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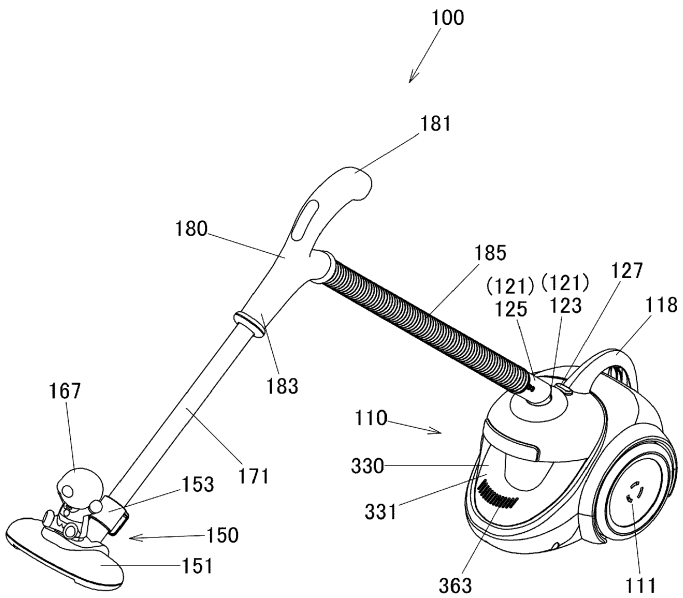
(54) **TOY VACUUM CLEANER**

(57) To provide a toy vacuum cleaner with which a player enjoys playing by seeing the toy sucking air and dust and which is allowed to be played with long time joyfully without making buoyant objects dirty by the air sucked in, a toy vacuum cleaner is provided in which outside air is sucked from an intake port of an intake head into an interior of a vacuum cleaner main body via a dust pod provided at the rear of the vacuum cleaner main body, a front air compartment separated from the interior of the vacuum cleaner main body is provided at the front of the vacuum cleaner main body, buoyant objects are sealed in the front air compartment, and the air is discharged from the front air compartment to an exterior of the vacuum cleaner main body via a space compartment and an exhaust duct.

Fig.1



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Description

[0001] The present invention relates to a toy vacuum cleaner with which a player can enjoy cleaning by allowing false dust and small particles to be sucked into the toy vacuum cleaner.

[0002] Recently, various toys have been proposed which are played with by doing vacuuming. These toy vacuum cleaners are devised in various ways so as not only to enable vacuuming but also to allow players to enjoy playing therewith.

[0003] For example, JP-A-2000-135186 discloses a toy vacuum cleaner in which a vacuuming machine is incorporated in an interior of a body and the body is covered by a stuffed toy of animal or a soft doll. With this toy vacuum cleaner, a player is allowed to enjoy not only operating the toy as a cleaning robot but also looking at it as an ornament toy or a toy which can move its arms and legs.

[0004] In addition to this, various toy vacuum cleaners or toy-like vacuum cleaners have been proposed. For example, JP-A-2008-253523 discloses a household electric vacuum cleaner having the shape of a four-wheeled motor vehicle. With this electric vacuum cleaner, a child can enjoy playing with the cleaner by riding with legs astride or pushing thereon. Further, JP-A-2009-520542 discloses a toy vacuum cleaner representing a general household electric vacuum cleaner which is equipped with operating functions similar to those of a practical vacuum cleaner and which is improved into a robust and safe toy which matches the conditions where it is used by children.

[0005] However, although the conventional toy vacuum cleaners are devised in external appearance and operability so that children can enjoy playing therewith safely, there are a few such toys with which children can enjoy playing by seeing the toy vacuum cleaner sucking air and dust thereinto.

[0006] The invention has been made in view of these situations and an object thereof is to provide a toy vacuum cleaner with which a player can enjoy playing for a long period of time by seeing how the toy sucks air and dust thereinto as well as by seeing buoyant objects, which can move as if dancing, without making them dirty by the air and dust which have been sucked in the toy.

[0007] According to the invention, there is provided a toy vacuum cleaner including a vacuum cleaner main body to which an intake head can be connected via a head pipe and an intake hose and which includes a driving motor and a suction fan in an interior thereof, wherein the suction fan sucks outside air, which is sucked in from an intake port of the intake head via the intake hose, into an interior space of the vacuum cleaner main body via an interior of a dust pod which is provided at a rear portion of the vacuum cleaner main body, wherein the vacuum cleaner main body allows the dust pod to be detachably attached to the rear portion of the vacuum cleaner main body, wherein the vacuum cleaner main body has a transparent front air compartment cover which is provided at a front portion thereof and a front air compartment on an inner side of the front air compartment cover, the front air compartment being separated from the interior space of the vacuum cleaner main body, and wherein a buoyant object is sealed in the front air compartment, an air ventilation hole is provided near a front end of a lower surface of the front air compartment so as to allow the front air compartment to communicate with the interior space of the vacuum cleaner main body, the front air compartment communicates with a space compartment which is formed above the front air compartment by an air compartment exhaust port, and the space compartment communicates with an exterior of the vacuum cleaner main body via an exhaust duct.

[0008] Preferably, in the toy vacuum cleaner described above, the front air compartment is defined at a front and on sides thereof by the front air compartment cover having a shape which is close to a curved crescent shape, is defined at a top thereof by an air compartment upper cover member and is defined at a bottom thereof by an air compartment lower cover plate which extends from a front lower portion to a rear upper portion of the front air compartment. In addition, the air compartment upper cover member is a thick plate, defines a space compartment on an inner side thereof, has a front part which is formed into a shape which resembles a semicircular shape and is connected to an upper edge of the front air compartment cover along a circumferential edge thereof. Further, the air compartment lower cover plate is a plate having a shape which is close to a semicircular shape, is made short at a front and tall at a rear thereof so that the air compartment lower cover plate is connected to a rear end of the air compartment upper cover member at a rear end thereof and is connected to a lower edge of the front air compartment cover along a circumferential edge thereof.

[0009] In this way, in the toy vacuum cleaner according to the invention, the dust pod can detachably attached to the rear portion of the vacuum cleaner main body, and the front air compartment can be defined at the front portion of the vacuum cleaner main body by the transparent front air compartment cover with the buoyant objects sealed inside the front air compartment cover. The front air compartment is separated from the interior space of the vacuum cleaner main body. Air is sucked together with dust from the intake port of the intake head into the interior space of the vacuum cleaner main body via the dust pod, and the air inside the interior space of the vacuum cleaner main body is jetted from near the front end of the lower surface of the front air compartment into the front air compartment so as to blow up the buoyant object. The air in the air compartment is discharged into the space compartment which is provided above the front air compartment and is then discharged from the space compartment to the exterior of the vacuum cleaner main body via the exhaust duct.

[0010] Because of this, large dust such as false dust

is collected into the dust pod, and the dust pod where the dust is collected is removed from the vacuum cleaner main body to thereby recover the false dust. Further, when the toy vacuum cleaner is in operation, it is possible to show the vacuum cleaner sucking air thereinto by the buoyant object which is sealed in the front air compartment being blown upwards.

[0011] Then, the air sucked into the dust pod via the intake head and the intake hose is spread once in the interior space of the vacuum cleaner main body which constitutes the wider space so as to scatter therein, whereafter the air is jetted from the lower portion of the front air compartment. Therefore, fine real dust which is sucked in together with air and the false dust can be allowed to settle down on the floor of the interior space of the vacuum cleaner main body, whereby the real dust sucked in together with the air from the outside can be prevented from flowing into the front air compartment in which the buoyant object is sealed. Thus, it is possible to prevent the buoyant object from getting dirty.

[0012] In this way, with the toy vacuum cleaner according to the invention, the buoyant object having the shape close the false dust which is sealed in the front air compartment can be kept as clean as in an initial state for a long period of time, whereby the player can enjoy playing with the toy for a long period of time by looking at the buoyant object kept so clean.

[0013] The front air compartment is surrounded at the front and on the sides by the front air compartment cover, at the top by the air compartment upper cover member and from the front lower portion to the rear upper portion by the air compartment lower cover plate. Further, the air compartment lower cover plate is inclined so that it is short at the front, and the air compartment ventilation port is provided near the front end of the air compartment lower cover plate. Therefore, when the buoyant object blown upwards in the front air compartment which is surrounded by the front air compartment cover, the air compartment upper cover member and the air compartment lower cover plate falls on the air compartment lower cover plate, the buoyant object rolls on along the inclined air compartment lower cover plate to be collected to the front, so that the buoyant object can be blown upwards again by the air blown out of the air compartment ventilation port. Thus, the false dust can be blown upwards effectively.

Examples of toy vacuum cleaners will now be described with reference to the accompanying drawings, in which:-

Fig. 1 is a perspective view showing an external appearance of a toy vacuum cleaner according to an embodiment of the invention.

Fig. 2 is a bottom view of the toy vacuum cleaner according to an embodiment of the invention.

Fig. 3 is a rear view of the toy vacuum cleaner according to an embodiment of the invention.

Fig. 4 is an exploded view of members that are attached to a vacuum cleaner main body of the toy vacuum cleaner according to an embodiment of the invention.

Fig. 5 is an exploded view of the vacuum cleaner main body of the toy vacuum cleaner according to an embodiment of the invention.

Fig. 6 is a perspective view of an upper case of the toy vacuum cleaner according to an embodiment of the invention as seen from a lower side thereof.

Fig. 7 is an exploded view of a front air compartment of the toy vacuum cleaner according to an embodiment of the invention.

Fig. 8 is a partial sectional view of the vacuum cleaner main body of the toy vacuum cleaner according to an embodiment of the invention.

