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(54) **VACUUM CLEANER**

(57) A vacuum cleaner, comprising: a housing ; a motor unit provided in the housing and used for generating suction force; a dust cup provided on the housing and used for collecting sucked particles, the dust cup comprising a suction inlet; a battery for supplying power to the vacuum cleaner; a handle located on the housing ; and a suction pipe unit having a storage state, wherein under the storage state, the suction pipe unit extends from the suction inlet on one side of the dust cup, across the handle , and to the other side of the dust cup along the length direction of the handle. The motor unit and the dust cup are located on the same straight line direction; the battery is provided on a side of the housing. The layout of the whole machine components of the present vacuum cleaner is optimized, and the performance of the vacuum cleaner is guaranteed under the premise of miniaturization.

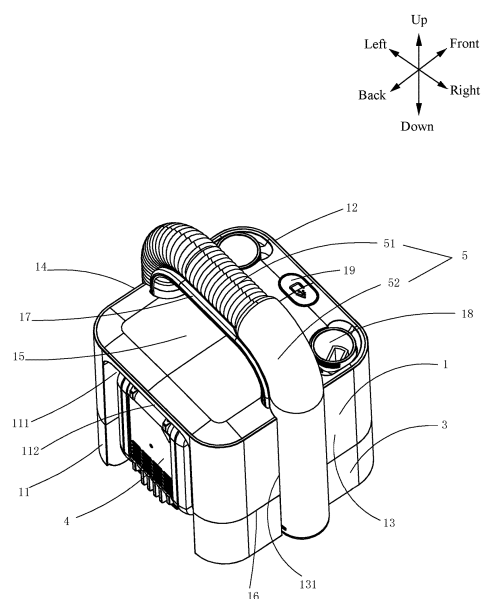


FIG. 1

Description

BACKGROUND

Technical Field

[0001] The present embodiments belong to the field of cleaning technologies, and in particular, to a vacuum cleaner.

Related Art

[0002] Most of the existing vacuum cleaners are in a form of a handheld, bucket, or box vacuum cleaner incapable of storing accessories or hoses. When a vacuum cleaner is in a storage state, none of the hoses, the accessories, and the like of the vacuum cleaner can be stored in the main body portion of the vacuum cleaner, to miniaturize the entire vacuum cleaner, resulting in inconvenience in storing, moving, or carrying the vacuum cleaner. While a vacuum cleaner is miniaturized and performance is ensured, in most cases, hoses, accessories, and the like of the vacuum cleaner are all connected to the suction port of the vacuum cleaner. Consequently, connecting components of the entire vacuum cleaner are uneasy to gather together. Secondly, although hoses or accessories of most of the vacuum cleaners are detachably mounted, the hoses or accessories after disassembly still need to be carried additionally, and cannot be stored into the main body portion of the vacuum cleaner.

SUMMARY

[0003] To resolve problems existing in the prior art, the present embodiments provide a vacuum cleaner, to optimize the layout of components of the entire vacuum cleaner, and ensure performance of the vacuum cleaner while miniaturizing the vacuum cleaner.

[0004] To achieve the foregoing objective, the present embodiments include the following technical solution:
A vacuum cleaner, comprising:

a housing, including an upper end surface; a motor unit, disposed inside the housing and configured to produce a suction force; a dust cup, disposed on the housing and configured to collect particles that are sucked in, where the dust cup includes a suction port; a battery, configured to supply power for the vacuum cleaner; a handle, located on the housing; and

a suction pipe unit having a storage state, where in the storage state, the suction pipe unit extends from the suction port on one side of the dust cup over the handle and extends along a length direction of the handle to an other side of the dust cup, where

the motor unit and the dust cup are arranged along an axial direction of the motor unit, and the battery is disposed on one side of the housing.

[0005] Further, the upper end surface is provided with an accessory storage recess, and the accessory storage recess extending along the axial direction of the motor unit is provided between the motor unit and at least one side wall of the housing.

[0006] Further, a corner between two adjacent side walls of the housing is provided with the accessory storage recess.

[0007] Further, the housing includes a lower end surface opposite to the upper end surface, the dust cup is disposed on the lower end surface, the dust cup includes a dust-cup outer wall and a dust collection and separation cavity, a gap space is provided between the dust-cup outer wall and an inner wall of the dust collection and separation cavity, and the accessory storage recess extends into the gap space.

[0008] Further, the battery is exposed from the housing, one side of the vacuum cleaner includes a recessed portion, and the battery is accommodated in the recessed portion.

[0009] Further, a top portion is disposed on the recessed portion, and the top portion is located below the upper end surface.

[0010] Further, the recessed portion includes a first recessed portion and a second recessed portion, the first recessed portion is formed through depression of the housing, and the second recessed portion is formed through depression of the dust cup.

[0011] Further, the dust cup includes a dust dumping cover and a fastener for locking the dust dumping cover, the vacuum cleaner further includes a dust dumping button that controls the dust dumping cover to open and an intermediate rod located between the dust dumping button and the dust dumping cover, the dust dumping button is located on the upper end surface, the dust dumping cover is located on a lower bottom surface of the dust cup, one end of the intermediate rod is fixedly connected to the dust dumping button, an other end of the intermediate rod corresponds to a position of the fastener, and under the action of the dust dumping button, the intermediate rod is capable of abutting against the fastener to control the dust dumping cover to open.

[0012] Further, the suction pipe unit includes a hose and a rigid pipe configured for gripping, and one end of the hose is at least partially retractable into the rigid pipe.

[0013] Further, the housing includes a first pipe groove and an air outlet located at a position of the first pipe groove, a magnet is disposed at the first pipe groove, an attracted member is disposed on one end of the suction pipe unit, and when the one end of the suction pipe unit is stored in the first pipe groove, the one end of the suction pipe unit covers the air outlet, and the magnet attracts the attracted member.

[0014] To achieve the foregoing objective, the present

embodiments include the following technical solution:

A vacuum cleaner, comprising:

a housing, including an upper end surface and a lower end surface opposite to each other; a motor unit, disposed inside the housing and configured to produce a suction force; a dust cup, disposed on the housing and configured to collect particles that are sucked in; a battery, configured to supply power for the vacuum cleaner; and a handle, located above an upper end surface; and

a suction pipe unit having a storage state, where in the storage state, the suction pipe unit at least partially bypasses the upper end surface, where

the motor unit and the dust cup are located in the same straight-line direction, and the battery is disposed on one side of the housing; and

the vacuum cleaner has a length range of 150 mm to 200 mm, a width range of 160 mm to 200 mm, and a height range of 220 mm to 250 mm, and the vacuum cleaner has a suction power range of 15 W to 50 W.

[0015] Further, a height of the handle relative to the upper end surface ranges from 20 mm to 40 mm.

[0016] Further, a height proportion of the housing to the dust cup ranges from 1.5:1 to 2.5:1.

[0017] Further, a width by which the suction pipe unit is exposed relative to a side wall of the housing ranges from 12 mm to 35 mm.

[0018] Further, a ratio of the diameter of the suction pipe unit to the diameter of the dust cup, or the length of the dust cup, or the width of the dust cup ranges from 0.3:1 to 0.4:1.

[0019] Further, the motor unit has a motor power range of 130 W to 220 W.

[0020] Further, the vacuum cleaner has a vacuum range of 8 kPa to 20 kPa.

[0021] Further, the vacuum cleaner has a flow rate range of 10 l/s to 25 l/s.

[0022] Further, the dust cup has an effective volume range of 0.1 L to 0.5 L.

[0023] Further, the suction pipe unit includes a rigid pipe and a hose that is at least partially retractable into the rigid pipe, the hose has a length range of 240 mm to 400 mm, and the hose has a working radius range of 0.9 m to 1.6 m.

[0024] To achieve the foregoing objective, the present embodiments include the following technical solution:

A vacuum cleaner, comprising:

a housing, including an upper end surface; a motor unit, disposed inside the housing and configured to produce a suction force; a dust cup, configured to collect particles that are sucked in, where the dust cup includes a suction port; and a battery, configured

to supply power for the vacuum cleaner, where

the motor unit and the dust cup are arranged along an axial direction of the motor unit; and

the upper end surface is provided with an accessory storage recess.

[0025] Further, the accessory storage recess extending along the axial direction of the motor unit is provided between the motor unit and at least one side wall of the housing.

[0026] Further, a corner between two adjacent side walls of the housing is provided with the accessory storage recess.

[0027] Further, the battery is disposed on one side of the housing, and the accessory storage recess is provided on an other side of the housing opposite to the battery.

[0028] Further, the vacuum cleaner includes a handle located on the upper end surface, the handle is provided with a grip region, and the battery and the accessory storage recess are respectively provided on two sides of the grip region.

[0029] Further, the accessory storage recess extends from the upper end surface into the housing, and an extending direction of the accessory storage recess and an axis of the motor unit are parallel to each other.

[0030] Further, the housing includes a lower end surface opposite to the upper end surface, the dust cup is disposed on the lower end surface, and the accessory storage recess extends into the dust cup.

[0031] Further, the dust cup includes a dust-cup outer wall and a dust collection and separation cavity, a gap space is provided between the dust-cup outer wall and an inner wall of the dust collection and separation cavity, and the accessory storage recess extends into the gap space.

