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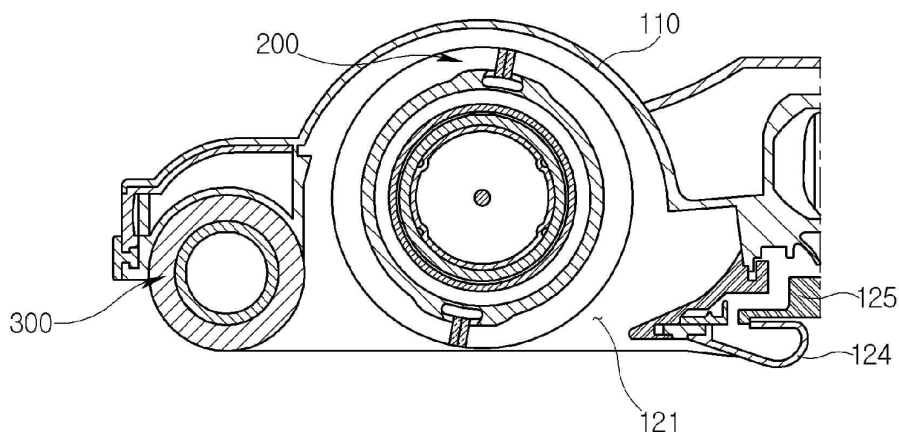
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(54) **VACUUM CLEANER NOZZLE**

(57) A cleaner nozzle according to the present invention includes a nozzle housing, a suction port which is formed in the nozzle housing and through which dust-containing air is introduced, a first agitator accommodated within the nozzle housing and rotatably coupled to the nozzle housing, a second agitator rotated in conjunc-

tion with the first agitator, and an agitator motor configured to apply a rotational force to the first agitator, wherein, since a rotational speed of the first agitator is at least ten times higher than a rotational speed of the second agitator, even large foreign substances can be moved without being caught on the agitator and cleaned.

[FIG. 3]



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Description

[Technical Field]

[0001] The present invention relates to a cleaner nozzle, and more specifically, to a cleaner nozzle for suctioning dust from a floor by rotating two agitators in the same direction.

[Background Art]

[0002] A vacuum cleaner is a device that uses suction force generated by a suction motor mounted inside a cleaner main body to suction dust and air and separates the dust from the air for collection.

[0003] The suction nozzle refers to a part that touches the floor and directly suctions dust and air. The suction force generated by the suction motor mounted inside the cleaner main body is transmitted to the suction motor, and dust and air are suctioned into the suction nozzle by this suction force.

[0004] An agitator is installed on the suction nozzle. The agitator rotates to scrape dust from the floor or carpet, thereby enhancing cleaning performance.

[0005] Meanwhile, U.S. Patent Registration No. US7243393B2 discloses a cleaner nozzle having a dual agitator.

[0006] The cleaner nozzle enhances the suction force of dust using two agitators.

[0007] However, since the two agitators in the cleaner nozzle rotate at a rotational speed ratio of 3:1, the agitator disposed at the front also has a high rotational speed. Accordingly, there is a limitation in that surface pressure cannot be generated between the agitator disposed at the front and a surface being cleaned.

[0008] In addition, when the agitator disposed at the front encounters a large foreign substance, the foreign substances cannot be pushed toward the suction port, resulting in the agitator becoming caught. In this case, a user needs to lift the cleaner nozzle, bring the suction port close to the large foreign substance, and then suction and clean them, which is inconvenient.

[0009] In addition, only the agitator disposed at the front is detachably provided, resulting in limitations in replacement and cleaning of the agitator.

[Disclosure]

[Technical Problem]

[0010] The present invention has been intended to solve the above problems of conventional cleaner nozzle and is directed to providing a cleaner nozzle capable of suctioning even large foreign substances.

[0011] In addition, the present invention is directed to providing a cleaner nozzle capable of enhancing suction force by forming surface pressure between an agitator at the front and a surface to be cleaned.

[0012] In addition, the present invention is directed to providing a cleaner nozzle that allows two agitators to be detached, allowing replacement of the agitator depending on the cleaning environment, and cleaning of the agitator when contamination occurs.

[Technical Solution]

[0013] To achieve the above objects, a cleaner nozzle according to the present invention includes a nozzle housing, a suction port which is formed in the nozzle housing and through which dust-containing air is introduced, a first agitator accommodated within the nozzle housing and rotatably coupled to the nozzle housing, a second agitator rotated in conjunction with the first agitator, and an agitator motor configured to apply a rotational force to the first agitator, wherein a rotational speed of the first agitator is at least ten times higher than a rotational speed of the second agitator.

[0014] To this end, the cleaner nozzle may further include a reducer connecting the first agitator to the second agitator and including at least one gear.

[0015] In this case, the second agitator may be disposed further away from the suction port than the first agitator.

[0016] The cleaner nozzle according to the present invention may further include a connection tube connected to the nozzle housing and having a flow path that communicates with the suction port formed therein to allow dust to flow toward the cleaner main body, wherein the second agitator may be disposed further away from the connection tube than the first agitator.

[0017] That is, the second agitator may be disposed in front of the first agitator.

[0018] Accordingly, in the present invention, cleaning performance can be improved by reducing the rotational speed of the second agitator disposed at the front.

[0019] Meanwhile, a diameter of the first agitator may be larger than a diameter of the second agitator.

[0020] In addition, a rotational direction of the first agitator may be the same as a rotational direction of the second agitator.

[0021] Meanwhile, the cleaner nozzle according to the present invention may further include an agitator cover which is detachably coupled to the nozzle housing and to which the first agitator and the second agitator are coupled.

[0022] In this case, the reducer may be accommodated within the agitator cover.

[0023] In addition, the agitator motor may be accommodated within the first agitator. Accordingly, the overall volume of the cleaner nozzle according to the present invention can be reduced.

[0024] Meanwhile, the agitator cover may be separated from the second agitator while coupled to the first agitator.

[0025] In this case, the second agitator may include a second agitator main body and a locking unit accommo-

dated within the second agitator main body and coupled to the agitator cover.

[0026] In this case, the locking unit may include a locking housing accommodated within the second agitator and having at least one catch portion formed on an inner circumferential surface thereof, a stopper provided to be movable in an axial direction of the locking housing and inserted into and coupled to the agitator cover, and a spring configured to apply a restoring force to the locking unit.

[0027] In addition, the agitator cover may include a push button configured to release the locking unit when an external force is applied.

[0028] Accordingly, a user may press the push button to separate the second agitator from the agitator cover.

[0029] Based on a state of being coupled to the nozzle housing, the agitator cover may be rotated at a predetermined angle around the first agitator with respect to the nozzle housing and then separated.

[0030] Accordingly, after the second agitator is separated from the agitator cover, the user can rotate the agitator cover to separate the first agitator from the nozzle housing.

[Advantageous Effects]

[0031] As described above, in the cleaner nozzle according to the present invention, since the agitator disposed at the front is also rotated by the driving force of the motor and is rotated with a large torque due to a high reduction ratio, even large foreign substances can be moved toward the suction port without being caught by the agitator and cleaned.

[0032] In addition, by introducing the reducer having the high reduction ratio, the agitator at the front rotates at a lower speed than the agitator at the rear, thereby forming surface pressure between the surface to be cleaned and the agitator and improving suction performance accordingly.

[0033] In addition, the user can easily separate the agitator at the front by pressing the push button and also separate the agitator at the rear from the nozzle housing by rotating the cover.

[0034] Accordingly, the agitator can be replaced depending on the cleaning environment and can be cleaned when contamination occurs.

[Description of Drawings]

[0035]

FIG. 1 is a perspective view for describing a cleaner nozzle according to one embodiment of the present invention.

FIG. 2 is a bottom view of FIG. 1.

FIG. 3 is a cross-sectional view of FIG. 1.

FIG. 4 is a side view of FIG. 1.

FIG. 5 is a cross-sectional view for describing a

coupling relationship between an agitator cover and a second agitator in a cleaner nozzle according to one embodiment of the present invention.

FIG. 6 is a side view for describing a state in which an agitator cover is rotated in a state in which the second agitator is separated from the cleaner nozzle according to one embodiment of the present invention.

FIG. 7 is a view for describing a state in which an agitator cover is separated from a nozzle housing in the cleaner nozzle according to one embodiment of the present invention.

FIG. 8 is a perspective view for describing the agitator cover in the cleaner nozzle according to one embodiment of the present invention.

FIG. 9 is a view for describing a reducer in the cleaner nozzle according to one embodiment of the present invention.

FIG. 10 is a graph illustrating the cleaning performance of the cleaner nozzle.

[Mode for Invention]

[0036] Hereinafter, exemplary embodiments of the present invention will be described in detail with reference to the accompanying drawings.

[0037] Since the present invention may have various changes and various embodiments, specific embodiments are illustrated in the accompanying drawings and specifically described in the detailed descriptions. This is not intended to limit the present invention to specific embodiments and should be construed to include all modifications, equivalents, and substitutes included in the spirit and technical scope of the present invention.