[0014] An embodiment of a toy vacuum cleaner according to the invention has, as shown in Fig. 1, a vacuum cleaner main body 110 which has a front air compartment 330 in an interior thereof which is defined by a transparent front air compartment cover 331 which is provided at a front portion of the vacuum cleaner main body 110 and wheels 111 which are provided at both sides of a rear part of the vacuum cleaner main body 110.

[0015] A lift handle portion 118 having an arc-like shape is provided on a rear upper portion of the vacuum cleaner main body 110 in such a way as to project therefrom. A switch knob 127 of a power supply switch 128 which activates the toy vacuum cleaner 100 is provided on a central upper portion of the vacuum cleaner main body 110 which lies in front of the left handle portion 118 in such a way as to project slightly therefrom. When the toy vacuum cleaner 100 is not in operation, by depressing the switch knob 127, the toy vacuum cleaner 100 starts sucking dust thereinto, whereas when the toy vacuum cleaner 100 is performing a dust sucking operation, by depressing the switch knob 127, the toy vacuum cleaner 100 is caused to stop the dust sucking operation.

[0016] Further, a hose attaching portion 121 is provided on a front upper portion of the vacuum cleaner main body 110. This hose attaching portion 121 is made up of a hollow pipe and has a vertical portion 123 where an axis of the hollow pipe is substantially vertical, and an inclined portion 125 which is inclined from an upper end of the vertical portion 123 and where the axis of the hollow pipe is inclined accordingly.

[0017] An intake hose 185 is detachably attached to the vacuum cleaner main body 110 via the hose attaching portion 121. Specifically, the intake hose 185 can detachably be attached to a front end of the inclined portion 125 and can rotate horizontally about an axis of the vertical portion 123 as a rotational center.

[0018] The intake hose 185 is a corrugated hollow hose and hence can be bent freely. The intake hose 185 has an appropriate length. A front end portion of the intake hose 185 is fixed to a handle portion 180.

[0019] This handle portion 180 is formed rigid from resin and has a pipe connecting portion 183 at a front end and a grip portion 181 at a rear end thereof. The handle

portion 180 has a substantially straight rod-like shape with the pipe connecting portion 183 and the grip portion 181 provided individually at ends thereof. A front end of the inlet hose 185 is fixed to a middle position on the handle portion 180. The handle portion 180 includes a space which establishes a communication between an interior of the pipe connecting portion 183 and an interior of the inlet hose 185, and a head pipe 171 can be fixed to the pipe connecting portion 183.

[0020] The head pipe 171, which can detachably be attached to the handle portion 180, is a rigid resin hollow pipe. As shown in Fig. 4, the head pipe 171 has a locking hole 173 provided near a rear end thereof, and a projection which is formed on an inner side of the pipe connecting portion 183 of the handle portion 180 is allowed to fit in the locking hole 173, whereby the head pipe 171 is detachably fixed to the handle portion 180.

[0021] Additionally, the head pipe 171 also has a locking hole 173 provided near a front end thereof and can be inserted into a head connecting portion 153 of an intake head 150 at the front end thereof. A projection which is formed on an inner side of the head connecting portion 153 is allowed to fit in the locking hole 173, whereby the head pipe 171 is detachably fixed to the intake head 150.

[0022] The intake head 150 has a head main body 151, a head connecting portion 153, and a decorative member 167. The head main body 151 has an elliptic shape, and a bottom surface of the head main body 151 is formed flat. The head connecting portion 153 is attached to the head main body 151 at an end portion thereof in such a way as to oscillate relative to the head main body 151. The decorative member 167 is provided on an upper surface of the head main body 151 in front of the head connecting portion 153.

[0023] As shown in Fig. 2, the intake head 150 has a main body bottom portion 155 where a substantially whole surface of the bottom surface of the head main body 151 is formed flat and also has an intake surface portion 157. This intake surface portion 157 is formed into a plane which spreads laterally from a position lying slightly further rearwards than a central portion of the main body bottom portion 155 towards a front end of the head main body 151 and which is raised slightly higher than the bottom surface of the main body bottom portion 155.

[0024] Further, the intake head 150 has a guiding wheel 161 and an intake port 163. The guiding wheel 161 is provided on the intake surface portion 157 in a position lying slightly further forwards than a central portion thereof and rotates about an axis which is oriented horizontally laterally. The intake port 163 is provided on the intake surface portion 157 in a position lying slightly further rearwards than the central portion thereof. A projecting amount of the guiding wheel 161 from the intake surface portion 157 is slightly larger than a projecting amount thereof from the intake surface portion 157 to the bottom surface of the main body bottom portion 155.

[0025] The intake port 163 is connected to an interior space of the head pipe 171 via an inner bore of the head connecting portion 153.

[0026] Consequently, when the bottom surface of the intake head 150 is brought into contact with a surface of a floor, a rear portion of the main body bottom portion 155 and the guiding wheel 161 are brought into contact with the surface of the floor, and a front bottom surface of the main body bottom portion 155 and the surface of the floor define an extremely small gap therebetween, whereby a space having a predetermined height can be formed between the intake surface portion 157 which spreads laterally at the front thereof and the surface of the floor.

[0027] Because of this, when the toy vacuum cleaner 100 is activated to operate, a large amount of air passes through the gap space formed between the intake surface portion 157 and the surface of the floor from the front of the head main body 151 to be sucked into the intake port 163 and is then sent to the vacuum cleaner main body 110 by way of interiors of the head pipe 171 and intake hose 185.

[0028] As shown in Fig. 3, a dust pod 210 is accommodated in a rear portion of the vacuum cleaner main body 110.

[0029] This dust pod 210 is a hollow box which is formed from transparent resin and has, as shown in Fig. 5, a pod upper wall 219, a pod bottom wall 218, pod left and right side walls 217, a pod rear wall 213, and a pod front wall 215. The pod rear wall 213 forms a plane which continues to a rear surface portion of the vacuum cleaner main body 110 so as to constitute part of the rear surface portion, and the pod front wall 215 contacts a far-side surface of a pod accommodating portion of the vacuum cleaner main body 110.

[0030] When looking at the vacuum cleaner main body 110 from the rear thereof, as shown in Fig. 3, a circular opening portion which functions as a dust intake port 221 is provided in a position on the pod front wall 215 which lies on the right and slightly upwards, and a substantially circular control plate 223 which is slightly larger than the dust intake port 221 is provided on an inner side of the dust intake port 221 in such a way as to close the dust intake port 221.

[0031] This control plate 223 is attached to an inner surface of the pod front wall 215 at an upper portion thereof so as to oscillate freely. When outside air flows into the dust pod 210 from the intake head 150 by way of the intake hose 185, the control plate 223 oscillates to be inclined in such a way that a lower end of the control plate 223 is caused to move into an inside of the dust pod 210 so that the intake air is allowed to flow into the dust pod 210 while being dispersed downwards therein.

[0032] Pod exhaust ports 225, which are a plurality of slits, are provided at an upper leftward portion of the pod front wall 215. Additionally, an opening/closing door 229 is provided in the pod bottom wall 218 of the dust pod 210 so as to be opened to discharge dust collected in the dust pod 210. Further, a knob portion 211 is provided

at a lateral center of the pod rear wall 213 to be used when removing the dust pod 210 from the pod accommodating portion.

[0033] As shown in Fig. 2, a battery compartment cover 131 is provided on a bottom portion of the vacuum cleaner main body 110 substantially at a center of a bottom plate 281 which makes up the bottom portion, and a battery compartment 130 is defined on an inner side of the battery compartment cover 131 for storage of a power supply battery.

[0034] Exhaust holes 149, which are a number of small holes, are provided at a portion on the bottom plate 281 which lies in front of the battery cover 131. The air taken in from the intake hose 185 to reach an interior of the vacuum cleaner main body 110 by way of the dust pod 210 and in the front air compartment 330 can be discharged to an exterior of the vacuum cleaner main body 110 through the exhaust holes 149.

[0035] A case of the vacuum cleaner main body 110 is made up of an upper case 230 and a lower case 280 and incorporates therein a drive motor 141, a suction fan 145 and the like.

[0036] As shown in Fig. 2 and the like, the lower case 280 has a bottom plate 281, a lower front surface portion 283, lower side surface portions 285 and a lower rear surface portion 287. A front part of the bottom plate 281 is formed semicircular and a rear part thereof is formed rectangular. The lower front surface portion 283 is provided at the semicircular front part of the bottom plate 281 so as to rise from a circumference of the semicircular front part of the bottom plate 281. The lower side surface portions 285 are provided continuously from the lower front surface portion 283 at the rear part of the bottom plate 281. The lower rear surface portion 287 is provided continuously from rear ends of the lower side surface portions 285 at the rear of the bottom plate 281.

[0037] As shown in Fig. 5 and the like, each of the lower side surface portions 285 is formed by a substantially rectangular plane which is curved substantially like an arc at front and rear ends thereof and has a semicircular lower wheel bearing 293 which is formed at the center of an upper end thereof. A lower wheel cover 291 is provided at each of front and rear portions of the lower side surface portion 285 so as to project further outwards than the lower side surface portion 285. The lower side surface portion 285 is connected to both a rear end of the lower front surface portion 283 and a front end of the lower rear surface portion 287 at the front and rear ends thereof by these lower wheel covers 291.

[0038] A U-shaped cutout which is opened upwards is provided at a lateral center of the lower rear surface portion 287, and plate-shaped accommodating portion lower side walls 323 are provided at left and right end portion of the cutout so as to extend to the front therefrom. A plate-shaped accommodating portion lower far-side wall 325 is provided so as to connect front ends of the accommodating portion lower side walls 323. Pod bearing plates 321 which are as tall as a lower end of the cutout are provided so as to extend from the lower rear surface portion 287 to the accommodating portion lower far-side wall 325. By adopting this configuration, a lower half portion of the dust pod 210 can be supported from the sides and bottom thereof, and the pod front wall 215 of the dust pod 210 can be brought into abutment with the accommodating portion lower far-side wall 325.

