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(54) **CYCLONE DUST COLLECTOR**

ZYKLON-STAUBSAMMELVORRICHTUNG

COLLECTEUR DE POUSSIERE A CYCLONE

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(56) References cited:
JP-A- 2 187 113
JP-A- 6 063 453
JP-A- 55 005 715
US-A- 4 569 687
US-A- 4 581 050

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Description

Field of the Invention

[0001] The present invention relates to a vacuum cleaner, and more particularly, to a cyclone dust collector for vacuum cleaner, which can suck and collect various kinds of pollutant such as dust utilizing a cyclonic principle.

Background of the Invention

[0002] Generally, a vacuum cleaner is a device for separating dust from air and collecting the dust after sucking an indoor air utilizing a suction force.

[0003] Figure 1 illustrates a vacuum cleaner of a general type as described above. The vacuum cleaner is provided with a canister body 1 which has a fan 1a and a fan motor 1b therein, and a suction nozzle 2 for sucking the indoor air containing dust and foreign matters and for transmitting it into the canister body 1.

[0004] A suction hose 3, a handle pipe 4 and an extension pipe 5 are interconnected between the canister body 1 and the suction nozzle 2 in order, whereby causing the dust-laden air to be transmitted into the canister body 1 through the suction nozzle 2. The canister body 1 further has a dirt collecting apparatus 1c at its inner space to which an end of the suction hose 3 is connected. The dirt collecting apparatus 1c collects the dust introduced into the canister body 1.

[0005] When a user manipulates a controller 4a of the handle pipe 4 to operate the fan motor 1b, the fan 1a received the driving force from the fan motor 1b is rotated, thereby generating a suction force.

[0006] The generated suction force is transmitted to the suction nozzle 2 through the suction hose 3, the handle pipe 4 and through the extension pipe 5, thereby the dust-laden air is sucked through the suction nozzle 2 and introduced into the dirt collecting apparatus 1c of the canister body 1 through the extension pipe 5, the handle pipe 4 and through the suction hose 3. In the step of passing through the dirt collecting apparatus 1c, the collected dust and various foreign matters remain inside the dirt collecting apparatus 1c while air passes through the dirt collecting apparatus 1c and is discharged outwardly from the canister body 1.

[0007] However, the conventional vacuum cleaner which uses the single-use dirt collecting apparatus 1c for collecting the dust and foreign matters should be separated from the canister body 1 when the collected dust is discarded, thereby causing the separation and the installation of the dirt collecting apparatus to be troublesome.

[0008] In consideration that the user does not frequently replace the dirt collecting apparatus 1c, the dust and debris collected inside the dirt collecting apparatus 1c can be decayed, thereby causing a generation of an offensive smell. Furthermore, to replace the dirt collecting apparatus 1c, the canister body 1 must be disassembled, thereby being inconvenient in its maintenance.

[0009] To solve the above problems, recently, a cyclonic dust collecting apparatus 10 has been invented. The cyclonic dust collecting apparatus 10 is made of a material capable of water cleaning and reusable not for a single-use. There are various kinds of cyclonic dust collecting apparatuses, but they are divided two types, one separating the dust from the air by forward air inlet and air outlet portions and the other separating the dust from the air by reverse(or tangential) air inlet and air outlet portions.

[0010] Some of the cyclonic dust collecting apparatuses for the vacuum cleaner having the reverse flow of air are disclosed in U.S. Pat. Nos. 3,870,486, 4,853,008, 4,373,228, 4,593,429, 5,080,697, 5,135,552 and 5,160,356. The disclosures teach that a cyclonic swirling part of the cyclone dust collector have air introduced in the tangential direction of the cyclone to obtain a centrifugal force.

[0011] Other cyclonic dust collecting apparatus, in which a spiral projection is formed on a cone portion, is disclosed in U.S. Pat. No. 5,137,554. The spiral projection portion formed on the cone portion of the cyclone apparatus is to smoothly drop particles of the dust by the rotary power. The rotary power causes the air introduced in the tangential direction as the above disclosures.

[0012] In European Pat. No. 815788, a helical air suction tube formed helical for obtaining the rotary power is disclosed. However, all the disclosures generating the rotary power by the air introduction of the tangential direction or by the helical air suction tube are not simple in applying the cyclone to the suction nozzle and the extension pipe of the cleaner, thereby resulting in becoming larger in volume.

[0013] The above problems can be solved by adopting the forward flow of air. A cleaner adopting a forward cyclone to the extension pipe is disclosed in U.S. Pat. No. 5,350,432.

[0014] Referring to Figures 2 through 5, the cleaner will be described in more detail as follows.

[0015] First, there is shown a collector body 11 having an inlet pipe 12 formed at an end side thereof for sucking air and pollutant (dust, debris or the likes) and an outlet pipe 13 formed at the other end side thereof for discharging the introduced dust-laden air into the collector body 11.

[0016] The inlet pipe 12 is connected to the extension pipe 5 for introducing the dust sucked through the suction nozzle 2 and the outlet pipe 13 is connected to the handle pipe 4 for receiving the suction force generated by the rotation of the fan 1a. A dust outlet 14 is provided in the inner circumference of the collector body 11 on which the outlet pipe 13 is arranged. The dust outlet 14 is connected to a dust box 15, thereby discharging the introduced dust into the dust box 15.

[0017] The operation of the cyclone dust collector 10

employing the cyclone will be described as follows.

[0018] When the fan fixed inside the canister body 1 of the vacuum cleaner is rotated to cause a suction force, The suction force is transmitted through the outlet pipe 13 of the collector body 11, the inlet pipe 12 and through the extension pipe 5 into the suction nozzle 2.

[0019] Then, dirt-laden air is introduced into the collector body 11 through the suction nozzle 2, and the extension pipe 5 and through the inlet pipe 12. Thereafter, the introduced dirt-laden air is rotated along the inner wall surface of the collector body 11.

[0020] Through the above process, the dust contained in the air is rotated and advanced along the inner wall surface of the collector body 11 and discharged into the dust box 15 through the dust outlet 14 and the air is discharged outwardly through the outlet pipe 13.

[0021] Since having a higher specific gravity relative to the air, the dust can be rotated and discharged along the collector body 11 through the dust outlet 14.

[0022] The pure air which has the gravity of approximately 0 is not influenced by the centrifugal force, but the dust which has the specific gravity is rotated along the inner wall of the collector body 11, as indicated in the following equation:

$$F=me\omega^2 ,$$

where F is the centrifugal force, m is the gravity, e is a distance from the center to the inner wall of the collector body, and ω is an acceleration.

[0023] Meanwhile, there is a necessity for separating the dust from the air by applying the centrifugal force to the dust-laden air during the introduction of the air through the inlet pipe 12.

[0024] Therefore, in the prior arts, a cyclonic swirling part 20 comprises a plurality of cycloid guiding axial vanes 21 fixed adjacently to the inlet pipe 12 within the collector body 11 to provide the centrifugal force to the dust-laden air introduced into the collector body. That is, the plurality of cycloid guiding axial vanes 21 such as wings of electric fan extend radially and outwardly from a center axis 23 at prescribed intervals respectively, thereby causing the air, which passes through the cyclonic swirling part 20, obtaining the centrifugal force.