[0038] FIG. 1 is a perspective view for describing a cleaner nozzle according to one embodiment of the present invention, FIG. 2 is a bottom view of FIG. 1, FIG. 3 is a cross-sectional view of FIG. 1, and FIG. 4 is a side view of FIG. 1.

[0039] A cleaner nozzle 1 of the present invention will be described with reference to FIGS. 1 to 4 as follows.

[0040] The cleaner nozzle 1 of the present embodiment may be used by being connected to, for example, a hand-type cleaner or a canister-type cleaner.

[0041] In addition, in the present specification, it can be understood that the term "floor" or "surface to be cleaned" means not only the floor of a living room or room, but also a surface to be cleaned, such as a carpet.

[0042] That is, the cleaner nozzle 1 may be detachably connected to a cleaner main body (not illustrated) or an extension tube (not illustrated). The cleaner nozzle 1 may be connected to the cleaner main body (not illustrated) or the extension tube (not illustrated), allowing the user to clean the floor using the cleaner nozzle 1. In this case, the cleaner main body (not illustrated) to which the cleaner nozzle 1 is connected may separate dust in the air using a multi-cyclone method.

[0043] The cleaner nozzle 1 may be operated by re-

ceiving electric power from the cleaner main body (not illustrated). Specifically, the cleaner nozzle 1 may be operated by receiving electric power from a battery (not illustrated) installed in the cleaner main body (not illustrated).

[0044] Since the cleaner main body (not illustrated) to which the cleaner nozzle 1 is connected includes a suction motor (not illustrated), the suction force generated by the suction motor (not illustrated) may be applied to the cleaner nozzle 1.

[0045] Accordingly, in the present embodiment, the cleaner nozzle 1 may suction foreign substances and air on the floor and guide them to the cleaner main body (not illustrated).

[0046] The cleaner nozzle 1 according to one embodiment of the present invention includes a nozzle housing 100, a first agitator 200, a second agitator 300, an agitator cover 400, and a connecting tube 500.

[0047] For reference, directions used in the present invention will be described as follows.

[0048] In the present invention, a direction of the cleaner nozzle 1 may be defined with respect to a suction port 121. Specifically, a direction in which the first agitator 200 is disposed with respect to the suction port 121 may be referred to as the front of the cleaner nozzle 1, and a direction opposite to the front may be referred to as the rear. In addition, based on a state in which the cleaner nozzle 1 is placed on the floor (surface to be cleaned), a direction away from the floor may be referred to as an upward (upper side), and a direction approaching the floor may be referred to as a downward (lower side).

[0049] The nozzle housing 100 may be provided with the first agitator 200 and the second agitator 300 and may form the exterior of the cleaner nozzle 1. Specifically, the nozzle housing 100 may be provided with the first agitator 200 and the second agitator 300 via the agitator cover 400. In addition, the nozzle housing 100 may be coupled to the agitator cover 400 to form the exterior of the cleaner nozzle 1. In addition, the connecting tube 500 may be coupled to the nozzle housing 100.

[0050] The nozzle housing 100 may include an upper housing 110.

[0051] Specifically, the upper housing 110 may be formed to include at least one curved surface having a predetermined curvature corresponding to the shape of the first agitator 200 and the shape of the second agitator 300.

[0052] The nozzle housing 100 may include a lower housing 120 coupled to the upper housing 110 to accommodate the first agitator 200 and the second agitator 300 therein.

[0053] In this case, the lower housing 120 may be disposed so as to face the floor (surface to be cleaned) in a state in which the nozzle housing 100 is placed on the floor.

[0054] The suction port 121 may be formed in the nozzle housing 100. Specifically, the suction port 121 may be formed in the lower housing 120. The suction port

121 refers to a space into which dust-containing air may be introduced. With this configuration, when the suction motor (not illustrated) of the cleaner main body (not illustrated) operates, dust and air that are present near the floor may be suctioned into a flow path of the cleaner nozzle 1 through the suction port 121.

[0055] A printed circuit board (not illustrated) for controlling the agitator motor (not illustrated) may be installed inside the nozzle housing 100.

[0056] In addition, the nozzle housing 100 may be provided with a flow path that communicates with the suction port 121 and guides air introduced from the suction port 121 to the cleaner main body (not illustrated).

[0057] The flow path may be disposed within the nozzle housing 100, with a lower end portion of the flow path communicating with the suction port 121, and an upper end portion of the flow path communicating with the inside of the connecting tube 500.

[0058] The lower housing 120 may have at least one caster 123. For example, a pair of casters 123 may be symmetrically disposed within the lower housing 120. For example, the pair of casters 123 may be disposed on an outer side of a lower surface of the lower housing 120 in a left-right direction. With this configuration, even when the user's operating force is concentrated on either the left or right side of the cleaner nozzle, the caster 123 may roll and move along the floor.

[0059] As a result, in the present invention, the caster 123 may roll along the floor even when the user pushes and pulls the cleaner nozzle, thereby improving the user's operating force.

[0060] The caster 123 may be rotatably coupled to the lower housing 120 and may roll along the floor (surface to be cleaned).

[0061] At least a portion of the caster 123 may be exposed to the outside of the nozzle housing 100.

[0062] With this configuration, when the cleaner nozzle 1 is placed on the floor, the caster 123 may be in contact with the floor. Accordingly, when the cleaner nozzle 1 is moved by the user's operation, friction between the nozzle housing 100 and the floor can be reduced, and the mobility of the cleaner nozzle 1 can be improved.

[0063] The nozzle housing 100 may be rotatably connected to the connecting tube 500. For example, the nozzle housing 100 may be provided with a hinge shaft coupled to a first steering unit 510, and the first steering unit 510 may rotate (pivot) around the hinge shaft.

[0064] With this configuration, a sufficient angle at which the connecting tube 500 may rotate can be secured. In addition, since the rear of the upper housing 110 is curved and faces downward, the overall height of the cleaner nozzle 1 can be lowered, and low-height accessible spaces, such as a bed, a sofa, etc., can be cleaned.

[0065] Meanwhile, the cleaner nozzle 1 may be provided with a damper 124 to enhance the suction force of the cleaner nozzle 1 and a damper cover 125 to protect the damper 124.

[0066] The damper 124 may be provided to block the

flow of air flowing from the rear to the front when the suction force is generated by the cleaner nozzle 1. In addition, the damper 124 can prevent dust from being suctioned into the suction port 121 between the cleaner nozzle 1 and the surface to be cleaned from being discharged rearward, thereby enabling the cleaner nozzle 1 to effectively suction dust on the surface to be cleaned.

[0067] The damper 124 is provided in the nozzle housing 100 and provided so as to be in contact with the surface to be cleaned. In addition, the damper 124 applies a supporting force to the surface to be cleaned so as to be in contact with the surface without a gap. That is, the damper 124 may be provided to elastically support the surface to be cleaned.

[0068] In addition, the damper 124 may be provided adjacent to the suction port 121 of the nozzle housing 100. The damper 124 may be provided behind the suction port 121 of the nozzle housing 100 and may block the flow of air from the rear to the front when the suction force is generated by the cleaner nozzle 1.

[0069] The damper 124 may be provided in the left-right direction of the nozzle housing 100 behind the suction port 121 of the nozzle housing 100.

[0070] When the cleaner nozzle 1 is not placed on the surface to be cleaned, a portion of the damper 124 protrudes from a lower surface of the cleaner nozzle 1.

[0071] Conversely, when the nozzle housing 100 is placed on the surface to be cleaned, the damper 124 is supported (pressed) against the surface to be cleaned and elastically deformed. That is, the damper 124 may be first in contact with the surface to be cleaned before at least one of a wheel 540 and the caster 123 of the nozzle housing 100 comes into contact with the surface to be cleaned. In addition, when at least one of the wheel 540 and the caster 123 is in contact with the surface to be cleaned, the damper 124 is pressed against the surface to be cleaned and elastically deformed.

[0072] Here, the damper 124 may be elastically deformed by being compressed in a direction perpendicular to the surface to be cleaned and extended in a front-rear direction. Specifically, the damper 124 may be compressed in a direction perpendicular to the surface to be cleaned and extended rearward to be in contact with the damper cover 125, which will be described below.

[0073] The damper 124 may be formed in a hollow shape and coupled to the lower housing 120 or coupled to the lower housing 120 and formed to have a hollow interior.

[0074] The damper 124 may be formed such that a portion that collides with an obstacle is thicker, thereby preventing excessive deformation of the damper 124 upon an impact with an obstacle.

[0075] The damper cover 125 is provided on the nozzle housing 100 to protect the damper 124. The damper cover 125 is formed in the left-right direction, provided behind the damper 124 of the nozzle housing 100, and provided to cover at least a portion of the damper 124. The damper cover 125 is provided to cover an upper

space of the damper 124 and prevents a portion of a rear end of the damper 124 from colliding with an obstacle. That is, when the cleaner nozzle 1 travels rearward, an obstacle placed on the surface to be cleaned can be prevented from colliding with the damper 124.