[0039] When looking at the vacuum clear main body 110 from the rear thereof, an accommodating portion opening lower portion 327 is provided at a right-hand side portion of an upper end of the accommodating portion lower far-side wall 325, and this accommodating portion opening lower portion 327 has a semicircular shape which corresponds to a lower half of the opening portion of the dust pod 210. Additionally, an accommodating portion exhaust port lower portion 329 is provided at a left-hand side portion of the upper end of the accommodating portion lower far-side wall 325, and this accommodating portion exhaust port lower portion 329 has a semicircular shape which corresponds to a lower half of the pod exhaust port 225.

[0040] Further, in the lower case 280, a fan case 147 and a motor bearing portion 143 are provided in front of the accommodating portion lower far-side wall 325. The fan case 147 incorporates therein a suction fan 145, and a fan driving motor 141 is fixed to the motor bearing portion 143.

[0041] The fan case 147 which includes the suction fan 145 in an inside thereof is brought into abutment with the accommodating portion lower far-side wall 325 at an intake port which is formed in the fan case 147. A lower half of the intake port is positioned in the accommodating portion exhaust port lower portion 329 which is provided in the accommodating portion lower far-side wall 325, whereas an upper half of the intake port is positioned in an accommodating portion exhaust port upper portion 319 (refer to Fig. 6) which is provided in an accommodating portion upper far-side wall 315 of the upper case 230, which will be described later.

[0042] The motor bearing portion 143 is provided in front of the fan case 147 with a space defined between a front end of the fan case 147 and itself, so that the driving motor 141 is fixedly supported thereon. As shown in Fig. 8, the fan case 147 and the motor bearing portion 143 are provided on an upper surface of an accommodating portion upper plate 133 which makes up the battery accommodating portion 130.

[0043] Then, the suction fan 145 is fixed to the driving motor 141 which is fixed, in turn, to the motor bearing portion 143. When the suction fan 145 is rotated by the driving motor 141, air in the pod accommodating portion is sucked in. When the dust pod 210 is accommodated in the pod accommodating portion, air in an interior of the dust pod 210 is sucked in, and the air in the interior of the dust pod 210 so sucked in is discharged into a space in an interior of the case of the vacuum cleaner main body 110 from the space between the front of the fan case 147 and the motor bearing portion 143.

[0044] The power supply switch 128 is fixed to an upper end of the motor bearing portion 143, and the switch knob 127 of this power supply switch 128 is caused to project from an upper surface of the upper case 230.

[0045] As shown in Fig. 8, the battery accommodating portion 130 has the accommodating portion upper plate 133 on an upper side thereof, an accommodating portion front plate 137 on a front side thereof, an accommodating portion rear plate 139 on a rear side thereof, and accommodating side plates on left-and right-hand sides thereof, whereby the battery accommodating portion 130 is separated from an interior space of the vacuum cleaner main body 110. The battery compartment cover 131, which is detachable, is provided on a lower side of the battery accommodating portion 130, and electrodes are provided on a rear surface of the accommodating portion front plate 137 and a front surface of the accommodating portion rear plate 139. Thus, a plurality of batteries can be accommodated in the battery accommodating portion 130.

[0046] A cylindrical lower exhaust duct 375 is provided in front of the accommodating portion front plate 137 of the battery accommodating portion 130, and the exhaust holes 149 are provided in the bottom plate 281 inside the lower exhaust duct 375.

[0047] Further, this lower exhaust duct 375 is connected to a lower end of an upper exhaust duct 371 of the air compartment upper cover member 340, which is fixed in place inside the upper case 230, at an upper end thereof, whereby an exhaust duct is made up of these upper and lower exhaust ducts 375, 371. In this way, air from the front air compartment 330 can be discharged to the exterior of the vacuum cleaner main body 110 via the exhaust holes 149.

[0048] A connecting pipe 275 can be connected to the accommodating portion opening lower portion 327 which is provided in the accommodating portion lower far-side wall 325. Thus, a rear end of the connecting pipe 275 can be fixed to a circular opening portion which is formed by an accommodating portion opening upper portion 317 (refer to Fig. 6) of the accommodating portion upper far-side wall 315 of the upper case 230, which will be described later, and the accommodating portion opening lower portion 327.

[0049] The connecting pipe 275 is fixedly connected to a thick, elliptic connecting air compartment member 260 at a front end thereof.

[0050] As shown in Fig. 5, this connecting air compartment member 260 has an elliptic plate-shaped connecting compartment bottom portion 263 and a connecting compartment circumferential wall 265 which rises from a circumference of the connecting compartment bottom portion 263. An upper end of the connecting compartment circumferential wall 265 is fixed to a lower end of a connecting compartment wall 271 which projects into an elliptically cylindrical shape from a lower surface of the upper case 230 as shown in Fig. 6 (refer to Fig. 8), whereby a space formed thereby is made into a connecting compartment 261.

[0051] The space in the connecting compartment 261 is connected to an interior space of the connecting pipe 275 and is further connected to an interior space of the pod accommodating portion via the opening defined by the accommodating portion lower far-side wall 325 and the accommodating portion upper far-side wall 315 and is eventually connected to an interior space of the dust pod 210 which is accommodated in the pod accommodating portion via the dust intake port 221 of the dust pod 210.

[0052] As shown in Figs. 1, 5 and 6, the upper case 230 has a top surface portion 231, an upper front surface portion 233, upper left and right side surface portions 235, and an upper rear surface portion 237. The top surface portion 231 includes a switch hole 249 from which the switch knob 127 projects and the hose attaching portion 121. The upper front surface portion 233 extends perpendicularly downwards from the front of the top surface portion 231 while being curved to follow the curvature of the top surface portion 231. The upper left and right side surface portions 235 extend perpendicularly downwards from left and right sides of the top surface portion 231 while continuing from a rear end of the upper front surface portion 233. The upper rear surface portion 237 extends perpendicularly downwards from a rear end of the top surface portion 231 while continuing from rear ends of the upper left and right side surface portions 235. Thus, the main body case of the vacuum cleaner main body 110 which incorporates the suction fan and the driving motor 141 in the interior thereof is formed by the upper case 230 formed by these surface portions together with the lower case 280.

[0053] As shown in Figs. 5 and 6, the upper left and right side surface portions 235 are each formed into a semicircular shape and have upper wheel covers 241. These upper wheel covers 241 extend into a semicircular shape along circumferences of the upper left and right side wall portions 235 and project further outwards than the upper left and right side wall portions 235. The upper left and right side wall portions 235 are connected to a rear end of the upper front surface portion 233 and to a front end of the upper rear surface portion 237 by the upper wheel covers 241. An upper wheel bearing 243, which is a semicircular cutout, is provided at a center of each of the semicircular upper left and right side surface portions 235.

[0054] Consequently, when the upper case 230 is joined to the lower case 280, circular wheel bearings are formed by the upper wheel bearings 243 and the lower wheel bearings 293, and the wheel bearings so formed support rotatably corresponding wheel axles 113 which are provided at centers of inner sides of the left and right wheels 111. Additionally, the wheel axles 113 are prevented from being dislocated from the corresponding wheel bearings by locking portions 115 which project radially outwards from end portions of the wheel axles 113.

[0055] As shown in Fig. 6, a U-shaped cutout which is

opened downwards is provided at the center of a lower end of the upper rear surface portion 237. Plate-shaped accommodating portion upper side walls 313 are provided so as to extend to the front from left and right ends of the cutout, and the plate-shaped accommodating portion upper far-side wall 315 is provided so as to connect front ends of the left and right accommodating portion upper side walls 313. Additionally, accommodating portion upper fastening plates 311 are provided so as to extend forwards from the upper end of the cutout to reach the accommodating portion upper far-side wall 315.

[0056] Lower ends of the left and right accommodating portion upper side walls 313 and the lower end of the accommodating portion upper far-side wall 315 which is situated at front ends of the accommodating portion upper side walls 313 are connected to upper ends of the accommodating portion lower side walls 323 and the upper end of the accommodating portion lower far-side wall 325, respectively, to thereby define the pod accommodating portion which is separated from the interior space of the vacuum cleaner main body 110. A lower surface of the dust pod 210 is supported at upper ends of the pod bearing plates 321 of the lower case 280, and an upper surface of the dust pod 210 is supported by the accommodating portion upper fastening plates 311 of the upper case 230. Additionally, left and right side surface of the dust pod 210 are supported by the accommodating portion upper side walls 313 and the accommodating portion lower side walls 323. Thus, the dust pod 210 can be fixedly accommodated in the pod accommodating portion.

[0057] The accommodating portion exhaust port upper portion 319, which is cutout into a semicircular shape, is provided at a left-hand side portion of the lower end of the accommodating portion upper far-side wall 315. This accommodating portion exhaust port upper portion 319 is joined to the accommodating portion exhaust port lower portion 329 which is provided at the left-hand side portion of the upper end of the accommodating portion lower far-side wall 325, whereby a circular exhaust port is formed in a far-side wall of the pod accommodating portion by the accommodating portion exhaust port upper portion 319 and the accommodating portion exhaust port lower portion 329.

[0058] The accommodating portion opening upper portion 317, which is cutout into a semicircular shape, is provided at a right-hand side portion of the lower end of the accommodating portion upper far-side wall 315. This accommodating portion opening upper portion 317 is joined to the accommodating portion opening lower portion 327 which is provided at the right-hand side portion of the upper end of the accommodating portion lower far-side wall 325, whereby a circular opening is formed in the far-side wall of the pod accommodating portion by the accommodating portion opening upper portion 317 and the accommodating portion opening lower portion 327.

