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(71) Applicant: **LG Electronics Inc.**
Seoul 150-721 (KR)

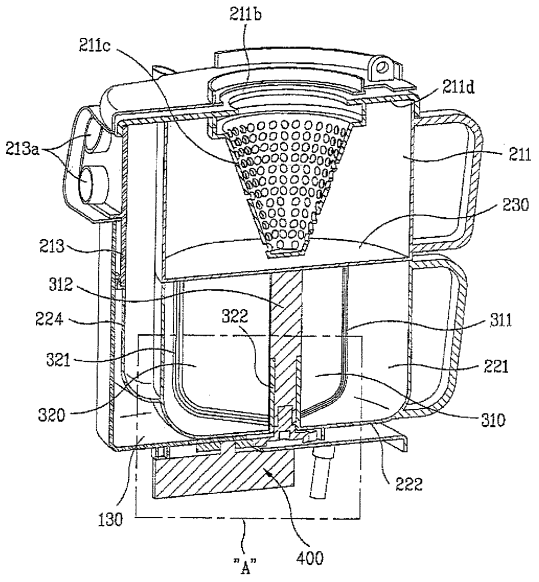
(72) Inventors:
- **Ha, Gun Ho**
  Book-gu
  Busan-si (KR)
- **Seo, Jin Wook**
  Busan-si (KR)
- **Yun, Chang Ho**
  Changwon-si
  Kyungsangnam-do (KR)
- **Kim, Jin Young**
  Busan-si (KR)
- **Lee, Chang Hoon**
  Kyungsangnam-do (KR)

(74) Representative: **Henkel, Feiler & Hänzel**
Patentanwälte
Maximiliansplatz 21
80333 München (DE)

(54) Dust collector and vacuum cleaner

(57) A dust collector and a vacuum cleaner are provided. The dust collector includes a dust separator, a dust container, and a plurality of press members. The dust separator separates dust contained in air. The dust container includes a dust storage part storing the separated. The press members are disposed in the dust container and interact with each other to decrease a volume of the dust. The vacuum cleaner includes a main body, a dust collector, and a plurality of press members. The main body includes an air suction device generating air suctioning force. The dust collector is detachably coupled to the main body and includes a dust separator separating dust contained in air by driving the air suction device and a dust container with a dust storage part. The press members are disposed in the dust container and interact with each other to decrease a volume of stored dust.

Fig.3



EP 1 839 758 A1

Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a dust collector and a vacuum cleaner, and more particularly, to a dust collector and a vacuum cleaner that have an increased dust collection capacity.

Description of the Related Art

[0002] Generally, a vacuum cleaner is a device that can suction air containing dust using the vacuum pressure generated by a vacuum motor mounted in a main body and filter off the dust in the main body.

[0003] Such a vacuum cleaner includes a suction nozzle for suctioning air containing dust, a main body of the vacuum cleaner that communicates with the suction nozzle, an extension tube for guiding the air suctioned through the suction nozzle to the main body, and a connecting passage for connecting the air that passes through the extension tube to the main body.

[0004] Here, the suction nozzle forms a nozzle suction opening of predetermined size on a bottom thereof, for suctioning air containing dust collected on the floor.

[0005] Within the main body of the vacuum cleaner is a drive unit that generates suctioning force to suction outside air including dust through the suctioning nozzle.

[0006] Also, a dust collector for separating and storing dust is detachably installed in the main body. The dust collector separates and stores dust in air that is suctioned through the suction nozzle.

[0007] In detail, the dust collector includes a dust collection body, an inlet through which air is suctioned into the dust collection body, a cyclone unit separating dust from air suctioned into the dust collection body, a dust storage part storing the dust separated in the cyclone unit, and an outlet through which the purified air is discharged.

[0008] Meanwhile, the dust stored at the bottom of the dust collection body (that is, the dust in the dust storage part) is continuously circulated along an inner circumference of the dust collection body by means of a circulating current within the dust collection body while the vacuum cleaner is operating.

[0009] When the operation of the vacuum cleaner ends, the dust settles down on the floor of the dust collection body and is stored therein at a low density.

[0010] Therefore, in the dust collector of a related art, when more than a predetermined amount of dust are stored in the dust collector while the vacuum cleaner is operating, the dust circulates and rises along an inner wall of the dust collector to invade the cyclone unit formed in an upper space of the dust collection body. Thus, the non-separated dust is discharged together with the air current through the outlet, thus lowering the dust collecting effectiveness of the dust collector.

[0011] As described above, when the operation of the vacuum cleaner ends, the dust settles down on the bottom of the dust collection body and has a low density. In other words, the dust inside the dust collection body takes up excessive volume in proportion to its weight, necessitating frequent (and therefore, cumbersome) emptying of the dust collection body in order to maintain a level of dust collecting effectiveness.

[0012] Accordingly, in order to improve the convenience in using the vacuum cleaner, constant efforts are being made to develop a product that can maximize the amount of dust collected in the dust collection body while improving the dust collecting effectiveness.

SUMMARY OF THE INVENTION

[0013] Accordingly, the present invention is directed to a dust collector and a vacuum cleaner that substantially obviate one or more problems due to limitations and disadvantages of the

related art.

[0014] An object of the present invention is to provide a dust collector and a vacuum cleaner that have an increased dust collection capacity.

[0015] Another object of the present invention is to provide a dust collector and a vacuum cleaner that have an increased dust collection capacity by automatically compressing dust stored therein.

[0016] Additional advantages, objects, and features of the invention will be set forth in part in the description which follows and in part will become apparent to those having ordinary skill in the art upon examination of the following or may be learned from practice of the invention. The objectives and other advantages of the invention may be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

[0017] To achieve these objects and other advantages and in accordance with the purpose of the invention, as embodied and broadly described herein, there is provided a dust collector, including: a dust separator separating dust contained in air; a dust container including a dust storage part storing the dust separated by the dust separator; and at least one press member movably disposed within the dust container to decrease a volume of the dust stored in the dust storage part.

[0018] In another object of the present invention, there is provided a vacuum cleaner, including: a main body including an air suction device generating air suctioning force; a dust collector detachably coupled to the main body and including a dust separator separating dust contained in air by driving of the air suction device and a dust container including a dust storage part storing the dust separated by the dust separator; and a plurality of press members disposed in the dust container and interact with

each other to decrease a volume of dust stored in the dust container.

[0019] It is to be understood that both the foregoing general description and the following detailed description of the present invention are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

[0021] Fig. 1 is a perspective view illustrating a dust collector separated from a vacuum cleaner according to an embodiment of the present invention;

[0022] Fig. 2 is a perspective view illustrating the dust collector separated from a dust collector receiving part applied to the vacuum cleaner;

[0023] Fig. 3 is a sectional perspective view of the dust collector;

[0024] Fig. 4 is an enlarged view of section "A" in Fig. 3;

[0025] Fig. 5 is a perspective view illustrating a coupling relation between a driving apparatus for compressing dust stored in the dust collector and the dust collector;

[0026] Figs. 6 and 7 are plan views illustrating how dust is compressed within the dust collector;

[0027] Fig. 8 is a disassembled view of a dust separator and a dust container from the dust collector; and

[0028] Fig. 9 is a perspective view of the dust separator illustrated in Fig. 8 as seen from underneath.