[0076] The damper cover 125 may be disposed so as to be spaced apart from the damper 124 in the front-rear direction.

[0077] Meanwhile, in the cleaner nozzle 1 of the present invention, two agitators 200 and 300 may be connected to the nozzle housing 100 by the agitator cover 400. Specifically, the cleaner nozzle 1 of the present invention may be configured such that the first agitator 200 and the second agitator 300 are coupled to the agitator cover 400 and the agitator cover 400 is detachably coupled to the nozzle housing 100.

[0078] A relationship between the first agitator 200, the second agitator 300, and the agitator cover 400 will be described below.

[0079] The agitator cover 400 is detachably coupled to the nozzle housing 100 and coupled to the first agitator 200 and the second agitator 300. In addition, a reducer 460 may be accommodated within the agitator cover 400.

[0080] The specific structure of the agitator cover 400 will be described below.

[0081] The connecting tube 500 is formed with a flow path that communicates with the suction port 121 and connects the nozzle housing 100 to an extension tube (not illustrated) or the nozzle housing 100 to the cleaner main body (not illustrated).

[0082] The connecting tube 500 may be connected to the nozzle housing 100 and formed with a flow path that communicates with the suction port 121, thereby allowing dust to flow toward the cleaner main body (not illustrated).

[0083] The connecting tube 500 includes a pipe 505, the first steering unit 510, a second steering unit 520, and a third steering unit 530.

[0084] The pipe 505 may have a flow path, which communicates with the suction port 121, formed therein. The pipe 505 may be coupled to the nozzle housing 100 and may communicate with the flow path within the nozzle housing 100.

[0085] The pipe 505 may be formed of a deformable material. Specifically, the pipe 505 may be formed of a bendable material. Accordingly, the pipe 505 may be bent and deformed by the rotation of the first steering unit 510, the second steering unit 520, and the third steering unit 530 of the connecting tube 500.

[0086] The first steering unit 510 accommodates at least a portion of the pipe 505 therein and is hinge-coupled to the nozzle housing 100.

[0087] The first steering unit 510 may be formed in a hollow shape such that the pipe 505 passes therethrough and may have one side provided with a hinge unit to be hinge-coupled to the nozzle housing 100 and the other side relatively rotatably coupled to the second steering unit 520.

[0088] With this configuration, when the user places

the cleaner nozzle 1 on the floor and moves the cleaner main body (not illustrated) upward or downward, the cleaner main body (not illustrated) and the connecting tube 500 may rotate around a rotational axis.

[0089] With this configuration, the user can easily move the cleaner nozzle 1 forward or rearward.

[0090] The second steering unit 520 may be coupled to the first steering unit 510 to be relatively rotatable and hinge-coupled with the third steering unit 530.

[0091] Specifically, the second steering unit 520 is formed in a hollow shape such that the pipe 505 passes therethrough and has one side swivel-rotatably coupled to the first steering unit 510 and the other side hinge-coupled to the third steering unit 530.

[0092] One inner perimetric surface of the second steering unit 520 may accommodate and may be coupled to the other end portion of the first steering unit 510. In this case, a protrusion may be formed on the other end portion of the first steering unit 510, thereby preventing the detachment of the first steering unit 510 and the second steering unit 520.

[0093] The second steering unit 520 may be formed in a cylindrical shape and swivel-rotatably coupled in a perimetric direction with respect to a center axis passing through the inside of the second steering unit 520. That is, the second steering unit 520 may rotate relatively with respect to the first steering unit 510 in the circumferential direction of the pipe.

[0094] With this configuration, when the user places the cleaner nozzle 1 on the floor and turns the cleaner main body (not illustrated), the second steering unit 520 may rotate. This allows the user to lie face down on the cleaner main body (not illustrated) and clean the floor even when cleaning a narrow space in which the cleaner nozzle may enter, such as under a bed or furniture.

[0095] With this configuration, the user may push or pull the cleaner main body (not illustrated) to reciprocate the cleaner nozzle 1 even when the cleaner main body (not illustrated) is laid flat on the surface to be cleaned.

[0096] Meanwhile, the direction in which the first steering unit 510 rotates (pivots) with respect to the nozzle housing 100 may intersect the direction in which the second steering unit 520 rotates (swivels) with respect to the first steering unit 510.

[0097] Accordingly, in the cleaner nozzle 1 of the present invention, the connecting tube 500 may be bent at various angles by combining rotational directions of the first steering unit 510 and the second steering unit 520.

[0098] The wheel 540 may include a cylindrical or disc-shaped wheel body and a tire surrounding an outer circumferential surface of the wheel body. With this configuration, the wheel 540 can increase the grip with the surface to be cleaned, thereby improving the traveling performance of the cleaner nozzle 1.

[0099] Even when the user's operating force is applied momentarily, the wheel 540 may absorb an impact.

[0100] The wheel 540 may roll along the floor (surface to be cleaned) according to the user's operation. When

the user's operating force is applied even in a state in which the cleaner nozzle 1 is adsorbed to the surface to be cleaned by the operation of the suction motor (not illustrated), the wheel 540 may roll along the surface to be cleaned, thereby assisting forward and rearward movement of the cleaner nozzle 1. Accordingly, the wheel 540 can enhance the user's operational convenience.

[0101] Accordingly, the user can easily move the cleaner nozzle 1 regardless of the material of the surface to be cleaned.

[0102] The third steering unit 530 is rotatably coupled to the second steering unit 520. For example, the third steering unit 530 may be formed in a tubular shape, and one longitudinal side of the third steering unit 530 may be provided with a hinge unit hinge-coupled to the second steering unit 520.

[0103] A swivel-rotatable second steering unit 520 may be provided between the rotational axis of the first steering unit 510 and the rotational axis of the third steering unit 530, which are disposed parallel to each other.

[0104] With this configuration, the user may operate the cleaner nozzle by pushing or pulling the cleaner main body even when the cleaner main body is laid flat against the surface to be cleaned.

[0105] Consequently, the connecting tube 500 of the present invention may be rotated along three rotational axes and bent at various angles, thereby facilitating the user's operation.

[0106] The other side of the third steering unit 530 is detachably connected to an extension tube (not illustrated) or the cleaner main body (not illustrated).

[0107] Meanwhile, FIG. 5 is a cross-sectional view for describing a coupling relationship between an agitator cover and a second agitator in a cleaner nozzle according to one embodiment of the present invention, FIG. 6 is a side view for describing a state in which an agitator cover is rotated in a state in which the second agitator is separated from the cleaner nozzle according to one embodiment of the present invention, FIG. 7 is a view for describing a state in which an agitator cover is separated from a nozzle housing in the cleaner nozzle according to one embodiment of the present invention, FIG. 8 is a perspective view for describing the agitator cover in the cleaner nozzle according to one embodiment of the present invention, and FIG. 9 is a view for describing a reducer in the cleaner nozzle according to one embodiment of the present invention.

[0108] The first agitator 200, the second agitator 300, and the agitator cover 400 will be described with reference to FIGS. 5 to 9 as follows.

[0109] The first agitator 200 is installed in the nozzle housing 100 and separates foreign substances from a cleaning target. The first agitator 200 may be rotatably coupled to the nozzle housing 100. The first agitator 200 may be disposed in front of the connecting tube 500.

[0110] The first agitator 200 may be formed in a cylindrical shape and disposed in the left-right direction of the nozzle housing 100. That is, the longitudinal direction

(axial direction) of the first agitator 200 may be disposed in a direction intersecting the front-rear direction of the cleaner nozzle 1.

[0111] An outer circumferential surface of the first agitator 200 may be provided with a brush or a member capable of increasing a friction force.

[0112] The first agitator 200 may receive rotational power from an agitator motor (not illustrated). In this case, the agitator motor (not illustrated) may be accommodated within the first agitator 200. For example, the agitator motor (not illustrated) and the first agitator 200 may be connected to transmit power through a clutch structure, a spline connection, or at least one gear.

[0113] The first agitator 200 may guide external dust and air to the suction port 121 by rotation. The first agitator 200 may rotate in a direction in which the outer circumferential surface facing the floor moves toward the suction port 121. That is, when viewing the cleaner nozzle 1 from the left side of the cleaner nozzle 1, the first agitator 200 may rotate counterclockwise. With this configuration, external dust and air may be guided toward the suction port 121 by friction with the first agitator 200.

[0114] Meanwhile, the first agitator 200 may be replaceably coupled to the nozzle housing 100. Specifically, the first agitator 200 may be coupled to the agitator cover 400, and the agitator cover 400 may be detachably coupled to the nozzle housing 100.

[0115] Accordingly, the first agitator 200 may be replaced and cleaned depending on the cleaning environment.

[0116] The second agitator 300 is installed in the nozzle housing 100 and, together with the first agitator 200, separates foreign substances from the cleaning target. The second agitator 300 may be rotatably coupled to the nozzle housing 100.