[0032] Further, the battery is disposed on one side of the housing, the battery is detachable from the housing, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the battery adapter, and a sliding direction of the battery is parallel to the axis of the motor unit.

[0033] Further, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the battery adapter, and a sliding direction of the battery is toward the upper end surface.

[0034] Further, the vacuum cleaner includes a recessed portion, and the battery is accommodated in the recessed portion.

[0035] Further, the recessed portion includes a first recessed portion and a second recessed portion, the first recessed portion is formed through depression of the housing, and the second recessed portion is formed through depression of the dust cup.

[0036] Further, the axis of the motor unit and an axis of the dust cup are parallel to each other.

[0037] Further, the vacuum cleaner includes a handle

located on the housing, the handle straddles the upper end surface, the vacuum cleaner includes a suction pipe unit, and in a storage state, the suction pipe unit extends from the suction port on one side of the dust cup over the handle and extends along a length direction of the handle to an other side of the dust cup.

[0038] Further, a pipe groove unit capable of storing the suction pipe unit is formed on the housing or inside the housing, the housing includes a third side wall and a fourth side wall that are located on two sides of the handle and that are opposite to each other, the pipe groove unit includes: a first pipe groove formed on the third side wall and a second pipe groove formed on the fourth side wall, one end of the suction pipe unit is engageable in the first pipe groove, an other end of the suction pipe unit is engageable in the second pipe groove, and a middle portion of the suction pipe unit bypasses the upper end surface.

[0039] Further, a magnet is disposed at the first pipe groove of the third side wall, an attracted member is disposed on one end of the suction pipe unit, and when the one end of the suction pipe unit is stored in the first pipe groove, the magnet attracts the attracted member.

[0040] Further, the suction pipe unit includes a hose and a rigid pipe configured for gripping, and one end of the hose is at least partially retractable into the rigid pipe.

[0041] Further, the vacuum cleaner further includes a fixed pipe mounted at the suction port, where an other end of the hose is rotatable relative to the fixed pipe.

[0042] Further, an end portion of the other end of the hose is connected to a rigid connector, a fixed ring with a notch is disposed on an outer side wall of the connector, the connector is rotatable relative to the fixed ring, an outer side of the fixed ring includes a fastener portion, and an inner side wall of the fixed pipe is provided with a fastener groove matching the fastener portion.

[0043] Further, a third pipe groove is formed on one side of the handle away from the housing, and the hose is engageable in the third pipe groove.

[0044] Further, the dust cup includes a dust dumping cover for supporting the vacuum cleaner, the vacuum cleaner further includes a dust dumping button that controls the dust dumping cover to open, and the dust dumping button is disposed on the upper end surface.

[0045] Further, the vacuum cleaner further includes a fastener for locking the dust dumping cover, an intermediate rod located between the dust dumping button and the dust dumping cover, one end of the intermediate rod is fixedly connected to the dust dumping button, an other end of the intermediate rod corresponds to a position of the fastener, and under the action of the dust dumping button, the intermediate rod is capable of abutting against the fastener to control the dust dumping cover to open.

[0046] To achieve the foregoing objective, the present embodiments include the following technical solution:

A vacuum cleaner, comprising:

a housing, including an upper end surface; a motor unit, disposed inside the housing and configured to

produce a suction force; a dust cup, disposed on the housing and configured to collect particles that are sucked in, where the dust cup includes a suction port; a battery, configured to supply power for the vacuum cleaner; and a handle, located on the housing, where the handle is connected to the upper end surface;

the motor unit and the dust cup are arranged along an axial direction of the motor unit; and

the housing is provided with an accessory storage recess, and an extending direction of the accessory storage recess and an axis of the motor unit are parallel to each other.

[0047] Further, the accessory storage recess extending along the axial direction of the motor unit is provided between the motor unit and at least one side wall of the housing.

[0048] Further, a corner between two adjacent side walls of the housing is provided with the accessory storage recess.

[0049] Further, the battery is disposed on one side of the housing, and the accessory storage recess is provided on an other side of the housing opposite to the battery.

[0050] Further, the handle is provided with a grip region, and the battery and the accessory storage recess are respectively provided on two sides of the grip region.

[0051] Further, the housing includes a lower end surface opposite to the upper end surface, the dust cup is disposed on the lower end surface, and the accessory storage recess extends into the dust cup.

[0052] Further, the dust cup includes a dust-cup outer wall and a dust collection and separation cavity, a gap space is provided between the dust-cup outer wall and an inner wall of the dust collection and separation cavity, and the accessory storage recess extends into the gap space.

[0053] Further, the battery is disposed on one side of the housing, the battery is detachable from the housing, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the battery adapter, and a sliding direction of the battery is parallel to the axis of the motor unit.

[0054] Further, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the battery adapter, and a sliding direction of the battery is toward the upper end surface.

[0055] Further, the vacuum cleaner includes a recessed portion, and the battery is accommodated in the recessed portion.

[0056] Further, the recessed portion includes a first recessed portion and a second recessed portion, the first recessed portion is formed through depression of the housing, and the second recessed portion is formed through depression of the dust cup.

[0057] Further, the axis of the motor unit and an axis

of the dust cup are parallel to each other.

[0058] Further, the handle straddles the upper end surface, the vacuum cleaner includes a suction pipe unit, and in a storage state, the suction pipe unit extends from the suction port on one side of the dust cup over the handle and extends along a length direction of the handle to an other side of the dust cup.

[0059] Further, a pipe groove unit capable of storing the suction pipe unit is formed on the housing or inside the housing, the housing includes a third side wall and a fourth side wall that are located on two sides of the handle and that are opposite to each other, the pipe groove unit includes: a first pipe groove formed on the third side wall and a second pipe groove formed on the fourth side wall, one end of the suction pipe unit is engageable in the first pipe groove, an other end of the suction pipe unit is engageable in the second pipe groove, and a middle portion of the suction pipe unit bypasses the upper end surface.

[0060] Further, a magnet is disposed at the first pipe groove of the third side wall, an attracted member is disposed on one end of the suction pipe unit, and when the one end of the suction pipe unit is stored in the first pipe groove, the magnet attracts the attracted member.

[0061] Further, the suction pipe unit includes a hose and a rigid pipe configured for gripping, and one end of the hose is at least partially retractable into the rigid pipe.

[0062] Further, the vacuum cleaner further includes a fixed pipe mounted at the suction port, where an other end of the hose is rotatable relative to the fixed pipe.

[0063] Further, an end portion of the other end of the hose is connected to a rigid connector, a fixed ring with a notch is disposed on an outer side wall of the connector, the connector is rotatable relative to the fixed ring, an outer side of the fixed ring includes a fastener portion, and an inner side wall of the fixed pipe is provided with a fastener groove matching the fastener portion.

[0064] Further, a third pipe groove is formed on one side of the handle away from the housing, and the hose is engageable in the third pipe groove.

[0065] Further, the dust cup includes a dust dumping cover for supporting the vacuum cleaner, the vacuum cleaner further includes a dust dumping button that controls the dust dumping cover to open, and the dust dumping button is disposed on the upper end surface.

[0066] Further, the vacuum cleaner further includes a fastener for locking the dust dumping cover, an intermediate rod located between the dust dumping button and the dust dumping cover, one end of the intermediate rod is fixedly connected to the dust dumping button, an other end of the intermediate rod corresponds to a position of the fastener, and under the action of the dust dumping button, the intermediate rod is capable of abutting against the fastener to control the dust dumping cover to open.

[0067] To achieve the foregoing objective, the present embodiments include the following technical solutions: A vacuum cleaner, comprising:

a housing, including an upper end surface; a motor

unit, disposed inside the housing and configured to produce a suction force; a dust cup, disposed on the housing and configured to collect particles that are sucked in, where the dust cup includes a suction port; a battery, configured to supply power for the vacuum cleaner; and a handle, located on the housing, where the handle is connected to the upper end surface;

the motor unit and the dust cup are arranged along an axial direction of the motor unit; and

the housing is provided with an accessory storage recess, and an extending direction of the accessory storage recess and an axis of the dust cup are parallel to each other.

[0068] Further, the accessory storage recess extending along the axial direction of the motor unit is provided between the motor unit and at least one side wall of the housing.

[0069] Further, a corner between two adjacent side walls of the housing is provided with the accessory storage recess.

[0070] Further, the battery is disposed on one side of the housing, and the accessory storage recess is provided on an other side of the housing opposite to the battery.

[0071] Further, the handle is provided with a grip region, and the battery and the accessory storage recess are respectively provided on two sides of the grip region.

[0072] Further, the extending direction of the accessory storage recess and an axis of the motor unit are parallel to each other.

[0073] Further, the housing includes a lower end surface opposite to the upper end surface, the dust cup is disposed on the lower end surface, and the accessory storage recess extends into the dust cup.

[0074] Further, the dust cup includes a dust-cup outer wall and a dust collection and separation cavity, a gap space is provided between the dust-cup outer wall and an inner wall of the dust collection and separation cavity, and the accessory storage recess extends into the gap space.

[0075] Further, the battery is disposed on one side of the housing, the battery is detachable from the housing, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the battery adapter, and a sliding direction of the battery is parallel to the axis of the motor unit.

