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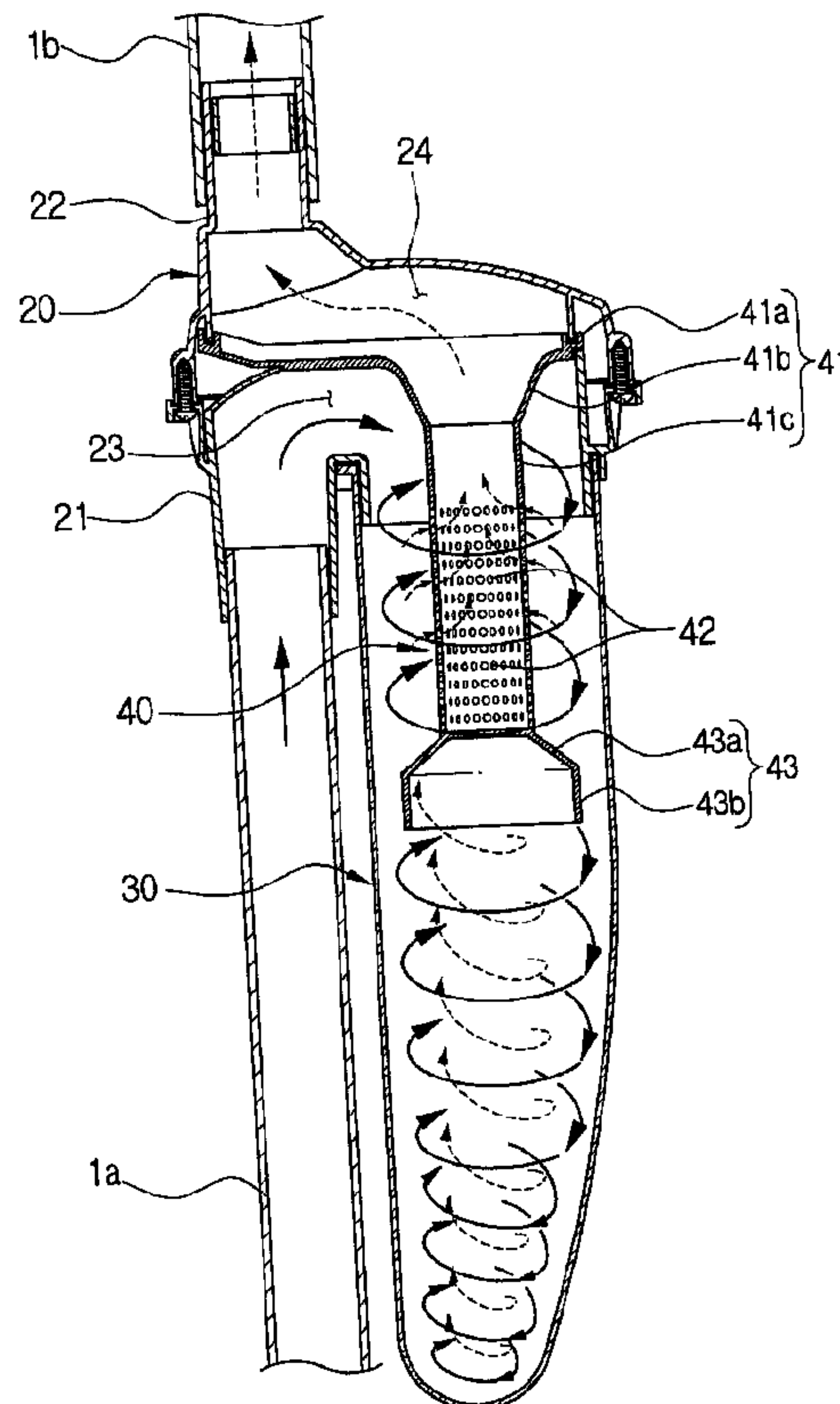
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(54) Titre : GRILLE ET CYCLONE DEPOUSSIÈREUR POUR ASPIRATEUR À GRILLE

(54) Title: GRILL ASSEMBLY AND CYCLONE DUST COLLECTING APPARATUS FOR VACUUM CLEANER HAVING A GRILL ASSEMBLY



(57) **Abrégé/Abstract:**

A grill assembly of a cyclone dust collecting apparatus for use in a vacuum cleaner is disclosed. The grill assembly includes provisions that help to block dust ascending towards the grill body and deflect that dust towards a whirling air content. The grill assembly has a blocking member that can include a first member formed as a frustum-cone and a second member formed as a hollow cylinder.



ABSTRACT OF DISCLOSURE

A grill assembly of a cyclone dust collecting apparatus for use in a vacuum cleaner is disclosed. The grill assembly includes provisions that help to block dust ascending towards the grill body and deflect that dust towards a whirling air current. The
5 grill assembly has a blocking member that can include a first member formed as a frustum-cone and a second member formed as a hollow cylinder.

GRILL ASSEMBLY AND CYCLONE DUST COLLECTING APPARATUS FOR VACUUM CLEANER HAVING A GRILL ASSEMBLY

BACKGROUND OF THE INVENTION

5 1. Field of the Invention

The present invention generally relates to a cyclone dust collecting apparatus for use in a vacuum cleaner, and more particularly, it relates to a grill assembly having improved structure capable of separating dust and foreign substances (hereinafter called “dust”) from an air moving inside of the cyclone dust collecting apparatus, and a cyclone
10 dust collecting apparatus having the grill assembly.

2. Description of the Prior Art

A cyclone dust collecting apparatus separates particles from a fluid using a centrifugal force, and has been widely used in the industrial fields due to its high
15 resistance to temperature and pressure. Such a cyclone dust collecting apparatus is also used in vacuum cleaners.

A representative exemplary of such a cyclone dust collecting apparatus is shown in Korean Patent No. 317117 issued to the same applicant, and FIG. 1 schematically shows a sectional view of such cyclone dust collecting apparatus for use in vacuum
20 cleaner.

As shown in FIG. 1, the cyclone dust collecting apparatus is mounted on extension pipes 1a, 1b of the vacuum cleaner. For the sole purpose of convenience in explanation, the cyclone dust collecting apparatus will be described as the cyclone dust

collecting apparatus for a canister type vacuum cleaner, compared to that of an upright type vacuum cleaner, which will also be described later.

Referring to FIG. 1, the cyclone dust collecting apparatus for the canister type vacuum cleaner includes a cyclone body 20, a dust receptacle 30 and a grill assembly 40.

5 The cyclone body 20 includes a first connecting pipe 21 connected to the extension pipe 1a toward the suction brush of the vacuum cleaner, a second connecting pipe 22 connected to the extension pipe 1b toward the body of the vacuum cleaner, an air inlet 23 being in fluid communication with the first connecting pipe 21, and an air outlet 24 being in fluid communication with the second connecting pipe 22. The dust-laden air
10 is drawn into the cyclone body 20 through the air inlet 23 into a whirling current.

The dust receptacle 30 is removably connected to the cyclone body 20, and separates the dusts separated from the whirling air moving inside of the cyclone body 20.

The grill assembly 40 is disposed at the air outlet 24 of the cyclone body 20, preventing the dusts collected in the dust receptacle 30 from reversing toward the vacuum
15 cleaner body. The grill assembly 40 includes a grill body 41, a plurality of air passages 42 formed in an outer circumference of the grill body 41 in fluid communication with the air outlet 24, and a dust blocking member 43 formed as a frustum-cone mounted on an end of the grill body 41.

