202
234
224
210
220
224a

Fig. 5a

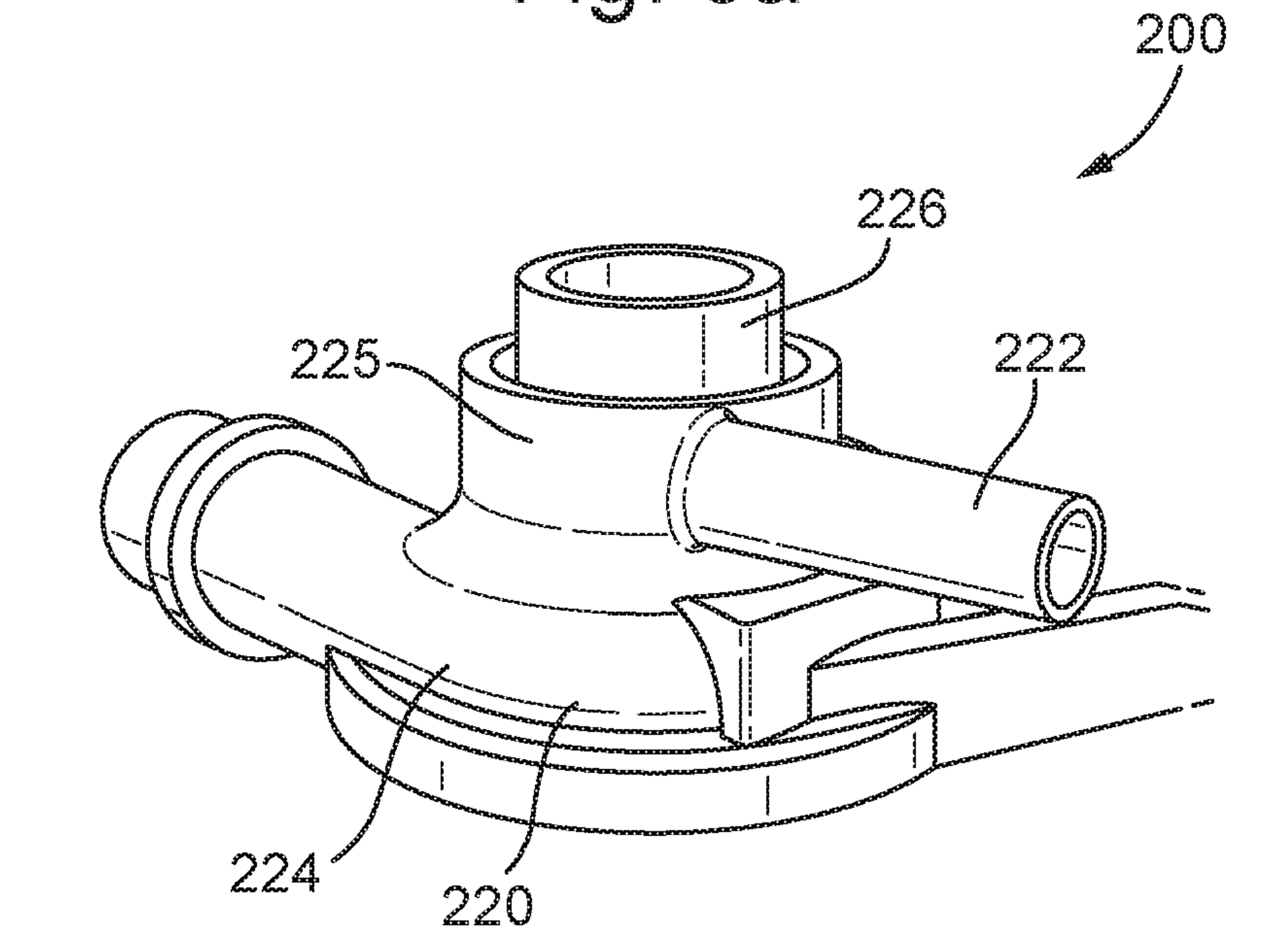