[0025] However, the cyclonic swirling part 20 can generate the centrifugal force by guiding the flow of air depending on the shape of the cycloid guiding axial vanes 21 during passing through spaces formed between the vanes 21, thereby the collector body provides a poor centrifugal force.

[0026] The centrifugal force generated during the introduction of the air is relatively weak, thereby the dust is not smoothly separated from the air to drop off in its dust collecting force.

[0027] The reason is that the inlet pipe 12 is formed on the center of the end side of the collector body 11 and the air introduced into the collector body 11 through the inlet pipe 12 spreads the inner circumference of the cyclone during the passage of the air through the spaces between the cycloid guiding axial vanes 21 constituting the cyclonic swirling part 20 as well as the flow of air is divided into large numbers by the spaces between the cycloid guiding axial vanes 21.

[0028] That is, axial blades of the cycloid guiding axial vane 21 are arranged in parallel with the flow of air to divide the flow of air into large numbers, so that the passed air is advanced and rotated along the curved surface of each cycloid guiding axial vane 21.

[0029] At this time, the rotary area of the dust-laden air is determined by a length of the axial vane 21. However, the conventional axial vane 21 which has the relatively short length provides a small rotary area, thereby resulting in a small rotary power of the particles of dust.

[0030] Therefore, the dust-laden air introduced through the inlet pipe 12 passes the cyclonic swirling part 20 from the inner circumference through the central portion of the collector body 11 during the spread procedure, and at this time, the rotary power is reduced in the central portion which has a small diameter.

[0031] Furthermore, the cyclonic swirling part 20 having the plural axial vanes 21 allows the suction force to be evenly applied to the entire area of the cyclone dust collector 10, thereby light and bulky particles such as wastepaper, paper, stockings or the likes are caught between the axial vanes 21 by the suction force during passing through the cyclonic swirling part 20. It causes stop of a suction passage of the cleaner to occur a decisive defect in its operation. Additionally, it rises a suction impossibility as well as increases rapidly the inside pressure resulting in the damage of the cyclone dust collector 10.

Summary of the Invention

[0032] Accordingly, it is an object of the present invention to provide a cyclone dust collector which increases a rotary power of dust-laden air during the introduction of the air into a collector body to smoothly separate dust from the air.

[0033] It is another object of the present invention to provide a cyclonic dust collector which prevents a stop of an air flow passage when bulky foreign matters are introduced, thereby preventing a cause of a suction impossibility.

[0034] To accomplish the above objects, the present invention provides a cyclone dust collector comprising: a collector body; an inlet pipe formed integrally with the collector body for sucking the dust-laden air; an outlet pipe for discharging the introduced air outwardly from the collector body; a dust outlet formed on the opposite side of the inlet pipe for discharging dust; and a cyclonic swirling part disposed on an air introducing portion in the collector body, the cyclonic swirling part having a single screw type vane extending along the inner wall surface of the collector body relative to the direction of the

air flow to rotate the dust-laden air introduced into the collector body.

[0035] Other advantages and objects of the present invention will become apparent to those skilled in the art from the subsequent detailed description, appended claims and drawings.

Brief Description of the Drawings

[0036] In the drawings which illustrate the best mode presently contemplated for carrying out the present invention:

Figure 1 is a perspective view, partly in section, of a conventional vacuum cleaner;
Figure 2 is a partly exploded perspective view showing a state that a cyclone dust collector is applied to an extension pipe of the vacuum cleaner;
Figure 3 is a sectional view of the cyclone dust collector of Figure 2;
Figure 4 is a sectional view taken along a line of I-I of Figure 3;
Figure 5 is a perspective view of a cyclonic swirling part of Figure 3;
Figure 6 is a perspective view, partly in section, of a cyclonic swirling part of a cyclone dust collector according to the present invention;
Figure 7 is a perspective view, partly in section, of a first preferred embodiment of a forward cyclone dust collector applying the cyclonic swirling part of Figure 6;
Figure 8 is a sectional view taken along a line of II-II of Figure 7;
Figure 9 is a perspective view, partly in section, of a cyclonic swirling part of another type according to the present invention;
Figure 10 is a perspective view, partly in section, of a second preferred embodiment of the forward cyclone dust collector applying the cyclonic swirling part of Figure 6;
Figure 11 is a sectional view taken along a line of III-III of Figure 10;
Figure 12 is a perspective view, partly in section, of a third preferred embodiment of the forward cyclone dust collector applying the cyclonic swirling part of Figure 6;
Figure 13 is a sectional view taken along a line of IV-IV of Figure 12;
Figure 14 is a longitudinal sectional view of a fourth preferred embodiment of the present invention; and
Figure 15 is a sectional view showing a location of an air discharge portion of an inlet pipe of the cyclone dust collector applying the cyclonic swirling part according to the present invention.

Detailed Description of the Preferred Embodiment

[0037] Referring to Figures 6 through 15, preferred embodiments of the present invention will be described hereinafter in more detail.

[0038] Figure 6 is a perspective view, partly in section, of a cyclonic swirling part according to the present invention. Figure 7 is a perspective view, partly in section, of a first preferred embodiment of a forward cyclone dust collector embodying the cyclonic swirling part of Figure 6. Figure 8 is a sectional view taken along a line of II-II of Figure 7. As shown in the drawings, the cyclone dust collector 100 according to the first embodiment of the present invention includes a cyclonic swirling part 200 consisting of a screw type vane 210, which is disposed inside the collector body 110 and adopted as means for providing a rotary power to dust-laden air.

[0039] The screw type vane 210 forms a single air flow passage resulting in a small size of the cyclonic swirling part 200, but sufficiently provides a rotary area. It is entirely different from the conventional method of sucking the dust-laden air into the collector body 11 using the conventional cyclonic swirling part 20 having a plurality of axial vanes 21 dividing the air flow passage into large numbers.

[0040] The cyclonic swirling part 200 of the cyclone dust collector 100 includes an outer body 220 mounted on the inner wall surface of a collector body 110, a central shaft 230 formed integrally with the central portion of the outer case body 220, and the screw type vane 210 formed spirally along the inner circumference of the outer body from the outer surface of the center axis 230. The cyclonic swirling part 200 has the single air flow passage by the above structure. The dust-laden air introduced into the collector body 110 rotates and advances along the air flow passage.

[0041] It will be appreciated that the cyclonic swirling part 200 may be constructed without the center axis 230 disposed on the central portion of the screw type vane 210.

[0042] As shown in Figure 9, the screw type vane 210 may be formed along the inner wall surface of the collector body 110 or along the inner wall surface of the outer body 220 constituting the cyclonic swirling part 200, and it can be formed on any other locations. It will be recognized that there are other equivalent ways of locating the cyclone dust collector 100 besides the way of locating between the extension pipe 5 and the handle pipe 4, but this embodiment refers to the above structure.

[0043] Functions according to the first embodiment of the present invention will be described hereinafter in more detail.