[0059] The switch hole 249 is provided substantially at the center of the top surface portion 231 of the upper case 230. The connecting compartment wall 271 is provided in front of the switch hole 249 and on an inner surface of the top surface portion 231 where the hose attaching portion 121 is provided. This connecting compartment wall 271 extends perpendicularly downwards into the elliptically cylindrical shape.

[0060] A cylindrical vertical portion holding portion 259 is provided inside the connecting compartment wall 271 on the inner surface of the top surface portion 231, and this vertical portion holding portion 259 supports rotatably a lower end of the vertical portion 123 of the hose attaching portion 121. An inside of the vertical portion 123 is opened to an inside of the vertical portion holding portion 259.

[0061] An upper end of the connecting compartment circumferential wall 265 of the connecting air compartment member 260 is connected and fixed to a lower end of the connecting compartment wall 271, whereby the connecting air compartment member 260 is fixed to the inner side of the top surface portion 231 of the upper case 230.

[0062] Consequently, an interior space of the intake hose 185 is allowed to communicate with the space of the connecting compartment 261 which is the interior space of the connecting air compartment member 260 which is defined by the connecting compartment wall 271 and the connecting air compartment member 260 via the hose attaching portion 121 which is attached to the top surface portion 231 inside the connecting compartment 261. The interior space of the intake hose 185 is communicated further with the interior space of the dust pod 210 which is accommodated the pod accommodating portion via the connecting pipe 275.

[0063] A front opening portion 251 is formed in the upper front surface portion 233 of the upper case 230. An upper portion of the front opening portion 251 in the upper front surface portion 233 is made as an opening portion upper wall 255, and a lower portion of the front opening portion 251 is made as an opening portion lower wall 253.

[0064] The transparent resin front air compartment cover 331 is attached to the front opening portion 251. Then, the front air compartment 330 is defined by the front air compartment cover 331, the air compartment upper cover member 340 which extends to the rear below a lower end of the opening portion upper wall 255, and an air compartment lower cover plate 361 which extends to the rear above an upper end of the opening portion lower wall 253 to thereby be connected to a rear end of the air compartment upper cover member 340 at a rear end thereof. Thus, the front air compartment 330 is separated from the interior space of the vacuum cleaner main body 110 by the air compartment upper cover member 340 and the air compartment lower cover plate 361 which make up the front air compartment 330.

[0065] As shown in Fig. 7, the air compartment upper cover member 340 has a substantially semicircular and arc-shaped cover member outer wall 343, a cover member upper wall 341 and a space compartment bottom

plate 345. The cover member upper wall 341 is provided at an upper end of the cover member outer wall 343at a rear half portion of the cover member outer wall 343, and the space compartment bottom plate 345 is provided at a lower end of the cover member outer wall 343 at a front half portion of the cover member outer wall 343. The air compartment upper cover member 340 also has a cover member riser wall 347 which connects a rear edge of the space compartment bottom plate 345 and a front edge of the cover member upper wall 341.

[0066] An elliptic duct port 353 is opened at the center of the rear end of the space compartment bottom plate 345. The cylindrical upper exhaust duct 371 is provided which extends perpendicularly downwards from a circumferential edge of the dust port 353. The lower end of the upper exhaust duct 371 is connected to the upper end of the lower exhaust duct 375 which rises from the bottom plate 281 of the lower case 280.

[0067] The air compartment upper cover member 340 has further a substantially semicircular space cover plate 355 which has the same shape as that of the space compartment bottom plate 345, and this space cover plate 355 can be fixed to the upper end of the cover member outer wall 343 which lies further forwards than the cover member riser wall 347.

[0068] Consequently, the air compartment upper cover member 340 is surrounded along the front and left and right sides by the cover member outer wall 343 at a front part thereof and has the cover member riser wall 347 at the rear thereof and the space compartment bottom plate 345 at the bottom thereof. A space compartment 351 which is covered by the space cover plate 355 from thereabove is disposed above the front air compartment 330.

[0069] A plurality of air compartment discharge ports 359 are provided along a circumferential edge of the space compartment bottom plate 345 so as to establish a communication between a front surface and a rear surface of the cover member riser wall 347. Further, air compartment discharge ports 359 are also provided in the cover member riser wall 347 at portions which are situated at the left and right of the duct port 353 so as to establish a communication between the front surface and the rear surface of the cover member riser wall 347.

[0070] The cover member upper wall 341 extends further rearwards than the upper exhaust duct 371 in positions on left- and right-hand sides of the upper exhaust duct 371. The cover member upper wall 341 so extending is inclined downwards at the rear thereof, and a rear end thereof is connected to a rear end of the air compartment lower cover plate 361.

[0071] Additionally, the air compartment upper cover member 340 has a dust port cover 349 which covers part of an interior space of an upper portion of the exhaust duct in a position lying further rearwards than the cover member riser wall 347.

[0072] The air compartment lower cover plate 361 is a plate member having a semi-elliptic shape and is inclined along an upper end of the opening portion lower wall 253 in such a manner that it is short at the front and is tall at the rear thereof.

[0073] The upper exhaust duct 371 is disposed so as to penetrate the air compartment lower cover plate 361. A partition side plate 357 is provided which connects an inner edge of the air compartment lower cover plate 361 which extends further rearwards than the upper exhaust duct 371 and an inner edge of the cover member upper wall 341 which extends further rearwards than the upper exhaust duct 371.

[0074] Further, the air compartment lower cover plate 361 has a plurality of air compartment ventilation ports 365 which establish a communication between an upper surface and a lower surface of the air compartment lower cover plate 361 near a front end thereof.

[0075] Consequently, the front air compartment 330 can be covered from the front to the left and right sides by the front air compartment cover 331 by fixing an upper end of the front air compartment cover 331 to the cover member outer wall 343 of the air compartment upper cover member 340 and fixing a lower end of the front air compartment cover 331 to an outer edge of the air compartment lower cover plate 361. Additionally, the front air compartment 330 is covered by the air compartment upper cover member 340 from thereabove and is covered by the air compartment lower cover plate 361 from therebelow. Thus, the front air compartment 330 can be made into a closed space.

[0076] The front air compartment 330 communicates with the interior space of the vacuum cleaner main body 110, which is the interior space defined by the upper case 230 and the lower case 280, by the plurality of air compartment ventilation ports 365 provided at a front portion of the air compartment lower cover plate 361.

[0077] Additionally, the front air compartment 330 also communicates with the space compartment 351, which is covered by the space compartment bottom plate 345 and the space cover plate 355 and the cover member riser wall 347 and a front portion of the cover member outer wall 343, by the air compartment discharge ports 359. Further, the front air compartment 330 communicates with an exterior of the vacuum cleaner main body 110 via the duct port 353 which is opened to the space compartment 351, the upper exhaust duct 371, the lower exhaust duct 375 and the exhaust holes 149.

[0078] Buoyant objects 335 are accommodated in the front air compartment 330. The buoyant objects 335 are, for example, spherical formed styrene particles of the order of several millimeters in diameter.

[0079] In this way, the toy vacuum cleaner 100 has the connecting compartment 261 on the inner side of the top surface portion 231 of the upper case 230 and the connecting compartment 261 is separated from the interior space of the vacuum cleaner main body 110. Then, by providing the hose attaching portion 121 in the top surface portion 231 which makes up the upper wall of the connecting compartment 261, the intake port of the intake head 150 is allowed to communicate with the space in

the connecting compartment 261 via the intake hose 185 and the like. As shown in Fig. 8, the space in the connecting compartment 261 is allowed to communicate with the interior space of the dust pod 210 which is accommodated in the pod accommodating portion via the connecting pipe 275. Then, the pod exhaust ports 225 of the dust pod 210 are positioned to face an intake port of the suction fan 145.

[0080] By adopting this configuration, when the driving motor 141 is driven, dust sucked in from the intake port 163 of the intake head 150 can be drawn into the interior of the dust pod 210 from the dust intake port 221 of the dust pod 210 by way of the head pipe 171, the intake hose 185, the connecting compartment 261, and the connecting pipe 275.

[0081] In drawing dust and air in this way, the intake surface portion 157 which spreads from the position, where the intake port 163 is provided, to the front of the head main body 151 into a fan-like shape is formed on the main body bottom portion 155 of the intake head 150 so as to be raised higher than the main body bottom portion 155. Therefore, the space which spreads at the front thereof is formed between the floor and the intake surface portion 157, whereby a large amount of air present in front of the head main body 150 can easily be drawn thereinto.

[0082] Additionally, when the toy vacuum cleaner 100 is played with, the small spherical foamed styrene particles are spread over the floor as false dust, and a player can play with the toy vacuum cleaner 100 by causing it to suck the false dust and the like thereinto.

[0083] Then, air, the false dust, real dust and the like, which are so sucked in, enter the dust pod 210 by way of the intake hose 185, the connecting compartment 261 and the connecting pipe 275. As this occurs, those sucked in hit on the control plate 223 provided at the dust intake port 221 of the dust pod 210. Since the control plate 223 is attached to the pod front wall 215 at the upper end thereof so as to oscillate, the air, false and real dust and the like so sucked in moves the lower end of the control plate 223 to the inside of the dust pod 210 to open the dust intake port 221, so that the air which flows into the dust pod 210 is spread downwards in the space in the dust pod 210, while the false dust and the real dust which flow into the dust pod 210 are caused to fall on the pod bottom wall 218 of the dust pod 210.

[0084] Then, the air inside the dust pod 210 is sucked out into the interior space of the vacuum cleaner main body 110 from the pod exhaust ports 225 by the suction fan 145.

[0085] As this occurs, since the pod exhaust ports 225 are made up of the plurality of slit-like through holes, large dust such as the false dust can be kept staying within the dust pod 210 in an ensured fashion, whereas part of the fine real dust is allowed to flow into the interior space of the vacuum cleaner main body 110.