DETAILED DESCRIPTION OF THE INVENTION

[0029] Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

[0030] Fig. 1 is a perspective view illustrating a dust collector separated from a vacuum cleaner according to an embodiment of the present invention.

[0031] Referring to Fig. 1, the vacuum cleaner according to an embodiment of the present invention includes a main body 100 of the vacuum cleaner having a suction generator therein and a dust collector 200 separating and scoring dust in the suctioned air.

[0032] The vacuum cleaner further includes a suction nozzle (not shown) suctioning air containing dust and a connecting passage (not shown) connecting the suction nozzle to the main body 100.

[0033] In the present invention, the suction nozzle and the connecting passage have a basic constitution that is the same as the related art, and thus detailed descriptions thereof will be not given.

[0034] In detail, a main body inlet 110 is formed at a front, lower portion of the main body 100. Air containing dust is suctioned from the suction nozzle through the main body inlet 110.

[0035] A main body outlet 120 is formed on a side of the main body 100. Air separated from dust is discharged out of the main body 100 through the main body outlet 120.

[0036] The dust collector 200 includes a dust separator 210 for separating dust from suctioned air and a dust container 220 for storing the dust separated in the dust separator 210.

[0037] The dust separator 210 includes a cyclone unit 211 (refer to Fig. 3) separating dust from the suctioned air using a difference in centrifugal force between air and dust (a cyclone principle).

[0038] The dust collector 200 may be configured to maximize it ability to store dust inside. For this reason, the dust collector 200 may further include structure for reducing the volume of dust stored inside the dust container 220.

[0039] Below, a vacuum cleaner having a dust collector that maximizes its ability to store dust therein according to the present invention will be described with reference to Figs. 2 to 5.

[0040] Fig. 2 is a perspective view illustrating the dust collector separated from a dust collector receiving part applied to the vacuum cleaner. Fig. 3 is a sectional perspective view of the dust collector. Fig. 4 is an enlarged view of section "A" in Fig. 3. Fig. 5 is a perspective view illustrating a coupling relation between a driving apparatus for compressing dust stored in the dust collector and the dust collector.

[0041] Referring to Figs. 2 to 5, the dust collector 200 according to an embodiment of the present invention is detachably installed on the main body 100.

[0042] The main body 100 includes a dust collector receiving part 130 for receiving the dust collector 200.

[0043] A pair of press members 310 and 320 are provided in the dust collector 200, for decreasing the volume of the dust stored in the dust container 220 to increase the dust collection capacity.

[0044] The pair of press members 310 and 320 interact with each other to compress the dust and reduce its volume, so that the density of the dust stored in the dust container 220 can be increased, thereby increasing the maximum dust collection capacity in the dust container 220.

[0045] Hereinafter, the pair of press members 310 and 320 will be referred to as the first press member 310 and the second press member 320, respectively, for the sake of descriptive simplicity.

[0046] In the present embodiment, at least one of the pair of press members 310 and 320 is movably provided within the dust container 220 to compress the dust stored between the pair of press members 310 and 320.

[0047] In other words, when both of the first and second press members 310 and 320 are rotatably provided within the dust container 220, the first and second press members 310 and 320 rotate towards each other, so that the

space between one side of the first press member 310 and the one side of the second press member 320 facing the one side of the first press member 310 becomes narrower, thus compressing the dust stored between the first and second press members 310 and 320.

[0048] However, in the present embodiment, the first press member 310 is rotatably disposed within the dust container 220 and the second press member 320 is fixed within the dust container 220.

[0049] That is, the first press member 310 serves as a rotating member and the second press member 320 serves as a fixed member.

[0050] A dust storage part 221 is formed within the dust container 220 to form a space for storing dust. The dust storage part 221 is formed so as to enclose a curve traced by a free edge 311 of the first press member 310 as it rotates within the dust storage part 221.

[0051] The second press member 320 may be disposed between an inner circumferential surface of the dust storage part 221 and a rotating shaft 312 serving as a rotation center of the first press member 310.

[0052] In other words, the second press member 320 is disposed on a plane connecting the rotating shaft 312 with the inner circumferential surface of the dust storage part 221. Here, the second press member 320 entirely or partially blocks a space defined between the inner circumferential surface of the dust storage part 221 and the axis of the rotating shaft 312, so as to compressing the dust together with the first press member 310 when the dust is pushed by the first press member 310.

[0053] For this purpose, an end 321 of the second press member 320 may be integrally formed on the inner circumferential surface of the dust storage part 221, and the other end may be integrally formed with a stationary shaft 322 coaxially provided with the rotating shaft 312 of the first press member 310.

[0054] Only the end 321 of the second press member 320 may be integrally formed with the inner circumferential surface of the dust storage part 221, or only one other end of the second press member 320 may be integrally formed with the stationary shaft 322. In other words, the second press member 320 is fixed to at least one of the inner circumferential surface of the dust storage part 221 and the stationary shaft 322.

[0055] However, although the end 321 of the second press member 320 is not integrally formed with the inner circumferential surface of the dust storage part 221, the end 321 of the second press member 320 may be disposed proximally to the inner circumferential surface of the dust storage part 221.

[0056] Also, although the other end of the second press member 320 is not integrally formed with the stationary shaft 322, the other end of the second press member 320 may be disposed proximally to the stationary shaft 322.

[0057] The reason for one above is to minimize the amount of the dust that is pushed by the first press member 310 to leak through gaps formed at a lateral side of the second press member 320.

[0058] The above-structured first and second press members 310 and 320 may be formed of a plate of a rectangular shape. Also, the rotating shaft 312 of the first press member 310 may be disposed on the same axis as the center of the dust storage part 221.

[0059] The stationary shaft 322 may protrude inward from one end of the dust storage part 221. A cavity is formed in an axial direction within the stationary shaft 322 to assemble the rotating shaft 312. A predetermined portion of the rotating shaft 312 is inserted into the cavity from topside of the stationary shaft 322.

[0060] Furthermore, the vacuum cleaner according to the present invention includes a driving apparatus 400 selectively connected to the rotating shaft 312 of the first press member 310 to rotate the first press member 310.

[0061] Hereinafter, a coupling relation between the dust collector 200 and the driving apparatus 400 will now be described with reference to Figs. 4 and 5.

[0062] The driving apparatus 400 includes a driving motor 430 for generating driving force and driving mechanism 410 and 420 that transfers driving force of the driving motor 430 to the first press member 310.