[0044] When a user manipulates the controller 4a of the handle pipe 4 to operate the fan motor 1b, the fan 1a received the driving force from the fan motor 1b is rotated, thereby causing generating a suction force. The generated suction force is transmitted to the suction nozzle 2 through the suction hose 3, the handle pipe 4, cyclone dust collector 100 and through the extension pipe 5.

[0045] The dust-laden air sucked through the suction nozzle 2 is introduced into the collector body 110 through an inlet pipe 120.

[0046] The flow of dust-laden air is guided by the screw type vane 210 during passing through the cyclonic swirling part 200, thereby generating a rotary power. That is, the screw type vane 210 extending spirally between the center axis 230 and the outer body 220 of the cyclonic swirling part 200 provides the flow of air with the rotary power.

[0047] The air passed through the cyclonic swirling part 200 is discharged outwardly through the outlet pipe 130 arranged on the other end of the collector body 110, rotating along the inner circumference of the collector body 110. At this time, the dust contained in the air is influenced by a centrifugal force, because of its gravity.

[0048] The dust with the specific gravity is separated from the air and moved toward the outlet pipe 130 portion, rotating along the inner wall surface of the collector body 110. The dust separated from the air is discharged into a dust box 150 through a dust outlet 140 during rotating along the inner wall surface of the collector body 110, while the air is discharged toward the handle pipe 4 through the outlet pipe 130.

[0049] Preferably, the cyclone dust collector is constructed for improving the rotary power of the air introduced into the cyclone dust collector.

[0050] For it, in a second embodiment of the present invention, the air outflow portion 121 of the inlet pipe 120 is directed to a inflow portion 211 of the screw type vane 210 constituting the cyclonic swirling part 200.

[0051] In Figures 10 and 11, the second embodiment of the dust collector adopting the screw type vane 210 is illustrated. In the second embodiment of the present invention, the inlet pipe 120 is arranged eccentrically on the collector body 110, so that the inlet pipe 120 is disposed on the same line as the inflow portion 211 of the screw type vane 210.

[0052] By the above structure of the collector body 110, the dust-laden air which is introduced into the collector body 110 through the inlet pipe 120 is directly delivered to the inflow portion 211 of the screw type vane 210, and a distance, that the rotary power is applied to the dust-laden air by the screw type vane 210, is maximized.

[0053] The rotary power of the dust-laden air rotating along the inner wall surface of the collector body 110 through the cyclonic swirling part 200 is generated more strongly, thereby improving the separating efficiency of the dust from the air.

[0054] In case that the inflow portion 211 and the center of the air outflow portion of the inlet pipe 120 is arranged on the same line, some of the air sucked through the inlet pipe 120 is smoothly introduced into the screw type vane 210, but the other air is rotated after passing through a certain length of the rotary area of the screw type vane 210, thereby resulting in reducing the rotary power occurred by the screw type vane 210. This embodiment is to solve the above problem.

[0055] In Figures 12 and 13, a third embodiment for improving the rotary power of the air is illustrated. In the third embodiment according to the present invention, the inlet pipe 120 is arranged centrally on the collector body 110 not eccentrically, but it has the same or more improved effect of rotary power.

[0056] For it, the cyclone dust collector 100 further includes a guide passage 160 on the air outflow portion of the inlet pipe 120, the guide passage 160 having an end extending to the inflow portion 211 of the screw type vane 210. The dust-laden air sucked through the inlet pipe 120 is advanced toward the inflow portion 211 by a guidance of the guide passage 160, thereby improving the rotary power of the dust-laden air.

[0057] That is, a distance between the air outflow portion of the inlet pipe 120 and the air inflow portion of the cyclonic swirling part 200 is shortened to a minimum, thereby resulting in minimizing the diffusion of the dust-laden air passing through the space.

[0058] A fourth embodiment, which has a modified shape of the second embodiment, is illustrated in Figure 14, the modified shape having the same effect as the third embodiment. In the fourth embodiment of the present invention, the inlet pipe 120 is arranged eccentrically on the end side of the collector body 110 in state that the distance between the air outflow portion of the inlet pipe 120 and the inflow portion of the cyclonic swirling part 200 is minimized.

[0059] Meanwhile, in case of the cyclone dust collector structured as the second, third and fourth embodiments, the air outflow portion of the inlet pipe 120 is located as shown in Figure 15. It will be appreciated that other equivalent constructions of cyclone dust collector having the cyclonic swirling part 200 can be used, but it is preferable that the outflow portion of the inlet pipe 120 is structured as shown in Figure 15.

[0060] As previously described above, the improved air flow passage structure inside the collector body of the cyclone dust collector has the following effects.

[0061] First, the flow of air is not divided into large numbers but is formed in a single, thereby leading to a concentration of the suction force to largely increase the rotary power of the introduced air. Therefore, the dust can be smoothly separated from the air, thereby sharply reducing the resistance of the air to eliminate the cause of a noise.

[0062] Second, also the bulky foreign matters which are introduced into the collector body can be smoothly discharged into the dust box of the collector body, thereby preventing a stop of the air flow passage to solve problems such as the suction impossibility.

[0063] Third, the cyclonic swirling part with a smaller size (diameter or length) has a sufficient area for the rotation, thereby improving the rotary power.

[0064] While the above detailed description describes the preferred embodiment of the present invention, it should be understood that the present invention is sus-

ceptible to modification, variation and alteration without deviating from the scope of the appended claims.

Claims

1. A cyclone dust collector (100) for a vacuum cleaner comprising a collector body (110), an inlet pipe (120) formed integrally with the collector body (110) for sucking the dust-laden air, an outlet pipe (130) for discharging the introduced air outwardly from the collector body (110), a dust outlet (140) for discharging dust, and a cyclonic swirling part (200) **characterised in that** teh cyclonic swirling part comprises a screw type vane (210) extending spirally in the collector body (110) relative to the direction of the air flow to rotate the dust-laden air introduced into the collector body (110), the dust outlet (140) being formed on the side of the collector body (110) opposite of the inlet pipe (120) and **in that** the cyclonic swirling part (200) includes only one screw type vane (210) forming one single air flow passage in the cyclonic swirling part (200) and being formed spirally along the inner wall surface of the collector body (110) or along the inner wall surface of an outer body (220) of the swirling part (200) mounted on the inner wall surface of the collector body (110).

2. Cyclone dust collector according to claim 1, wherein an air outflow portion of the inlet pipe (120) is directed to an air inflow portion (211) of the screw type vane (210).

3. Cyclone dust collector according to claim 2, wherein the air outflow portion of the inlet pipe (120) is eccentrically formed on the collector body (110) to be directed toward the inflow portion (211) of the screw type vane (210).

4. Cyclone dust collector according to claim 3, wherein the air outflow portion of the inlet pipe (120) in inclined toward the inside of an air passage of the screw type vane (210) relative to the inflow portion (211) of said screw type vane (210).

5. Cyclone dust collector according to claim 2, further comprising a guide passage (160) arranged on the outflow portion of the inlet pipe, said guide passage (160) having an end extending to the inflow portion (211) of the screw type vane (210).

6. Cyclone dust collector according to claim 5, wherein the air outflow portion of the inlet pipe (120) is inclined toward the inside of an air passage of the screw type vane (210) relative to the inflow portion (211) of the screw type vane (210).