[0086] The interior space of the vacuum cleaner main body 110 into which the air in the dust pod 210 is allowed to flow by the suction fan 145 is made into the closed space by the upper case 230 and the lower case 280. Therefore, although part of the air leaks out to the outside from the circumferences of the wheel axles 113, the air pressure in the interior space of the vacuum cleaner main body 110 becomes slightly higher than that of the exterior thereof.

[0087] The interior space of the vacuum cleaner main body 110 communicates with the front air compartment 330 by the air compartment ventilation ports 365 in the air compartment lower cover plate 361, the front air compartment 330 communicates with the space compartment 351 of the air compartment upper cover member by the air compartment discharge ports 359, and the space compartment 351 communicates with the exterior of the vacuum cleaner main body 110 via the upper exhaust duct 371 and the lower exhaust duct 375, and the exhaust holes 149 in the bottom plate 281. Therefore, when the air pressure in the interior space of the vacuum cleaner main body 110 is increased, the air inside the interior space of the vacuum cleaner main body 110 flows out from the air compartment ventilation ports 365 into the interior of the front air compartment 330.

[0088] Consequently, the buoyant objects 335 in the interior of the front air compartment 330 are blown upwards in the interior of the front air compartment 330. The air which flows into the front air compartment 330 is discharged from the air compartment discharge ports 359 into the space compartment 351 and is then discharged to the exterior of the vacuum cleaner main body 110 from the exhaust holes 149 via the exhaust dust.

[0089] The air compartment lower cover plate 361 of the front air compartment 330 is inclined so as to be short at the front and tall at the rear thereof, and the buoyant objects 335 within the front air compartment 330 are collected to the front within the front air compartment 330 by the inclined air compartment lower cover plate 361. Since the air compartment ventilation ports 365 are provided at the front of the air compartment lower cover plate 361, the buoyant objects 335 can be blown upwards effectively. Additionally, the buoyant objects 335 which falls on the air compartment lower cover plate 361 within the front air compartment 330 can be moved to the front by the inclined air compartment lower cover plate 361 to be blown upwards again.

[0090] In the toy vacuum cleaner 100, the interior space of the vacuum cleaner main body 110 has a larger interior capacity than that of the interior space of the dust pod 210 or the like, and the motor bearing portion 143 is provided at the rear of the suction fan 145 so as to spread air discharged from the suction fan 145 into the interior space of the vacuum main body 110. Therefore, fine real dust which flows from the dust pod 210 into the interior space of the vacuum cleaner main body 110 via the suction fan 145 can be caused to fall on the floor of the interior space, that is, on an upper surface of the accommodating portion upper plate 133 which separates the battery accommodating portion 130 from the interior space of the

vacuum cleaner main body 110 and an upper surface of the bottom plate 281 of the lower case 280.

[0091] Further, in the toy vacuum cleaner 100, the air compartment ventilation ports 365 which communicates the front air compartment 330 with the interior space of the vacuum cleaner main body 110 are provided near the front end of the interior space, and therefore, it is possible to more effectively prevent fine real dust which flows into the interior space from moving from the rear to the front of the vacuum cleaner main body 110 to flow into the front air compartment 330.

[0092] Because of this, the buoyant objects 355 which are sealed in the front air compartment 330 are prevented from getting dirty by the real dust or the like, whereby the player can enjoy seeing the buoyant objects 335, which are kept as clean as in an initial state where the buoyant objects 335 are started to be used, being blown upwards for a long period of time.

[0093] The buoyant objects 335 are not limited to the small spherical foamed styrene particles and hence may be small sheet-like pieces such as small resin sheet-like pieces which can blown upwards easily by a current of air. It is preferable that the buoyant objects 335 are made up of objects which have an external shape similar to that of the false dust which is sucked in from the intake head 150.

[0094] In this way, in the toy vacuum cleaner 100 according to the invention, the dust pod 210 can detachably attached to the rear portion of the vacuum cleaner main body 110, and the front air compartment 330 can be defined at the front portion of the vacuum cleaner main body 110 by the transparent front air compartment cover 331 with the buoyant objects 335 sealed inside the front air compartment cover 331. The front air compartment 330 is separated from the interior space of the vacuum cleaner main body 110. Dust is sucked from the intake port of the intake head 150 into the interior space of the vacuum cleaner main body 110 via the dust pod 210, and the air inside the interior space of the vacuum cleaner main body 110 is jetted from near the front end of the lower surface of the front air compartment 330 into the front air compartment 330 so as to blow up the buoyant objects 335. The air in the front air compartment 330 is discharged into the space compartment 351 which is provided above the front air compartment 330 and is then discharged from the space compartment 351 to the exterior of the vacuum cleaner main body 110 via the exhaust duct.

[0095] Because of this, when the toy vacuum cleaner 100 is in operation, it is possible to show the vacuum cleaner sucking air thereinto by the buoyant objects 335 being blown upwards. Then, the false dust and large real dust are sucked into the dust pod 210 by way of the intake head 150 and the intake hose 185 so as to be collected therein, and the air sucked into the dust pod 210 is spread once in the interior space of the vacuum cleaner main body 110 which constitutes the wider space so as to scatter therein, whereafter the air is jetted from the lower portion of the front air compartment 330. Therefore, fine real dust which is sucked in together with air and the false dust can be allowed to settle down on the floor of the interior space of the vacuum cleaner main body 110.

[0096] Because of this, not only the false dust and large real dust which are sucked in together with air from the exterior but also fine real dust are prevented from flowing into the front air compartment 330 in which the buoyant objects 335 are sealed, whereby the buoyant objects 335 can be prevented from getting dirty.

[0097] Consequently, the buoyant objects 335 sealed in the front air compartment 330 which look similar to the false dust can be kept clean for a long period of time, and therefore, the player can enjoy playing with the toy for a long period of time while looking at the buoyant objects 335 which are kept as clean as in the initial state where the toy vacuum cleaner 100 is started to be used.

[0098] In this way, in the toy vacuum cleaner 100 according to the invention, real dust and the false dust can be sucked in together, and the player can be allowed to feel as if he or she is actually vacuuming by being allowed to see the vacuum cleaner sucking in dust and air through the buoyant objects 335, which are sealed in the front air compartment 330, being blown upwards when dust is sucked in. Then, much of the dust so sucked in together with air from the intake head 150 is removed from the air by the dust pod 210, and fine dust is allowed to settle down in the wide space of the vacuum cleaner main body 110, whereby only the air which contains little dust is allowed to blown into the front air compartment 330. Thus, the toy vacuum cleaner 100 according to the invention is such that the player can enjoy playing with the toy vacuum cleaner 100 for a long period of time while looking at the buoyant objects 335 which are kept as clean as in the initial state.

[0099] The embodiments that have been described heretofore are presented as the examples and are not intended to limit the scope of the invention. These novel embodiments can be carried out in other various forms, and various omissions, replacements and/or modifications can be made thereto without departing from the spirit and scope of the invention. The resulting embodiments or their modifications are included in the spirit and scope of the invention and are also included in the scope of inventions claimed under claims and their equivalents.

Claims

1. A toy vacuum cleaner comprising:

a vacuum cleaner main body to which an intake head can be connected via a head pipe and an intake hose and which includes a driving motor and a suction fan in an interior thereof, and **characterized in that**

the suction fan sucks outside air sucked in from an intake port of the intake head via the intake hose into an interior space of the vacuum clean-

er main body via an interior of a dust pod which is provided at a rear portion of the vacuum cleaner main body, **in that**
the vacuum cleaner main body allows the dust pod to be detachably attached to the rear portion of the vacuum cleaner main body, **in that**
the vacuum cleaner main body has a transparent front air compartment cover which is provided at a front portion thereof and a front air compartment on an inner side of the front air compartment cover, the front air compartment being separated from the interior space of the vacuum cleaner main body, and **in that**
a buoyant object is sealed in the front air compartment, an air ventilation hole is provided near a front end of a lower surface of the front air compartment so as to allow the front air compartment to communicate with the interior space of the vacuum cleaner main body, the front air compartment communicates with a space compartment which is formed above the front air compartment by an air compartment exhaust port, and the space compartment communicates with an exterior of the vacuum cleaner main body via an exhaust duct.

2. The toy vacuum cleaner according to Claim 1, wherein
the front air compartment is defined at a front and on sides thereof by the front air compartment cover having a shape which is close to a curved crescent shape, is defined at a top thereof by an air compartment upper cover member and is defined at a bottom thereof by an air compartment lower cover plate which extends from a front lower portion to a rear upper portion of the front air compartment, wherein the air compartment upper cover member is a thick plate, defines a space compartment on an inner side thereof, has a front part which is formed into a shape which resembles a semicircular shape and is connected to an upper edge of the front air compartment cover along a circumferential edge thereof, in that
the air compartment lower cover plate is a plate having a shape which is close to a semicircular shape, is made short at a front and tall at a rear thereof so that the air compartment lower cover plate is connected to a rear end of the air compartment upper cover member at a rear end thereof and is connected to a lower edge of the front air compartment cover along a circumferential edge thereof.