[0063] In detail, the driving mechanisms 410 and 420 include a driven gear coupled to the rotating shaft 312 of the first press member 310 and a driving gear transferring driving force to the driven gear 410.

[0064] The driving gear 420 is coupled to a rotating shaft of the driving motor 430, and rotates by the driving motor 430.

[0065] Therefore, when the driving motor 430 rotates, the driving gear 420 coupled to the driving motor 430 rotates, and rotating force of the driving motor 430 is transferred to the driven gear 410 through the driving gear 420, thereby rotating the driven gear 410 to rotate the first press member 310.

[0066] Here, the driving motor 430 is disposed under the dust collector receiving part 130, and the driving gear 420 is coupled to a rotating shaft of the driving motor 430 and disposed on the bottom surface of the dust collector receiving part 130.

[0067] An outer circumferential surface of the driving gear 420 is partially exposed from the bottom of the dust collector receiving part 130 to the outside. For this purpose, a motor receiving portion (not shown) for installing the driving motor 430 may be formed under the bottom of the dust collector receiving part 130. An opening 131 is formed at the approximate center of the bottom of the dust collector receiving part 130, for partially exposing the outer circumferential surface of the driving gear 420.

[0068] Meanwhile, the rotating shaft 312 of the first press member 310 is inserted into the cavity of the stationary shaft 322 from a top portion of the stationary shaft 322, and the driven gear 410 is inserted into the cavity of the stationary shaft 322 from a lower end of the dust container 220 and coupled to the rotating shaft 312.

[0069] Also, a width-difference portion 312c is formed in the rotating shaft 312 and supported by an upper end

of the stationary shaft 322. The width-difference portion 312c divides the rotating shaft 312 into an upper shaft 312a coupled to the first press member 310 and a lower shaft 312b coupled to the driven gear 410.

[0070] The lower shaft 312b includes a groove 312d for receiving a gear shaft of the driven gear 410, so that the lower shaft 312b is coupled to the driven gear 410.

[0071] The groove 312d may be formed of various shapes such as a circular shape and a rectangular shape, and the gear shaft of the driven gear 410 is formed of a shape engaged with the groove 312d.

[0072] Therefore, when the driven gear 410 is coupled to the rotating shaft 312, the driven gear 410 is exposed to the outside of the dust container 220.

[0073] Since the driven gear 410 is exposed to the outside of the dust container 220, when the dust collector 200 installed on the dust collector receiving part 130, the driven gear 410 is engaged with the driving gear 420.

[0074] The driving motor 430 may be a motor capable of both forward and reverse operation. In other words, the driving motor 430 is a motor capable of rotating in either direction.

[0075] The driving motor 430 may rotate in both forward and reverse directions. In other words, the driving motor 430 may be a motor capable of bidirectionally rotating.

[0076] Accordingly, as illustrated in Figs. 6 and 7, the first press member 310 may rotate in forward/reverse directions, and thus the compressed dust is accumulated in both sides of the second press member 320.

[0077] In order to allow the driving motor 430 to rotate bidirectionally, a synchronous motor may be used as the driving motor 430.

[0078] The synchronous motor is configured to rotate in forward/reverse directions by itself. When a force greater than a set value is applied to the synchronous motor while rotating in one direction, the synchronous motor rotates in a reverse direction.

[0079] Here, the force applied to the synchronous motor is torque that is generated when the first press member 310 compresses the dust. The synchronous motor is configured to rotate in a reverse direction when the torque reaches the set value.

[0080] Since the synchronous motor is well known to those skilled in the art, detailed description thereof will not be provided. It is worth stating, however, the driving motor 430 rotate in forward/reverse directions by means of the synchronous motor.

[0081] Even if the first press member 310 compress dust and reaches the limit point when it cannot rotate any more, the first pres member 310 may continuously compress the dust for a predetermined time.

[0082] Here, the limit point when the first press member 310 cannot rotate any more means that the torque has reached the set value.

[0083] When the torque reaches the set value, driving force to rotate the first press member 310, that is, power applied to the driving motor 430 is cut off for a predetermined time, maintaining the dust compressed in the state that the first press member 310 does not rotate. After the predetermined time elapses, power is applied to the driving motor 430, so that the first press member 310 can rotate.

[0084] The point of time of cutting off the power being applied to the driving motor 430 is the time when the torque reaches the set value. Therefore, when the driving motor 430 is driven again, the rotating direction of the driving motor 430 will be reverse to the rotating direction before power is cut off.

[0085] The driving motor 430 may rotate the first press member 310 in the forward/reverse directions at a constant angular speed, in order to more easily compress the dust.

[0086] When a quantity of dust exceeding a predetermined amount is collected inside the dust container 220, it may be informed to a user that it is time to empty the dust container 220, in order to prevent a drop in vacuuming ability and an overloaded driving motor.

[0087] For this reason, a display unit (not shown) is provided in the main body 100, the dust collector 200 or a handle (not shown). When the dust exceeding a predetermined amount is collected inside the dust container 220 and thus the rotation range of the first press member 310 falls below a predetermined angle, the display unit may notify the user that it is time to empty the dust container 220.

[0088] Figs. 6 and 7 are plan views illustrating how dust is compressed within the dust collector.

[0089] Below, a compressing procedure of the dust collected within the dust container 220 will be described with reference to Figs. 6 and 7.

[0090] When a user performs a cleaning operation using the vacuum cleaner, the dust separated in the cyclone unit 211 is stored in the dust storage part 221. Here, the pair of press members 310 and 320 compress the dust stored in the dust storage part 221.

[0091] In detail, when the driving motor 430 rotates in one direction, rotating force of the driving motor 430 is transferred to the driven gear 410 through the driving gear 420. Therefore, the driven gear 410 rotates, thereby rotating the rotating shaft 312 and the first press member 310.

[0092] Here, since the driving gear 420 is engaged with the driven gear 410, when the driving motor 430 rotates in one direction, the driving gear 420 rotates in the same direction as the rotating direction of the driving motor 430, and the driven gear 410 rotates in a reverse direction to the rotating direction of the driving motor 430.

[0093] That is, the rotating direction of the driven gear 410 and the rotating shaft 312 are opposite to the rotating direction of the driving motor 430.

[0094] When the first press member 310 rotates in the other direction (counterclockwise direction), the first press member 310 pushes the dust collected between the first and second press members 310 and 320 toward one side of the second press member 320, thereby com-

pressing the dust. The first press member 310 continuously rotates until the torque generate during the compression of the dust reaches the set value.

[0095] When the torque reaches the set value, power applied to the driving motor 430 is cut off, stopping the first press member 310 in the state that the dust is compressed. After a predetermined time elapses, the driving motor 430 is driven again, rotating the first press member 310.

[0096] Here, since the first press member 310 is stopped in the state that the torque reaches the set value, the rotating direction thereof is changed to a clockwise direction, as illustrated in Fig. 7.