[0076] Further, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the battery adapter, and a sliding direction of the battery is toward the upper end surface.

[0077] Further, the vacuum cleaner includes a recessed portion, and the battery is accommodated in the recessed portion.

[0078] Further, the recessed portion includes a first recessed portion and a second recessed portion, the first

recessed portion is formed through depression of the housing, and the second recessed portion is formed through depression of the dust cup.

[0079] Further, the axis of the motor unit and an axis of the dust cup are parallel to each other.

[0080] Further, the handle straddles the upper end surface, the vacuum cleaner includes a suction pipe unit, and in a storage state, the suction pipe unit extends from the suction port on one side of the dust cup over the handle and extends along a length direction of the handle to an other side of the dust cup.

[0081] Further, a pipe groove unit capable of storing the suction pipe unit is formed on the housing or inside the housing, the housing includes a third side wall and a fourth side wall that are located on two sides of the handle and that are opposite to each other, the pipe groove unit includes: a first pipe groove formed on the third side wall and a second pipe groove formed on the fourth side wall, one end of the suction pipe unit is engageable in the first pipe groove, an other end of the suction pipe unit is engageable in the second pipe groove, and a middle portion of the suction pipe unit bypasses the upper end surface.

[0082] Further, a magnet is disposed at the first pipe groove of the third side wall, an attracted member is disposed on one end of the suction pipe unit, and when the one end of the suction pipe unit is stored in the first pipe groove, the magnet attracts the attracted member.

[0083] Further, the suction pipe unit includes a hose and a rigid pipe configured for gripping, and one end of the hose is at least partially retractable into the rigid pipe.

[0084] Further, the vacuum cleaner further includes a fixed pipe mounted at the suction port, where an other end of the hose is rotatable relative to the fixed pipe.

[0085] Further, an end portion of the other end of the hose is connected to a rigid connector, a fixed ring with a notch is disposed on an outer side wall of the connector, the connector is rotatable relative to the fixed ring, an outer side of the fixed ring includes a fastener portion, and an inner side wall of the fixed pipe is provided with a fastener groove matching the fastener portion.

[0086] Further, a third pipe groove is formed on one side of the handle away from the housing, and the hose is engageable in the third pipe groove.

[0087] Further, the dust cup includes a dust dumping cover for supporting the vacuum cleaner, the vacuum cleaner further includes a dust dumping button that controls the dust dumping cover to open, and the dust dumping button is disposed on the upper end surface.

[0088] Further, the vacuum cleaner further includes a fastener for locking the dust dumping cover, an intermediate rod located between the dust dumping button and the dust dumping cover, one end of the intermediate rod is fixedly connected to the dust dumping button, an other end of the intermediate rod corresponds to a position of the fastener, and under the action of the dust dumping button, the intermediate rod is capable of abutting against the fastener to control the dust dumping cover to open. To achieve the foregoing objective, the present embod-

iments include the following technical solution:

A vacuum cleaner, comprising:

a housing, including an upper end surface; a motor unit, disposed inside the housing and configured to produce a suction force; a dust cup, disposed on the housing and configured to collect particles that are sucked in, where the dust cup includes a suction port; a battery, configured to supply power for the vacuum cleaner; a handle, located on the housing, where the handle includes a grip region and a connection region; and a switch, configured to control the vacuum cleaner to start or shut down, where the switch includes a control button;

the motor unit and the dust cup are arranged along an axial direction of the motor unit; and

the switch is disposed in the connection region and is located above the upper end surface.

[0089] Further, the handle is located on the upper end surface, the connection region is connected to the upper end surface, and the switch is disposed at a position at which the handle is connected to the upper end surface.

[0090] Further, the handle and the housing enclose a grip space, and the control button faces an outer side of the handle and is away from the grip space.

[0091] Further, the housing is provided with an accessory storage recess, and an extending direction of the accessory storage recess and an axis of the motor unit are parallel to each other.

[0092] Further, the accessory storage recess extending along the axial direction of the motor unit is provided between the motor unit and at least one side wall of the housing.

[0093] Further, a corner between two adjacent side walls of the housing is provided with the accessory storage recess.

[0094] Further, the battery is disposed on one side of the housing, and the accessory storage recess is provided on an other side of the housing opposite to the battery.

[0095] Further, the handle is provided with a grip region, and the battery and the accessory storage recess are respectively provided on two sides of the grip region.

[0096] Further, the housing includes a lower end surface opposite to the upper end surface, the dust cup is disposed on the lower end surface, and the accessory storage recess extends into the dust cup.

[0097] Further, the dust cup includes a dust-cup outer wall and a dust collection and separation cavity, a gap space is provided between the dust-cup outer wall and an inner wall of the dust collection and separation cavity, and the accessory storage recess extends into the gap space.

[0098] Further, the housing is provided with an accessory storage recess, and the accessory storage recess extends in a direction perpendicular to the upper end

surface.

[0099] Further, the battery is disposed on one side of the housing, the battery is detachable from the housing, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the battery adapter, and a sliding direction of the battery is parallel to the axis of the motor unit.

[0100] Further, the battery is detachable from the housing, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the battery adapter, and a sliding direction of the battery is toward the upper end surface.

[0101] Further, the vacuum cleaner includes a recessed portion, and the battery is accommodated in the recessed portion.

[0102] Further, the recessed portion includes a first recessed portion and a second recessed portion, the first recessed portion is formed through depression of the housing, and the second recessed portion is formed through depression of the dust cup.

[0103] Further, the axis of the motor unit and an axis of the dust cup are parallel to each other.

[0104] Further, the vacuum cleaner includes a suction pipe unit, and in a storage state, the suction pipe unit extends from the suction port on one side of the dust cup over the handle and extends along a length direction of the handle to an other side of the dust cup.

[0105] Further, a pipe groove unit capable of storing the suction pipe unit is formed on the housing or inside the housing, the housing includes a third side wall and a fourth side wall that are located on two sides of the handle and that are opposite to each other, the pipe groove unit includes: a first pipe groove formed on the third side wall and a second pipe groove formed on the fourth side wall, one end of the suction pipe unit is engageable in the first pipe groove, an other end of the suction pipe unit is engageable in the second pipe groove, and a middle portion of the suction pipe unit bypasses the upper end surface.

[0106] Further, a magnet is disposed at the first pipe groove of the third side wall, an attracted member is disposed on one end of the suction pipe unit, and when the one end of the suction pipe unit is stored in the first pipe groove, the magnet attracts the attracted member.

[0107] Further, the suction pipe unit includes a hose and a rigid pipe configured for gripping, and one end of the hose is at least partially retractable into the rigid pipe.

[0108] Further, the vacuum cleaner further includes a fixed pipe mounted at the suction port, where an other end of the hose is rotatable relative to the fixed pipe.

[0109] Further, an end portion of the other end of the hose is connected to a rigid connector, a fixed ring with a notch is disposed on an outer side wall of the connector, the connector is rotatable relative to the fixed ring, an outer side of the fixed ring includes a fastener portion, and an inner side wall of the fixed pipe is provided with a fastener groove matching the fastener portion.

[0110] Further, a third pipe groove is formed on one side of the handle away from the housing, and the hose

is engageable in the third pipe groove.

[0111] Further, the housing includes a lower end surface opposite to the upper end surface, the dust cup includes a dust dumping cover located below the lower end surface, the vacuum cleaner further includes a dust dumping button that controls the dust dumping cover to open, and the dust dumping button is disposed on the upper end surface.

[0112] Further, the vacuum cleaner further includes a fastener for locking the dust dumping cover, an intermediate rod located between the dust dumping button and the dust dumping cover, one end of the intermediate rod is fixedly connected to the dust dumping button, an other end of the intermediate rod corresponds to a position of the fastener, and under the action of the dust dumping button, the intermediate rod is capable of abutting against the fastener to control the dust dumping cover to open.

[0113] To achieve the foregoing objective, the present embodiments include the following technical solution:

A vacuum cleaner, comprising:

a housing; a motor unit, disposed inside the housing and configured to produce a suction force; a dust cup, disposed on the housing and configured to collect particles that are sucked in, where the dust cup includes a suction port;

the motor unit and the dust cup are arranged along an axial direction of the motor unit; and

the dust cup includes a dust dumping cover, the vacuum cleaner further includes a dust dumping button that controls the dust dumping cover to open, and the dust dumping button is disposed away from the dust dumping cover.

[0114] Further, the dust dumping button is located on an outer surface of the housing.

[0115] Further, the housing includes an upper end surface, and the dust dumping button is located on upper end surface.

[0116] Further, the dust dumping cover is located on a lower bottom surface of the dust cup, and the dust dumping button is located above and away from the dust dumping cover.

[0117] Further, the dust cup includes a fastener for locking the dust dumping cover, the vacuum cleaner further includes an intermediate rod located between the dust dumping button and the dust dumping cover, one end of the intermediate rod is fixedly connected to the dust dumping button, an other end of the intermediate rod corresponds to a position of the fastener, and under the action of the dust dumping button, the intermediate rod is capable of abutting against the fastener to control the dust dumping cover to open.