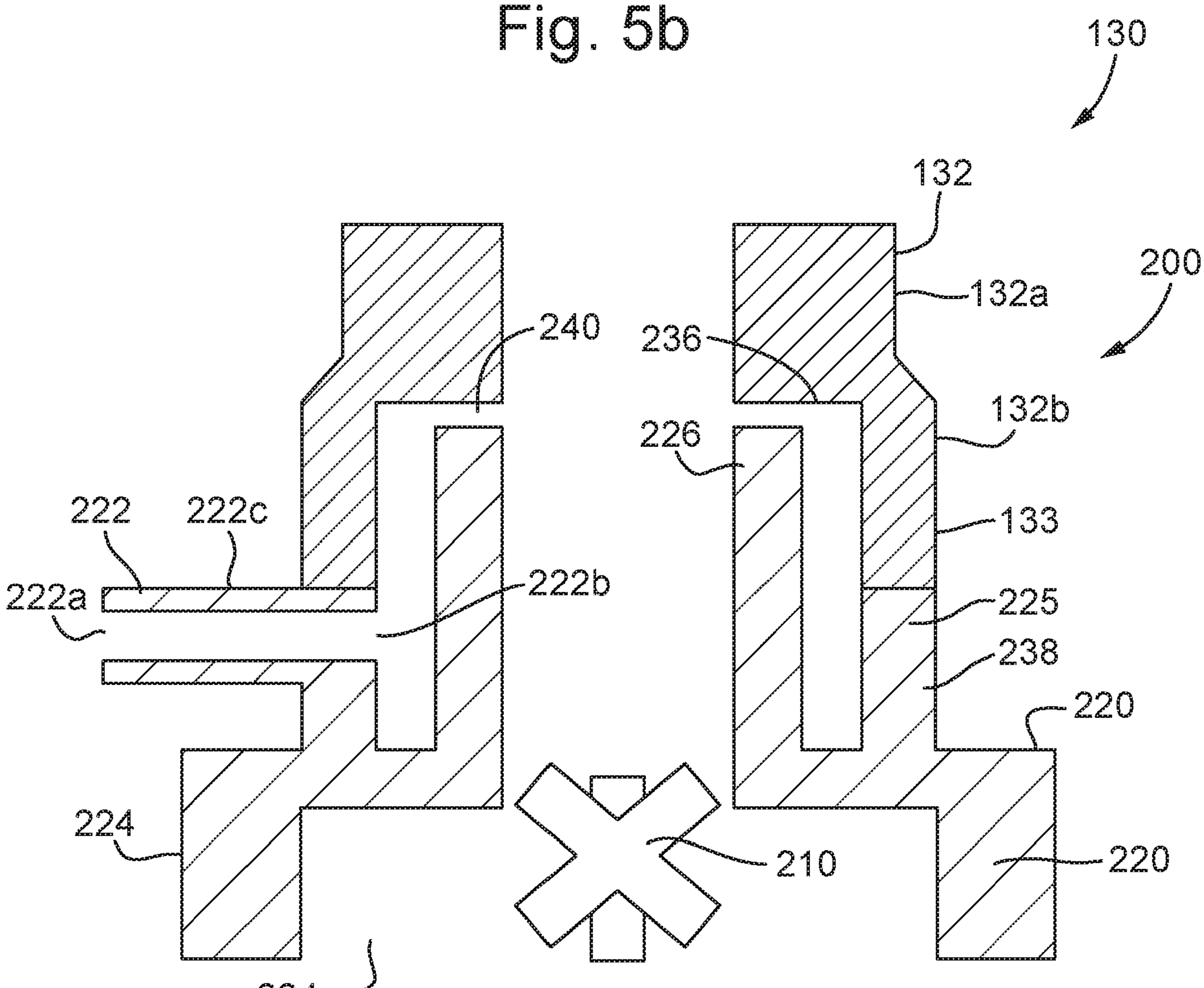