[0097] When the first press member 310 rotates in a clockwise direction, the first press member 310 pushes the dust collected between the first and second press members 310 and 320 toward the other side of the second press member 320, thereby compressing the dust.

[0098] The compressing operation is repeatedly performed until the rotation range of the first press member 310 falls below a predetermined angle.

[0099] Fig. 8 is a disassembled view of a dust separator and a dust container from the dust collector and Fig. 9 is a perspective view of the dust separator illustrated in Fig. 8 as seen from underneath.

[0100] Referring to Figs. 8 and 9, the dust separator 210 is coupled to an upper side of the dust container 220. The dust separated in the dust separator 210 moves downward and is stored in the dust container 220.

[0101] In detail, an inlet 211a for suctioning air containing dust is disposed in a tangent direction of the dust separator 210 in an upper, outer circumferential surface of the dust separator 210. A cover 211d is detachably provided in a top portion of the dust separator 210.

[0102] An outlet 211b is formed at a center portion of the cover 211d. The purified air, which is separated by the inside of the dust separator 210 (that is, the cyclone unit 211), is discharged through the outlet 211b.

[0103] A filter member 211c of a cavity shape is coupled to the outlet 211b. An outer circumferential surface of the filter member 211c has a plurality of through holes formed therein to discharge air that has undergone a dust separating process in the cyclone unit 211.

[0104] A partition plate 230 is formed horizontally at a bottom of the dust separator 210. The partition plate 230 divides mutually the dust separator 210 and the dust container 220.

[0105] Furthermore, the partition plate 230 prevents the dust stored inside the dust container 220 from scattering to the dust separator 210 when the dust separator 210 is coupled to the dust container 220.

[0106] The partition plate 230 includes a dust discharge port 231. The dust separated in the cyclone unit 211 is discharged to the dust container 220 through the dust discharge port 231.

[0107] Here, the dust discharge port 231 may be located at the side opposite to the second press member 320. The reason for the above is that the quantity of the dust compressed on either side of the second press member 320 is maximized to minimize scattering of the dust during the process of storing the dust in the dust container 220, while at the same time, to maximize the dust collection capacity of the dust storage part 221, and to allow the dust separated in the dust separator 210 to easily fall down to the dust container 220.

[0108] The dust separator 210 and the dust container 220 include an upper handle 212 and a lower handle 223, respectively, so as to couple the dust separator 210 and the dust container 220 to each other.

[0109] Also, the dust collector 200 includes a hook fastener such that the dust container 220 is coupled to the dust separator 210 with the dust collector 220 installed on the dust separator 210.

[0110] In detail, a hook receptacle 241 is disposed in an outer, lower circumferential surface of the dust separator 210, and a hook 242 is disposed in an upper, outer circumferential surface of the dust container 220, and selectively coupled to the hook receptacle 241.

[0111] Meanwhile, when the cyclone unit 211 is referred to as a main cyclone unit and the dust storage part 221 is referred to as a main storage unit, the present invention may further include at least one auxiliary cyclone unit 140 provided in the main body 100 of the vacuum cleaner and an auxiliary storage unit 224 provided in the dust collector 200.

[0112] Here, the auxiliary cyclone unit 140 secondarily separates dust from the air discharged from the main cyclone unit 211, and the auxiliary storage part 224 stores the dust separated by the auxiliary cyclone unit 140.

[0113] The auxiliary storage part 224 is provided on an outer circumferential surface of the dust collector 200 with its top surface open.

[0114] In the present embodiment, the auxiliary storage part 224 is disposed on an outer circumferential surface of the dust container 220, and an auxiliary dust entrance 213 communicating with the auxiliary storage part 224 is disposed on an outer circumferential surface of the dust separator 210.

[0115] Here, auxiliary dust entrance holes 213a that are selectively connected to dust discharge holes 141 of the auxiliary cyclone unit 140 are formed on an outer wall of the auxiliary dust entrance 213, and a bottom surface of the auxiliary dust entrance 213 is opened to communicate with an upper side of the auxiliary storage part 224.

[0116] Accordingly, when the main cyclone unit 211 is installed on the main body 100 of the vacuum cleaner, the auxiliary dust entrance holes 213a are connected to the dust discharge holes 141 of the auxiliary cyclone unit 140.

[0117] Thus, the dust separated in the auxiliary cyclone unit 140 passes through the auxiliary dust entrance holes 213a to be stored in the auxiliary storage part 224.

[0118] Hereinafter, the operation of the above-structured vacuum cleaner will be described according to the present invention.

[0119] When power is supplied to the vacuum cleaner,

the suction generator generates force for suctioning air, and air containing dust is suctioned into the suction nozzle using the force.

[0120] The air that is suctioned through the suction nozzle flows to the inlet 211a of the main cyclone unit 211 through the main body inlet 110. The air that passes through the inlet 211a of the main cyclone unit 211 is guided along an inner wall of the main cyclone unit 211 in a tangent direction to flow a spiraling motion, and thus the dust is separated from the air due to a difference in centrifugal force between air and dust, and falls down.

[0121] The dust in the air thus spirals along the inner wall of the main cyclone unit 211 and descends through the dust discharge port 231 of the partition plate 230, and is stored in the main storage part 221.

[0122] The air firstly purified by means of the main cyclone unit 211 passes through the exhaust member 211c and is discharged through the outlet 211b. Then the air flows into the auxiliary cyclone unit 140.

[0123] Accordingly, the dust that is separated from the air using the cyclone principle within the auxiliary cyclone unit 140 is stored in the auxiliary storage part 224, and the air purified in the auxiliary cyclone unit 140 is discharged from the auxiliary cyclone unit 140, flows into the main body 100, and is discharged from the main body 100 through the main body outlet 120.

[0124] Meanwhile, most of the dust that flows into the vacuum cleaner is stored in the main storage part 221 during a cleaning operation. Also, since the dust stored within the main storage part 221 is compressed bv the first and second press members 310 and 320 and is minimized in volume, the large quantity of dust can be stored in the main storage part 221.

[0125] The operation of the first press member 310 and the interaction between the first and second press members 310 and 320 have already been described, and thus repetition thereof will not be made.

[0126] When a quantity of dust exceeding a predetermined amount is stored inside the dust container 220 during a cleaning operation, a signal is generated in the display unit, and the signal may notify a user that it is time to empty the dust container 220.

[0127] Then, a user separates the dust collector 200 from the main body 100 and empties the dust container 220.

[0128] Referring to the diagrams, a canister-type vacuum cleaner has been described above as an example of a vacuum cleaner according to the present invention. However, the present invention is not limited thereto, and may be applied to an upright-type, a robot-type, or other type of vacuum cleaner

[0129] Also, a pair of press members have been described above, but a plurality of press members may be provided or a plurality of rotatable press members may be provided in the present embodiment.