In the conventional cyclone dust collecting apparatus for use in the canister type
20 vacuum cleaner constructed as above, by the suction generated at the suction brush of the vacuum cleaner, dust-laden air is drawn into the cyclone body 20 through the first connecting pipe 21 in an oblique relation with respect to the cyclone body 20. Accordingly, the drawn air is moved to the lower portion of the dust receptacle 30 in a

whirling air current. In this process, dust is separated from the whirling air due to centrifugal force, and collected in dust receptacle 30. Then, the air is reflected from the bottom of dust receptacle 30 and moves upward in a circle smaller than the downward air current. By the ascending air current, the air is discharged to the outside of the vacuum cleaner body through the air passages 42, air outlet 24 and second connecting pipe 22.

Some dust is drawn to the ascending whirling air current inside of the dust receptacle 30, but then blocked by the dust blocking member 43 and re-entrained in the whirling air current. The dust blocked by the dust blocking member 43 does not pass through air passages 42 of grill assembly 40, and the dust is re-entrained in the whirling air current and collected in dust receptacle 30.

FIG. 2 is a sectional view showing a conventional cyclone dust collecting apparatus for use in an upright type vacuum cleaner.

Referring to FIG. 2, the conventional cyclone dust collecting apparatus for use in the upright type vacuum cleaner has a similar basic structure as that of the cyclone dust collecting apparatus for use in the canister type vacuum cleaner as described above. Accordingly, the conventional cyclone dust collecting apparatus for use in the upright type vacuum cleaner includes a cyclone body 200, a dust receptacle 300 and a grill assembly 400. The difference is that the cyclone dust collecting apparatus of the upright type vacuum cleaner is mounted in the dust collecting chamber of the vacuum cleaner body, while the cyclone dust collecting apparatus of the canister type vacuum cleaner is not. This difference will be described in detail below.

The cyclone body 200 includes an air intake pipe 210 and an air discharge pipe 220. While mounting the cyclone dust collecting apparatus in the vacuum cleaner body

(not shown), the air intake pipe 210 is connected to an air intake path that is formed in fluid communication with a suction brush (not shown) of the vacuum cleaner body. Also, the air discharge pipe 220 is connected to an air discharge path that is formed in fluid communication with a motor chamber (not shown) of the vacuum cleaner body.

5 Accordingly, dust-laden air is drawn from the surface being cleaned by the suction brush

The dust laden-air then travels through the air intake path and air intake pipe 210 of the vacuum cleaner body, and then into cyclone body 200 in a tangential direction

Accordingly, a whirling air current is formed inside cyclone body 200, causing the dust to be separated from the drawn air by centrifugal force. The clean air is discharged to the

10 outside through the air discharge pipe 220, and then through the air discharge path and the motor chamber of the vacuum cleaner body.

The dust receptacle 300 is removably connected to the lower portion of the cyclone body 200, for collecting the dust separated from the air by the whirling current.

Grill assembly 400 is disposed at an entrance of the air discharge pipe 220 inside
15 of the cyclone body 200, preventing the separated dust from escaping through air discharge pipe 220. The grill assembly 400 includes a grill body 410, a plurality of air passages 420 formed on the outer surface of the grill body 410. Air passages 420 permit fluid communication between air outside grill assembly 400 and air discharge pipe 220. Grill assembly 400 also includes a dust blocking member 430 formed as a frustum-cone
20 mounted on a lower portion of grill body 410.

In the upright type vacuum cleaner equipped with the cyclone dust collecting apparatus constructed as above, as the cleaning operation is started, the motor in the motor chamber is driven, and suction is accordingly generated by the suction brush.

Dust-laden air is drawn into the cyclone body 200 through the suction brush, and travels through the air intake path and air intake pipe 210 of the vacuum cleaner body. Due to the tangential orientation of air intake pipe 210, the dust-laden air is drawn into cyclone body 200 in an oblique direction along the inner circumference of cyclone body 200.

5 Accordingly, a whirling air current is formed inside of the cyclone body 200, and the dust is separated from the whirling air by the centrifugal force and collected in dust receptacle 300. The clean air is discharged outside through air passages 420 of grill assembly 400, and air discharge pipe 220. The clean air then flows through the air discharge path and the motor chamber of the vacuum cleaner body.

10 In this process, dust in the air current ascending inside of the dust receptacle 300 is blocked by dust blocking member 430, thus re-entrained in the whirling air current. Since the dust that is blocked by the dust blocking member 430 cannot pass through air passages 420 of grill assembly 400, the dust is re-entrained in the whirling air current and is eventually collected in dust receptacle 300.

15 In operation, the above-described cyclone dust collecting apparatus can help reduce the amount of dust collected by a paper filter. Considering the fact that the paper filter is not recyclable after use, reducing the amount of dust collected at the paper filter and thereby extending the life span of the paper filter was very helpful to reduce the financial burden of the users.

20 The research for the cyclone dust collecting apparatus for use in a vacuum cleaner is now mainly focused on how to efficiently constrain the dust and prevent its escape through the grill assembly.

Referring to FIGS. 1 and 2, grill assembly 40, 400 has an air passage 42, 420 of a predetermined size for external discharge of clean air, and by nature, some of dust escapes through air passages 42, 420 of grill assembly 40, 400 because grill assembly 40, 400 is disposed at the entrance of the air discharge pipe 22, 220 inside of cyclone body 20, 200. As the dust escapes, the amount of dust collected by the paper filter increases, or when there is no paper filter, there is an increased amount of dust discharged out of the dust collecting apparatus. As a result, the dust collecting efficiency is degraded.

In order to prevent the escape of the dust, conventionally, a dust blocking member 43, 430 of frustum-cone shape is mounted on the lower portion of the grill body 41, 410. The dust blocking member 43, 430 blocks the dust in the ascending air current back to the whirling current so that the dust may not flow close to the air passage 42, 420 of the grill body 41, 410. However, conventional dust blocking members 43, 430 are limited in their ability to prevent all of the dust from escaping.

While dust of a predetermined size are blocked by dust blocking member 43, 430 and thus restrained from flowing into air passage 42, 420 of the grill body 41, 410, dust such as hair are minute enough to pass through the space between dust blocking member 43 and the inner wall of dust receptacle 30, and between dust blocking member 430 and the inner wall of cyclone body 200. Such fine dust sometimes clogs grill body 41, 410 or is otherwise discharged to the outside through the air passage 42, 420, deteriorating the dust collecting efficiency of the vacuum cleaner. Accordingly, improvements can be made.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a grill assembly of a cyclone dust collecting apparatus for use in a vacuum cleaner, having an improved structure that is capable of constraining and thus minimizing the flow of dust including
5 find dust such as hair, through an air passage of the grill assembly.

It is another object of the present invention to provide a cyclone dust collecting apparatus for use in a vacuum cleaner that contributes to improved dust collecting efficiency of the vacuum cleaner with a grill assembly having an improved structure.

The above objects are accomplished by a grill assembly of a cyclone dust
10 collecting apparatus for use in a vacuum cleaner, being arranged at an entrance of an air discharge pipe of a cyclone body where a whirling air current is formed from dust-laden air. Dust is separated from the dust-laden air by the centrifugal force of the whirling air current, which prevents dust from escaping. The present invention includes a grill body, a plurality of air passages formed on the grill body, and a dust blocking member arranged
15 at a lower portion of the grill body, blocking the dust entrained in an ascending air current toward the grill body and deflecting the dust toward the whirling air current. The dust blocking member includes a first member formed as a frustum-cone having a gradually increasing diameter downward, and a second member formed as a hollow cylinder vertically spaced from a lower side of the first member, the second member
20 having a predetermined length.

Accordingly, even minute and long dust such as hair are blocked by the dust blocking member and can not ascend toward the grill body. The dust is instead re-

entrained in the whirling air current, separated therefrom and falls to the dust receptacle.

As a result, degradation of the dust collecting efficiency due to escaping dust is prevented.