[0118] Further, the housing is provided with an accessory storage recess, and an extending direction of the accessory storage recess and an axis of the motor unit

are parallel to each other.

[0119] Further, the accessory storage recess extending along the axial direction of the motor unit is provided between the motor unit and at least one side wall of the housing.

[0120] Further, a corner between two adjacent side walls of the housing is provided with the accessory storage recess.

[0121] Further, the battery is disposed on one side of the housing, and the accessory storage recess is provided on an other side of the housing opposite to the battery.

[0122] Further, the vacuum cleaner includes a handle located on the housing, the housing includes an upper end surface, the handle straddles the upper end surface, the handle is provided with a grip region, the battery and the accessory storage recess are respectively provided on two sides of the grip region, and the dust dumping button is away from the grip region.

[0123] Further, the housing includes a lower end surface opposite to the upper end surface, the dust cup is disposed on the lower end surface, and the accessory storage recess extends into the dust cup.

[0124] Further, the dust cup includes a dust-cup outer wall and a dust collection and separation cavity, a gap space is provided between the dust-cup outer wall and an inner wall of the dust collection and separation cavity, and the accessory storage recess extends into the gap space.

[0125] Further, the housing includes an upper end surface, the upper end surface is provided with an accessory storage recess, and the accessory storage recess extends in a direction perpendicular to the upper end surface.

[0126] Further, there are two accessory storage recess, and the dust dumping button is located between the accessory storage recess.

[0127] Further, the battery is disposed on one side of the housing, the battery is detachable from the housing, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the battery adapter, and a sliding direction of the battery is parallel to the axis of the motor unit.

[0128] Further, the housing includes an upper end surface, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the battery adapter, and a sliding direction of the battery is toward the upper end surface.

[0129] Further, the vacuum cleaner includes a recessed portion, and the battery is accommodated in the recessed portion.

[0130] Further, the recessed portion includes a first recessed portion and a second recessed portion, the first recessed portion is formed through depression of the housing, and the second recessed portion is formed through depression of the dust cup.

[0131] Further, the axis of the motor unit and an axis of the dust cup are parallel to each other.

[0132] Further, the vacuum cleaner includes a handle

located on the housing, the handle straddles the upper end surface, the vacuum cleaner includes a suction pipe unit, and in a storage state, the suction pipe unit extends from the suction port on one side of the dust cup over the handle and extends along a length direction of the handle to an other side of the dust cup.

[0133] Further, a pipe groove unit capable of storing the suction pipe unit is formed on the housing or inside the housing, the housing includes a third side wall and a fourth side wall that are located on two sides of the handle and that are opposite to each other, the pipe groove unit includes: a first pipe groove formed on the third side wall and a second pipe groove formed on the fourth side wall, one end of the suction pipe unit is engageable in the first pipe groove, an other end of the suction pipe unit is engageable in the second pipe groove, and a middle portion of the suction pipe unit bypasses the upper end surface.

[0134] Further, a magnet is disposed at the first pipe groove of the third side wall, an attracted member is disposed on one end of the suction pipe unit, and when the one end of the suction pipe unit is stored in the first pipe groove, the magnet attracts the attracted member.

[0135] Further, the suction pipe unit includes a hose and a rigid pipe configured for gripping, and one end of the hose is at least partially retractable into the rigid pipe.

[0136] Further, the vacuum cleaner further includes a fixed pipe mounted at the suction port, where an other end of the hose is rotatable relative to the fixed pipe.

[0137] Further, an end portion of the other end of the hose is connected to a rigid connector, a fixed ring with a notch is disposed on an outer side wall of the connector, the connector is rotatable relative to the fixed ring, an outer side of the fixed ring includes a fastener portion, and an inner side wall of the fixed pipe is provided with a fastener groove matching the fastener portion.

[0138] Further, a third pipe groove is formed on one side of the handle away from the housing, and the hose is engageable in the third pipe groove.

[0139] To achieve the foregoing objective, the present embodiments include the following technical solution:
A vacuum cleaner, comprising:

a housing, including an upper end surface and an air outlet; a motor unit, disposed inside the housing and configured to produce a suction force; a dust cup, disposed on the housing and configured to collect particles that are sucked in, where the dust cup includes a suction port; a battery, configured to supply power for the vacuum cleaner; a handle, located on the housing, where the handle is connected to the upper end surface; and a suction pipe unit, where the suction pipe unit straddles the upper end surface, where the motor unit and the dust cup are arranged along an axial direction of the motor unit.

the air outlet is located beside the motor unit, and in a storage state, the suction pipe unit extends from the suction port on one side of the dust cup over the

handle, extends along a length direction of the handle to an other side of the dust cup, and covers the air outlet.

[0140] Further, a first pipe groove provided concavely on the housing, and the air outlet is located at a position of the first pipe groove.

[0141] Further, a pipe groove unit capable of storing the suction pipe unit is formed on the housing or inside the housing, the housing includes a third side wall and a fourth side wall that are located on two sides of the handle and that are opposite to each other, the first pipe groove is formed on the third side wall, the pipe groove unit includes a second pipe groove formed on the fourth side wall, one end of the suction pipe unit is engageable in the first pipe groove and covers the air outlet, an other end of the suction pipe unit is engageable in the second pipe groove, and a middle portion of the suction pipe unit bypasses the upper end surface.

[0142] Further, a magnet is disposed at the first pipe groove, an attracted member is disposed on one end of the suction pipe unit, and when the one end of the suction pipe unit is stored in the first pipe groove, the magnet attracts the attracted member.

[0143] Further, the suction pipe unit includes a hose and a rigid pipe configured for gripping, the rigid pipe is at least partially accommodated in the first pipe groove, and the rigid pipe covers the air outlet.

[0144] Further, one end of the hose is at least partially retractable into the rigid pipe.

[0145] Further, the vacuum cleaner further includes a fixed pipe mounted at the suction port, where an other end of the hose is rotatable relative to the fixed pipe.

[0146] Further, an end portion of the other end of the hose is connected to a rigid connector, a fixed ring with a notch is disposed on an outer side wall of the connector, the connector is rotatable relative to the fixed ring, an outer side of the fixed ring includes a fastener portion, and an inner side wall of the fixed pipe is provided with a fastener groove matching the fastener portion.

[0147] Further, a third pipe groove is formed on one side of the handle away from the housing, and the hose is engageable in the third pipe groove.

[0148] Further, the housing is provided with an accessory storage recess, and an extending direction of the accessory storage recess and an axis of the motor unit are parallel to each other.

[0149] Further, the accessory storage recess extending along the axial direction of the motor unit is provided between the motor unit and at least one side wall of the housing.

[0150] Further, a corner between two adjacent side walls of the housing is provided with the accessory storage recess.

[0151] Further, the battery is disposed on one side of the housing, and the accessory storage recess is provided on an other side of the housing opposite to the battery.

[0152] Further, the handle is provided with a grip re-

gion, and the battery and the accessory storage recess are respectively provided on two sides of the grip region.

[0153] Further, the accessory storage recess is located on the upper end surface.

[0154] Further, the housing includes a lower end surface opposite to the upper end surface, the dust cup is disposed on the lower end surface, and the accessory storage recess extends into the dust cup.

[0155] Further, the dust cup includes a dust-cup outer wall and a dust collection and separation cavity, a gap space is provided between the dust-cup outer wall and an inner wall of the dust collection and separation cavity, and the accessory storage recess extends into the gap space.

[0156] Further, the battery is disposed on one side of the housing, the battery is detachable from the housing, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the battery adapter, and a sliding direction of the battery is parallel to the axis of the motor unit.

[0157] Further, the battery is detachable from the housing, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the battery adapter, and a sliding direction of the battery is toward the upper end surface.

[0158] Further, the vacuum cleaner includes a recessed portion, and the battery is accommodated in the recessed portion.

[0159] Further, the recessed portion includes a first recessed portion and a second recessed portion, the first recessed portion is formed through depression of the housing, and the second recessed portion is formed through depression of the dust cup.

[0160] Further, the axis of the motor unit and an axis of the dust cup are parallel to each other.

[0161] Further, the housing includes a lower end surface opposite to the upper end surface, the dust cup includes a dust dumping cover located below the lower end surface, the vacuum cleaner further includes a dust dumping button that controls the dust dumping cover to open, and the dust dumping button is disposed on the upper end surface.

[0162] Further, the vacuum cleaner further includes a fastener for locking the dust dumping cover, an intermediate rod located between the dust dumping button and the dust dumping cover, one end of the intermediate rod is fixedly connected to the dust dumping button, an other end of the intermediate rod corresponds to a position of the fastener, and under the action of the dust dumping button, the intermediate rod is capable of abutting against the fastener to control the dust dumping cover to open.

[0163] To achieve the foregoing objective, the present embodiments include the following technical solution:

A vacuum cleaner, comprising:

a housing, including an upper end surface and a lower end surface opposite to the upper end surface; a motor unit, disposed inside the housing and config-

ured to produce a suction force; a dust cup, disposed on the housing and configured to collect particles that are sucked in, where the dust cup includes a suction port;

the motor unit and the dust cup are arranged along an axial direction of the motor unit; and

the dust cup is mounted at the lower end surface of the housing, the dust cup includes a dust dumping cover, and the dust dumping cover is located on a lower bottom surface of the dust cup.