[0130] According to the present invention, the dust that is stored in a dust collector can be compressed and minimized in volume by means of a plurality of press members, maximizing a dust collection capacity of the dust collector.

[0131] Since the dust collection capacity of the dust collector is maximized by the compressing operation of a plurality of press members, a user does not have to frequently empty the dust collector.

[0132] Since the dust collected in the dust collector is maintained compressed, the compressed dust can be easily discharged from the dust collector when emptying the dust collector.

[0133] When a quantity of dust exceeding a predetermined amount is collected inside the dust container, a display unit notifies a user that it is time to empty the dust collector, so that a user can easily recognize the time of emptying the dust collector.

[0134] It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention. Thus, it is intended that the present invention covers the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

Claims

1. A dust collector, comprising:

   a dust separator separating dust contained in air;
   a dust container including a dust storage part storing the dust separated by the dust separator; and
   at least one press member movably disposed within the dust container to decrease a volume of the dust stored in the dust storage part.

2. The dust collector according to claim 1, wherein the dust separator is detachably coupled to au upper portion of the dust container.

3. The dust collector according to claim 2, wherein a partition plate is formed at a bottom of the dust separator to divide the dust separator and the dust storage part.

4. The dust collector according to claim 1, wherein the press member rotates together with a rotating shaft disposed on the same axis as a center of the dust container.

5. The dust collector according to claim 4, wherein an inner circumferential surface of the dust container is formed so as to enclose a curve traced by the press member as it rotates within the dust container.

6. The dust collector according to claim 4, wherein the dust container comprises a fixed member that is fixed to the dust container and interacts with the press

member to compress dust.

7. The dust collector according to claim 6, wherein the fixed member is integrally fixed to one of an inner circumferential surface of the dust container and a stationary shaft disposed on the same axis as a rotating shaft of the press member.

8. The dust collector according to claim 6, wherein the press member bidirectionally rotates to compress dust at both sides of the fixed member.

9. The dust collector according to any one of claims 4 to 8, wherein the press member rotates by means of a driving apparatus connected to the rotating shaft.

10. The dust collector according to claim 9, wherein the driving apparatus comprises :

a driving motor;
a driven gear coupled to the rotating shaft of the press member; and
a driving gear selectively coupled to the rotating shaft of the driving motor so as to transfer driving force to the driven gear.

11. The dust collector according to claim 10, wherein the driven gear is coupled to the rotating shaft of the press member from the outside of the dust container.

12. A vacuum cleaner, comprising:

a main body including an air suction device generating air suctioning force;
a dust collector detachably coupled to the main body and including a dust separator separating dust contained in air and a dust container including a dust storage part storing the dust separated by the dust separator; and
a plurality of press members disposed in the dust container and interact with each other to decrease a volume of dust stored in the dust container.

13. The vacuum cleaner according to claim 12, wherein the plurality of press members comprises:

a first press member fixed to the dust container; and
a second press member movably disposed within the dust container and interacting with the first press member to decrease a volume of dust.

14. The vacuum cleaner according to claim 13, wherein the main body comprises a driving apparatus for driving the second press member.

15. The vacuum cleaner according to claim 14, wherein the second press member is connected to the driving apparatus by installing the dust collector on the main body.

16. The vacuum cleaner according to claim 14, wherein the driving apparatus comprises:

a driving motor;
a driven gear coupled to a rotating shaft of the second press member; and
a driving gear selectively coupled to a rotating shaft of the driving motor so as to transfer driving force to the driven gear.

17. The vacuum cleaner according to claim 16, wherein the driven gear is coupled to the rotating shaft of the second press member from the outside of the dust container, and
the driving gear is coupled to the driving motor and exposed to the outside of the main body.

18. The vacuum cleaner according to claim 12, wherein the dust storage part comprises:

a first dust storage part storing dust separated in the dust separator; and
a second dust storage part storing dust separated in an auxiliary dust separator disposed in the main body.

19. The vacuum cleaner according to claim 18, wherein the plurality of press members are disposed in the first dust storage part.