The plurality of air passages are formed by a plurality of blades that are arranged along an outer circumference of the grill body at a predetermined distance from one
 5 another, allowing fluid to pass through the air passages. Accordingly, the escape of dust through the air passages is prevented, and dust collecting efficiency is increased.

In one aspect of the present invention, the dust blocking member is removably connected to a lower side of the grill body by a connector.

In another aspect, the connector includes a pair of connecting holes oppositely
 10 formed in an inner circumference of a lower part of the grill body, each connecting hole having a position guiding portion having a open lower end and a connecting portion spaced from the open lower end of the position guiding portion, and a pair of connecting protrusions formed on an outer surface of an upper side of the dust blocking member, the protrusions corresponding to the connecting holes.

15 In another aspect, the connector includes a screw being fastened from a lower side of the dust blocking member to a lower side of the grill body.

Another object is accomplished by a cyclone dust collecting apparatus for use in a vacuum cleaner, which is attached to an extension pipe of a canister type vacuum cleaner and separates dust by whirling the dust-laden air. The cyclone dust collecting apparatus
 20 includes a cyclone body comprising a first connecting pipe connected to an inlet extension pipe for drawing in air, and a second connecting pipe connected to an outlet extension pipe for discharging air, a dust receptacle removably mounted on the cyclone body for collecting dust separated from the dust-laden air whirling in the cyclone body by

the centrifugal force, and a grill assembly arranged at an entrance of the second connecting pipe inside of the cyclone body, for preventing the separated dust from escaping through the second connecting pipe. The grill assembly includes a grill body comprising a first grill body portion having a supporting rib designed to engage the cyclone body, and a second grill body portion formed as a hollow cylinder integrally extending from the first grill body portion, a plurality of air passages formed on the outer surface of the second grill body portion of the grill body, the air passages placing air outside the grill assembly in fluid communication with the second connecting pipe, and a dust blocking member arranged at a lower portion of the second grill body for blocking dust entrained in an ascending air current toward the grill body and deflecting the dust toward the whirling air current, the dust blocking member comprising a first member formed as a frustum-cone having a gradually increasing diameter downward, and a second member vertically extending down from the first member, the second member having a predetermined length.

The cyclone dust collecting apparatus for use in the upright type vacuum cleaner includes a cyclone body comprising an air intake pipe connected to the air intake path, and an air discharge pipe connected to the air discharge path, the cyclone body includes provisions to produce a whirling air current from dust-laden air is drawn through the air intake pipe, a dust receptacle removably connected to the cyclone body, for collecting dust separated from the dust-laden air whirling inside of the cyclone body by centrifugal force, and a grill assembly arranged at an entrance of the air discharge pipe inside of the cyclone body, for preventing the dust separated from the dust-laden air from escaping through the air discharge pipe. The grill assembly includes a grill body formed as a

hollow cylinder with open upper end, a plurality of air passages formed on an outer surface of the grill body that permit fluid to flow from outside the grill assembly to the air discharge pipe, and a dust blocking member arranged at a lower portion of the second grill body, for blocking the dust entrained in an air ascending toward the grill body so as to deflect the dust toward the whirling air current, the dust blocking member comprising a first member formed as a frustum-cone having a gradually increasing diameter downward, and a second member vertically extending down from the first member, the second member having a predetermined length.

10 BRIEF DESCRIPTION OF THE DRAWINGS

The above-mentioned objects and the feature of the present invention will be more apparent by describing the preferred embodiment of the present invention in detail referring to the appended drawings, in which:

FIG. 1 is a schematic sectional view of a conventional cyclone dust collecting apparatus for use in a canister type vacuum cleaner;

FIG. 2 is a schematic sectional view of a conventional cyclone dust collecting apparatus for use in an upright type vacuum cleaner;

FIG. 3 is a sectional view of a preferred embodiment of a cyclone dust collecting apparatus for use in a canister type vacuum cleaner, which is equipped with a grill assembly according to the present invention;

FIG. 4 is a perspective view showing the grill assembly of FIG. 3;

FIG. 5 is an exploded perspective view showing the grill assembly of FIG. 3;

FIG. 6 is a sectional view of a preferred embodiment of a cyclone dust collecting apparatus for use in an upright type vacuum cleaner, which is equipped with a grill assembly according to the present invention;

FIG. 7 is a perspective view showing the grill assembly of FIG. 6; and

5 FIG. 8 is an exploded perspective view showing the grill assembly of FIG. 6.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT(S)

The objects and other characteristics of the present invention will be made more apparent by describing the preferred embodiments with reference to the accompanying
10 drawings. Throughout the description, like elements have been given the same reference numerals.

FIGS. 3 and 4 show a cyclone dust collecting apparatus for use in a canister type vacuum cleaner, which is equipped with a grill assembly according to the present invention. Referring to FIGS. 3 and 4, the cyclone dust collecting apparatus for use in a
15 canister type vacuum cleaner includes a cyclone body 20, a dust receptacle 30 and a grill assembly 40.

The cyclone body 20 includes a first connecting pipe 21 connected to inlet extension pipe 1a, which places first connecting pipe 21 in fluid communication with a suction brush of the vacuum cleaner, a second connecting pipe 22 connected to outlet
20 extension pipe 1b, which extends toward the body of the vacuum cleaner, an air inlet 23 being in fluid communication with the first connecting pipe 21, and an air outlet 24 being in fluid communication with the second connecting pipe 22. The dust-laden air is drawn into the cyclone body 20 through the air inlet 23 and into a whirling current.

The dust receptacle 30 is removably connected to the cyclone body 20, and separates the dusts separated from the whirling air moving inside of the cyclone body 20.

The grill assembly 40 is disposed at the air outlet 24 of the cyclone body 20, and is designed to prevent dust collected in the dust receptacle 30 from escaping dust
5 receptacle 30 and flowing toward the vacuum cleaner body. Grill assembly 40 includes a grill body 41, a plurality of air passages 42 formed in an outer surface of grill body 41. Air passages 42 place the interior volume of dust receptacle 30 in fluid communication with the air outlet 24. Dust blocking member 43 is mounted on an end of grill body 41.

Grill body 41 includes a first grill body portion 41b and a second grill body
10 portion 41c. First grill body portion 41b has a supporting rib 41a designed to engage cyclone body 20. Second grill body portion 41c is formed as a hollow cylinder integrally extending from first grill body portion 41b.

Air passages 42 are formed on the outer surface of second grill body portion 41c in the form of, as shown in FIG. 3, a plurality of through holes. Alternatively, the air
15 passages 42 can be formed as slits which are defined by arranging a plurality of blades on the outer surface of second grill body portion 41c at predetermined angles. Air passages 42 in slit form are more preferable than other configurations because they prevent the escape of dust more effectively.

Dust blocking member 43 prevents the escape of dust, by blocking dust entrained
20 in the air ascending toward grill body 41 and deflecting it towards the whirling air current. Dust blocking member 43 is mounted on the lower portion of the second grill body portion 41c, and includes a first member 43a formed as a frustum-cone having a gradually increasing diameter downward, and a second member 43b formed as a hollow

cylinder extending from the lower side of first member 43a. Second member 43b has a predetermined length.

The length of second member 43b can be adjusted to achieve a desired dust blocking effect. In one embodiment, second member 43b has a length of between 10 to
5 30mm. In a preferred, exemplary embodiment, second member 43b has a length of between 15 and 20mm.

Meanwhile, as shown in FIG. 4, dust blocking member 43 can either be integrally formed with grill body 41, or as shown in FIG. 5, be formed separately from grill body 41.