7. Cyclone dust collector according to anyone of claims 1 to 6, wherein the screw type vane (210) has a central shaft (230) and is also spirally extending along the outer circumference of said central shaft (230) according to the direction of the airflow.

Patentansprüche

1. Zyklon-Staubsammelvorrichtung (100) für einen Staubsauger, mit einem Sammelkörper (110), einem Einlaßrohr (120), das einstückig mit dem Sammelkörper (110) ausgebildet ist, um die staubbeladene Luft anzusaugen, mit einem Auslaßrohr (130) zum Abziehen der eingeführten Luft aus dem Sammelkörper (110) nach außen, mit einem Staubauslaß (140) zum Abziehen von Staub und mit einem Zyklon-Wirbelelement (200), **dadurch gekennzeichnet, daß** das Zyklon-Wirbelelement einen Schneckenflügel (210) umfaßt, der relativ zur Richtung des Luftstroms spiralförmig im Sammelkörper (110) verläuft, um die in den Sammelkörper (110) eingebrachte staubbeladene Luft zu verwirbeln, wobei der Staubauslaß (140) auf der Seite des Sammelkörpers (110) ausgebildet ist, die dem Einlaßrohr (120) gegenüberliegt, und daß das Zyklon-Wirbelelement (200) nur einen Schneckenflügel (210) aufweist, der einen einzigen Luftstromkanal im Zyklon-Wirbelelement (200) bildet und entlang der Innenwandfläche des Sammelkörpers (110) oder entlang der Innenwandfläche eines äußeren Körpers (220) des Wirbelelementes (200), das an der Innenwandfläche des Sammelkörpers (110) montiert ist, spiralförmig ausgebildet ist.

2. Zyklon-Staubsammelvorrichtung nach Anspruch 1, bei der ein Luftauslaßabschnitt des Einlaßrohrs (120) auf einen Lufteinlaßabschnitt (211) des Schneckenflügels (210) hin ausgerichtet ist.

3. Zyklon-Staubsammelvorrichtung nach Anspruch 2, bei der der Luftauslaßabschnitt des Einlaßrohrs (120) auf dem Sammelkörper (110) in Ausrichtung auf den Einlaßabschnitt (211) des Schneckenflügels (210) hin exzentrisch ausgebildet ist.

4. Zyklon-Staubsammelvorrichtung nach Anspruch 3, bei der der Luftauslaßabschnitt des Einlaßrohrs (120) relativ zum Einlaßabschnitt (211) des Schnekkenflügels (210) zur Innenseite eines Luftkanals des Schneckenflügels (210) hin geneigt ist.

5. Zyklon-Staubsammelvorrichtung nach Anspruch 2, ferner mit einem Führungsdurchlaß (160), der am Auslaßabschnitt des Einlaßrohrs angeordnet ist, wobei der Führungsdurchlaß (160) ein Ende aufweist, das sich bis zum Einlaßabschnitt (211) des Schneckenflügels (210) hin erstreckt.

6. Zyklon-Staubsammelvorrichtung nach Anspruch 5, bei der der Luftauslaßabschnitt des Einlaßrohrs (120) zum Einlaßabschnitt (211) des Schneckenflügels (210) hin relativ zur Innenseite eines Luftkanals des Schneckenflügels (210) geneigt ist.

7. Zyklon-Staubsammelvorrichtung nach einem der Ansprüche 1 bis 6, bei der der Schneckenflügel (210) einen Mittelschaft (230) aufweist und auch entlang dem Außenumfang der Mittelwelle (230), der Richtung des Luftstroms entsprechend, spiralförmig verläuft.

Revendications

1. Collecteur de poussière à cyclone (100) pour un aspirateur comprenant un corps collecteur (110), un tuyau d'arrivée (120) formé intégralement dans le corps collecteur (110) pour aspirer l'air poussiéreux, un tuyau de sortie (130) pour évacuer l'air introduit vers l'extérieur du corps collecteur (110), une sortie des poussières (140) pour évacuer la poussière, et une chambre de tourbillonnement cyclonique (200), **caractérisé en ce que** la chambre de tourbillonnement cyclonique comprend une aile du type hélice (210) s'étendant en spirale dans le corps collecteur (110) par rapport à la direction du flux d'air pour faire tourner l'air poussiéreux introduit dans le corps collecteur (110), la sortie des poussières (140) étant formée sur le côté du corps collecteur (110) à l'opposé du tuyau d'arrivée (120) et **en ce que** la chambre de tourbillonnement cyclonique (200) comprend uniquement une aile du type hélice (210) formant un passage de flux d'air unique dans la chambre de tourbillonnement cyclonique (200) et étant formé en spirale le long de la surface de paroi interne du corps collecteur (110) ou le long de la surface de paroi interne d'un corps extérieur (220) de la chambre de tourbillonnement (200) montée sur la surface de paroi interne du corps collecteur (110).

2. Collecteur de poussière à cyclone selon la revendication 1, dans lequel une partie de sortie d'air du tuyau d'arrivée (120) est dirigée vers la partie d'entrée d'air (211) de l'aile du type hélice (210).

3. Collecteur de poussière à cyclone selon la revendication 2, dans lequel la partie de sortie d'air du tuyau d'arrivée (120) est formée de façon excentrique sur le corps collecteur (110) pour être dirigée vers la partie d'entrée d'air (211) de l'aile du type hélice (210).

4. Collecteur de poussière à cyclone selon la revendication 3, dans lequel la partie de sortie d'air du tuyau d'arrivée (120) est inclinée vers l'intérieur d'un passage d'air de l'aile du type hélice (210) par rapport à la partie d'entrée d'air (211) de ladite aile du type hélice (210).

5. Collecteur de poussière à cyclone selon la revendication 2, comprenant en outre un passage de guidage (160) agencé sur la partie de sortie d'air du tuyau d'arrivée, ledit passage de guidage (160) ayant une extrémité s'étendant vers la partie d'entrée d'air (211) de l'aile du type hélice (210).

6. Collecteur de poussière à cyclone selon la revendication 5, dans lequel la partie de sortie d'air du tuyau d'arrivée (120) est inclinée vers l'intérieur du passage d'air de l'aile du type hélice (210) par rapport à la partie d'entrée d'air (211) de l'aile du type hélice (210).

7. Collecteur de poussière à cyclone selon l'une quelconque des revendications 1 à 6, dans lequel l'aile du type hélice (210) a un arbre central (230) et s'étend également en spirale le long de la circonférence extérieure dudit arbre central (230) selon la direction du flux d'air.