Fig.1

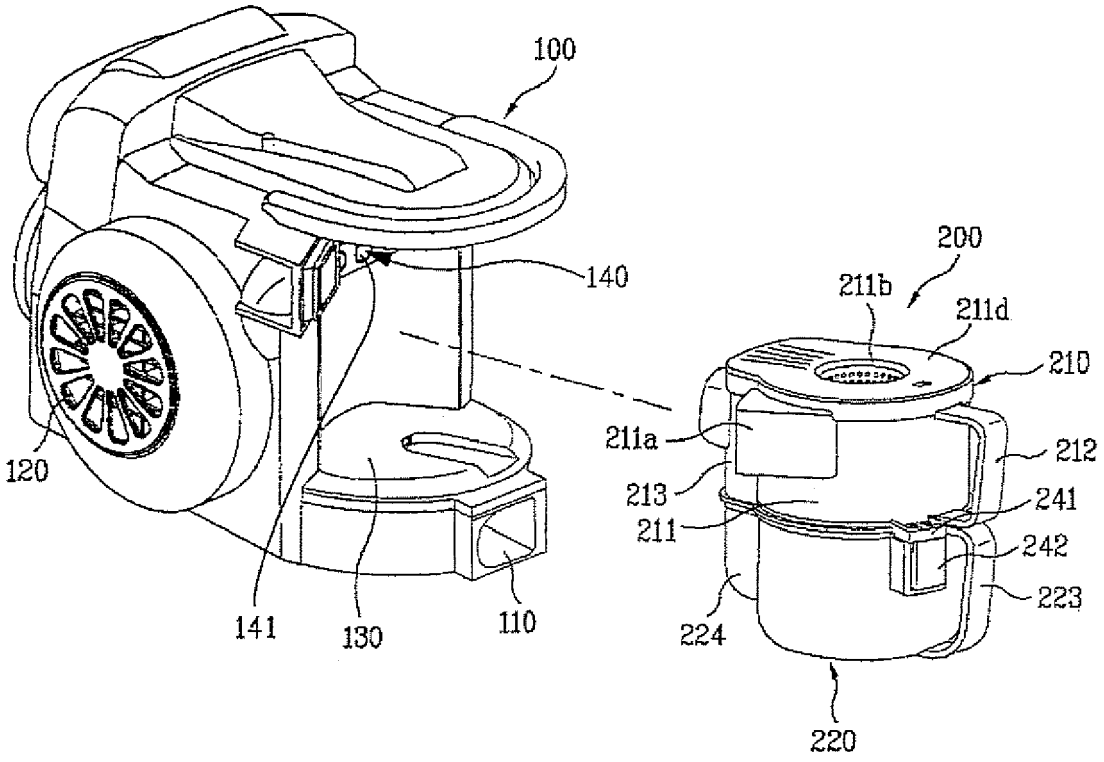

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Fig.2

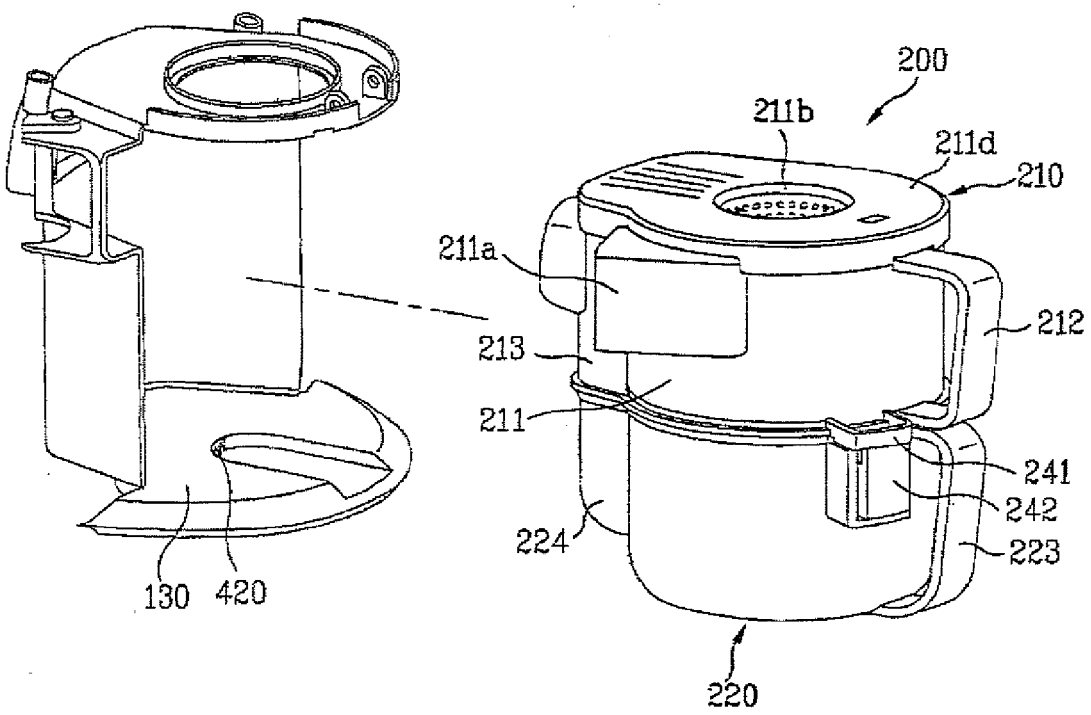

Fig.3

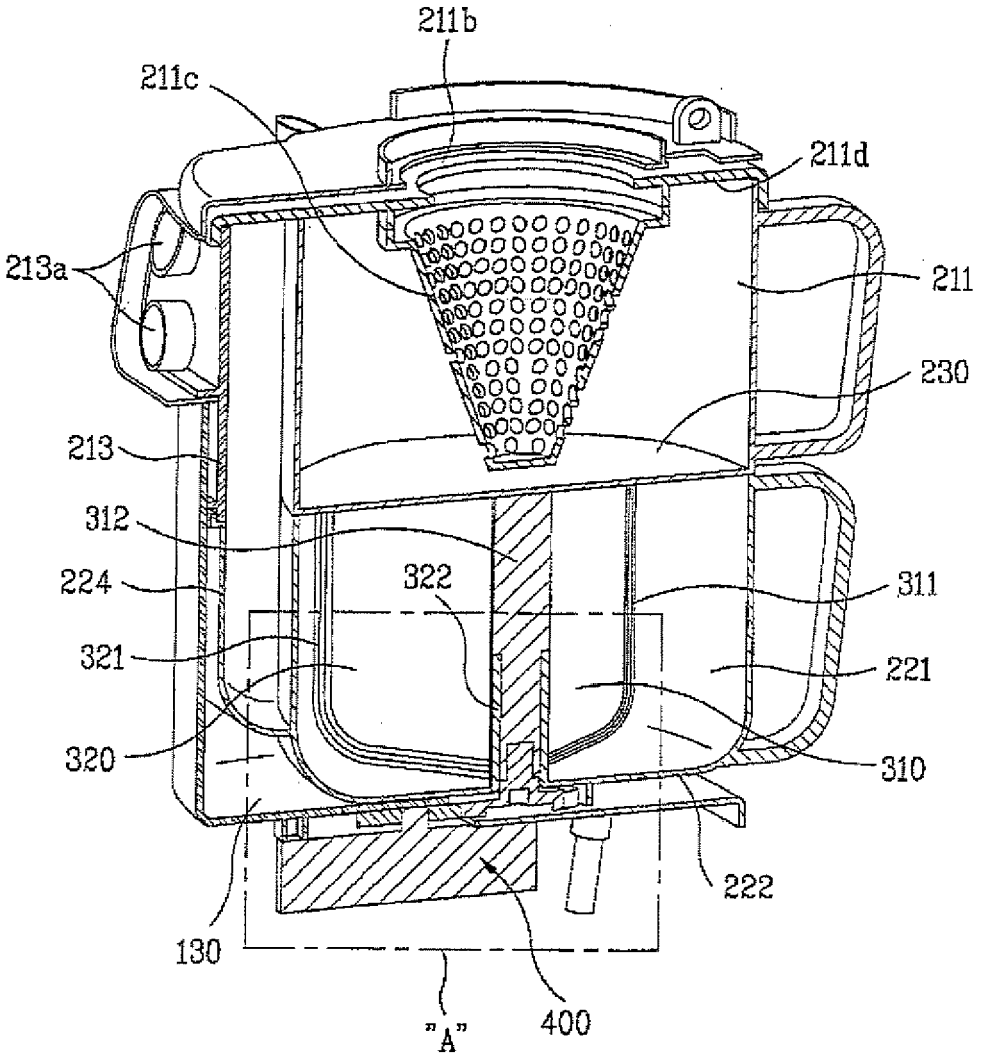
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Fig.4