Fig.1

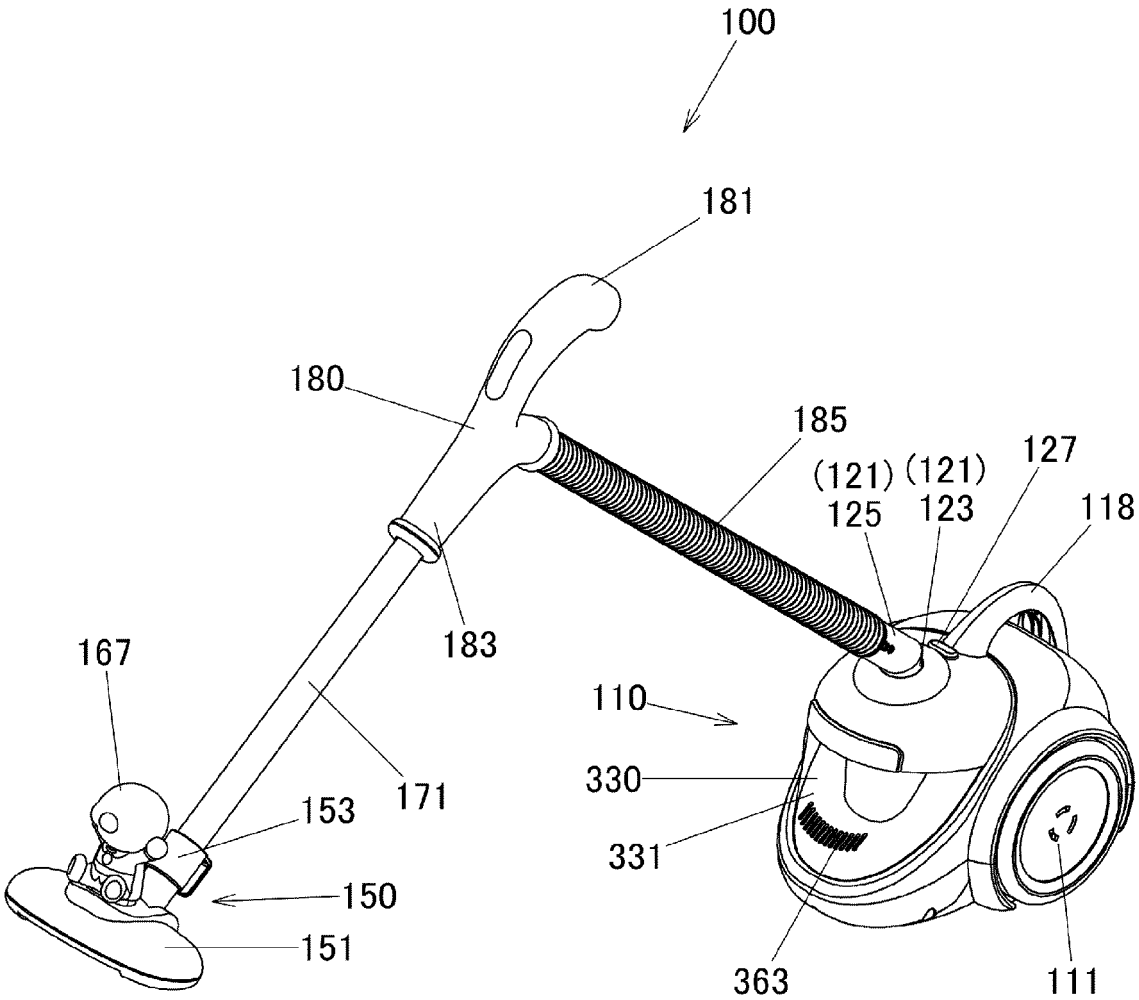
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Fig.2

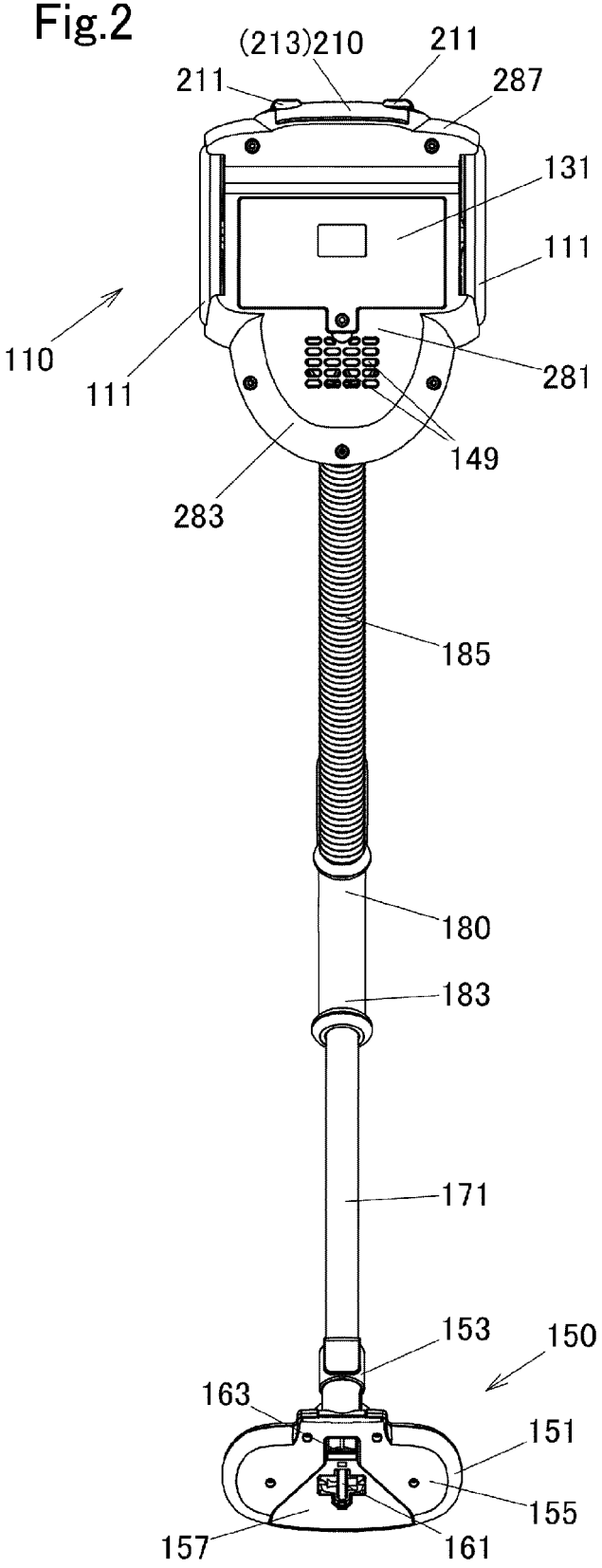
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Fig.3

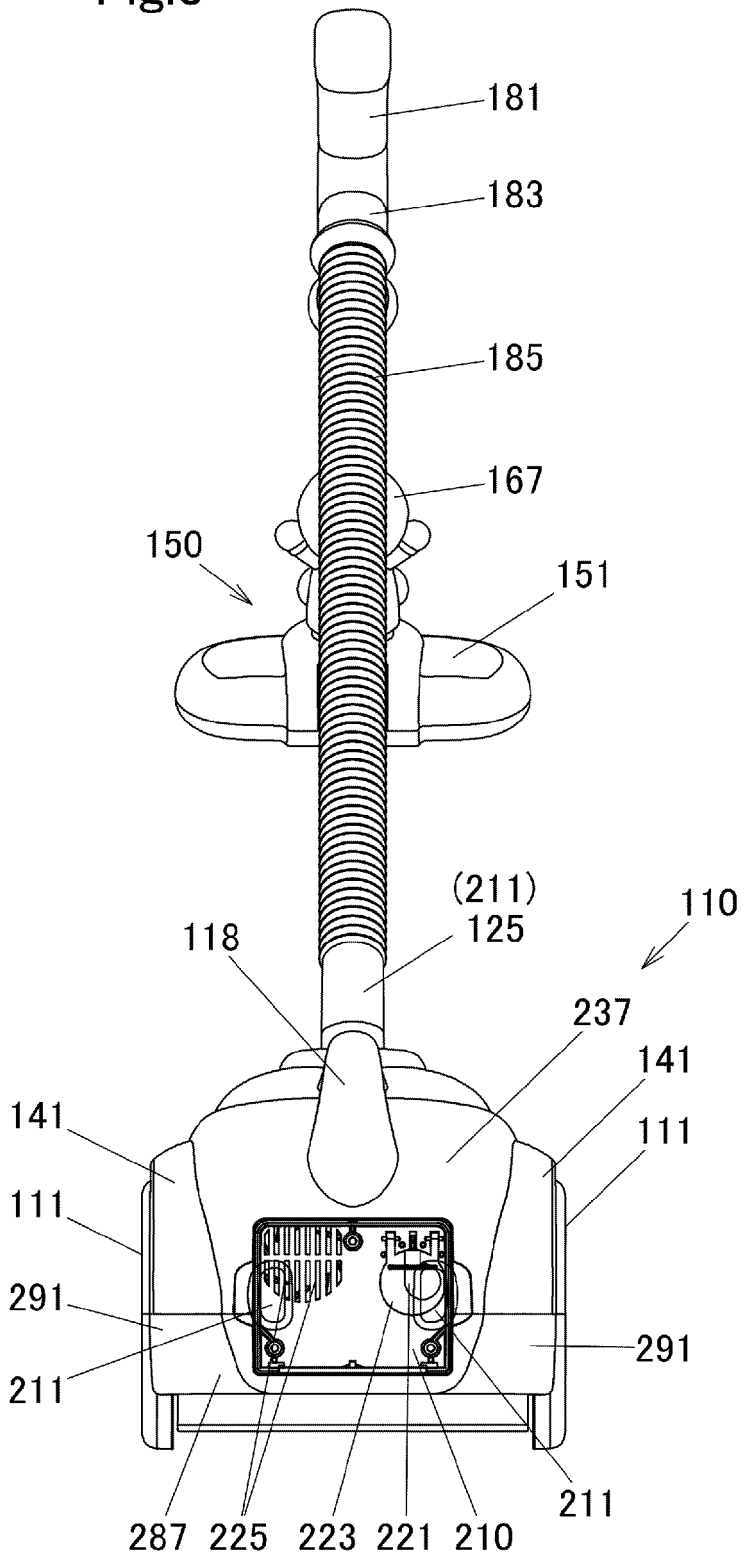
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Fig.4