200
226
225
222
224
220

Fig. 5b


130
132
132a
200
240
236
132b
226
222
222c
133
222a
222b
225
238
220
224
210
220
224a

Turbocharger compressor housings

Technical Field

The present disclosure relates to turbocharger compressor housing and is particularly, although not exclusively, concerned with a turbocharger compressor housing configured to reduce freezing of crankcase ventilation gases.

Background

Engines, e.g. for motor vehicles, often comprise a crankcase ventilation system configured to extract gases, e.g. blow-by gases, from inside the crankcase. The gases that are extracted from the crankcase may be reintroduced into the intake system to be drawn back into the engine cylinders.

In cold ambient temperatures, water within the crankcase ventilation gases can begin to freeze at or close to the point at which they are reintroduced into the intake system. Freezing of the crankcase ventilation gases can block the crankcase ventilation system, leading to a build-up of blow-by gases within the crankcase, which is undesirable.

With reference to Figure 1, a previously proposed engine assembly 2 comprises an engine 4 including a crankcase 6, and an intake system 10. The intake system comprises an intake duct 12, a turbocharger compressor 14 and an intake resonator 16 for damping vibrations of the inlet gases within the intake duct 12 at a desired frequency, e.g. at which it is desirable to reduce noise within the intake system.

The engine assembly 2 further comprises a crankcase ventilation system 20 comprising a crankcase ventilation valve 22 coupled to the crankcase 6, and a crankcase ventilation duct 24 for carrying extracted crankcase ventilation gases from the crankcase ventilation valve 22 to the intake duct 12. The pressure within the intake duct 12 may be less than the pressure within the crankcase 6, and hence, blow-by gases within the crankcase 6 may be drawn through the crankcase ventilation valve 22 and the crankcase ventilation duct 24 into the intake duct 12.

As shown in Figure 1, the intake duct 12 comprises a spigot 13 formed on the intake duct. The crankcase ventilation duct 24 is fluidically coupled to the intake duct 12 at the spigot 13 and the crankcase ventilation gases are introduced into the intake duct 12 via the spigot 13.

In order to prevent the crankcase ventilation duct 24 from become blocked by ice forming in the crankcase ventilation duct 24, the crankcase ventilation system may further comprise a heater 26 configured to heat the crankcase ventilation duct 24 to raise the temperature of the crankcase ventilation gases and reduce the risk of water within the crankcase ventilation gases freezing.

Statements of Invention

According to an aspect of the present disclosure, there is provided a turbocharger compressor housing for a motor vehicle, the housing comprising:

a compressor housing portion for housing at least a portion of the turbocharger compressor, e.g. a rotor of the turbocharger compressor;

a compressor inlet duct portion integrally formed with the compressor housing portion, the compressor inlet duct portion for carrying a flow of inlet gases from an intake duct to an inlet of the turbocharger compressor; and

a crankcase ventilation pipe, e.g. a spigot for coupling a crankcase ventilation duct to the turbocharger compressor housing, in fluidic communication with the inlet of the turbocharger compressor, e.g. via the intake duct and/or the compressor housing portion, the pipe for the introduction of crankcase ventilation gases into the turbocharger compressor, wherein the pipe is integrally formed with the compressor housing portion, such that the compressor housing portion, compressor inlet duct portion and crankcase ventilation pipe form a one-piece component , wherein the turbocharger compressor housing further comprises:

a crankcase ventilation inlet chamber extending about the compressor intake duct, wherein the crankcase ventilation inlet chamber is in fluidic communication with the inlet of the turbocharger compressor, and wherein the pipe is in fluidic communication with the crankcase ventilation inlet chamber, wherein an inner wall of the crankcase ventilation inlet chamber is formed by a wall of the compressor inlet duct portion and wherein a wall of the crankcase ventilation inlet chamber is to be at least partially formed by the intake duct.

The turbocharger housing may be a one-piece metal component.

The pipe may comprise an inlet opening, an outlet opening and a duct portion extending between the inlet opening and the outlet opening. The duct portion may be in contact with, or may be integrally formed with the compressor housing portion, e.g. a wall of the compressor housing portion.

The compressor housing portion may at least partially define an outlet volume, e.g. an outlet flow passage, of the turbocharger compressor, such as an outlet diffuser, volute or scroll.
A passage may be formed between the crankcase ventilation inlet chamber and the compressor inlet duct portion, e.g. in an inner wall of the chamber. The passage may be formed at an opposite end of the crankcase ventilation inlet chamber to an opening of the pipe into the crankcase ventilation inlet chamber.

18 03 20

At least a portion of a wall of the crankcase ventilation inlet chamber may be formed by the compressor inlet duct portion and/or the compressor housing portion, e.g. such that crankcase ventilation gases within the crankcase ventilation inlet chamber are in contact with the wall of the compressor intake duct and/or the compressor housing portion. An axial end wall and/or an outer, e.g. radially outer, wall of the crankcase ventilation inlet chamber may be at least partially formed by the compressor housing portion.

A passage is formed between the crankcase ventilation inlet chamber and the compressor intake duct or the compressor housing portion. An opening of the passage into the crankcase ventilation inlet chamber may be spaced apart from an opening of the pipe into the crankcase ventilation inlet chamber along a wall of the of the crankcase ventilation inlet chamber formed by the compressor intake duct and/or the compressor housing portion.

The turbocharger compressor housing may further comprise a wall portion extending at least partially about the controller intake duct. An outer, e.g. radially outer, wall of the crankcase ventilation inlet chamber may be at least partially formed by the wall portion. The wall portion may be integrally formed with the compressor housing portion.