[0164] Further, the dust cup supports the housing.

[0165] Further, the vacuum cleaner further includes a fastener for locking the dust dumping cover, a dust dumping button that controls the dust dumping cover to open, and an intermediate rod located between the dust dumping button and the dust dumping cover, one end of the intermediate rod is fixedly connected to the dust dumping button, an other end of the intermediate rod corresponds to a position of the fastener, and under the action of the dust dumping button, the intermediate rod is capable of abutting against the fastener to control the dust dumping cover to open.

[0166] Further, the vacuum cleaner further includes a dust dumping button that controls the dust dumping cover to open, and the dust dumping button is disposed away from the dust dumping cover and on the upper end surface.

[0167] Further, the housing is provided with an accessory storage recess, and an extending direction of the accessory storage recess and an axis of the motor unit are parallel to each other.

[0168] Further, the accessory storage recess extending along the axial direction of the motor unit is provided between the motor unit and at least one side wall of the housing.

[0169] Further, a corner between two adjacent side walls of the housing is provided with the accessory storage recess.

[0170] Further, the battery is disposed on one side of the housing, and the accessory storage recess is provided on an other side of the housing opposite to the battery.

[0171] Further, the vacuum cleaner includes a handle located on the upper end surface, the handle is provided with a grip region, and the battery and the accessory storage recess are respectively provided on two sides of the grip region.

[0172] Further, the accessory storage recess extends into the dust cup.

[0173] Further, the dust cup includes a dust-cup outer wall and a dust collection and separation cavity, a gap space is provided between the dust-cup outer wall and an inner wall of the dust collection and separation cavity, and the accessory storage recess extends into the gap space.

[0174] Further, the battery is disposed on one side of

the housing, the battery is detachable from the housing, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the battery adapter, and a sliding direction of the battery is parallel to the axis of the motor unit.

[0175] Further, the battery is detachable from the housing, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the battery adapter, and a sliding direction of the battery is toward the upper end surface.

[0176] Further, the vacuum cleaner includes a recessed portion, and the battery is accommodated in the recessed portion.

[0177] Further, the recessed portion includes a first recessed portion and a second recessed portion, the first recessed portion is formed through depression of the housing, and the second recessed portion is formed through depression of the dust cup.

[0178] Further, the axis of the motor unit and an axis of the dust cup are parallel to each other.

[0179] Further, the vacuum cleaner includes a handle located on the upper end surface, the vacuum cleaner includes a suction pipe unit, and in a storage state, the suction pipe unit extends from the suction port on one side of the dust cup over the handle and extends along a length direction of the handle to an other side of the dust cup.

[0180] Further, a pipe groove unit capable of storing the suction pipe unit is formed on the housing or inside the housing, the housing includes a third side wall and a fourth side wall that are located on two sides of the handle and that are opposite to each other, the pipe groove unit includes: a first pipe groove formed on the third side wall and a second pipe groove formed on the fourth side wall, one end of the suction pipe unit is engageable in the first pipe groove, an other end of the suction pipe unit is engageable in the second pipe groove, and a middle portion of the suction pipe unit bypasses the upper end surface.

[0181] Further, a magnet is disposed at the first pipe groove of the third side wall, an attracted member is disposed on one end of the suction pipe unit, and when the one end of the suction pipe unit is stored in the first pipe groove, the magnet attracts the attracted member.

[0182] Further, the suction pipe unit includes a hose and a rigid pipe configured for gripping, and one end of the hose is at least partially retractable into the rigid pipe.

[0183] Further, the vacuum cleaner further includes a fixed pipe mounted at the suction port, where an other end of the hose is rotatable relative to the fixed pipe.

[0184] Further, an end portion of the other end of the hose is connected to a rigid connector, a fixed ring with a notch is disposed on an outer side wall of the connector, the connector is rotatable relative to the fixed ring, an outer side of the fixed ring includes a fastener portion, and an inner side wall of the fixed pipe is provided with a fastener groove matching the fastener portion.

[0185] Further, a third pipe groove is formed on one side of the handle away from the housing, and the hose

is engageable in the third pipe groove.

[0186] To achieve the foregoing objective, the present embodiments include the following technical solution:
A vacuum cleaner, comprising:

a housing, including an upper end surface; a motor unit, disposed inside the housing and configured to produce a suction force; a dust cup, disposed on the housing and configured to collect particles that are sucked in, where the dust cup includes a suction port; and a battery, configured to supply power for the vacuum cleaner, where

the motor unit and the dust cup are arranged along an axial direction of the motor unit; and

the vacuum cleaner includes a recessed portion, the battery is accommodated in the recessed portion, a top portion is disposed on the recessed portion, and the top portion is located below the upper end surface.

[0187] Further, the recessed portion includes a first recessed portion and a second recessed portion, the first recessed portion is formed through depression of the housing, and the second recessed portion is formed through depression of the dust cup.

[0188] Further, the battery is disposed on one side of the housing, the battery is detachable from the housing, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the battery adapter, and a sliding direction of the battery is parallel to the axis of the motor unit.

[0189] Further, the battery is disposed on one side of the housing, the battery is detachable from the housing, and a sliding direction of the battery is parallel to the axis of the motor unit.

[0190] Further, the axis of the motor unit and an axis of the dust cup are parallel to each other.

[0191] Further, the housing is provided with an accessory storage recess, and an extending direction of the accessory storage recess and an axis of the motor unit are parallel to each other.

[0192] Further, the accessory storage recess extending along the axial direction of the motor unit is provided between the motor unit and at least one side wall of the housing.

[0193] Further, a corner between two adjacent side walls of the housing is provided with the accessory storage recess.

[0194] Further, the battery is disposed on one side of the housing, and the accessory storage recess is provided on an other side of the housing opposite to the battery.

[0195] Further, the vacuum cleaner includes a handle located on the housing, the handle straddles the upper end surface, the handle is provided with a grip region, and the battery and the accessory storage recess are respectively provided on two sides of the grip region.

[0196] Further, the accessory storage recess is provided on the upper end surface.

[0197] Further, the accessory storage recess extends into the housing in a direction perpendicular to the upper end surface.

[0198] Further, the housing includes a lower end surface opposite to the upper end surface, the dust cup is disposed on the lower end surface, and the accessory storage recess extends into the dust cup.

[0199] Further, the dust cup includes a dust-cup outer wall and a dust collection and separation cavity, a gap space is provided between the dust-cup outer wall and an inner wall of the dust collection and separation cavity, and the accessory storage recess extends into the gap space.

[0200] Further, the vacuum cleaner includes a handle located on the housing, the handle straddles the upper end surface, the vacuum cleaner includes a suction pipe unit, and in a storage state, the suction pipe unit extends from the suction port on one side of the dust cup over the handle and extends along a length direction of the handle to an other side of the dust cup.

[0201] Further, a pipe groove unit capable of storing the suction pipe unit is formed on the housing or inside the housing, the housing includes a third side wall and a fourth side wall that are located on two sides of the handle and that are opposite to each other, the pipe groove unit includes: a first pipe groove formed on the third side wall and a second pipe groove formed on the fourth side wall, one end of the suction pipe unit is engageable in the first pipe groove, an other end of the suction pipe unit is engageable in the second pipe groove, and a middle portion of the suction pipe unit bypasses the upper end surface.

[0202] Further, a magnet is disposed at the first pipe groove of the third side wall, an attracted member is disposed on one end of the suction pipe unit, and when the one end of the suction pipe unit is stored in the first pipe groove, the magnet attracts the attracted member.

[0203] Further, the suction pipe unit includes a hose and a rigid pipe configured for gripping, and one end of the hose is at least partially retractable into the rigid pipe.

[0204] Further, the vacuum cleaner further includes a fixed pipe mounted at the suction port, where an other end of the hose is rotatable relative to the fixed pipe.

[0205] Further, an end portion of the other end of the hose is connected to a rigid connector, a fixed ring with a notch is disposed on an outer side wall of the connector, the connector is rotatable relative to the fixed ring, an outer side of the fixed ring includes a fastener portion, and an inner side wall of the fixed pipe is provided with a fastener groove matching the fastener portion.

[0206] Further, a third pipe groove is formed on one side of the handle away from the housing, and the hose is engageable in the third pipe groove.

[0207] Further, the housing includes a lower end surface opposite to the upper end surface, the dust cup includes a dust dumping cover located below the lower end surface, the vacuum cleaner further includes a dust

dumping button that controls the dust dumping cover to open, and the dust dumping button is disposed on the upper end surface.

[0208] Further, the vacuum cleaner further includes a fastener for locking the dust dumping cover, an intermediate rod located between the dust dumping button and the dust dumping cover, one end of the intermediate rod is fixedly connected to the dust dumping button, an other end of the intermediate rod corresponds to a position of the fastener, and under the action of the dust dumping button, the intermediate rod is capable of abutting against the fastener to control the dust dumping cover to open. To achieve the foregoing objective, the present embodiments include the following technical solution:

A vacuum cleaner, comprising:

a housing, including an upper end surface; a motor unit, disposed inside the housing and configured to produce a suction force; a dust cup, disposed on the housing and configured to collect particles that are sucked in, where the dust cup includes a suction port; and a battery, configured to supply power for the vacuum cleaner, where

the motor unit and the dust cup are arranged along an axial direction of the motor unit; and

the vacuum cleaner is provided with a recessed portion, the battery is accommodated in the recessed portion, the recessed portion includes a first recessed portion and a second recessed portion, the first recessed portion is formed through depression of the housing, and the second recessed portion is formed through depression of the dust cup.