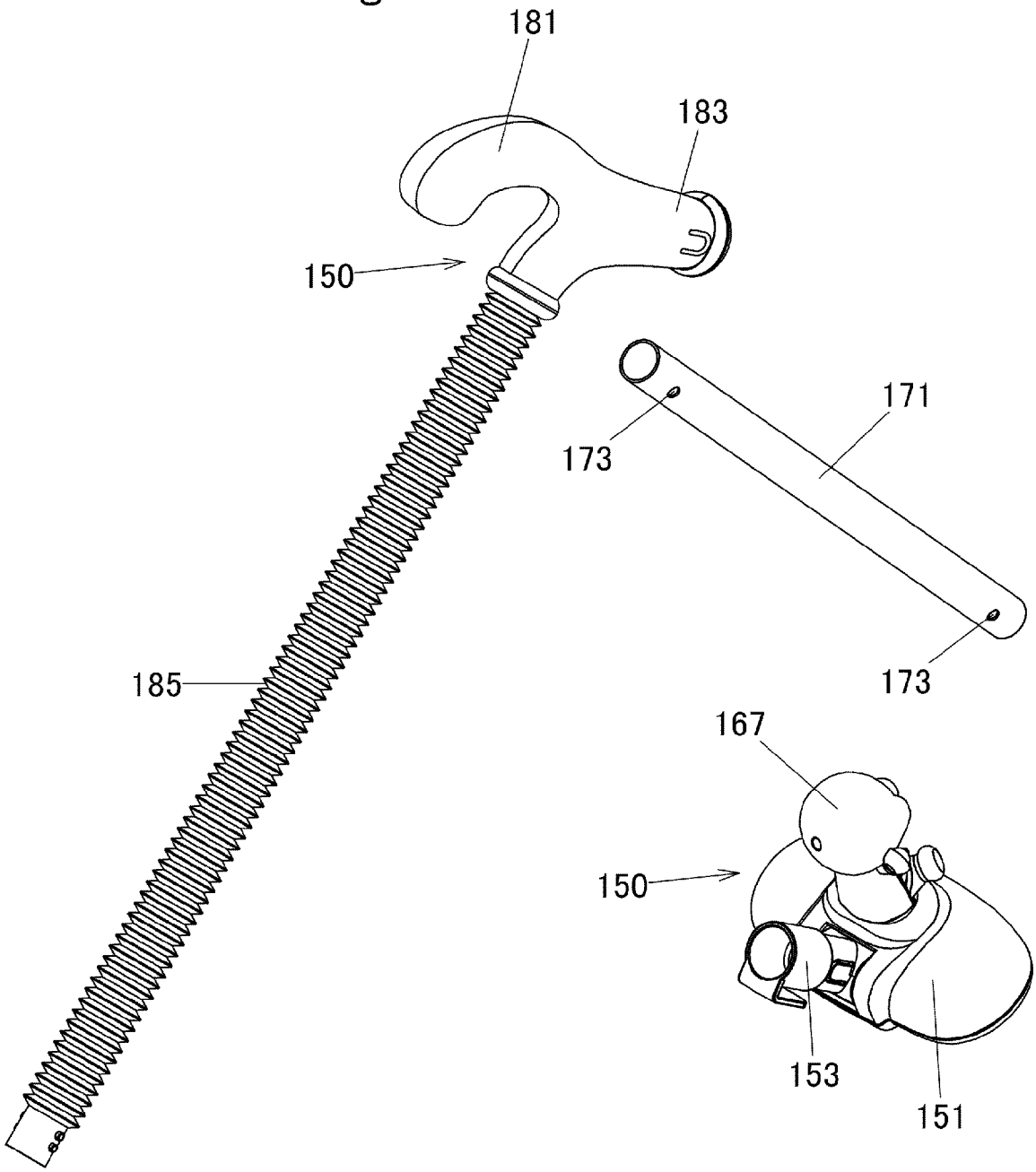

Fig.5

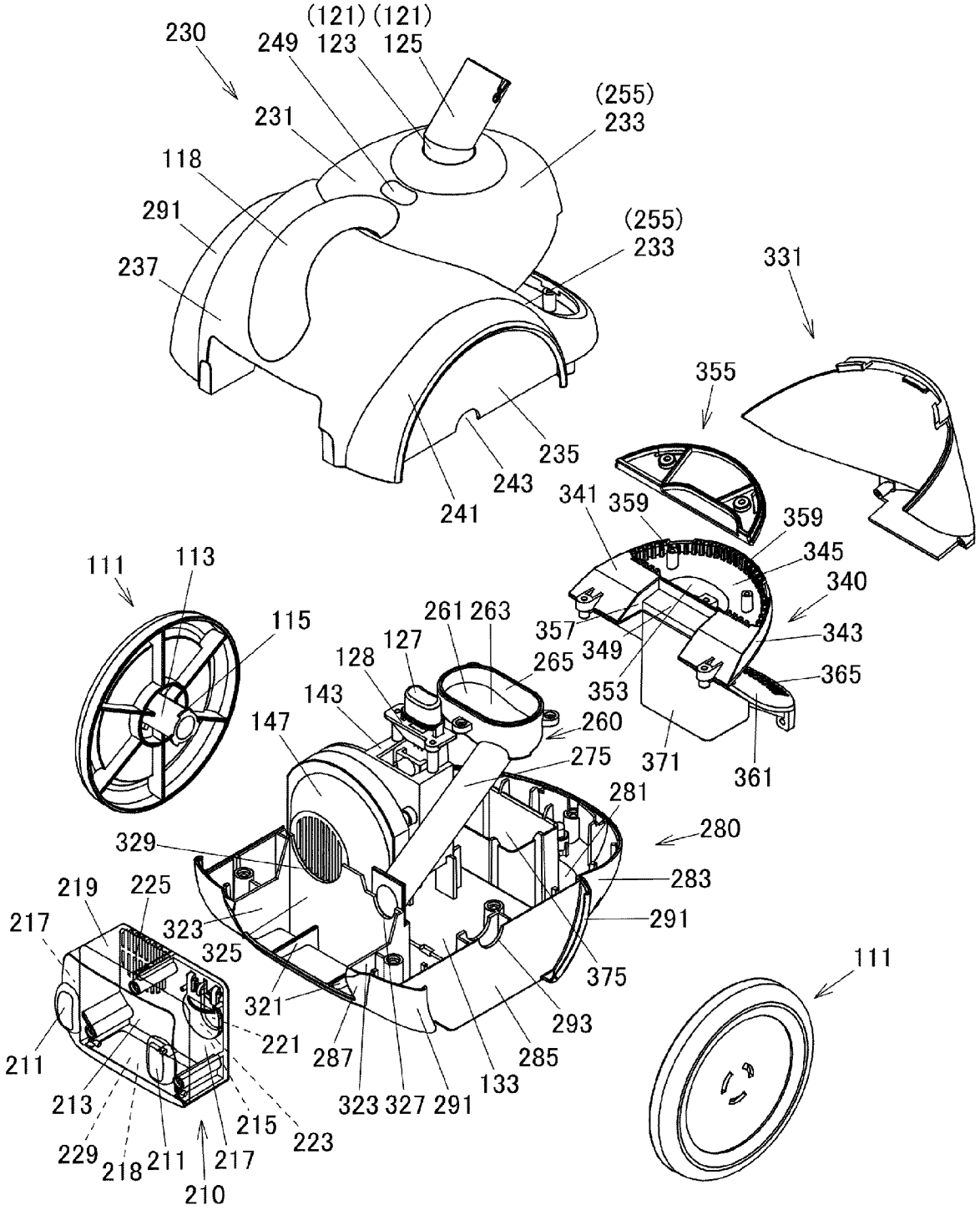
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Fig.6