In one embodiment where dust blocking member 43 formed separately, dust
10 blocking member 43 is attached to grill body 41 by a connector 45. In one embodiment, connector 45 includes a pair of connecting holes 45a oppositely formed in the inner surface of the lower portion of second grill body portion 41c, and a pair of connecting protrusions 45b formed on the outer surface of upper portion of the dust blocking member 43 that correspond with the pair of connecting holes 45a. Each of the connecting
15 holes 45a includes a position guiding portion having an open lower end, and a connecting portion vertically spaced from the open lower end of the position guiding portion. The connecting protrusions 45b are aligned with, and inserted in the corresponding position guiding portion of the connecting holes 45a, and then rotated in a predetermined direction until the connecting protrusions 45b are positioned in the connecting portion of the
20 connecting holes 45a. Accordingly, the dust blocking member 43 is assembled with the grill body 41.

Connector 45 can take the form of various structures in addition to the structure described above. For example, connector 45 can include a threaded fastener or threads disposed on respective surfaces of grill body 41 and dust blocking member 43.

The cyclone dust collecting apparatus can be used in the canister type vacuum cleaner, as described above. In operation, suction generated at the suction brush of the vacuum cleaner draws dust-laden air into cyclone body 20 through the first connecting pipe 21 in an oblique direction with respect to the cyclone body 20. Accordingly, the drawn air is moved to the lower portion of dust receptacle 30 in a whirling air current. In this process, dust is separated from the whirling air due to centrifugal force, and collected in dust receptacle 30. Then, the air is reflected from the bottom of dust receptacle 30 and moves upward in a smaller circle than the downward air current. Air in the ascending air current is eventually discharged to the outside of the vacuum cleaner body through air passages 42, air outlet 24 and second connecting pipe 22.

Some dust is entrained with the ascending whirling air current inside of dust receptacle 30, but then is blocked by dust blocking member 43 and re-entrained in the whirling air current. Because the dust is blocked by dust blocking member 43, it does not pass through air passages 42 of grill assembly 40, the dust re-entrained in the whirling air current is collected in dust receptacle 30.

By using dust blocking member 43 that has the improved structural features, blocking ascending dust and deflecting it toward the whirling air current is performed more effectively. As a result, even minute particles of dust, such as hair, are blocked, so that they do not ascend toward the grill body 41 but instead fall to, and collect in dust

receptacle 30. Because dust is constrained and prevented from escaping more effectively, the dust collecting efficiency of the vacuum cleaner is increased.

FIGS. 6 and 7 are views showing a cyclone dust collecting apparatus for use in an upright type vacuum cleaner according to the present invention. As shown in FIGS. 6 and

5 7, the cyclone dust collecting apparatus for use in the upright type vacuum cleaner according to the present invention has a similar basic structure as that of the cyclone dust collecting apparatus for use in the canister type vacuum cleaner as described above.

Accordingly, the cyclone dust collecting apparatus for use in the upright type vacuum cleaner according to the present invention includes cyclone body 200, dust receptacle 300,
10 and grill assembly 400. The difference is that the cyclone dust collecting apparatus of the upright type vacuum cleaner according to the present invention is mounted in the dust collecting chamber of the vacuum cleaner body, while the cyclone dust collecting apparatus of the canister type vacuum cleaner is not. This difference will be described in detail below.

15 Cyclone body 200 includes an air intake pipe 210 and an air discharge pipe 220.

While mounting the cyclone dust collecting apparatus in the vacuum cleaner body (not shown), the air intake pipe 210 is connected to an air intake path that is formed in fluid communication with a suction brush (not shown) of the vacuum cleaner body. Also, the air discharge pipe 220 is connected to an air discharge path that is formed in fluid
20 communication with a motor chamber (not shown) of the vacuum cleaner body.

Accordingly, dust-laden air is drawn from the surface to be cleaned through the suction brush. The dust-laden air then travels through the air intake path and air intake pipe 210 of the vacuum cleaner body, and then into the cyclone body 200 in a tangential direction.

Accordingly, a whirling air current is formed inside of the cyclone body 200, causing the dust to be separated from the drawn air by centrifugal force. The clean air is discharged to the outside through the air discharge pipe 220, and then through the air discharge path and the motor chamber of the vacuum cleaner body.

5 The dust receptacle 300 is removably connected to the lower portion of cyclone body 200, for collecting the dust separated from the air by the centrifugal force generated by the whirling current of cyclone body 200.

Grill assembly 400 is disposed at an entrance of the air discharge pipe 220 inside of cyclone body 200, preventing the separated dust from flowing through air discharge
10 pipe 220. Grill assembly 400 includes a grill body 410 formed as a hollow cylinder with an open upper end, and a plurality of air passages 420 formed on the outer surface of grill body 410 that place air outside grill body 410 in fluid communication with air discharge pipe 220. A dust blocking member 430 is mounted on the lower portion of the grill body 410.

15 Air passages 420 are formed as a slit in the outer surface of the grill body 410, by arranging a plurality of blades at predetermined angles. Although not shown, air passages 420 can also be formed as a plurality of through holes formed in the outer surface of the grill body 410. Forming air passages 420 in the slit form by the arrangement of the blades is more preferable because air passages 420 in slit form can
20 prevent the escape of dust through air passages 420 more effectively.

Dust blocking member 430 prevents the escape of dust, by blocking dust entrained in the air ascending toward the grill body 410 and deflecting the dust into the whirling air current. According to the present invention, the dust blocking member 430

includes a first member 430a formed as a frustum-cone having a gradually increasing diameter downward, and a second member 430b formed as a hollow cylinder extending from the lower side of the first member 430a for a predetermined length.

The length of second member 430b can be adjusted to achieve a desired dust blocking effect. In one embodiment, second member 430b has a length of between 10 to 30mm. In a preferred, exemplary embodiment, second member 430b has a length of between 15 and 20mm.

As shown in FIG. 7, dust blocking member 430 can either be integrally formed with grill body 410, or as shown in FIG. 8, be separately formed from grill body 410.

In the embodiment where dust blocking member 430 is formed separately from grill body 410, a connector 450 is preferably used to attach dust blocking member 430 with the grill body 410. In one embodiment, connector 450 may include a screw that is inserted from the lower side of dust blocking member 430 and into the lower side of the grill body 410. However, this should not be considered limiting. Connector 450 may have various other structures so long as it can attach dust blocking member 430 to grill body 410.

In an upright type vacuum cleaner equipped with the cyclone dust collecting apparatus constructed as above, the device operates as follows. The motor in the motor chamber is driven, and suction is accordingly generated by the suction brush. This suction draws dust-laden air into the air intake path and the air intake pipe 210 of the vacuum cleaner body. After passing through air intake pipe 210, the dust-laden air is drawn into cyclone body 200 in an oblique direction along the inner circumference of cyclone body 200. Accordingly, a whirling air current is formed inside cyclone body 200,

dust is separated from the whirling air by centrifugal force, and collected in dust receptacle 300. The clean air is discharged outside through the air passages 420 of the grill assembly 400. The clean air then passes through air discharge pipe 220, the air discharge path, and the motor chamber of the vacuum cleaner body.

5 In this process, dust in the ascending air current inside of dust receptacle 300 is blocked by dust blocking member 430, and re-entrained in the whirling air current. Since the dust is blocked by dust blocking member 430, it cannot pass through air passages 420 of grill assembly 400, the dust is re-entrained in the whirling air current and collected in dust receptacle 300.

10 By using dust blocking member 430 according to the present invention, blocking ascending dust and deflecting it toward the whirling air current is performed more effectively. As a result, even dust of minute particles, such as hair, are blocked, so that they do not ascend toward the grill body 410 but fall to dust receptacle 300. As the escape of dust is constrained and prevented more effectively, the dust collecting
15 efficiency of the vacuum cleaner is increased.