[0117] The second agitator 300 may be disposed in front of the first agitator 200. That is, the second agitator 300 may be disposed further away from the suction port 121 than the first agitator 200. In addition, the second agitator 300 may be disposed further away from the connecting tube 500 than the first agitator 200.

[0118] The second agitator 300 may be formed in a cylindrical shape and disposed in the left-right direction of the nozzle housing 100. That is, the longitudinal direction (axial direction) of the second agitator 300 may be disposed parallel to the longitudinal direction (axial direction) of the first agitator 200.

[0119] In the present embodiment, a diameter of the second agitator 300 is smaller than that of the first agitator 200, but is not limited thereto.

[0120] An outer circumferential surface of the second agitator 300 may be formed of a material capable of increasing a friction force.

[0121] The second agitator 300 may receive rotational power from the first agitator 200. Specifically, the second agitator 300 may receive the rotational force of the first agitator 200 through the reducer 460 provided within the agitator cover 400. Accordingly, the second agitator 300

may rotate in conjunction with the first agitator 200.

[0122] In this case, a ratio of a rotational speed of the first agitator 200 to a rotational speed of the second agitator 300 may be determined according to a gear ratio of the reducer 460. Specifically, the rotational speed of the first agitator 200 may be at least ten times higher than the rotational speed of the second agitator 300. For example, when the rotational speed of the first agitator 200 is 3,500 rpm, the rotational speed of the second agitator 300 may be 350 rpm or less. In addition, preferably, when the rotational speed of the first agitator 200 is 3,500 rpm, the rotational speed of the second agitator 300 may be 50 rpm or more and 150 rpm or less.

[0123] With this configuration, the second agitator 300 may be rotated by the agitator motor (not illustrated), and a difference in rotation speed between the first agitator 200 and the second agitator 300 can be significantly increased.

[0124] As a result, the second agitator 300 can maintain a high suction force for foreign substances by applying a high surface pressure.

[0125] That is, when the conventional agitator disposed at the front rotates at high speed, the agitator cannot sufficiently press the surface to be cleaned to sweep foreign substances, and the effect is simply that foreign substances are swept away twice by the two agitators.

[0126] In contrast, the second agitator 300 according to the present invention rotates at a slow speed and thus may rotate while sufficiently pressing the surface to be cleaned and sweep foreign substances with a great force.

[0127] Accordingly, for foreign substances that are not easily cleaned by high-speed rotation, the second agitator 300 may first sweep them, facilitating cleaning, and the first agitator 200 may perform additional cleaning, cleaning the surface to be cleaned.

[0128] In addition, when cleaning relatively large foreign substances, the conventional cleaner nozzles provided with only the high-speed rotating agitator may become caught between the agitator and the ground, thereby preventing the agitator from sweeping the foreign substances, or stopping the agitator's rotation, and ultimately, the user needs to perform additional cleaning operations to clean the foreign substances.

[0129] In contrast, the second agitator 300 of the present invention may rotate with a great force even at a slow rotational speed and can effectively move relatively large foreign substances caught between the second agitator 300 and the ground toward the suction port 121.

[0130] The second agitator 300 may guide external dust and air to the suction port 121 by rotation. The second agitator 300 may rotate in the same direction as the first agitator 200. That is, the second agitator 300 may rotate in a direction in which the outer circumferential surface facing the floor moves toward the suction port 121. With this configuration, external dust and air may be guided toward the first agitator 200 and the suction port

121 by friction with the second agitator 300.

[0131] Meanwhile, FIG. 10 illustrates a graph for describing a relationship between the rotational speed of the second agitator 300 and cleaning performance.

[0132] Referring to FIG. 10, as the rotational speed of the second agitator 300 increases, the cleaning performance for foreign substances increases. In addition, when the rotational speed is a predetermined rotational speed or higher, cleaning performance can be maintained. For example, as illustrated in FIG. 10, the cleaning performance of the cleaner nozzle 1 can be maintained at a rotational speed of 350 rpm or more. This can be interpreted as a result of the faster the second agitator 300 rotates, the faster it sweeps foreign substances.

[0133] Meanwhile, referring to FIG. 10, it can be seen that as the rotational speed of the second agitator 300 increases, the pickup performance on a carpet is degraded. When the surface to be cleaned, such as a carpet, has bristles, friction with the second agitator 300 may increase, and as the rotational speed of the second agitator 300 increases, the second agitator 300 and the carpet may become adsorbed, thereby reducing the airflow toward the suction port 121. Consequently, for the surface to be cleaned formed of a material such as carpet, the foreign substance suction performance of the cleaner nozzle 1 can be degraded as the rotational speed of the second agitator 300 increases.

[0134] Accordingly, when the second agitator 300 rotates at 350 rpm or less as in the present invention (preferably 50 rpm or more and 150 rpm or less), the pickup performance degradation on the carpet can be minimized, and the cleaning performance for foreign substances can be maintained.

[0135] Meanwhile, the second agitator 300 may be replaceably coupled to the nozzle housing 100. Specifically, the second agitator 300 may be detachably coupled to the agitator cover 400 and the nozzle housing 100.

[0136] Specifically, the second agitator 300 may include a second agitator main body 310 and a locking unit 320.

[0137] The second agitator main body 310 may be formed in a hollow cylindrical shape. With this configuration, a weight of the cleaner nozzle 1 can be minimized.

[0138] The locking unit 320 may be accommodated within the second agitator main body 310 and coupled to the agitator cover 400. Specifically, the locking unit 320 may be spline-coupled to a second agitator connection unit 440 of the agitator cover 400 and may receive power applied through the reducer 460.

[0139] The locking unit 320 includes a locking housing 321, a stopper 322, a spring 323, and a locking unit cover 324.

[0140] The locking housing 321 is accommodated within the second agitator main body 310. For example, the locking housing 321 may be formed in a cylindrical shape and fitted into a groove formed in an inner circumferential surface of the second agitator main body 310.

[0141] The stopper 322 may be provided to be movable

in the axial direction of the locking housing 321 and inserted into and coupled to the agitator cover.

[0142] Specifically, the stopper 322 includes an insertion portion 322a formed such that one axial end is spline-coupled into a coupling groove 441 formed in the second agitator connection unit 440. In this case, the one axial end of the stopper 322 may be formed to be inserted to correspond to the shape of the coupling groove 441.

[0143] In addition, the stopper 322 may include a stopper body 322b formed to extend cylindrically from the insertion portion 322a in the axial direction, and a support 322c formed to protrude radially outward from an outer circumferential surface of the stopper body 322b to receive an elastic force from a spring 323 on the other axial end of the stopper body 322b.

[0144] The spring 323 may apply a restoring force to the stopper 322. Specifically, the spring 323 may return the stopper 322 to its original position when the force applied to the stopper 322 is released.

[0145] The locking cover 324 may be coupled to the locking housing 321 and can prevent detachment of the stopper 322. Specifically, the locking cover 324 may be hook-coupled to the locking housing 321 and may accommodate the stopper 322 therein. Accordingly, even when the stopper 322 is moved toward the agitator cover 400 by the spring 323, a movement range of the stopper 322 can be limited.

[0146] With this configuration, when a push button 450 to be described below is pressed by the user, the stopper 322 moves, thereby releasing the coupling between the second agitator 300 and the agitator cover 400.

[0147] Accordingly, in a state in which the agitator cover 400 and the nozzle housing 100 are separated, the second agitator 300 may be separated from the nozzle housing 100.

[0148] Accordingly, the second agitator 300 may be replaced and cleaned depending on the cleaning environment. In addition, the second agitator 300 can be separated and cleaned.

[0149] The agitator cover 400 may be detachably coupled to the nozzle housing 100. Specifically, the agitator cover 400 may be coupled to one side of the nozzle housing 100 in the left-right direction. That is, one surface of the nozzle housing 100 in the left-right direction may be formed in an open shape and coupled to the agitator cover 400, and the other surface of the nozzle housing 100 in the left-right direction may be formed in a closed shape.

[0150] Accordingly, the agitator cover 400 forms the exterior of the cleaner nozzle 1 together with the nozzle housing 100, and the first agitator 200 and the second agitator 300 may be accommodated in an internal space in which the agitator cover 400 and the nozzle housing 100 are coupled.

[0151] The agitator cover 400 includes a cover main body 410, a first agitator connection unit 420, a gear box 430, the second agitator connection unit 440, and the push button 450.

[0152] The cover main body 410 covers the one surface of the nozzle housing 100 in the left-right direction. For example, the cover main body 410 may be formed in a flat shape that covers the one surface of the nozzle housing 100 in the left-right direction. In this case, the shape of the cover main body 410 may be formed to be symmetrical (mirror image) with a portion of the other surface of the nozzle housing 100 in the left-right direction, which faces the cover main body 410.

[0153] The first agitator connection unit 420 may be inserted into and coupled to the first agitator 200 and coupled to the agitator motor (not illustrated) to receive power from the agitator motor (not illustrated).