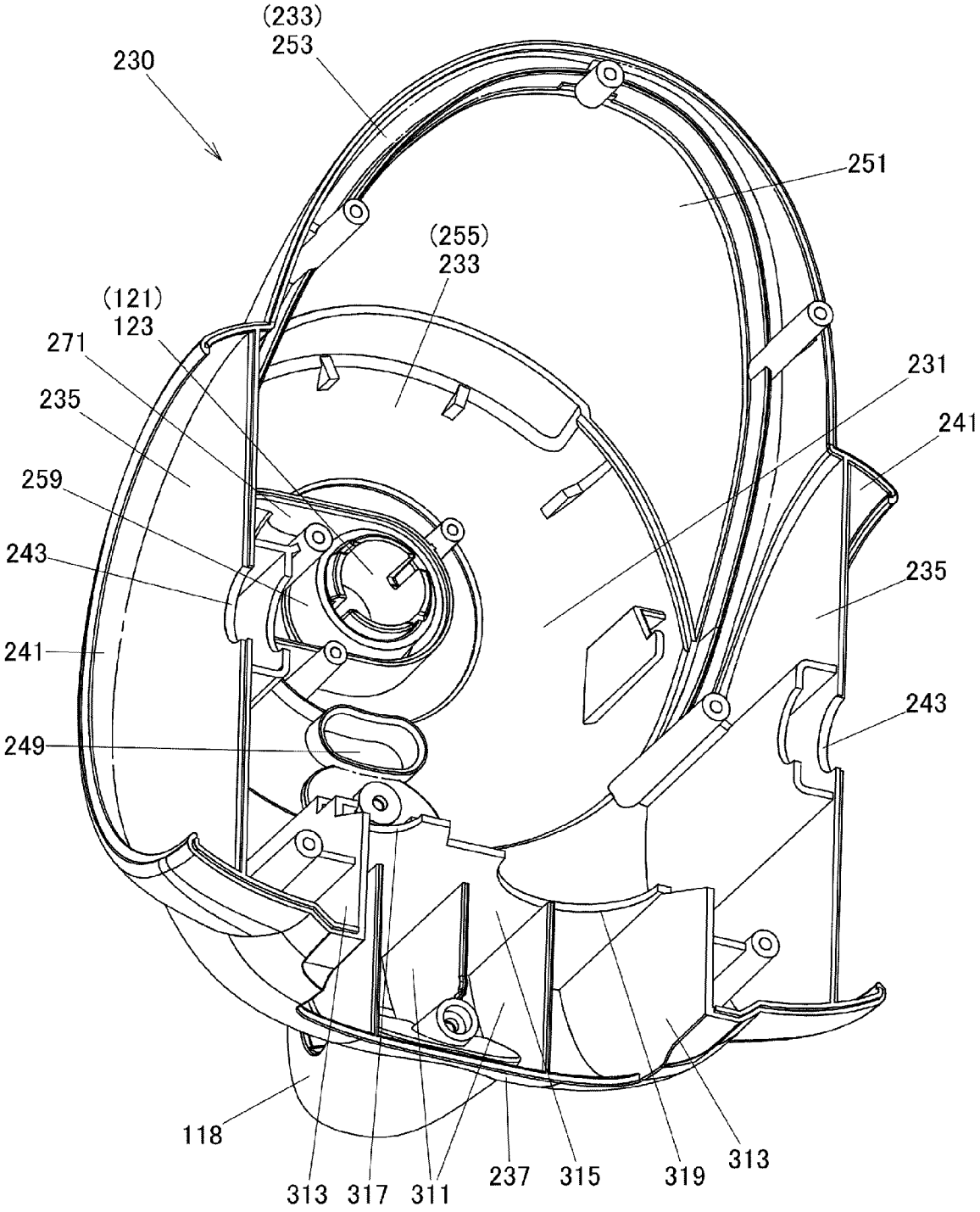
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Fig.7

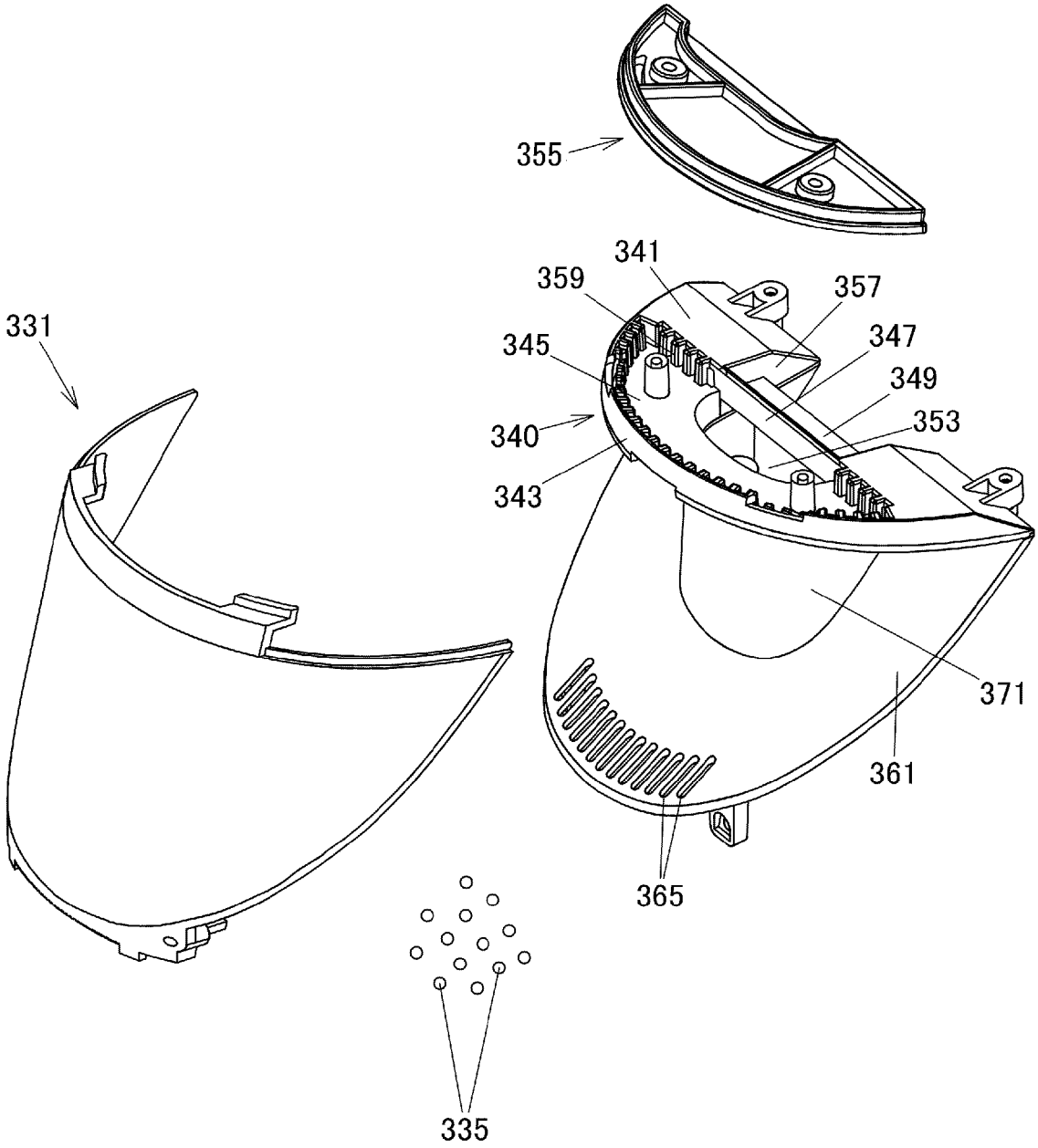
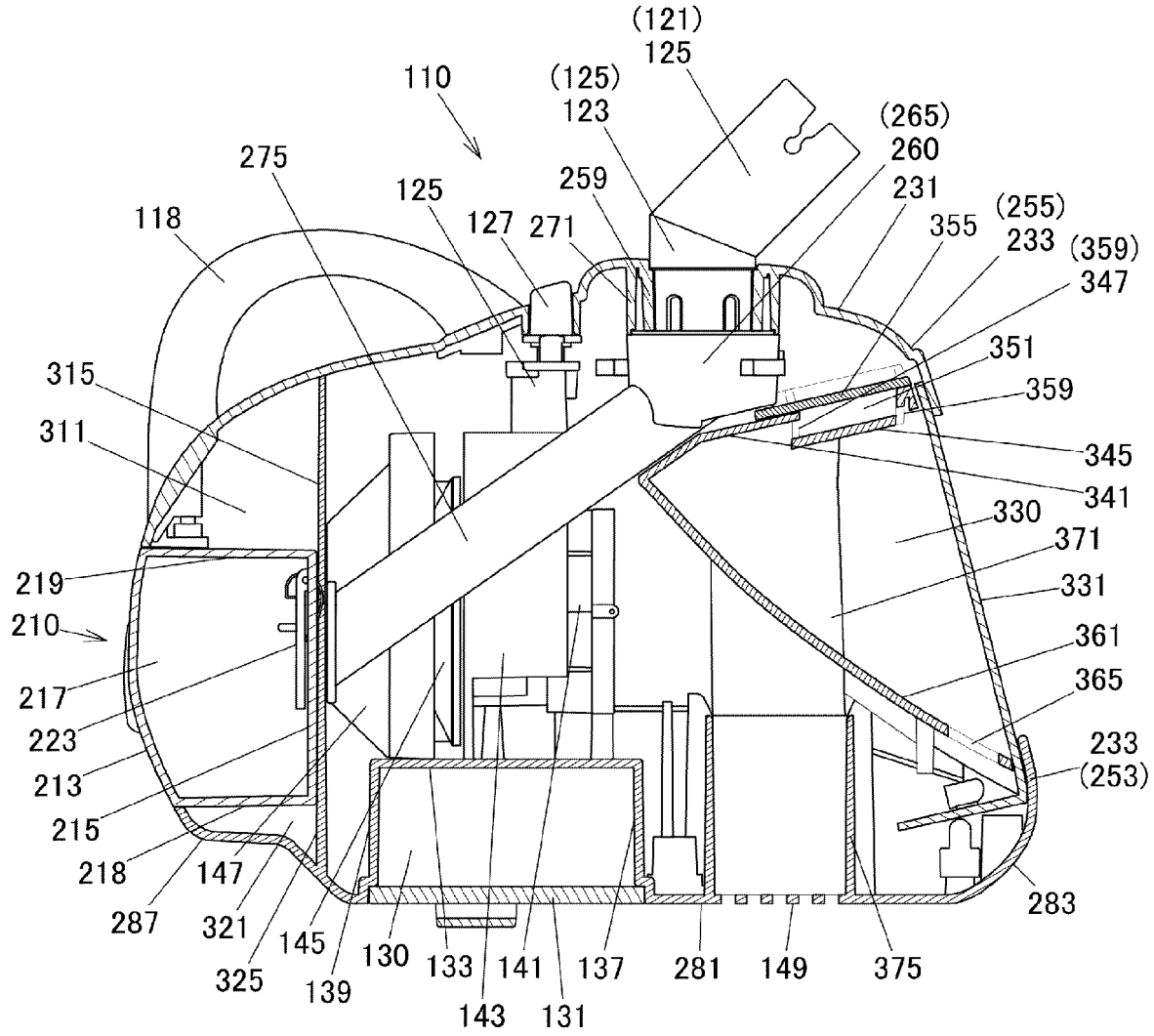


Fig.8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REFERENCES CITED IN THE DESCRIPTION

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