FIG. 1
Related Art

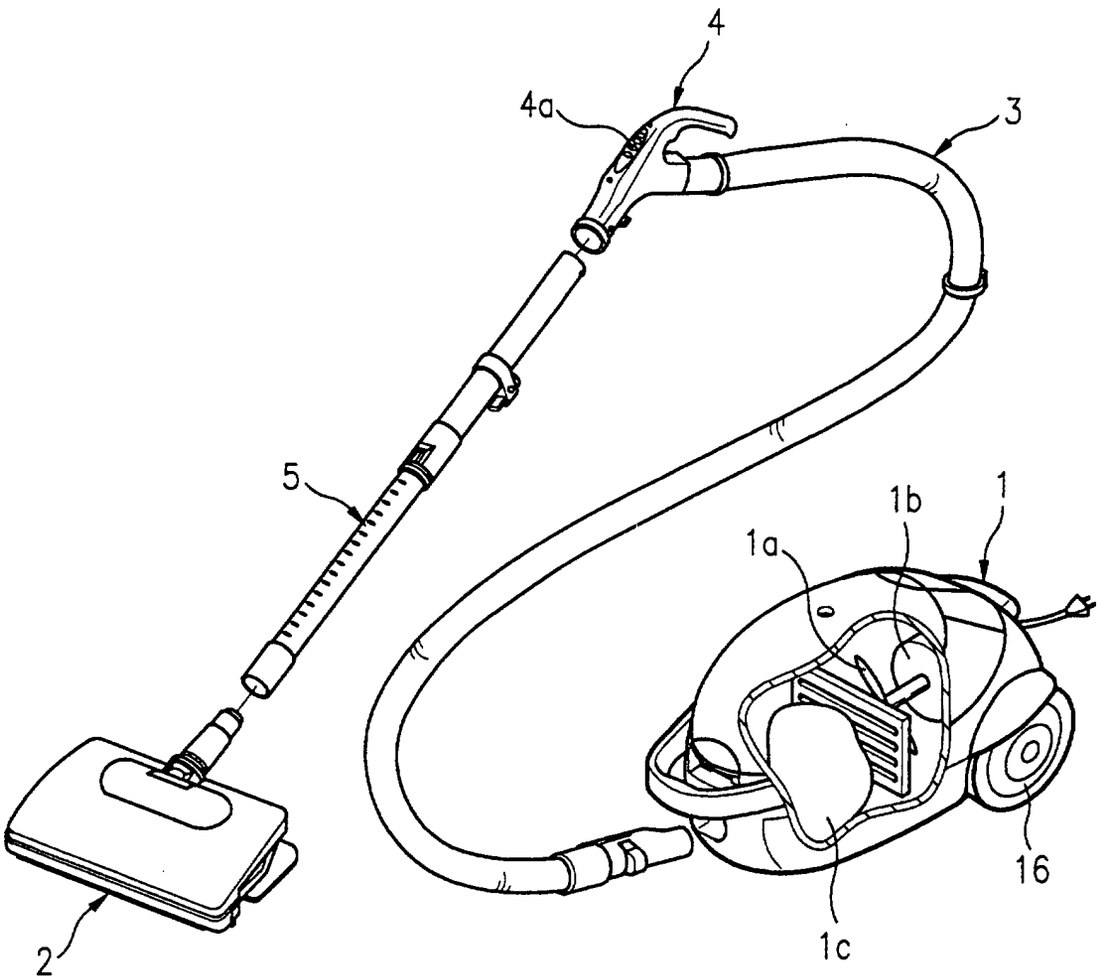


FIG. 2
Related Art

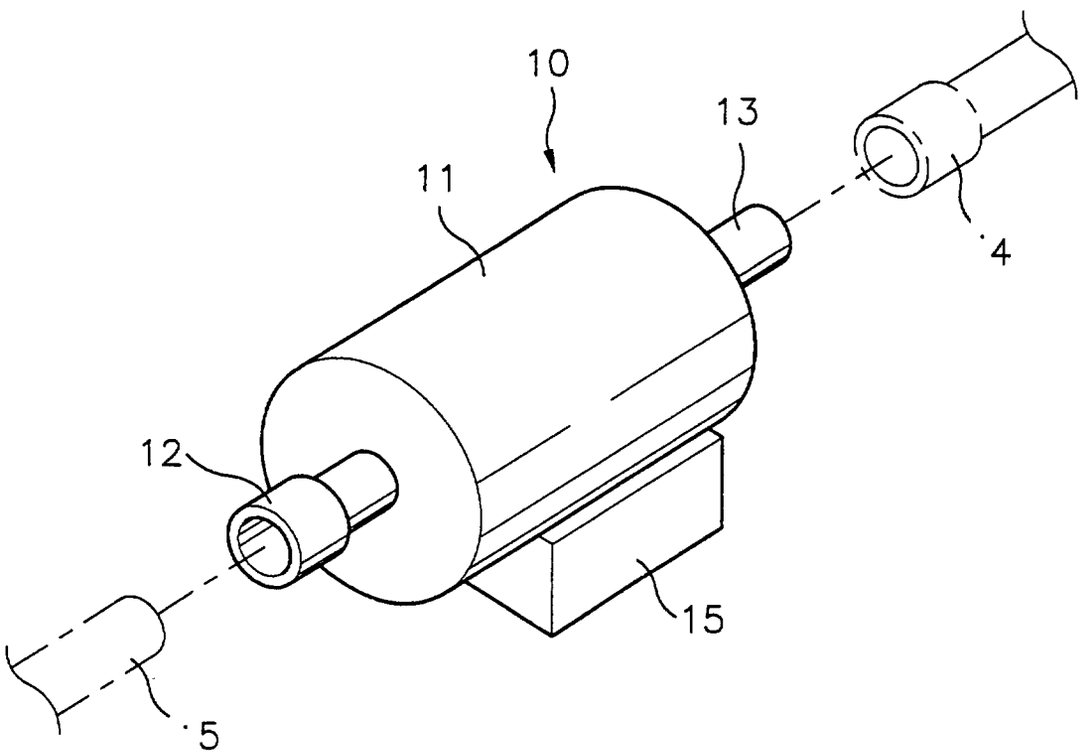


FIG. 3
Related Art

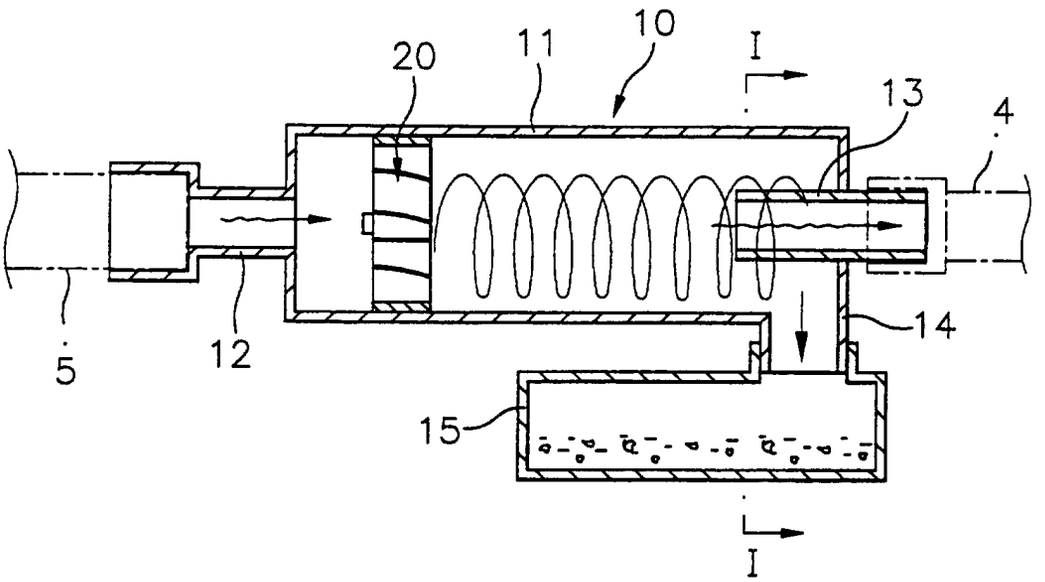


FIG. 4
Related Art

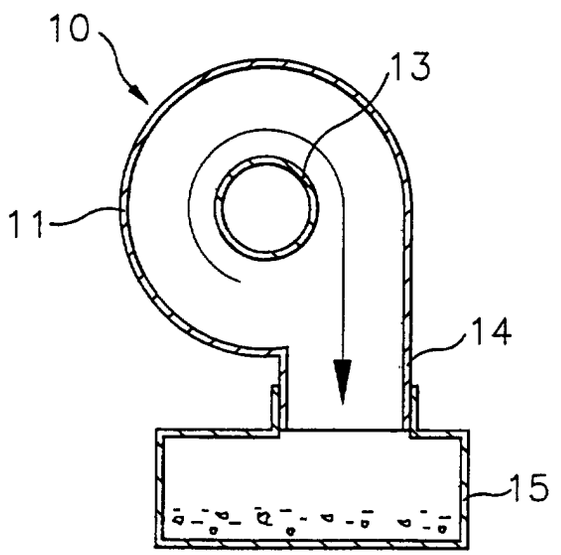