[0154] Specifically, the first agitator connection unit 420 includes an agitator insertion portion 421 coupled to the inner circumferential surface of the first agitator 200 and coupled to the first agitator 200 and a shaft coupling portion 422 spline-coupled to the shaft of the agitator motor (not illustrated) and rotated together with the shaft of the agitator motor (not illustrated).

[0155] Accordingly, the first agitator connection unit 420 may be coupled to the agitator motor (not illustrated), may receive power from the agitator motor (not illustrated), and rotate together with the first agitator 200.

[0156] The reducer 460 may be accommodated within the agitator cover 400. Specifically, the reducer 460 including at least one gear may be accommodated within the gear box 430 of the agitator cover 400.

[0157] That is, the gear box 430 may be coupled to the cover main body 410 to form a space capable of accommodating a reducer 460 therein.

[0158] The gear box 430 may be formed to protrude into the nozzle housing 100. That is, the gear box 430 may be formed to protrude toward the first agitator 200 and the second agitator 300.

[0159] The gear box 430 may include an input gear box 431 that is provided coaxially with the first agitator connection unit 420 and accommodates a gear that rotates together, an output gear box 432 that accommodates at least a portion of the second agitator connection unit 440, and a connection gear box 433 that connects the input gear box 431 to the output gear box 432.

[0160] Accordingly, the gear housed within the gear box 430 rotates to transmit power applied from the agitator motor (not illustrated) to the second agitator 300, and interference with other components or the like during this process can be blocked.

[0161] Meanwhile, at least one guide rib 434 that guides coupling with the nozzle housing 100 may be formed on an outer perimetric surface of the gear box 430. Specifically, the guide rib 434 may be formed on the outer perimetric surface of the input gear box 431 and formed to protrude in a circumferential direction of the shaft coupling portion 422.

[0162] The guide rib 434 may be mutually supported by a guide rib (not illustrated) formed on the nozzle housing 100. Specifically, in a state in which the agitator cover 400 is coupled to the nozzle housing 100, the guide ribs of the

nozzle housing 100 may be disposed between the cover main body 410 and the guide rib 434. In addition, when two or more guide ribs 434 are formed, a space between the guide ribs 434 is at least greater than the guide ribs of the nozzle housing 100. Accordingly, when the agitator cover 400 is coupled to or separated from the nozzle housing 100, the user may rotate the agitator cover 400 to cause the guide ribs of the nozzle housing 100 to move through the space between the guide ribs 434. On the other hand, in the state in which the agitator cover 400 and the nozzle housing 100 are coupled, the guide rib 434 of the agitator cover 400 and the guide rib of the nozzle housing 100 support each other, thereby preventing detachment of the agitator cover 400.

[0163] Accordingly, when coupled to the nozzle housing 100, the agitator cover 400 may be rotated at a predetermined angle around the first agitator 200 with respect to the nozzle housing 100 and then separated.

[0164] The second agitator connection unit 440 may be coupled to the second agitator 300 and may transmit the rotational force applied from the agitator motor and transmitted to the second agitator 300 through the reducer 460. Specifically, the second agitator connection unit 440 may be accommodated within the gear box 430 and spline-coupled to the second agitator 300. For example, the second agitator connection unit 440 may have gear teeth formed on an outer circumferential surface thereof to receive rotational power, and the coupling groove 441 to which the second agitator 300 is spline-coupled may be formed at the center of rotation. For example, the coupling groove 441 may be formed in a square groove shape, but is not limited thereto.

[0165] The push button 450 may release the coupling between the second agitator 300 and the second agitator connection unit 440 when an external force is applied. Specifically, the push button 450 may release the coupling between the second agitator 300 and the second agitator connection unit 440 by pushing the locking unit 320 accommodated in the coupling groove 441 by an external force.

[0166] Meanwhile, one axial end of the push button 450 includes a button portion 451 that is formed in a plate shape to form the exterior of the cleaner nozzle 1 together with the cover main body 410 and is pressed by the user. For example, the button portion 451 may be circular or oval.

[0167] In this case, the button portion 451 may be accommodated in a button accommodation hole 411 formed in the cover main body 410. In this case, the button accommodation hole 411 may be formed to face the second agitator connection unit 440, and the spring 454 may be provided between the button portion 451 and the second agitator connection unit 440, so that, when the push button 450 is pressed, the push button may be returned to its original position.

[0168] In addition, a catch portion 452 formed to be bent and extended inward from the cleaner nozzle 1 may be formed on a radially outer end portion of the button

portion 451 in the circumferential direction. In this case, the catch portion 452 may be formed in a shape in which a diameter gradually increases as it moves away from the button portion 451. Meanwhile, the button accommodation hole 411 may be formed in a shape in which the diameter gradually decreases outward from the cleaner nozzle 1.

[0169] With this configuration, when the button portion 451 is pressed and then moved outward from the cleaner nozzle 1 by the restoring force of the spring 454, the button portion 451 can be prevented from being separated from the cover main body 410.

[0170] In addition, the push button 450 may include a push portion 453 that moves in a stroke to press the locking unit 320 when an external force is applied. Specifically, the push portion 453 may be formed to protrude from an inner surface (inward from the cleaner nozzle 1) of the button portion 451, and when an external force is applied and the button portion 451 is pressed, the push portion 453 may move together with the button portion 451 to press the locking unit 320 through the second agitator connection unit 440.

[0171] With this configuration, when the push portion 453 presses the locking unit 320, the coupling between the agitator cover 400 and the second agitator 300 may be released, separating the agitator cover 400 from the second agitator 300.

[0172] Accordingly, according to the present invention, the user may separate the second agitator 300 from the agitator cover 400 with just a simple action of pressing the push button 450.

[0173] In addition, after the second agitator 300 and the agitator cover 400 are separated, only the second agitator 300 may be separated from the nozzle housing 100 by rotating the agitator cover 400.

[0174] That is, the agitator cover 400 may be separated from the second agitator 300 while coupled to the first agitator 200.

[0175] Accordingly, according to the present invention, since the user can easily separate the second agitator 300 from the nozzle housing 100, the second agitator 300 can be replaced according to the cleaning environment, and a contaminated second agitator 300 can be cleaned.

[0176] The reducer 460 may include at least one gear to connect the rotational power between the first agitator 200 and the second agitator 300. Specifically, the reducer 460 may include an input gear 461 that is directly connected to the shaft of the agitator motor (not illustrated) or connected and rotated through the first agitator 200, and a connection gear 462 that connects the input gear 461 to the second agitator connection unit 440.

[0177] In this case, a rotational speed ratio of the first agitator 200 and the second agitator 300 may be set by a gear ratio between the input gear 461 and/or the connection gear 462 and the second agitator connection unit 440. In particular, in the present invention, the gear ratio can be preferably set so that the rotational speed of the first agitator 200 is at least ten times higher than the

rotational speed of the second agitator 300.

[0178] Meanwhile, in the present embodiment, the connection gear 462 is provided as three connection gears, but is not limited thereto, and the gear ratio can be set through various combinations of gears

Although the present invention has been described in detail through specific embodiments, this is intended to specifically describe the present invention, and it is apparent that the present invention is not limited thereto, and the present invention can be modified or improved by those skilled in the art without departing from the technical spirit of the present invention.

[0179] All simple modifications or changes of the present invention fall within the scope of the present invention, and the specific scope of the present invention will be made clear by the appended claims.

Claims

1. A cleaner nozzle comprising:

a nozzle housing (100);
a suction port (121) which is formed in the nozzle housing (100) and through which dust-containing air is introduced;
a first agitator (200) accommodated within the nozzle housing (100) and rotatably coupled to the nozzle housing (100); and
a second agitator (300) rotated in conjunction with the first agitator (200),
characterized in that a rotational speed of the first agitator (200) is at least ten times higher than a rotational speed of the second agitator (300).

2. The cleaner nozzle of claim 1, further comprising a reducer (460) connecting the first agitator (200) to the second agitator (300) and including at least one gear.

3. The cleaner nozzle of claim 1, further comprising an agitator motor configured to apply a rotational force to the first agitator (200).

4. The cleaner nozzle of claim 1, wherein the second agitator (300) is disposed further away from the suction port (121) than the first agitator (200).

5. The cleaner nozzle of claim 1, further comprising a connection tube (500) connected to the nozzle housing (100) and having a flow path, which communicates with the suction port (121), formed therein to allow dust to flow toward the main body of the cleaner, wherein the second agitator (300) is disposed further away from the connection tube (500) than the first agitator (200).