The crankcase ventilation inlet chamber may be configured to damp pressure variations in the inlet air arriving at the compressor intake duct. For example, the volume of the crankcase ventilation inlet chamber may be tuned to act as an inlet resonator.

According to another aspect of the present disclosure, there is provided a turbocharger compressor housing, the housing comprising:

an intake duct portion for carrying a flow of inlet gases to an inlet of the turbocharger compressor;

a chamber disposed about a portion of the housing, wherein the chamber is configured to damp pressure variations within the inlet gases; and

a pipe coupled to the chamber for inducing gases separated from a crank case ventilation system into the inlet gases.

According to another aspect of the present disclosure, there is provided a turbocharger compressor housing for a motor vehicle, the housing comprising:

a compressor housing portion for housing at least a portion of the turbocharger compressor;

a compressor inlet duct portion for carrying a flow of inlet gases to an inlet of the turbocharger compressor; and

a crankcase ventilation pipe in fluidic communication with the inlet of the turbocharger compressor, the pipe for the introduction of crankcase ventilation gases into the turbocharger compressor.

An intake assembly may comprise the above mentioned turbocharger compressor housing and an intake duct in fluidic communication with the compressor intake duct.

A wall of the crankcase ventilation inlet chamber may be at least partially formed by the intake duct. For example, an axial end wall of the crankcase ventilation inlet chamber may be at least partially formed by the intake duct. The intake duct may comprise a duct portion and a connector coupled to or integrally formed with the duct portion. The wall of the crankcase ventilation inlet chamber may be at least partially formed by the connector of the intake duct. At least a portion of an outer wall of the crankcase ventilation inlet chamber may be formed by the intake duct, e.g. a radially outer wall.

A motor vehicle may comprise the above-mentioned turbocharger compressor housing or the above-mentioned intake assembly.

To avoid unnecessary duplication of effort and repetition of text in the specification, certain features are described in relation to only one or several aspects or embodiments of the invention. However, it is to be understood that, where it is technically possible, features described in relation to any aspect or embodiment of the invention may also be used with any other aspect or embodiment of the invention within the scope of the claims below. In particular, the features described in relation to the first aspect of the disclosure, described above, may be combined with the features of the second and third aspects of the disclosure within the scope of the claims below.

Brief Description of the Drawings

For a better understanding of the present invention, and to show more clearly how it may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:

Figure 1 is schematic view of a previously proposed engine assembly;

Figure 2 is a schematic view of an engine assembly according to arrangements of the present disclosure;

Figure 3a and 3b are perspective views of a turbocharger compressor according to arrangements of the present disclosure;

Figure 4a is a perspective view of a turbocharger compressor assembly according to another arrangements of the present disclosure;

Figure 4b is a schematic, cross-sectional view of the turbocharger compressor assembly shown in Figure 4a;

Figure 5a is a perspective view of a turbocharger compressor assembly according to another arrangements of the present disclosure; and

Figure 5b is a schematic, cross-sectional view of a turbocharger compressor assembly shown in Figure 5a.

Detailed Description

With reference to Figure 2 an engine assembly 100 for a motor vehicle, according to arrangements of the present disclosure comprises an engine 110, a crankcase ventilation system 120 and an intake system 130.

The engine 110 is similar to the engine 4 and comprises a crankcase 112. The crankcase ventilation system 120 is similar to the crankcase ventilation system 20 and comprises a crankcase ventilation valve 122, in fluidic communication with the interior of the crankcase 112, and a ventilation duct 124 for carrying extracted crankcase ventilation gases from the valve 122 to be reintroduced into the intake system 130, as described below.

The intake system 130 comprises turbocharger compressor assembly 200 and an intake duct 132 for carrying intake gases from an air inlet 134 to an inlet 202 of a turbocharger compressor, e.g. a compressor rotor 210 of the turbocharger compressor assembly 200. The intake system 130 may further comprise an intake resonator 136 that is similar to the intake resonator 16 described above.

The turbocharger compressor assembly 200 comprises the turbocharger compressor, e.g. the compressor rotor 210, and a turbocharger compressor housing 220. The turbocharger compressor housing 220 defines the turbocharger compressor inlet 202 and is configured to house the compressor rotor 210.

In the arrangement shown in Figure 2, the turbocharger compressor assembly is depicted as an axial flow machine. However, in other arrangements the turbocharger compressor may be a radial or mixed flow machine, e.g. an axial-to-radial flow machine, as depicted in Figure 3a.