FIG. 5
Related Art

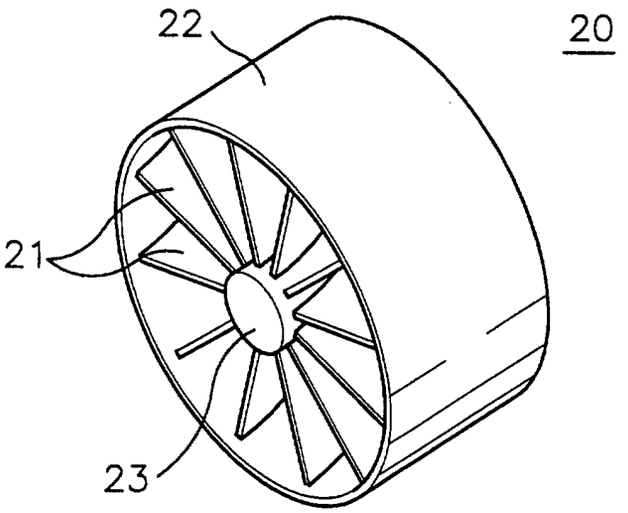


FIG. 6

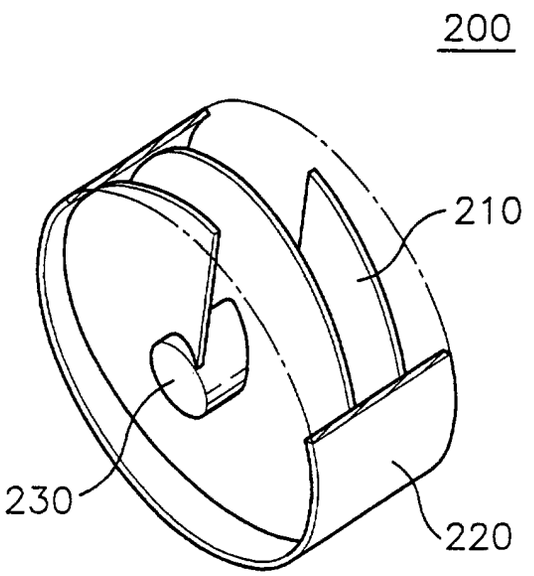


FIG. 7

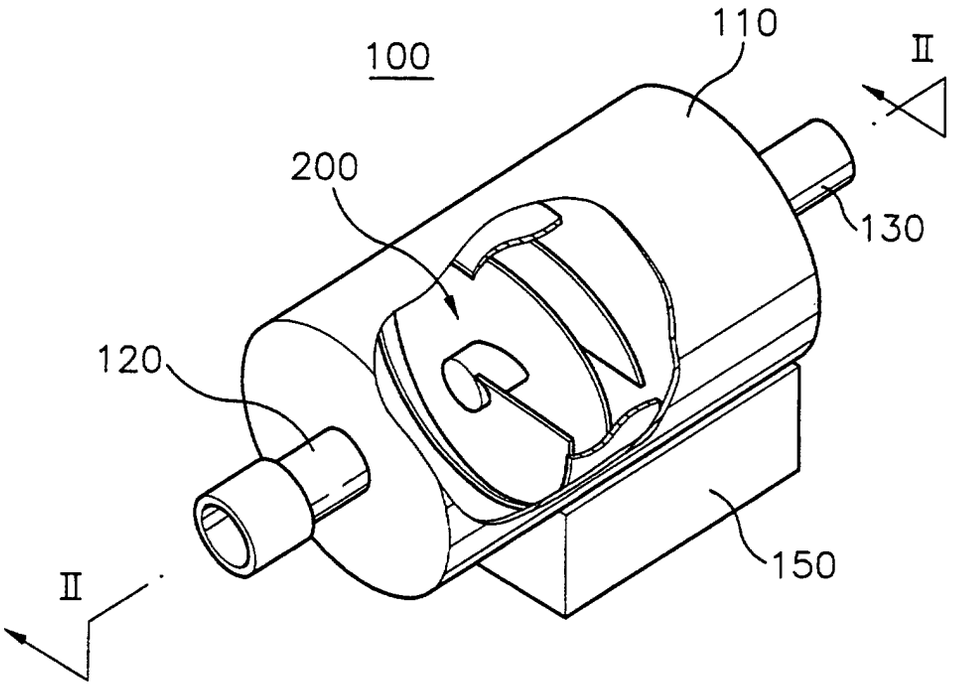

100
110
II
200
130
120
150
II

FIG. 8

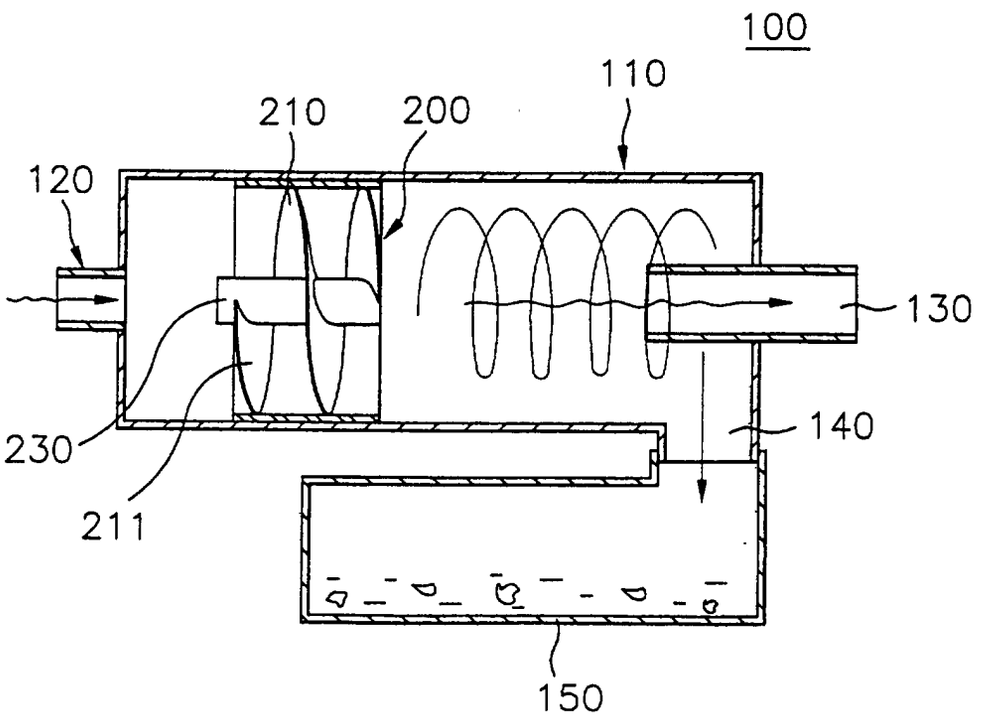

100
110