6. The cleaner nozzle of claim 1, wherein a diameter of the first agitator (200) is larger than a diameter of the second agitator (300).
7. The cleaner nozzle of claim 1, wherein a rotational direction of the first agitator (200) is the same as a rotational direction of the second agitator (300). 5
8. The cleaner nozzle of claim 1, further comprising an agitator cover (400) which is detachably coupled to the nozzle housing (100) and to which the first agitator (200) and the second agitator (300) are coupled. 10
9. The cleaner nozzle of claim 8, further comprising a reducer (460) connecting the first agitator (200) to the second agitator (300) and including at least one gear, wherein the reducer (460) is accommodated within the agitator cover (400). 15 20
10. The cleaner nozzle of claim 8, further comprising an agitator motor configured to apply a rotational force to the first agitator (200), wherein the agitator motor is accommodated within the first agitator (200). 25

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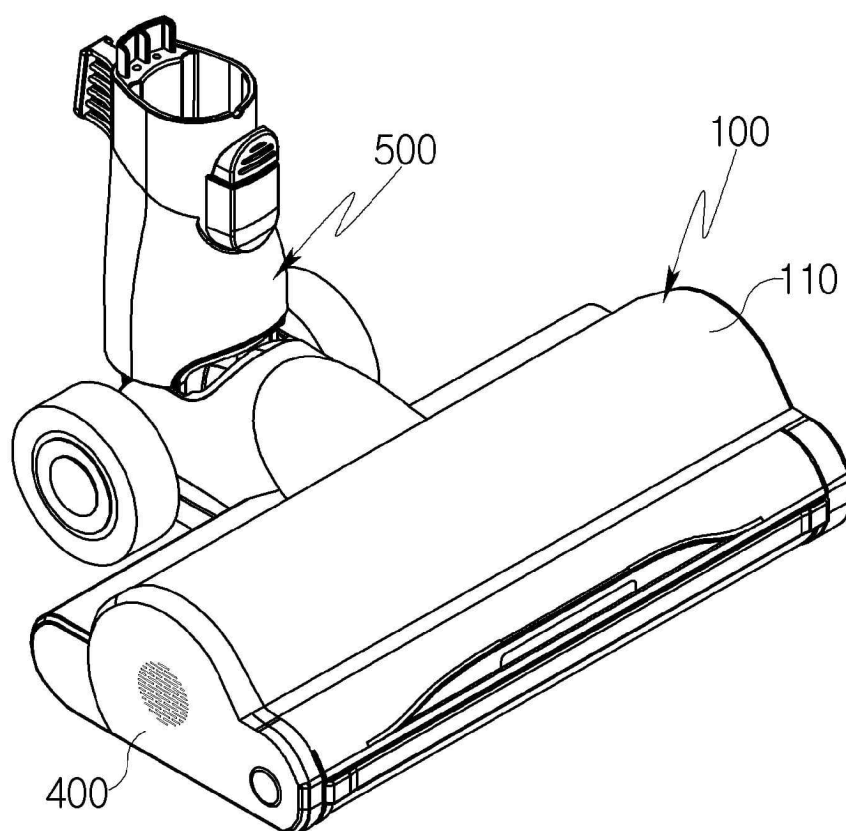
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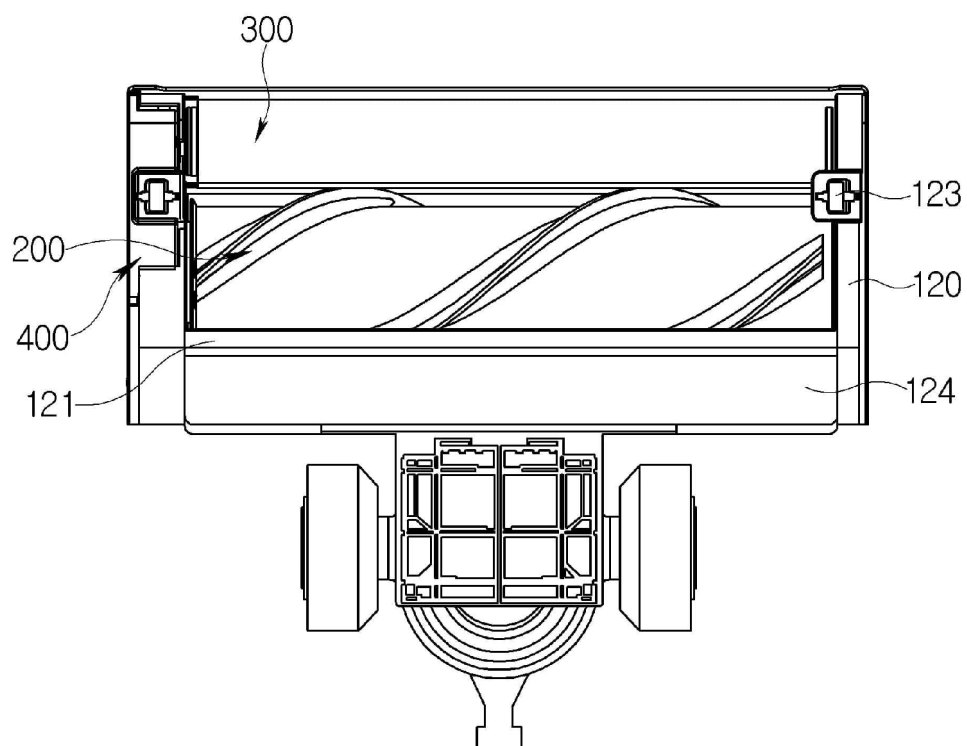
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[FIG. 1]

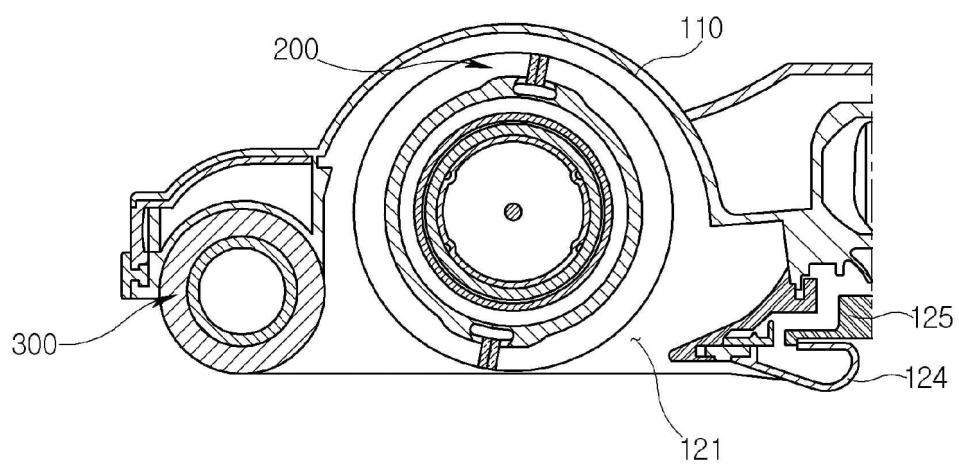
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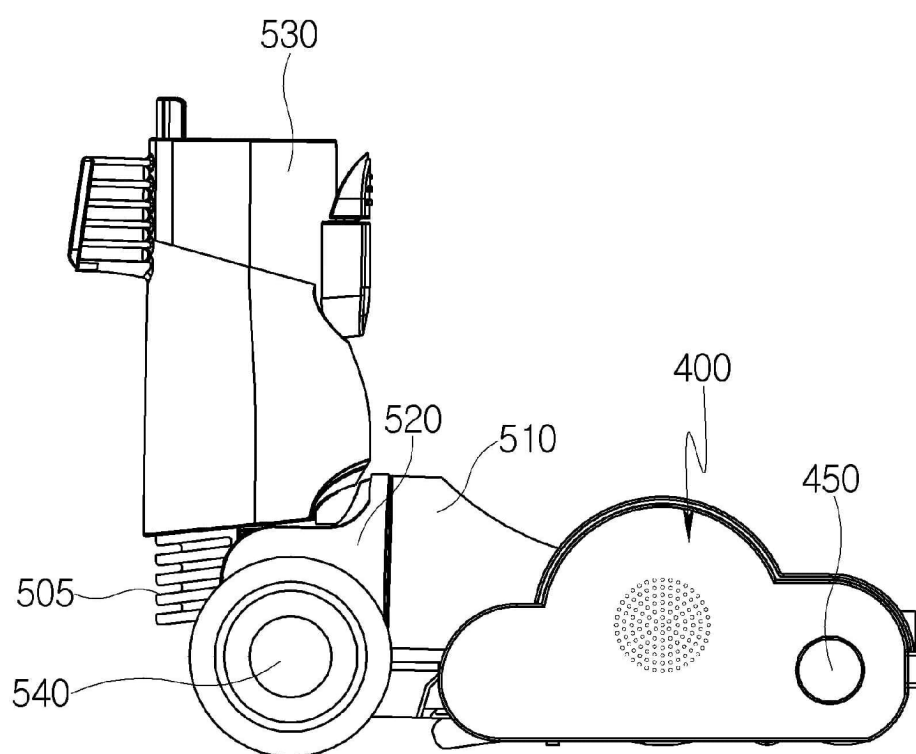
[FIG. 2]