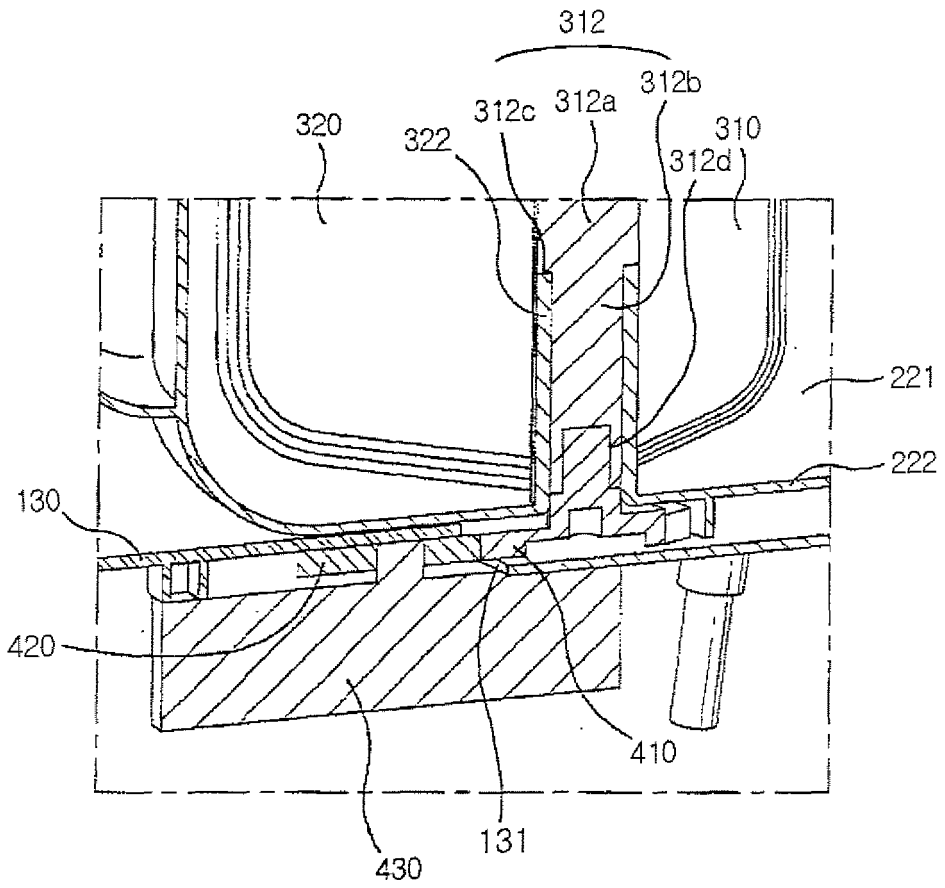

Fig.5

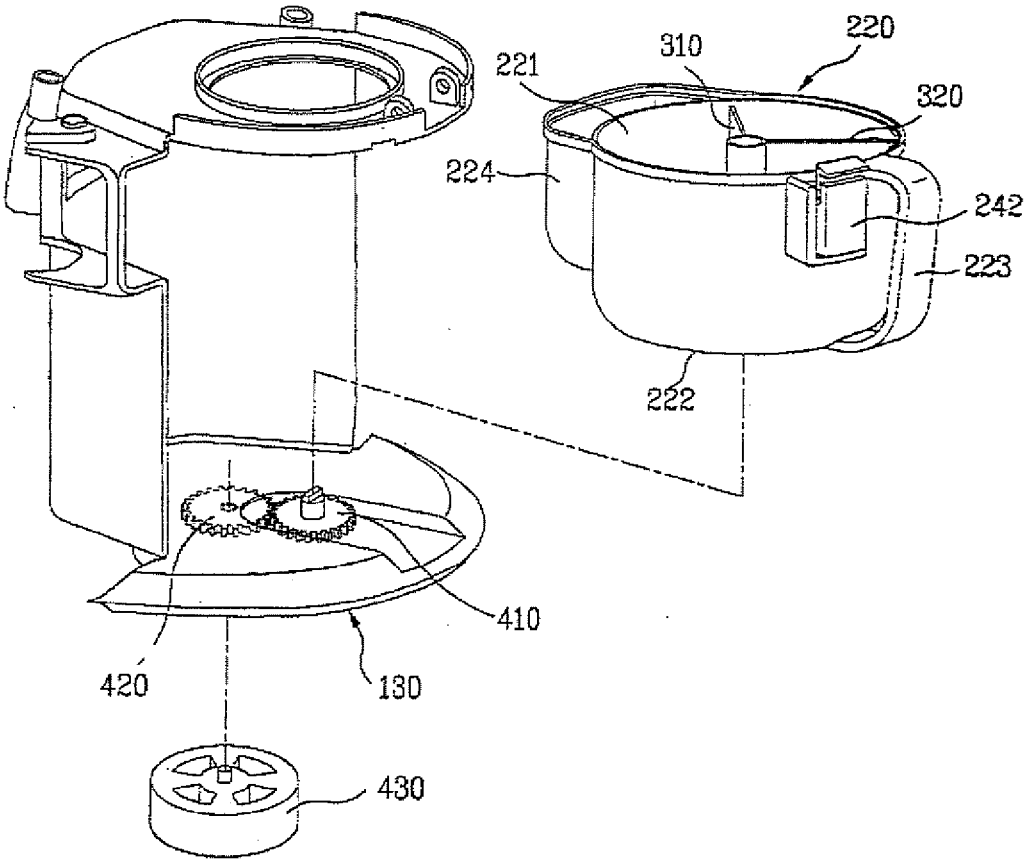

Fig.6

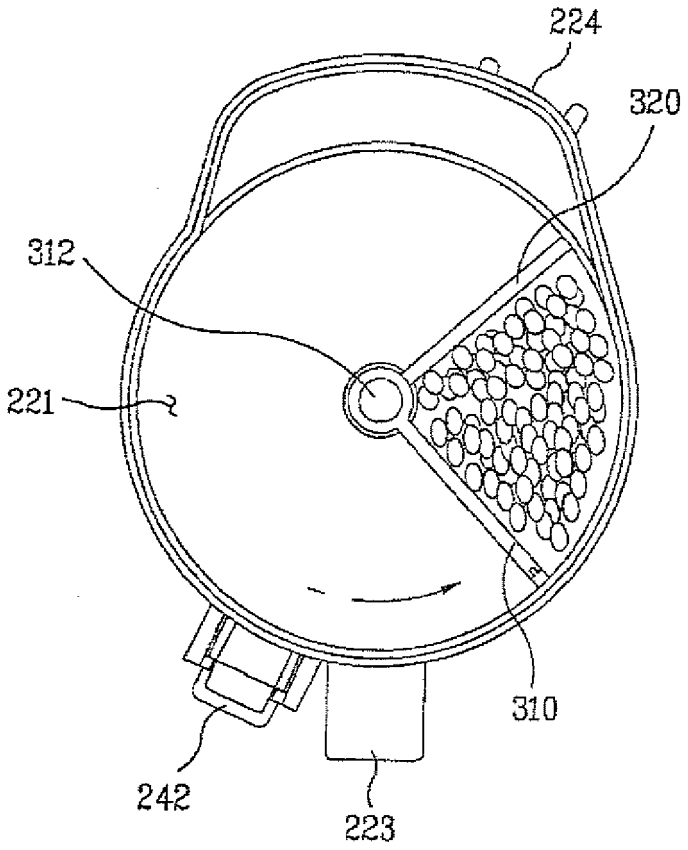

Fig.7

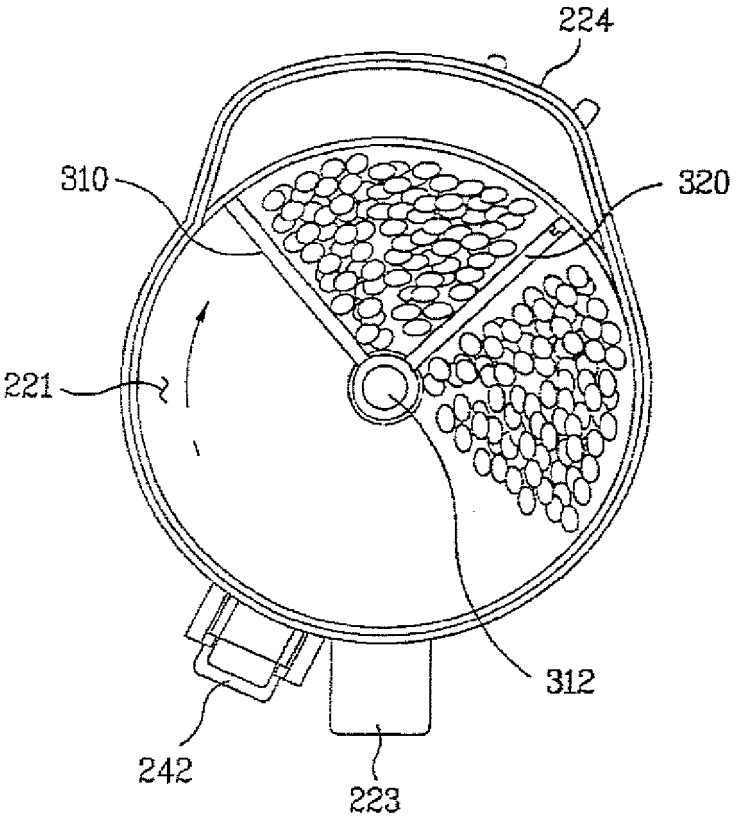

Fig.8

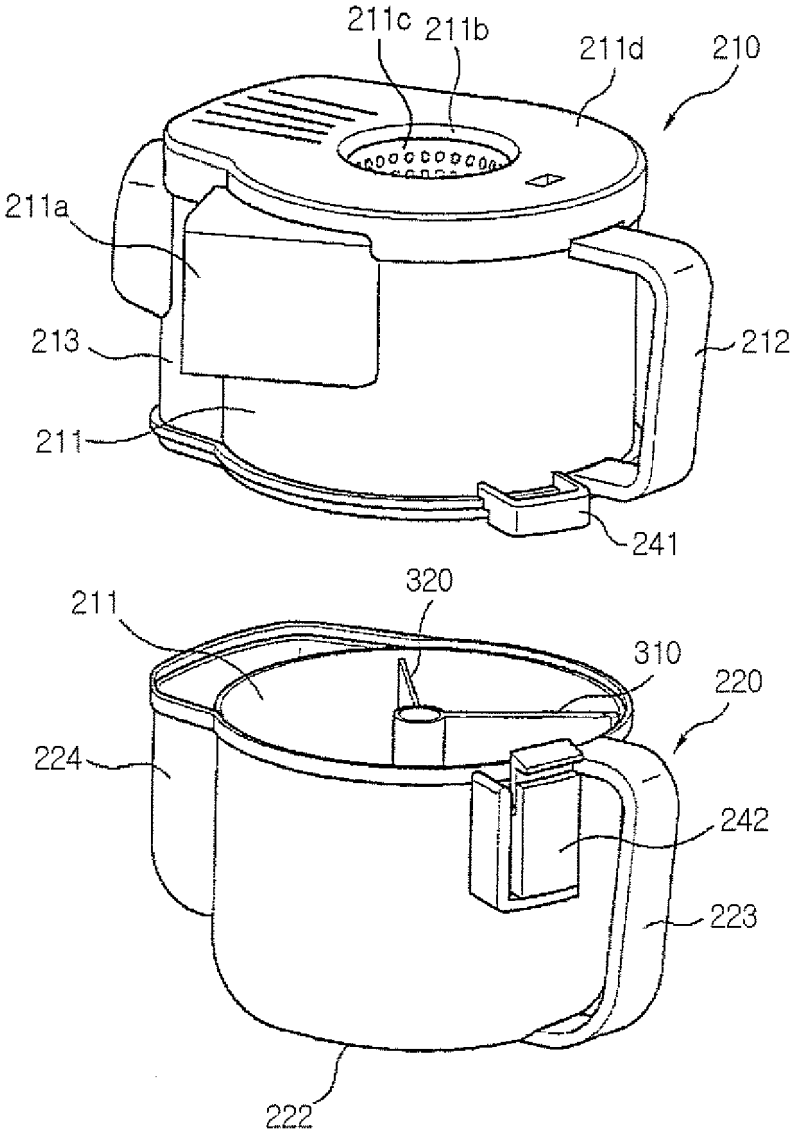
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