210
200
120
130
140
230
211
150

FIG. 9

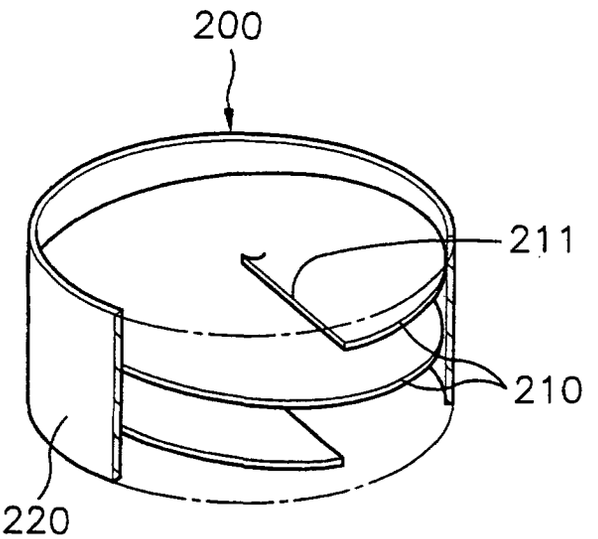


FIG. 10

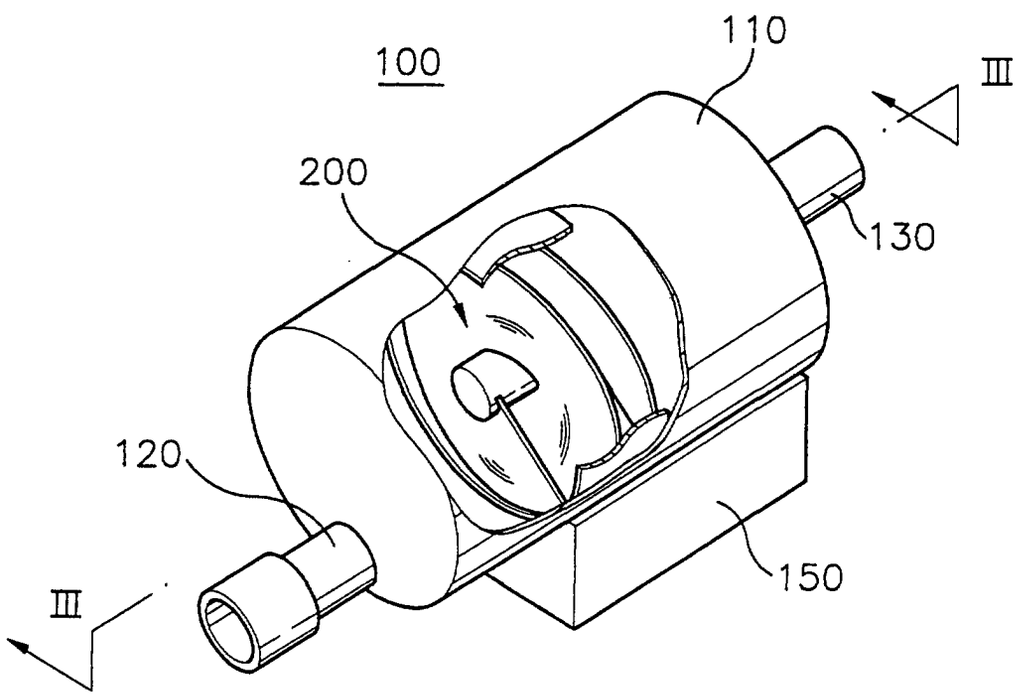


FIG. 11

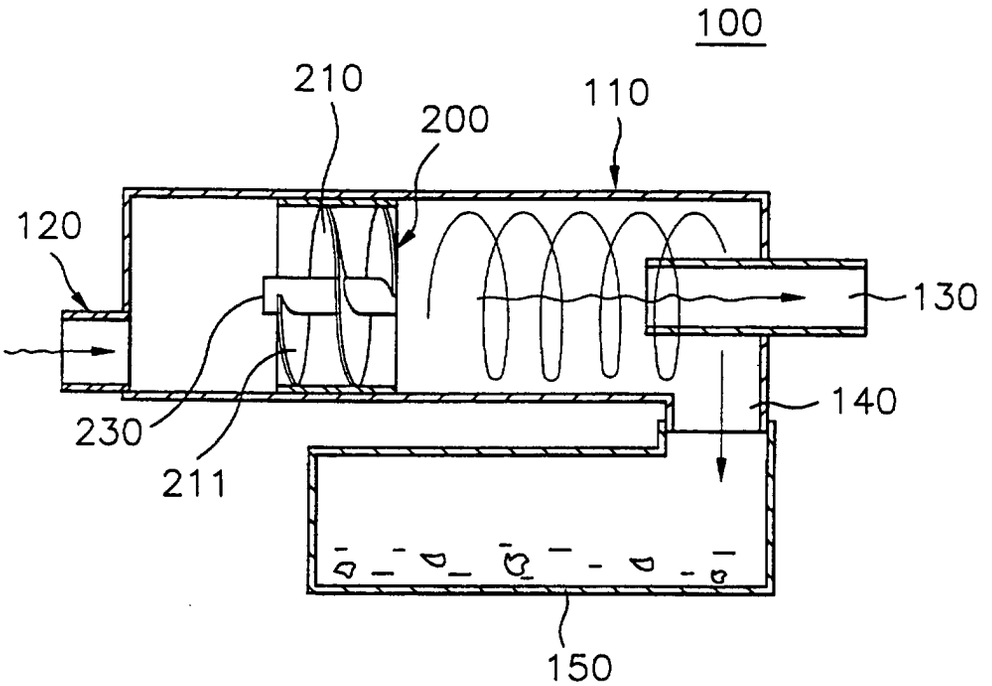

100
210
200
110
120
130
140
230
211
150

FIG. 12