The intake system 130 differs from the intake system 10 depicted in Figure 1 in that the intake resonator 136 does not comprise a spigot for introducing the crankcase ventilation gases into the intake system 130. Instead, a crankcase ventilation pipe, e.g. a crankcase ventilation spigot 222, is formed on the turbocharger compressor assembly 200 for the crankcase ventilation gases to be introduced into the intake system. As shown in Figure 2, the crankcase ventilation spigot 222 is formed on the turbocharger compressor housing 220.

With reference to Figures 3a and 3b, the crankcase ventilation spigot 222 may be formed integrally with the turbocharger compressor housing 220. The turbocharger compressor housing comprises a compressor housing portion 224, configured to house at least a portion of the turbocharger compressor, e.g. the rotor 210 of the turbocharger compressor, and a compressor inlet duct portion 226 for carrying intake gases from the intake duct 132 to the inlet 202 of the turbocharger compressor.

The crankcase ventilation spigot 222 may be formed integrally with the compressor housing portion 224 and/or the compressor inlet duct portion 226. As depicted, the compressor housing portion 224, the compressor inlet duct portion 226 and the crankcase ventilation spigot 222 may be formed integrally with one another such that the turbocharger compressor housing 220 is a one-piece component. For example, the turbocharger compressor housing 220 may be a one-piece cast component.

The crankcase ventilation spigot 222 may be formed from the same material as the compressor housing portion 224 and/or the compressor inlet duct portion 226. In particular, the crankcase ventilation spigot 222 may be manufactured from a metal material. Accordingly, heat may be transferred from the compressor housing portion 224 to the crankcase ventilation spigot 222 through heat conduction more effectively than if the crankcase ventilation spigot 222 was manufactured from a different material.

The compressor housing portion 224 may at least partially define an outlet flow passage of the turbocharger compressor. For example, the compressor housing portion 224 may at least partially define an outlet volume 224a, e.g. a diffuser, volute or scroll of the turbocharger compressor. Gases within the outlet volume may have been heated by virtue of the action of the turbocharger compressor. The compressor housing portion 224 may be heated by the gases within the outlet volume 224a.

Referring for Figures 3a and 3b, the crankcase ventilation spigot 222 comprises an inlet opening 222a, for receiving the crankcase ventilation gases from the crankcase ventilation duct 124, an outlet opening 222b, though which the crankcase ventilation gases enter the compressor inlet duct portion 226 or compressor housing portion 224, and a duct portion 222c extending between the inlet and outlet openings 222a, 222b.

As shown in Figure 3a, the crankcase ventilation spigot 222 may be arranged such that a wall of the duct portion 222c is in contact with or is integrally formed with the compressor housing portion 224. In particular, the wall of the duct portion 222c may be in contact with or integrally formed with a part of the compressor housing portion 224 forming a wall of the compressor outlet volume 224a.

With reference to Figure 3b, the crankcase ventilation spigot 222 may be arranged such that the outlet opening 222b is adjacent, e.g. immediately adjacent, to the inlet 202 of the turbocharger compressor.

With reference to Figures 4a and 4b, in another arrangement of the present disclosure the turbocharger compressor assembly 200 may comprise a crankcase ventilation inlet chamber 230. The crankcase ventilation spigot 222 is in fluidic communication with the crankcase ventilation inlet chamber 230 and the crankcase ventilation gases are introduced into the crankcase ventilation inlet chamber 230 before flowing from the crankcase ventilation inlet chamber 230 into the compressor inlet duct portion 226 or compressor housing portion 224, e.g. via a passage 240 formed between the crankcase ventilation inlet chamber 230 and the compressor inlet duct portion 226 or compressor housing portion 224.

As shown, the crankcase ventilation inlet chamber 230 is arranged about the turbocharger compressor inlet 202. The crankcase ventilation inlet chamber 230 may be arranged about the compressor inlet duct portion 226. For example, the crankcase ventilation inlet chamber 30 may comprise a toroidal volume defined about an axis that is substantially aligned with a central axis of the turbocharger compressor inlet duct portion 226, e.g. the direction of the flow of inlet gases into the turbocharger compressor.

At least a portion of a wall forming the crankcase ventilation inlet chamber 230 may be formed by, or integrally formed with, the compressor inlet duct portion 226 and/or the compressor housing portion 224. For example, as shown in Figure 4b, an inner, e.g. radially inner, wall 232 of the crankcase ventilation inlet chamber 230 may be formed by the compressor inlet duct portion 226. Additionally or alternatively, a first end wall

234, e.g. at a first axial end of the crankcase ventilation inlet chamber 230, may be formed by the compressor housing portion 224.