 As described above, according to the present invention, dust, including minute and long particles such as hair, are effectively blocked by the dust blocking member that has the first member of frustum-conical shape and the second member of hollow cylindrical shape and those particles of dust are re-entrained in the whirling air current.
20 Accordingly, even minute and long particles are prevented from ascending toward grill body 410, and fall into dust receptacle 300. Accordingly, the escape of dust is more effectively constrained and prevented, and the dust collecting efficiency of the vacuum cleaner increases.

According to the present invention as described above, even the minute and long particles such as hair are blocked by the dust blocking member that has a first member of frustum-conical shape and a second member of hollow cylindrical shape. Accordingly, dust does not ascend toward the grill body but are re-entrained in the whirling air current.

5 As a result, the escape of dust can be minimized.

Although a few preferred embodiments of the present invention have been shown and described, it would be appreciated by those skilled in the art that changes may be made in these embodiments without departing from the principles and spirit of the invention, the scope of which is defined in the claims and their equivalents.

WHAT IS CLAIMED IS:

1. A grill assembly of a cyclone dust collecting apparatus for use in a vacuum cleaner, being arranged at an entrance of an air discharge pipe of a cyclone body where a whirling air current is formed from dust-laden air and wherein the dust is separated from the dust-laden air by a centrifugal force of the whirling air current, the grill assembly for preventing the escape of dust comprising:

a grill body;

a plurality of air passages formed on the grill body; and

a dust blocking member arranged at a lower portion of the grill body, blocking the dust entrained in an air current ascending toward the grill body thereby deflecting the dust toward the whirling air current,

the dust blocking member comprising

a first member formed as a frustum-cone having a gradually increasing diameter downward; and

a second member formed as a hollow cylinder vertically extending from a lower side of the first member, and having a predetermined length.

2. The grill assembly of claim 1, wherein the plurality of air passages are formed by a plurality of blades that are arranged along an outer surface of the grill body at a predetermined distance from one another.

3. The grill assembly of claim 1, wherein the dust blocking member is removably connected to a lower side of the grill body by a connector.

4. The grill assembly of claim 3, wherein the connector comprises:

a pair of connecting holes oppositely formed in an inner surface of a lower part of the grill body, each connecting hole having a position guiding portion having a open lower end and a connecting part vertically spaced from the open lower end of the position guiding portion; and

a pair of connecting protrusions formed on an outer surface of an upper side of the dust blocking member, wherein the pair of connecting protrusions align with the pair of connecting holes.

5. The grill assembly of claim 3, wherein the connector comprises a screw being fastened from a lower side of the dust blocking member to a lower side of the grill body.

6. The grill assembly of claim 1, wherein the second member of the dust blocking member has a length of between 10 to 30mm.

7. The grill assembly of claim 6, wherein the second member of the dust blocking member has a length of between 15 to 20mm.

8. A cyclone dust collecting apparatus for use in a vacuum cleaner, attached to an inlet extension pipe of a canister type vacuum cleaner and configured to separate dust by whirling dust-laden air drawn into the cyclone dust collecting apparatus, comprising:

a cyclone body comprising a first connecting pipe connected to the inlet extension pipe for receiving air, and a second connecting pipe connected to an outlet extension pipe for discharging air;

a dust receptacle removably mounted on the cyclone body, for collecting dust separated from the dust-laden air whirling in the cyclone body by centrifugal force; and

a grill assembly arranged at an entrance of the second connecting pipe inside of the cyclone body, for preventing the separated dust from escaping through the second connecting pipe,

the grill assembly comprising,

a grill body comprising a first grill body portion having a supporting rib adapted to engage the cyclone body, and a second grill body portion formed as a hollow cylinder integrally extending from the first grill body portion,

a plurality of air passages formed on the outer surface of the second grill body portion, the air passages placing air outside of the grill assembly in fluid communication with the second connecting pipe, and

a dust blocking member disposed at a lower portion of the second grill body, for blocking the dust entrained in an ascending air current toward the grill body so as to deflect the dust toward the whirling air current, the dust blocking member comprising a first member formed as a frustum-cone having a gradually increasing diameter downward, and a second member vertically extending downward from the first member, the second member having a predetermined length.

9. The cyclone dust collecting apparatus of claim 8, wherein the plurality of air passages are formed by a plurality of blades arranged along an outer surface of the second grill body at a predetermined distance from one another, allowing fluid to pass between the air passages.

10. The cyclone dust collecting apparatus of claim 8, wherein the dust blocking member is removably connected to a lower portion of the second grill body by connecting means.

11. The cyclone dust collecting apparatus of claim 10, wherein the connecting means comprises:

a pair of connecting holes oppositely formed in an inner surface of a lower part of the second grill body, each connecting hole having a position guiding portion having an open lower end and a connecting part vertically spaced from the open lower end of the position guiding portion; and

a pair of connecting protrusions formed on an outer surface of an upper side of the dust blocking member, wherein the connecting protrusions cooperating with the pair of connecting holes for connecting the dust blocking member to the second grill body.

12. The cyclone dust collecting apparatus of claim 8, wherein the second member of the dust blocking member has a length of between 10 to 30mm.

13. The cyclone dust collecting apparatus of claim 12, wherein the second member of the dust blocking member has a length of between 15 to 20mm

14. A cyclone dust collecting apparatus for use in a vacuum cleaner, which is mounted in a dust collecting chamber of an upright type vacuum cleaner and separates dust from dust-laden air by whirling the dust-laden air drawn therein through an air intake path formed in fluid communication with a suction brush of the upright type vacuum cleaner, and discharges clean air after dust separation through an air discharge path formed in fluid communication with a motor chamber of the upright type vacuum cleaner, the cyclone dust collecting apparatus comprising:

- a cyclone body comprising an air intake pipe connected to the air intake path, and an air discharge pipe connected to the air discharge path;

- a dust receptacle removably connected to the cyclone body for collecting dust separated from the dust-laden air whirling inside of the cyclone body by a centrifugal force; and

- a grill assembly arranged at an entrance of the air discharge pipe inside of the cyclone body, for preventing dust separated from the dust-laden air from escaping through the air discharge pipe,

- the grill assembly comprising,

- a grill body formed as a hollow cylinder with open upper end,

- a plurality of air passages formed on an outer surface of the grill body in fluid communication with the air discharge pipe, and

a dust blocking member arranged at a lower portion of the second grill body, for blocking the dust entrained in an ascending air current toward the grill body, and deflecting the dust toward the whirling air current, the dust blocking member comprising a first member formed as a frustum-cone having a gradually increasing diameter downward, and a second member vertically extending down from the first member, the second member having a predetermined length.

15. The cyclone dust collecting apparatus of claim 14, wherein the plurality of air passages are formed by a plurality of blades arranged along an outer surface of the grill body at a predetermined distance from one another, allowing fluid to flow through the air passages.

16. The cyclone dust collecting apparatus of claim 14, wherein the dust blocking member is removably connected to a lower portion of the grill body by a connector.

17. The cyclone dust collecting apparatus of claim 16, wherein the connector comprises a screw fastened from a lower side of the dust blocking member to a lower side of the grill body.

18. The cyclone dust collecting apparatus of claim 14, wherein the second member of the dust blocking member has a length of between 10 to 30mm.

19. The cyclone dust collecting apparatus of claim 18, wherein the second member of the dust blocking member has a length of between 15 to 20mm.