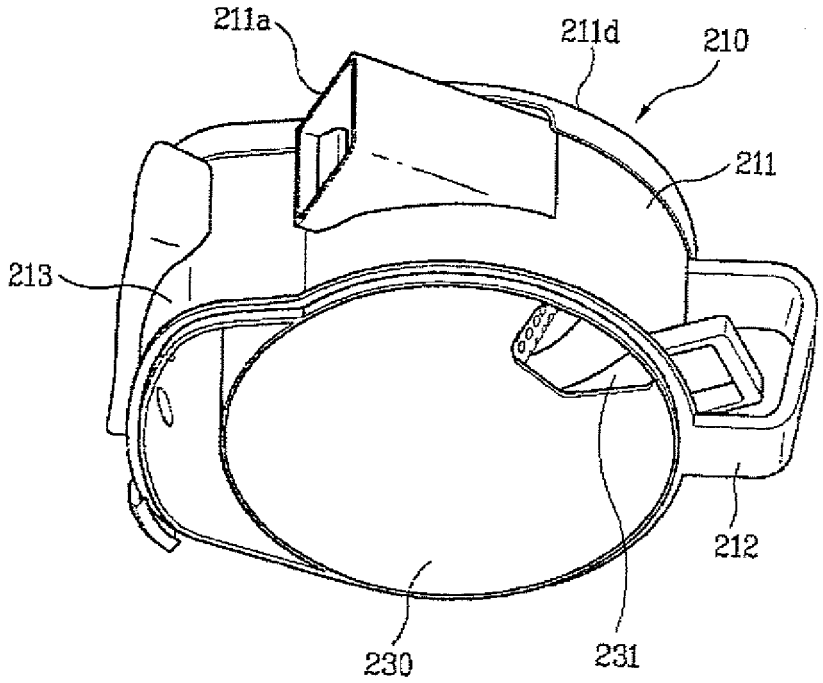
Fig.9



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Application Number
EP 07 10 1388

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	3 August 2007	REDELSPERGER, C

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