As described above, the compressor housing portion 224 may be heated by the gases within the outlet volume 224a of the compressor. The crankcase ventilation gases within the crankcase ventilation inlet chamber 230, which are in contact with the first end wall 234, may therefore be heated.

Additionally, the compressor inlet duct portion 226 is in thermal communication with the compressor housing portion 224 and is heated by the gases within the compressor outlet volume 224a through thermal conduction, e.g. via the material of the compressor housing portion 224. Accordingly, the crankcase ventilation gases within the crankcase ventilation inlet chamber 230, which are in contact with the inner wall 232, may be heated.

As shown in Figure 4b, the outlet opening 222b of the crankcase ventilation spigot 222 may be positioned at a first end, e.g. axial end, of the crankcase ventilation inlet chamber 230, e.g. adjacent to the first end wall 234. An opening 242 of the passage 240 into the crankcase ventilation inlet chamber 230 may be spaced apart from outlet opening 222b along a length of a wall of the crankcase ventilation inlet chamber 230 formed by the compressor inlet duct portion 226 and/or the compressor housing portion 224. For example, the opening 242 may be formed adjacent to a second end wall 236 of the inlet chamber 230, e.g. at a second (axial) end of the crankcase ventilation inlet chamber 230. The crankcase ventilation gases may therefore flow over the length of wall before flowing through the passage 240 into the compressor inlet duct portion 226 or the compressor housing portion 224.

As shown in Figures 4a and 4b, the turbocharger assembly may comprise a chamber forming part 300. The chamber forming part 300 may be coupled to the compressor housing 220. The chamber forming part 300 may comprise a hollow substantially cylindrical portion 310 positioned about the intake duct portion 226 of the compressor housing 220 when the chamber forming part 300 is coupled to the compressor housing 220. An outer, e.g. radially outer, wall 238 of the inlet chamber 230 may be formed by the chamber forming part 300, e.g. by the hollow cylindrical portion 310.

The crankcase ventilation spigot 222 may be coupled to or formed integrally with the chamber forming part 300. The outlet opening 222b of the crankcase ventilation spigot may be formed in the cylindrical portion 310 of the chamber forming part, e.g. in the outer wall 238 of the crankcase ventilation inlet chamber 230.

In the arrangement shown in Figures 4a and 4b, the chamber forming part 300 is configured to form the second end wall 236 of the crankcase ventilation inlet chamber 230. However in other arrangements, the second end wall 236 may be formed by the intake duct 132, as described below.

With reference to Figures 5a and 5b, in other arrangements of the disclosure, the turbocharger compressor housing 220, e.g. the compressor housing portion 224, may comprise a wall portion 225 extending about the compressor inlet duct portion 226 and spaced apart, e.g. radially apart, from the compressor inlet duct portion 226. At least part of the crankcase ventilation inlet chamber 230 is formed between the wall portion 225 and the compressor inlet duct portion 226. The wall portion 225 of the compressor housing therefore forms at least part of the outer wall 238 of the inlet chamber 230.

As depicted, when the compressor housing 220 comprises the wall portion 225, the crankcase ventilation spigot 222 may be coupled to or integrally formed with the wall portion 225. The outlet opening 222b of the spigot 222 may be formed through the wall portion 225 into the crankcase ventilation inlet chamber 230. The spigot 222 may thereby be formed integrally with the compressor housing portion 224, and optionally the compressor inlet duct portion 226.

In the arrangement shown in Figure 5b, the intake duct 132 comprises a chamber forming portion 133. The chamber forming portion 133 comprises a hollow, substantially cylindrical portion that extends about the compressor inlet duct portion 226 of the turbocharger compressor housing 220 when the intake duct 132 is coupled to the compressor inlet duct portion 226.

As depicted in Figure 5b, the chamber forming portion 133 of the intake duct 132 may form part of the outer wall 238 of the crankcase ventilation inlet chamber 230. The chamber forming portion 133 and the wall portion 225 of the compressor housing 220 may together form the outer wall 238 of the inlet chamber 230. Additionally, the chamber forming portion 133 of the intake duct 132 may at least partially form the second end wall 236 of the inlet chamber 230.