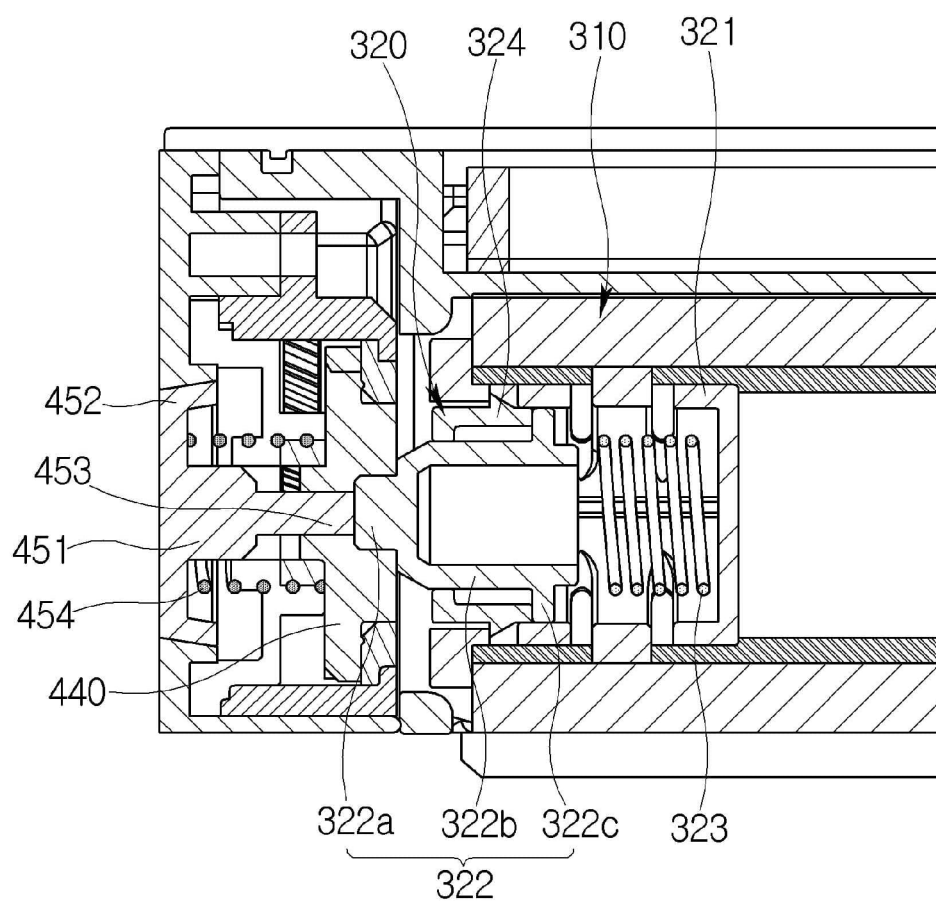
[FIG. 3]



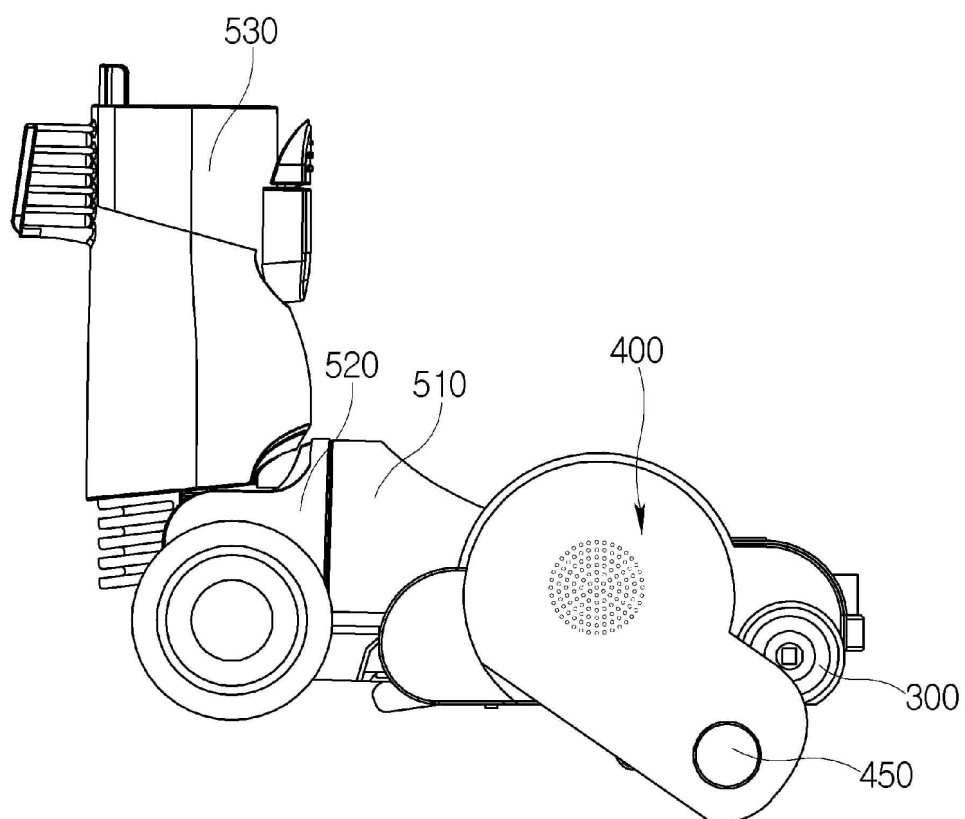
[FIG. 4]



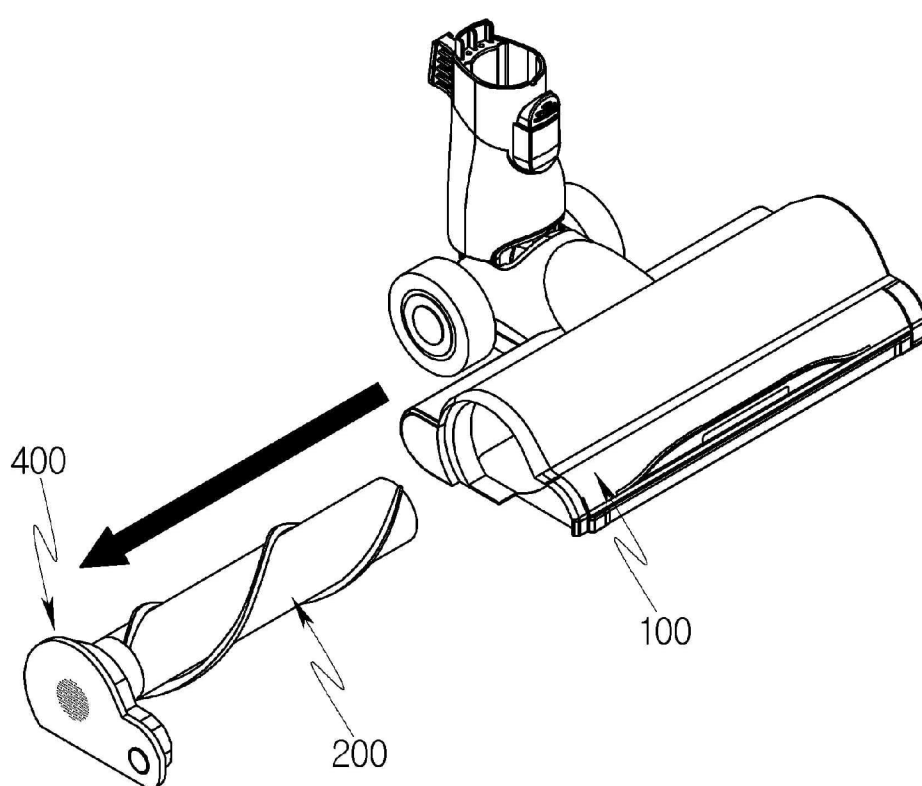
[FIG. 5]



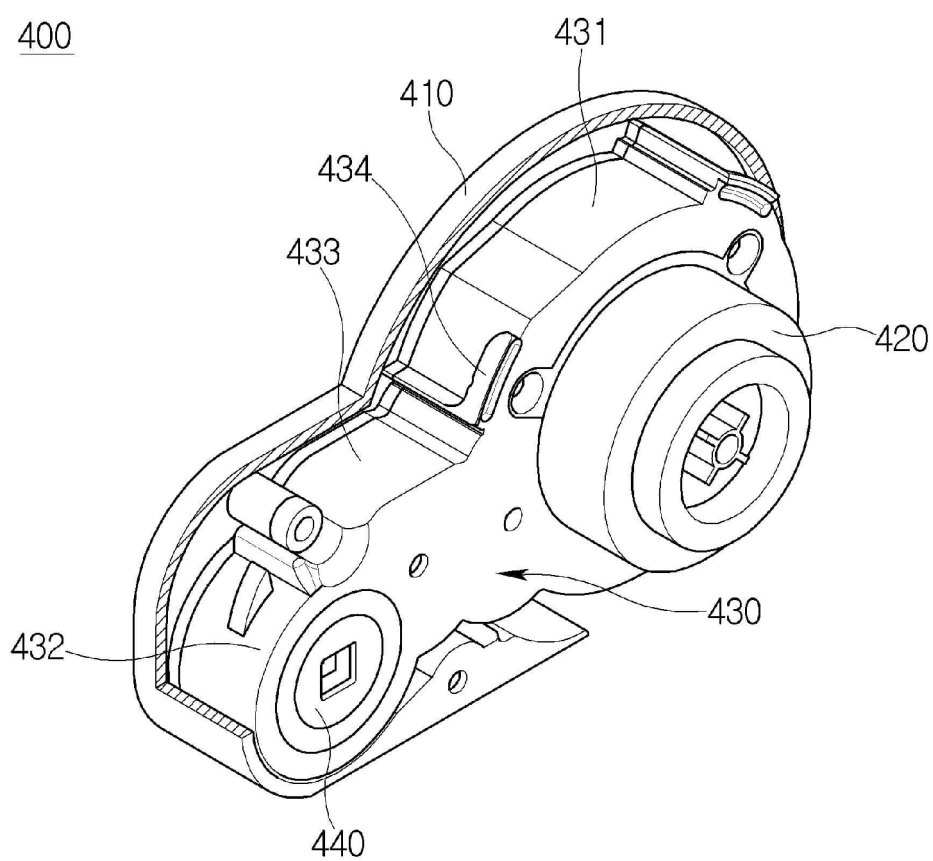
[FIG. 6]