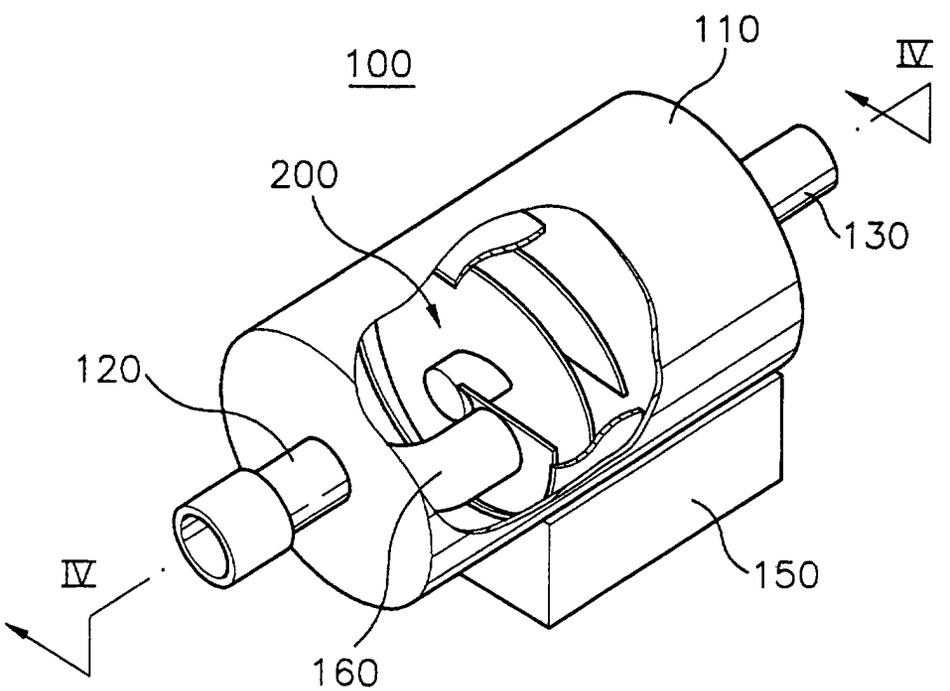

100
110
Ⅳ
200
130
120
Ⅳ
150
160

FIG. 13

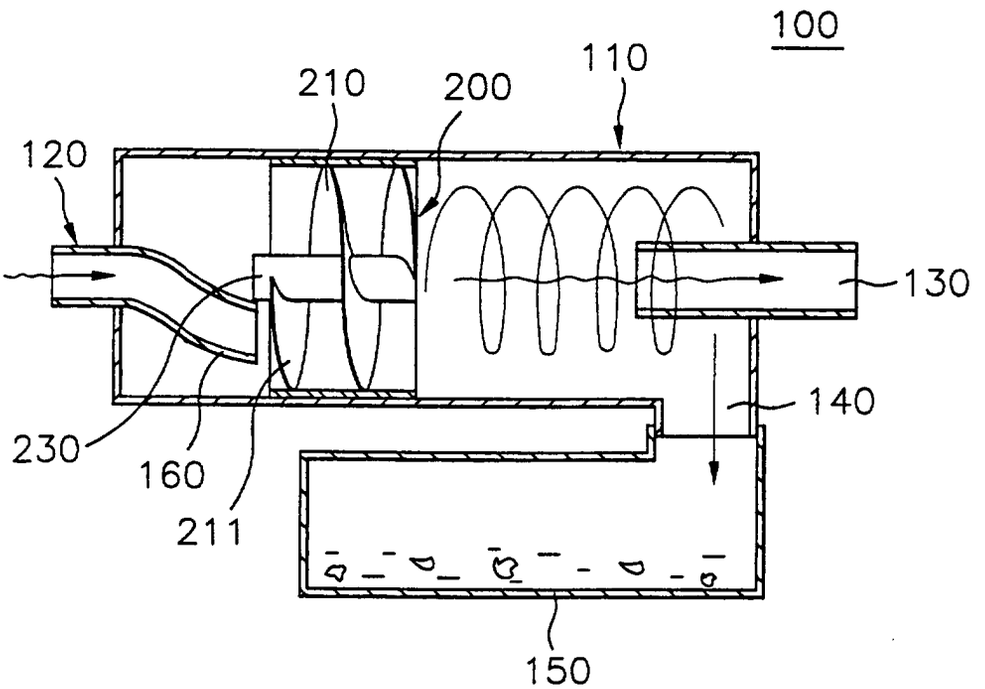

100
110
210
200
120
130
140
230
160
211
150

FIG. 14

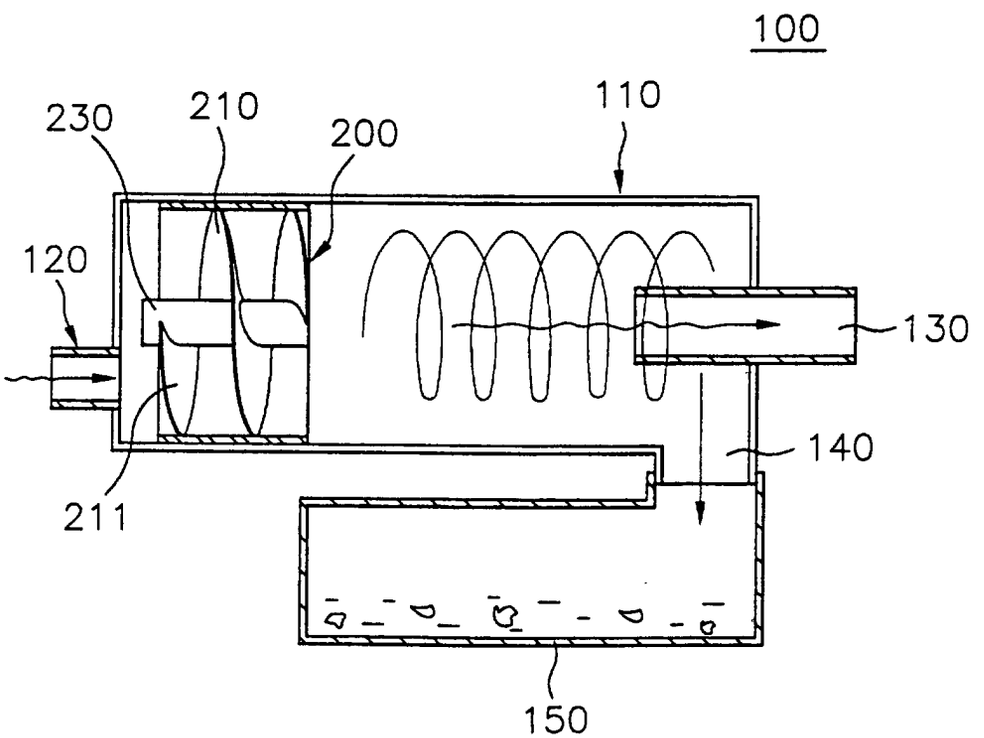

100
230
210
200
110
120
130
140
211
150

FIG. 15