FIG. 1 (Prior Art)

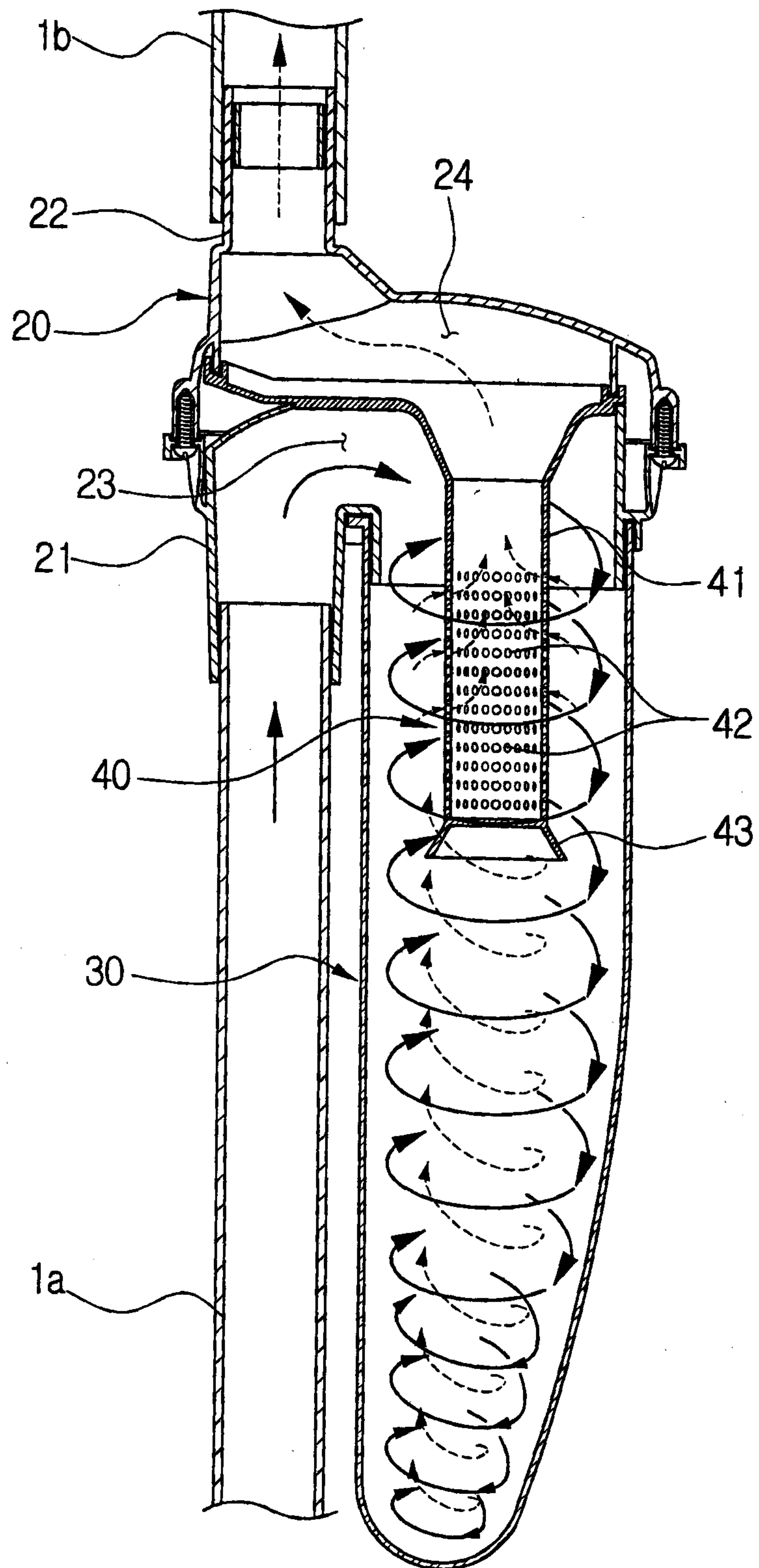


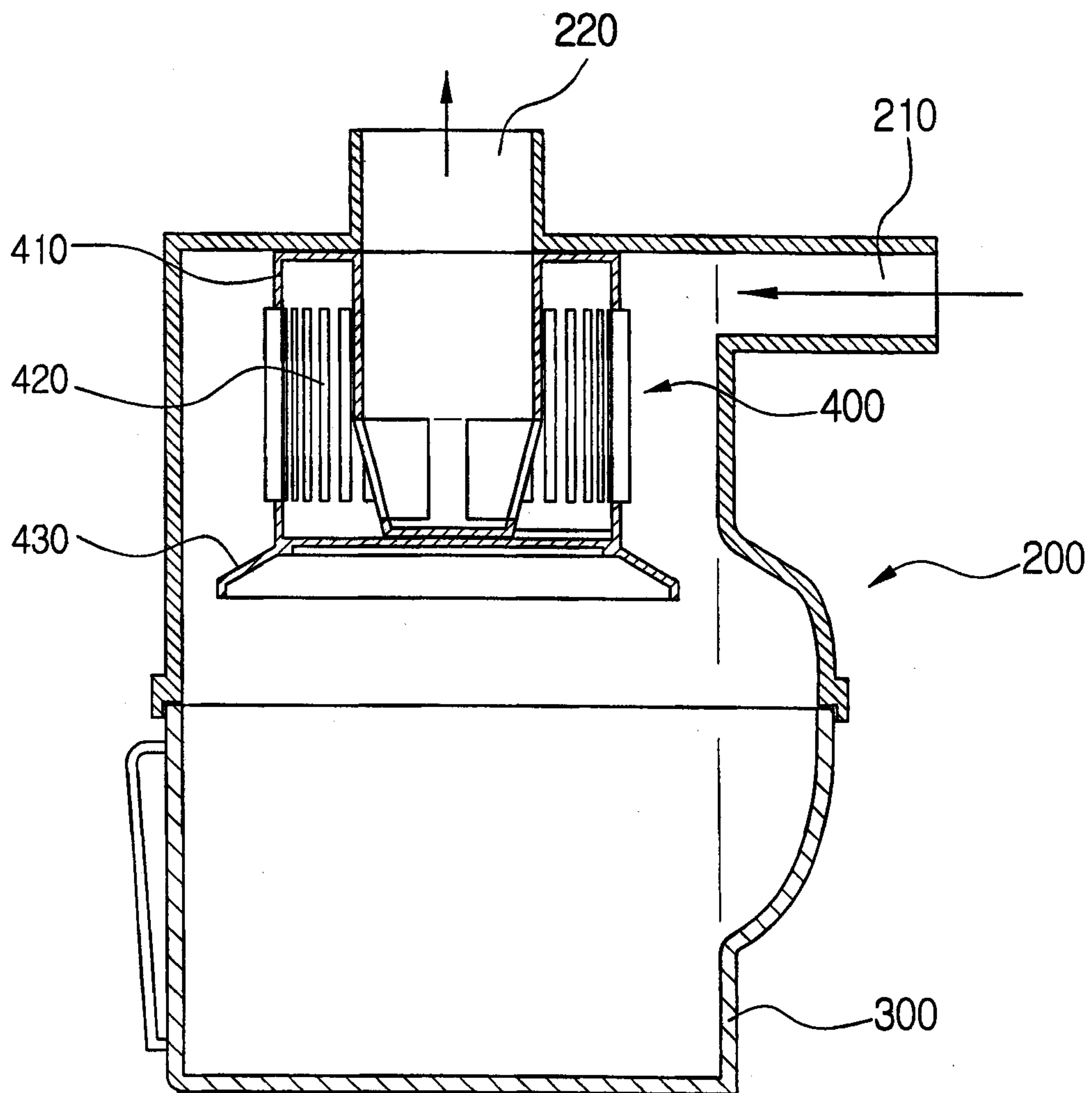
FIG. 2 (Prior Art)