[0209] Further, the recessed portion has an opening bottom, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the battery adapter, and a sliding direction of the battery is toward the upper end surface from bottom to top.

[0210] Further, the battery is disposed on one side of the housing, the battery is detachable from the housing, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the battery adapter, and a sliding direction of the battery is parallel to the axis of the motor unit.

[0211] Further, the axis of the motor unit and an axis of the dust cup are parallel to each other.

[0212] Further, the housing is provided with an accessory storage recess, and an extending direction of the accessory storage recess and an axis of the motor unit are parallel to each other.

[0213] Further, the accessory storage recess extending along the axial direction of the motor unit is provided between the motor unit and at least one side wall of the housing.

[0214] Further, a corner between two adjacent side walls of the housing is provided with the accessory stor-

age recess.

[0215] Further, the battery is disposed on one side of the housing, and the accessory storage recess is provided on an other side of the housing opposite to the battery.

[0216] Further, the vacuum cleaner includes a handle located on the housing, the handle straddles the upper end surface, the handle is provided with a grip region, and the battery and the accessory storage recess are respectively provided on two sides of the grip region.

[0217] Further, the accessory storage recess is provided on the upper end surface.

[0218] Further, the accessory storage recess extends into the housing in a direction perpendicular to the upper end surface.

[0219] Further, the housing includes a lower end surface opposite to the upper end surface, the dust cup is disposed on the lower end surface, and the accessory storage recess extends into the dust cup.

[0220] Further, the dust cup includes a dust-cup outer wall and a dust collection and separation cavity, a gap space is provided between the dust-cup outer wall and an inner wall of the dust collection and separation cavity, and the accessory storage recess extends into the gap space.

[0221] Further, the vacuum cleaner includes a handle located on the housing, the handle straddles the upper end surface, the vacuum cleaner includes a suction pipe unit, and in a storage state, the suction pipe unit extends from the suction port on one side of the dust cup over the handle and extends along a length direction of the handle to an other side of the dust cup.

[0222] Further, a pipe groove unit capable of storing the suction pipe unit is formed on the housing or inside the housing, the housing includes a third side wall and a fourth side wall that are located on two sides of the handle and that are opposite to each other, the pipe groove unit includes: a first pipe groove formed on the third side wall and a second pipe groove formed on the fourth side wall, one end of the suction pipe unit is engageable in the first pipe groove, an other end of the suction pipe unit is engageable in the second pipe groove, and a middle portion of the suction pipe unit bypasses the upper end surface.

[0223] Further, a magnet is disposed at the first pipe groove of the third side wall, an attracted member is disposed on one end of the suction pipe unit, and when the one end of the suction pipe unit is stored in the first pipe groove, the magnet attracts the attracted member.

[0224] Further, the suction pipe unit includes a hose and a rigid pipe configured for gripping, and one end of the hose is at least partially retractable into the rigid pipe.

[0225] Further, the vacuum cleaner further includes a fixed pipe mounted at the suction port, where an other end of the hose is rotatable relative to the fixed pipe.

[0226] Further, an end portion of the other end of the hose is connected to a rigid connector, a fixed ring with a notch is disposed on an outer side wall of the connector, the connector is rotatable relative to the fixed ring, an outer side of the fixed ring includes a fastener portion,

and an inner side wall of the fixed pipe is provided with a fastener groove matching the fastener portion.

[0227] Further, a third pipe groove is formed on one side of the handle away from the housing, and the hose is engageable in the third pipe groove.

[0228] Further, the housing includes a lower end surface opposite to the upper end surface, the dust cup includes a dust dumping cover located below the lower end surface, the vacuum cleaner further includes a dust dumping button that controls the dust dumping cover to open, and the dust dumping button is disposed on the upper end surface.

[0229] Further, the vacuum cleaner further includes a fastener for locking the dust dumping cover, an intermediate rod located between the dust dumping button and the dust dumping cover, one end of the intermediate rod is fixedly connected to the dust dumping button, an other end of the intermediate rod corresponds to a position of the fastener, and under the action of the dust dumping button, the intermediate rod is capable of abutting against the fastener to control the dust dumping cover to open.

[0230] Further, the battery is exposed from the housing.

[0231] To achieve the foregoing objective, the present embodiments include the following technical solution:
A vacuum cleaner, comprising:

a housing, including an upper end surface and a lower end surface opposite to the upper end surface; a motor unit, disposed inside the housing and configured to produce a suction force; a dust cup, disposed on the housing and configured to collect particles that are sucked in, where the dust cup includes a suction port; a battery, configured to supply power for the vacuum cleaner; and a handle, located on the housing, where the handle is connected to the upper end surface;

the motor unit and the dust cup are arranged along an axial direction of the motor unit; and

the dust cup is disposed at the lower end surface, and the dust cup supports the housing.

[0232] Further, a shape of an outer contour of the dust cup matches a shape of an outer contour of the housing.

[0233] Further, the housing and the dust cup are non-detachable after being connected to each other.

[0234] Further, the housing is provided with an accessory storage recess, and an extending direction of the accessory storage recess and an axis of the motor unit are parallel to each other.

[0235] Further, the accessory storage recess extending along the axial direction of the motor unit is provided between the motor unit and at least one side wall of the housing.

[0236] Further, a corner between two adjacent side walls of the housing is provided with the accessory stor-

age recess.

[0237] Further, the battery is disposed on one side of the housing, and the accessory storage recess is provided on an other side of the housing opposite to the battery.

[0238] Further, the handle is provided with a grip region, and the battery and the accessory storage recess are respectively provided on two sides of the grip region.

[0239] Further, the accessory storage recess is located on the upper end surface.

[0240] Further, the accessory storage recess extends into the dust cup.

[0241] Further, the dust cup includes a dust-cup outer wall and a dust collection and separation cavity, a gap space is provided between the dust-cup outer wall and an inner wall of the dust collection and separation cavity, and the accessory storage recess extends into the gap space.

[0242] Further, the battery is disposed on one side of the housing, the battery is detachable from the housing, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the battery adapter, and a sliding direction of the battery is parallel to the axis of the motor unit.

[0243] Further, the battery is detachable from the housing, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the battery adapter, and a sliding direction of the battery is toward the upper end surface.

[0244] Further, the vacuum cleaner includes a recessed portion, and the battery is accommodated in the recessed portion.

[0245] Further, the recessed portion includes a first recessed portion and a second recessed portion, the first recessed portion is formed through depression of the housing, and the second recessed portion is formed through depression of the dust cup.

[0246] Further, the axis of the motor unit and an axis of the dust cup are parallel to each other.

[0247] Further, the vacuum cleaner includes a suction pipe unit, and in a storage state, the suction pipe unit extends from the suction port on one side of the dust cup over the handle and extends along a length direction of the handle to an other side of the dust cup.

[0248] Further, a pipe groove unit capable of storing the suction pipe unit is formed on the housing or inside the housing, the housing includes a third side wall and a fourth side wall that are located on two sides of the handle and that are opposite to each other, the pipe groove unit includes: a first pipe groove formed on the third side wall and a second pipe groove formed on the fourth side wall, one end of the suction pipe unit is engageable in the first pipe groove, an other end of the suction pipe unit is engageable in the second pipe groove, and a middle portion of the suction pipe unit bypasses the upper end surface.

[0249] Further, a magnet is disposed at the first pipe groove of the third side wall, an attracted member is disposed on one end of the suction pipe unit, and when the one end of the suction pipe unit is stored in the first pipe

groove, the magnet attracts the attracted member.

[0250] Further, the suction pipe unit includes a hose and a rigid pipe configured for gripping, and one end of the hose is at least partially retractable into the rigid pipe.

[0251] Further, the vacuum cleaner further includes a fixed pipe mounted at the suction port, where an other end of the hose is rotatable relative to the fixed pipe.

[0252] Further, an end portion of the other end of the hose is connected to a rigid connector, a fixed ring with a notch is disposed on an outer side wall of the connector, the connector is rotatable relative to the fixed ring, an outer side of the fixed ring includes a fastener portion, and an inner side wall of the fixed pipe is provided with a fastener groove matching the fastener portion.

[0253] Further, a third pipe groove is formed on one side of the handle away from the housing, and the hose is engageable in the third pipe groove.

[0254] Further, the dust cup includes a dust dumping cover located below the lower end surface, the vacuum cleaner further includes a dust dumping button that controls the dust dumping cover to open, and the dust dumping button is disposed on the upper end surface.

[0255] Further, the vacuum cleaner further includes a fastener for locking the dust dumping cover, an intermediate rod located between the dust dumping button and the dust dumping cover, one end of the intermediate rod is fixedly connected to the dust dumping button, an other end of the intermediate rod corresponds to a position of the fastener, and under the action of the dust dumping button, the intermediate rod is capable of abutting against the fastener to control the dust dumping cover to open.