In other arrangements, the wall portion 225 may form, e.g. entirely form, the outer wall 238 and the chamber forming portion 133 of the intake duct 132 may form the second end wall 236 of the inlet chamber. Alternatively, the wall portion 225 may form, e.g. entirely form, the outer wall 238 and the second end wall 236 of the inlet chamber 230.

The chamber forming portion 133 may be formed integrally with the intake duct 132. In some arrangements, the intake duct 132 may comprise a duct portion 132a and a connection portion 132b for connecting the duct portion to the compressor inlet duct portion 226. The connection portion 132b may be coupled to or formed integrally with the duct portion 132a. The chamber forming portion 133 may be formed by the connection portion 132b.

Although in the arrangements shown in Figures 4b and 5b, the spigot 222 is spaced apart from the compressor housing portion 224, e.g. the part of the compressor housing portion forming the outlet volume 224a of the turbocharger compressor assembly 200, in other arrangements, a wall of the duct portion 222c of the spigot 222 may be in contact with or may be integrally formed with the compressor housing portion 224. In either arrangement, the spigot 222 may be formed from the same material as the compressor housing portion 224 and compressor inlet duct portion 226, e.g. from a metal material.

In either of the arrangements shown in Figures 4a and 4b, and Figures 5a and 5b, the crankcase ventilation inlet chamber 230 may be tuned to act as an intake resonator for damping vibrations of inlet gases within the intake duct 132 at the desired frequency. In particular, the size of the crankcase ventilation inlet chamber 230 and/or the size of the passage 240 may be selected in order to damp vibrations of the inlet gases at the desired frequency. The intake resonator 136 shown in Figure 2 may therefore be omitted in arrangements of the engine assembly 100 comprising the compressor assembly 200 shown in Figures 4a and 4b or 5a and 5b.

The following additional, numbered statements of invention are also included within the specification and form part of the present disclosure:

Statement 1. A turbocharger compressor housing for a motor vehicle, the housing comprising:

a compressor housing portion for housing at least a portion of the turbocharger compressor;

a compressor inlet duct portion for carrying a flow of inlet gases to an inlet of the turbocharger compressor; and

a crankcase ventilation pipe in fluidic communication with the inlet of the turbocharger compressor, the pipe for the introduction of crankcase ventilation gases into the turbocharger compressor, wherein the pipe is integrally formed with the compressor housing portion.

Statement 2. The turbocharger compressor housing of statement 1, wherein the turbocharger compressor housing is a one-piece metal component.

Statement 3. The turbocharger compressor housing of statement 1 or 2, wherein the crankcase ventilation pipe comprises an inlet opening, an outlet opening and a duct portion extending between the inlet opening and the outlet opening, wherein the duct portion is in contact with, or is integrally formed with the compressor housing portion.

Statement 4. The turbocharger compressor housing of any of the preceding statements, wherein the compressor housing portion at least partially defines an outlet flow passage of the turbocharger compressor.

Statement 5. The turbocharger compressor housing of any of the preceding statements, wherein the turbocharger compressor housing further comprises:

a crankcase ventilation inlet chamber extending about the compressor intake duct, wherein the crankcase ventilation inlet chamber is in fluidic communication with the inlet of the turbocharger compressor, and wherein the pipe is in fluidic communication with the crankcase ventilation inlet chamber.

Statement 6. The turbocharger compressor housing according to statement 5, wherein at least a portion of a wall of the crankcase ventilation inlet chamber is formed by the compressor intake duct and/or the compressor housing portion.

Statement 7. The turbocharger compressor housing of statement 6, wherein a passage is formed between the crankcase ventilation inlet chamber and the compressor intake duct or the compressor housing portion, wherein an opening of the passage into the crankcase ventilation inlet chamber is spaced apart from an opening of the pipe into the crankcase ventilation inlet chamber along a wall of the of the crankcase ventilation inlet chamber formed by the compressor intake duct and/or the compressor housing portion.

Statement 8. The turbocharger compressor housing according to any of statements 5 to 7, wherein the turbocharger compressor housing further comprises a wall portion extending at least partially about the compressor inlet duct portion, wherein an outer wall of the crankcase ventilation inlet chamber is at least partially formed by the wall portion.

Statement 9. The turbocharger compressor housing according to statement 8, wherein the wall portion is integrally formed with the compressor housing portion.

Statement 10. The turbocharger compressor housing according to any of statements 5 to 9, wherein the crankcase ventilation inlet chamber is configured to damp pressure variation in the inlet air arriving at the compressor inlet duct portion.

Statement 11. An intake assembly comprising, the turbocharger compressor housing according to any of the preceding statements and an intake duct in fluidic communication with the compressor inlet duct portion.