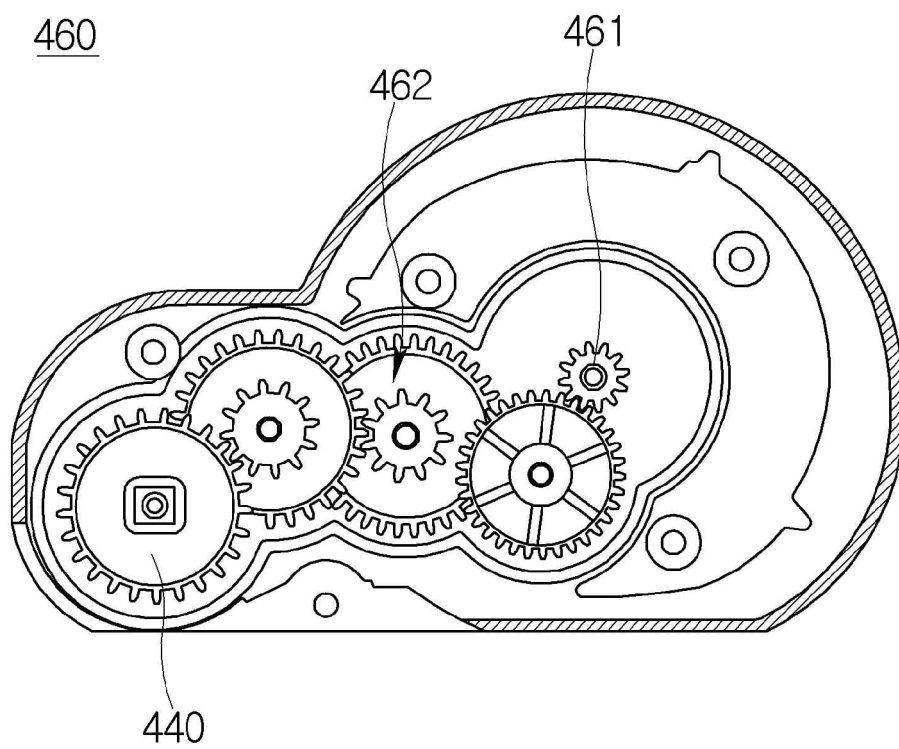
[FIG. 7]



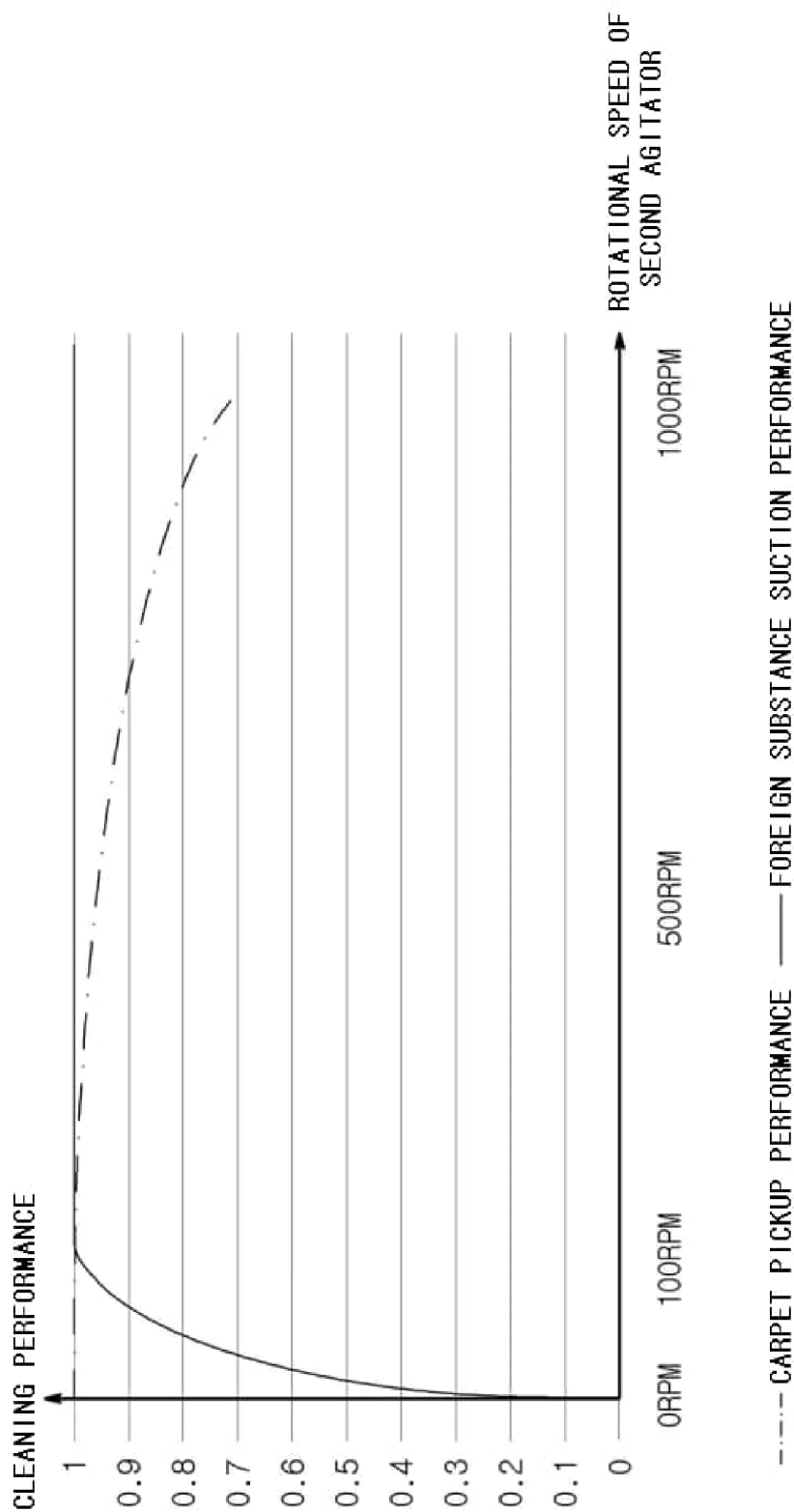
[FIG. 8]



[FIG. 9]



[FIG. 10]



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2024/012465

A. CLASSIFICATION OF SUBJECT MATTER

A47L 9/04(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A47L 9/04(2006.01); A47L 9/02(2006.01); A47L 9/06(2006.01); A47L 9/28(2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models: IPC as above

Japanese utility models and applications for utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & keywords: 청소기(vacuum cleaner), 노즐(nozzle), 헤드(head), 브러시(brush), 아지테이터(agitator), 회전 속도(rotation speed), 회전 방향(rotation direction), 듀얼(dual), 기어(gear), 감속기(reducer), 커버(cover)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	JP 2019-514661 A (LUPE TECHNOLOGY LIMITED) 06 June 2019 (2019-06-06) See paragraph [0054] and figure 3.	1-10
Y	KR 10-2369190 B1 (LG ELECTRONICS INC.) 02 March 2022 (2022-03-02) See paragraph [0180] and figures 7 and 11.	7
A	JP 2018-110855 A (DYSON TECHNOLOGY LTD.) 19 July 2018 (2018-07-19) See paragraphs [0013]-[0014] and figures 1-3.	1-10
A	JP 2020-039697 A (SHARP CORP.) 19 March 2020 (2020-03-19) See paragraphs [0043]-[0044] and figures 1-3.	1-10

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

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“P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

“&” document member of the same patent family

Date of the actual completion of the international search

10 December 2024

Date of mailing of the international search report

10 December 2024

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon Building 4, 189 Cheongsaro, Seo-gu, Daejeon 35208

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Authorized officer

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/KR2024/012465

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