[0256] To achieve the foregoing objective, the present embodiments include the following technical solution:

A vacuum cleaner, comprising:

a housing, including an upper end surface and a lower end surface opposite to the upper end surface; a motor unit, disposed inside the housing and configured to produce a suction force; a dust cup, disposed on the housing and configured to collect particles that are sucked in, where the dust cup is disposed at the lower end surface, and the dust cup includes a suction port; a battery, configured to supply power for the vacuum cleaner; and a handle, located on the housing, where the handle is connected to the upper end surface;

the motor unit and the dust cup are arranged along an axial direction of the motor unit; and

the motor unit includes a fan, a filter is disposed inside the dust cup and corresponding to a position of the fan, the suction port is tangent to at least one of a peripheral wall of the filter or an inner wall of the dust cup.

[0257] Further, the suction port is located within one third of the height of the dust cup above the dust cup.

[0258] Further, the vacuum cleaner includes a first filter located inside the dust cup and a second filter located inside the first filter and at a front end of the fan, the housing includes an inner cavity wall formed at the front end of the fan, and the second filter is disposed at a position of the inner cavity wall.

[0259] Further, a ratio of the diameter of the fan to the diameter, the length, or the width of the dust cup ranges from 0.7:1 to 0.9:1.

[0260] Further, the housing is provided with an accessory storage recess, and an extending direction of the accessory storage recess and an axis of the motor unit are parallel to each other.

[0261] Further, the accessory storage recess extending along the axial direction of the motor unit is provided between the motor unit and at least one side wall of the housing.

[0262] Further, a corner between two adjacent side walls of the housing is provided with the accessory storage recess.

[0263] Further, the battery is disposed on one side of the housing, and the accessory storage recess is provided on an other side of the housing opposite to the battery.

[0264] Further, the handle is provided with a grip region, and the battery and the accessory storage recess are respectively provided on two sides of the grip region.

[0265] Further, the accessory storage recess is located on the upper end surface.

[0266] Further, the accessory storage recess extends into the dust cup.

[0267] Further, the dust cup includes a dust-cup outer wall and a dust collection and separation cavity, a gap space is provided between the dust-cup outer wall and an inner wall of the dust collection and separation cavity, and the accessory storage recess extends into the gap space.

[0268] Further, the battery is disposed on one side of the housing, the battery is detachable from the housing, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the battery adapter, and a sliding direction of the battery is parallel to the axis of the motor unit.

[0269] Further, the battery is detachable from the housing, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the battery adapter, and a sliding direction of the battery is toward the upper end surface.

[0270] Further, the vacuum cleaner includes a recessed portion, and the battery is accommodated in the recessed portion.

[0271] Further, the recessed portion includes a first recessed portion and a second recessed portion, the first recessed portion is formed through depression of the housing, and the second recessed portion is formed through depression of the dust cup.

[0272] Further, the axis of the motor unit and an axis of the dust cup are parallel to each other.

[0273] Further, the vacuum cleaner includes a suction

pipe unit, and in a storage state, the suction pipe unit extends from the suction port on one side of the dust cup over the handle and extends along a length direction of the handle to an other side of the dust cup.

[0274] Further, a pipe groove unit capable of storing the suction pipe unit is formed on the housing or inside the housing, the housing includes a third side wall and a fourth side wall that are located on two sides of the handle and that are opposite to each other, the pipe groove unit includes: a first pipe groove formed on the third side wall and a second pipe groove formed on the fourth side wall, one end of the suction pipe unit is engageable in the first pipe groove, an other end of the suction pipe unit is engageable in the second pipe groove, and a middle portion of the suction pipe unit bypasses the upper end surface.

[0275] Further, a magnet is disposed at the first pipe groove of the third side wall, an attracted member is disposed on one end of the suction pipe unit, and when the one end of the suction pipe unit is stored in the first pipe groove, the magnet attracts the attracted member.

[0276] Further, the suction pipe unit includes a hose and a rigid pipe configured for gripping, and one end of the hose is at least partially retractable into the rigid pipe.

[0277] Further, the vacuum cleaner further includes a fixed pipe mounted at the suction port, where an other end of the hose is rotatable relative to the fixed pipe.

[0278] Further, an end portion of the other end of the hose is connected to a rigid connector, a fixed ring with a notch is disposed on an outer side wall of the connector, the connector is rotatable relative to the fixed ring, an outer side of the fixed ring includes a fastener portion, and an inner side wall of the fixed pipe is provided with a fastener groove matching the fastener portion. Further, a third pipe groove is formed on one side of the handle away from the housing, and the hose is engageable in the third pipe groove.

[0279] Further, the dust cup includes a dust dumping cover located below the lower end surface and a fastener for locking the dust dumping cover, the vacuum cleaner further includes a dust dumping button that controls the dust dumping cover to open, and the dust dumping button is disposed on the upper end surface.

[0280] Further, the vacuum cleaner further includes an intermediate rod located between the dust dumping button and the dust dumping cover, one end of the intermediate rod is fixedly connected to the dust dumping button, an other end of the intermediate rod corresponds to a position of the fastener, and under the action of the dust dumping button, the intermediate rod is capable of abutting against the fastener to control the dust dumping cover to open.

[0281] To achieve the foregoing objective, the present embodiments include the following technical solution:
A vacuum cleaner, comprising:

a housing, including an upper end surface and a lower end surface opposite to the upper end surface; a motor unit, disposed inside the housing and config-

ured to produce a suction force; a dust cup, disposed on the housing and configured to collect particles that are sucked in, where the dust cup includes a suction port, a dust-cup outer wall located on an outer side, and a dust collection and separation cavity located in a middle portion; a battery, configured to supply power for the vacuum cleaner; and a handle, located on the housing, where the handle is straddles the upper end surface;

the motor unit and the dust cup are arranged along an axial direction of the motor unit; and

a shape of an outer contour of the dust cup is the same as a shape of an outer contour of the housing, and a gap space is provided between the dust-cup outer wall and an inner wall of the dust collection and separation cavity.

[0282] Further, the housing is square, a corner between two adjacent side walls of the housing is filleted, and the dust collection and separation cavity is circular or quasi-circular.

[0283] Further, the housing is provided with an accessory storage recess, and an extending direction of the accessory storage recess and an axis of the motor unit are parallel to each other.

[0284] Further, the accessory storage recess extending along the axial direction of the motor unit is provided between the motor unit and at least one side wall of the housing.

[0285] Further, a corner between two adjacent side walls of the housing is provided with the accessory storage recess.

[0286] Further, the battery is disposed on one side of the housing, and the accessory storage recess is provided on an other side of the housing opposite to the battery.

[0287] Further, the handle is provided with a grip region, and the battery and the accessory storage recess are respectively provided on two sides of the grip region.

[0288] Further, the accessory storage recess is located on the upper end surface.

[0289] Further, the accessory storage recess extends into the housing in a direction perpendicular to the upper end surface.

[0290] Further, the accessory storage recess extends into the dust cup.

[0291] Further, the accessory storage recess extends into the gap space.

[0292] Further, the battery is disposed on one side of the housing, the battery is detachable from the housing, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the battery adapter, and a sliding direction of the battery is parallel to the axis of the motor unit.

[0293] Further, the battery is detachable from the housing, a battery adapter is disposed on the housing, when being mounted, the battery is slidably engaged with the

battery adapter, and a sliding direction of the battery is toward the upper end surface.

[0294] Further, the vacuum cleaner includes a recessed portion, and the battery is accommodated in the recessed portion.

[0295] Further, the recessed portion includes a first recessed portion and a second recessed portion, the first recessed portion is formed through depression of the housing, and the second recessed portion is formed through depression of the dust cup.

[0296] Further, the axis of the motor unit and an axis of the dust cup are parallel to each other.

[0297] Further, the vacuum cleaner includes a suction pipe unit, and in a storage state, the suction pipe unit extends from the suction port on one side of the dust cup over the handle and extends along a length direction of the handle to an other side of the dust cup.

[0298] Further, a pipe groove unit capable of storing the suction pipe unit is formed on the housing or inside the housing, the housing includes a third side wall and a fourth side wall that are located on two sides of the handle and that are opposite to each other, the pipe groove unit includes: a first pipe groove formed on the third side wall and a second pipe groove formed on the fourth side wall, one end of the suction pipe unit is engageable in the first pipe groove, an other end of the suction pipe unit is engageable in the second pipe groove, and a middle portion of the suction pipe unit bypasses the upper end surface.

[0299] Further, a magnet is disposed at the first pipe groove of the third side wall, an attracted member is disposed on one end of the suction pipe unit, and when the one end of the suction pipe unit is stored in the first pipe groove, the magnet attracts the attracted member.

[0300] Further, the suction pipe unit includes a hose and a rigid pipe configured for gripping, and one end of the hose is at least partially retractable into the rigid pipe.

[0301] Further, the vacuum cleaner further includes a fixed pipe mounted at the suction port, where an other end of the hose is rotatable relative to the fixed pipe.

[0302] Further, an end portion of the other end of the hose is connected to a rigid connector, a fixed ring with a notch is disposed on an outer side wall of the connector, the connector is rotatable relative to the fixed ring, an outer side of the fixed ring includes a fastener portion, and an inner side wall of the fixed pipe is provided with a fastener groove matching the fastener portion.