FIG. 4

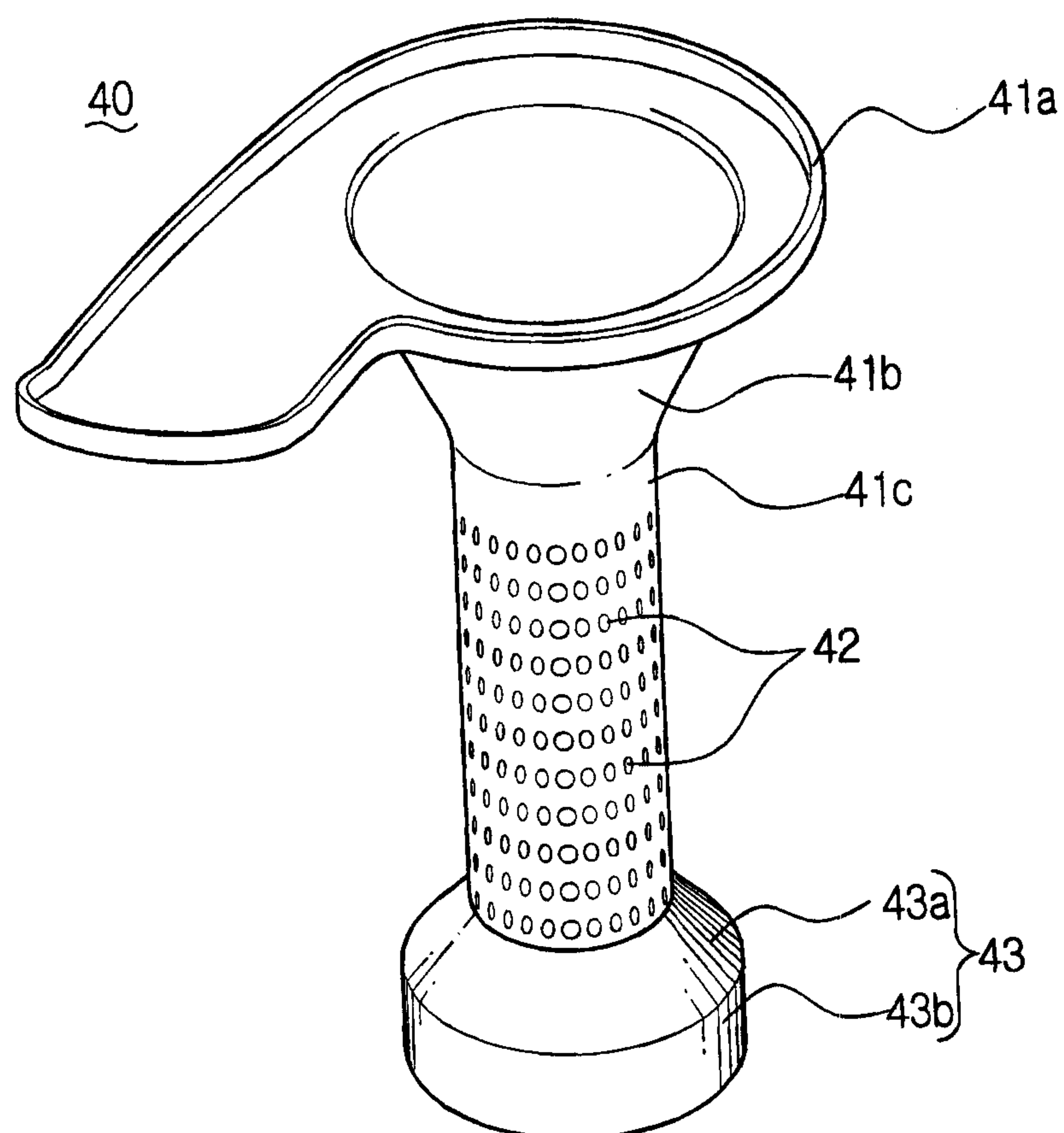


FIG. 5

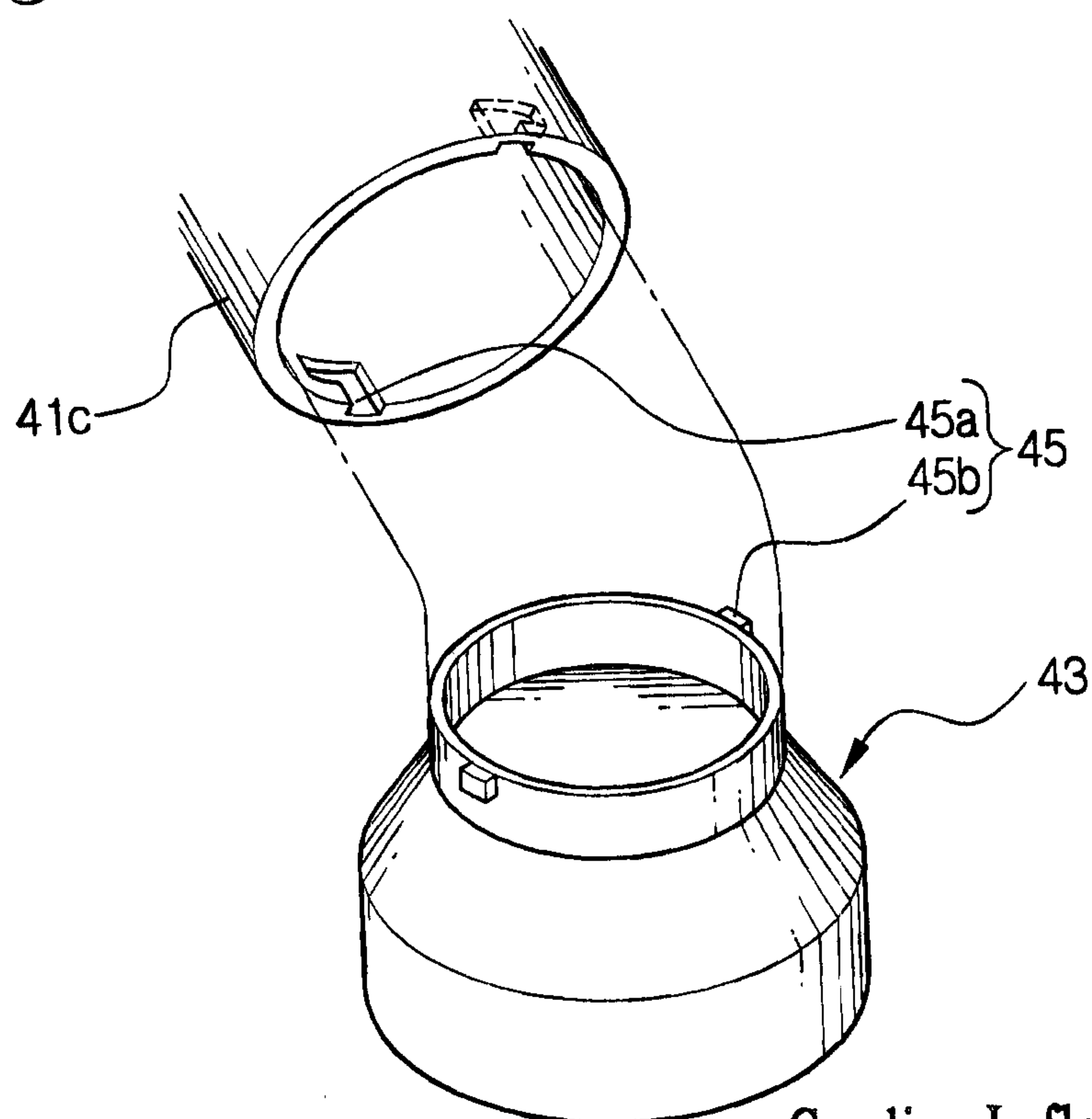