Statement 12. The intake assembly of statement 11 when depending on any of statements 5 to 10, wherein a wall of the crankcase ventilation inlet chamber is at least partially formed by the intake duct.

Statement 13. The intake assembly of statement 12, wherein an axial end wall of the crankcase ventilation inlet chamber is at least partially formed by the intake duct.

Statement 14. The intake assembly of statement 12 or 13, wherein at least a portion of an outer wall of the crankcase ventilation inlet chamber is formed by the intake duct.

Statement 15. A motor vehicle comprising the turbocharger compressor housing of any of statements 1 to 10 or the intake assembly of any of statements 11 to 14.

It will be appreciated by those skilled in the art that although the invention has been described by way of example, with reference to one or more exemplary examples, it is not limited to the disclosed examples and that alternative examples could be constructed without departing from the scope of the invention as defined by the appended claims.

Claims

1. A turbocharger compressor housing for a motor vehicle, the housing comprising:

a compressor housing portion for housing at least a portion of the turbocharger compressor;

a compressor inlet duct portion integrally formed with the compressor housing portion, the compressor inlet duct portion for carrying a flow of inlet gases from an intake duct to an inlet of the turbocharger compressor; and

a crankcase ventilation pipe in fluidic communication with the inlet of the turbocharger compressor, the pipe for the introduction of crankcase ventilation gases into the turbocharger compressor, wherein the pipe is integrally formed with the compressor housing portion, such that the compressor housing portion, compressor inlet duct portion and crankcase ventilation pipe form a one-piece component, wherein the turbocharger compressor housing further comprises:

a crankcase ventilation inlet chamber extending about the compressor inlet duct portion, wherein the crankcase ventilation inlet chamber is in fluidic communication with the inlet of the turbocharger compressor, and wherein the pipe is in fluidic communication with the crankcase ventilation inlet chamber, wherein an inner wall of the crankcase ventilation inlet chamber is formed by a wall of the compressor inlet duct portion and wherein a wall of the crankcase ventilation inlet chamber is to be at least partially formed by the intake duct.

2. The turbocharger compressor housing of claim 1, wherein the turbocharger compressor housing is a one-piece metal component.

3. The turbocharger compressor housing of claim 1 or 2, wherein the crankcase ventilation pipe comprises an inlet opening, an outlet opening and a duct portion extending between the inlet opening and the outlet opening, wherein a wall of the duct portion is in contact with, or is integrally formed with a part of the compressor housing portion forming a wall of a compressor outlet volume.

4. The turbocharger compressor housing of any of the preceding claims, wherein the compressor housing portion at least partially defines an outlet flow passage of the turbocharger compressor.

5. The turbocharger compressor housing according to any of the preceding claims, wherein at least a portion of a wall of the crankcase ventilation inlet chamber is formed by the compressor housing portion.

6. The turbocharger compressor housing of claim 5, wherein a passage is formed between the crankcase ventilation inlet chamber and the compressor intake duct or the compressor housing portion, wherein an opening of the passage into the crankcase ventilation inlet chamber is spaced apart from an opening of the pipe into the crankcase ventilation inlet chamber along a wall of the of the crankcase ventilation inlet chamber formed by the compressor intake duct and/or the compressor housing portion.

7. The turbocharger compressor housing according to any of the preceding claims, wherein the turbocharger compressor housing further comprises a wall portion extending at least partially about the compressor inlet duct portion, wherein an outer wall of the crankcase ventilation inlet chamber is at least partially formed by the wall portion.

8. The turbocharger compressor housing according to claim 7, wherein the wall portion is integrally formed with the compressor housing portion.

9. The turbocharger compressor housing according to any of the preceding claims, wherein the crankcase ventilation inlet chamber is tuned to act as an inlet resonator and is thereby configured to damp pressure variation in the inlet air arriving at the compressor inlet duct portion.

10. An intake assembly comprising, the turbocharger compressor housing according to any of the preceding claims and an intake duct in fluidic communication with the compressor inlet duct portion.

11. The intake assembly of claim 10, wherein an axial end wall of the crankcase ventilation inlet chamber is at least partially formed by the intake duct.

12. The intake assembly of claim 10 or 11, wherein at least a portion of an outer wall of the crankcase ventilation inlet chamber is formed by the intake duct.

13. A motor vehicle comprising the turbocharger compressor housing of any of claims 1 to 9 or the intake assembly of any of claims 10 to 12.