FIG. 6

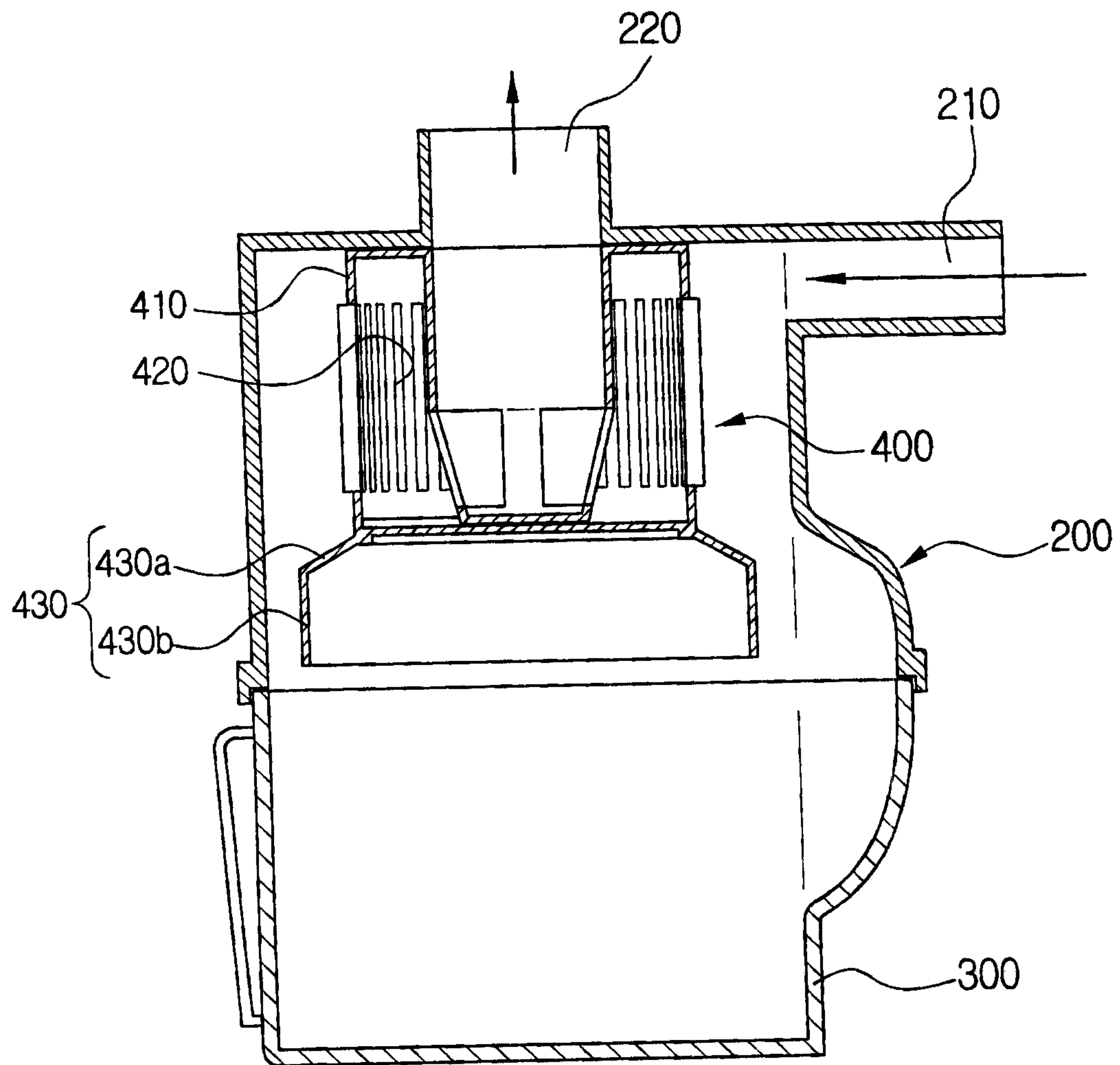


FIG. 7

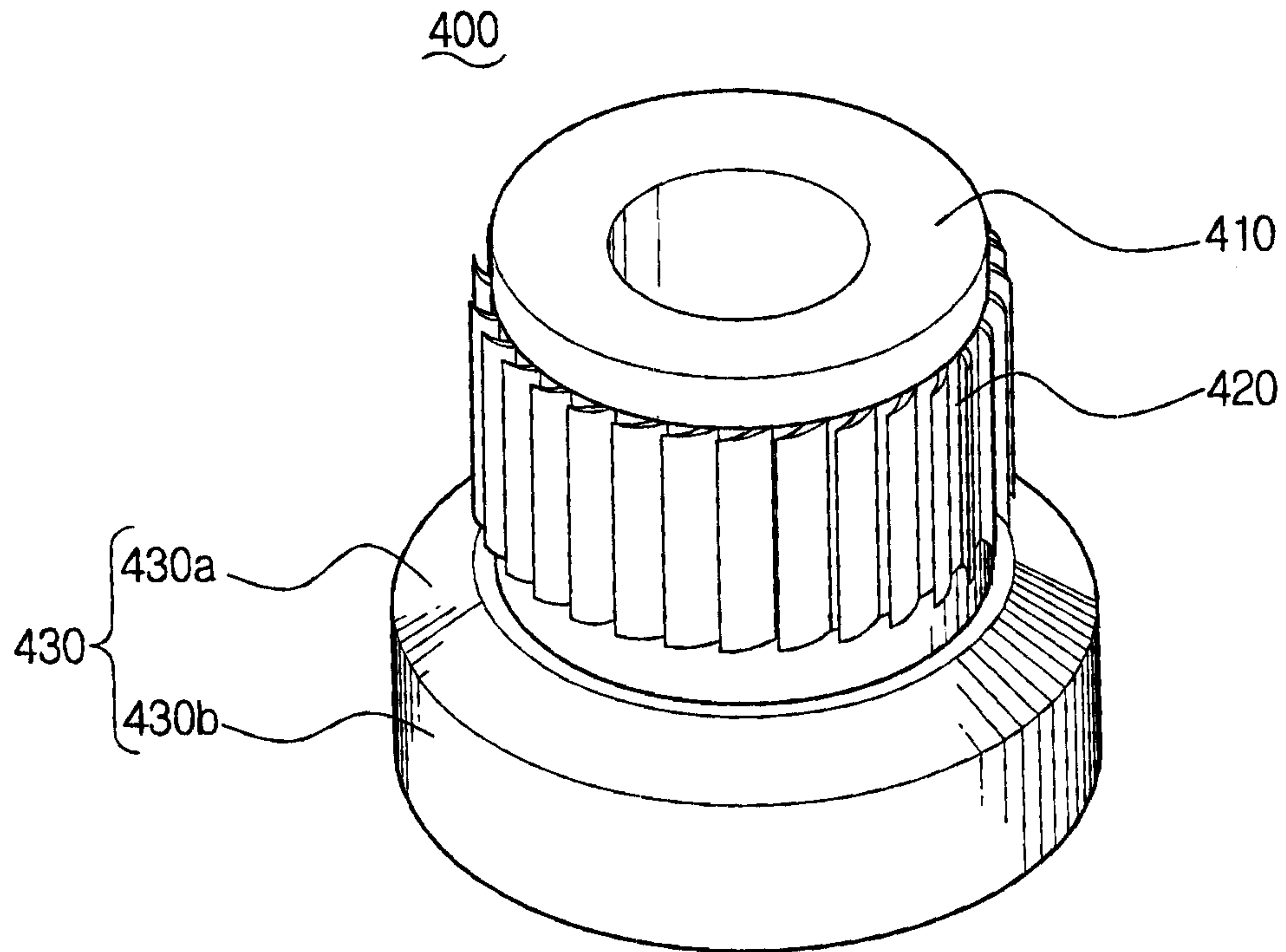


FIG. 8