[0303] Further, a third pipe groove is formed on one side of the handle away from the housing, and the hose is engageable in the third pipe groove.

[0304] Further, the dust cup includes a dust dumping cover located below the lower end surface, the vacuum cleaner further includes a dust dumping button that controls the dust dumping cover to open, and the dust dumping button is disposed on the upper end surface.

[0305] Further, the vacuum cleaner further includes a fastener for locking the dust dumping cover, an intermediate rod located between the dust dumping button and the dust dumping cover, one end of the intermediate rod

is fixedly connected to the dust dumping button, an other end of the intermediate rod corresponds to a position of the fastener, and under the action of the dust dumping button, the intermediate rod is capable of abutting against the fastener to control the dust dumping cover to open.

[0306] The present embodiments provide a vacuum cleaner, which effectively stores accessories by utilizing a layout of components of the entire vacuum cleaner, to ensuring performance of the vacuum cleaner while being miniaturized. The motor unit and the dust cup are disposed in such a way that the axes thereof are parallel to each other, and are arranged along the axial direction of the motor unit, so that motor unit and the dust cup are more compact. When the vacuum cleaner is not in use, the vacuum cleaner may enter the storage state, in which the suction pipe unit extends from the suction port on one side of the dust cup over the handle and extends along a length direction of the handle to an other side of the dust cup, so that space occupied by the suction pipe unit is reduced during storage. In addition, the battery is disposed on one side of the housing, so that the battery abuts the motor unit and the dust cup, to minimize a distance between the battery and the motor unit and a distance between the battery and the dust cup. In this way, compactness of the three components having the largest volumes mounted on the housing of the vacuum cleaner is maximized, so that the vacuum cleaner can be miniaturized. In addition, the foregoing structural optimization can ensure that a motor unit of a proper model can be selected to output sufficient power.

BRIEF DESCRIPTION OF THE DRAWINGS

[0307] The present embodiments are further described below with reference to the accompanying drawings and embodiments.

FIG. 1 is a schematic three-dimensional structural diagram of a vacuum cleaner from a perspective according to an embodiment of the present invention;

FIG. 2 is a schematic diagram corresponding to FIG. 1 in which only a length, a width, and a height are marked;

FIG. 3 is a schematic three-dimensional structural diagram of a vacuum cleaner from another perspective according to an embodiment of the present invention;

FIG. 4 is a partial exploded view of a vacuum cleaner according to an embodiment of the present invention;

FIG. 5 is a schematic diagram of a vacuum cleaner in use according to an embodiment of the present invention;

FIG. 6 is a cross-sectional view of a vacuum cleaner according to an embodiment of the present invention;

FIG. 7 is an enlarged schematic structural diagram of a portion A in FIG. 6;

FIG. 8 is a partial schematic diagram of a position at which a hose is connected to a fixed pipe in FIG. 6;

FIG. 9 is a partial schematic diagram of a position at which a hose is connected to a rigid pipe in FIG. 6;

FIG. 10 is a partial schematic diagram of an end of a hose close to a rigid pipe in FIG. 6;

FIG. 11 is a schematic diagram of a structure between a dust dumping button and a dust dumping cover of a vacuum cleaner in a cross section according to an embodiment of the present invention;

FIG. 12 is a schematic diagram of a structure between a dust dumping button and a dust dumping cover of a vacuum cleaner in another cross section according to an embodiment of the present invention;

FIG. 13 is a schematic structural diagram of a fan of a vacuum cleaner in another cross section according to an embodiment of the present invention;

FIG. 14 is a schematic structural diagram of a vacuum cleaner in another cross section after a fan and a second filter are mounted according to an embodiment of the present invention; and

FIG. 15 is a schematic diagram of a positional relationship between a fan and a suction port of a vacuum cleaner in another cross section according to an embodiment of the present invention.

DETAILED DESCRIPTION

[0308] The present embodiments provide a vacuum cleaner, which is flexible to operate and has a long single cleaning time.

[0309] Exemplary implementations of the present invention are described below in detail with reference to the accompanying drawings. It should be understood that the detailed descriptions are merely used for teaching a person skilled in the art to implement the present embodiments, but are not used to exhaust all manners of the present embodiments and are not used for limiting the scope of the present embodiments.

[0310] It should be noted that, when a component is referred to as "being fixed to" another component, the component may be directly on the other component, or an intervening component may be present. When a com-

ponent is considered to be "connected to" another component, the component may be directly connected to the another component, or an intervening component may also be present. In contrast, when a component is referred to as being "directly on" or "directly connected to" another component, there is no intervening component. The terms "vertical", "horizontal", "left", and "right" and similar expressions used in this specification are merely used for the purpose of description. Different objects in the accompanying drawings of the embodiments are drawn to the scale for convenience of enumeration and description, rather than the actual scale of the components.

[0311] It should be noted that, in the terms used in this application, "below" indicates a position close to a support surface supporting the vacuum cleaner and "above" indicates a position close to a handle, and "side wall" indicates an outer peripheral wall of a housing. To optimize a layout of components of the entire vacuum cleaner and ensure performance of the vacuum cleaner while miniaturizing the vacuum cleaner, the embodiments of this application provide a vacuum cleaner, as shown in FIG. 1 to FIG. 6, including a housing 1, a motor unit 2 disposed inside the housing 1 and configured to produce a suction force, a dust cup 3 disposed on the housing 1 and configured to collect particles that are sucked in, a battery 4 that supplies power for the vacuum cleaner, a handle 17 located on the housing 1, and a suction pipe unit 5 having a storage state. The battery 4 supplies power for the motor unit 2, and the dust cup 3 includes a suction port 31. In the storage state, the suction pipe unit 5 extends from the suction port 31 on one side of the dust cup 3 over the handle 17 and extends along a length direction of the handle 17 to an other side of the dust cup 3. The vacuum cleaner further includes a switch 56, and a control button 561 is disposed on the switch 56. The switch 56 is disposed at one end of the handle 17 and is located above an upper end surface 15. Such disposition makes it convenient for a user to grip the handle 17 with a single hand while controlling the switch 56 without using an other hand to operate, thereby improving convenience of operations without affecting the gripping. In an embodiment, the handle 17 and the housing 1 encircle a grip space, and the control button 561 faces an outer side of the handle 17 and is away from the grip space. If the user grips the handle 17 with a single hand, the user can select a suitable finger to press the control button 561 from a side surface of the handle 17 to start the vacuum cleaner, where the side surface is either of two sides the grip space.

[0312] As shown in FIG. 4 and FIG. 6, the motor unit 2 and the dust cup 3 are arranged along a direction of an axis X1 of the motor unit 2, and the battery 4 is disposed on one side of the housing 1. In another embodiment, if the axis X1 of the motor unit 2 is not used as a reference, and instead, a specific straight-line direction is used as a reference, for example, a straight line in a vertical direction relative to a horizontal direction, the mo-

tor unit 2 and the dust cup 3 are located in the same straight-line direction. In different embodiments, the axis X1 of the motor unit 2 and an axis X2 of the dust cup 3 may be parallel to each other or coincide with each other. In this embodiment of the present invention, in the vacuum cleaner, the motor unit 2 and the dust cup 3 are arranged to have parallel axes and are disposed along an axial direction of the motor unit. Specifically, the motor unit 2 is located directly above the dust cup 3, so that the two are more compact. When the vacuum cleaner is not in use, the vacuum cleaner may enter the storage state, in which the suction pipe unit 5 extends from the suction port 31 on one side of the dust cup 3 over the handle 17 and extends along a length direction of the handle 17 to an other side of the dust cup 3, so that space occupied by the suction pipe unit 5 is reduced during storage. In addition, the battery 4 is disposed on one side of the housing 1, so that the battery 4 abuts the motor unit 2 and the dust cup 3, to minimize a distance between the battery 4 and the motor unit 2 and a distance between the battery 4 and the dust cup 3. In this way, compactness of the three components having the largest volumes mounted on the housing of the vacuum cleaner 1 is maximized, so that the vacuum cleaner can be miniaturized. In addition, the foregoing structural optimization can ensure that a motor unit 2 of a proper model can be selected to output sufficient power.

[0313] To make the vacuum cleaner in this application better understood, the vacuum cleaner is further explained and described below. As shown in FIG. 1, FIG. 3, and FIG. 4, a main body portion of a housing 1 may be roughly in a shape of a cuboid, and edges between adjacent surfaces of the housing 1 may have smooth chamfers, so that the housing 1 has a reduced volume and is also more beautiful. The main body portion of the housing 1 may include a first side wall 11 and a second side wall 12 that are opposite to each other, a third side wall 13 and a fourth side wall 14 that are opposite to each other, and an upper end surface 15 and a lower end surface 16 that are opposite to each other. The handle 17 is located above the upper end surface 15 and is connected to the upper end surface 15, and the handle 17 straddles the upper end surface 15. The switch 56 is disposed at a position at which the handle 17 is connected to the upper end surface 15. With such disposition, when operating the vacuum cleaner with a single hand, a user may switch on a switch 56 with one finger of the hand while gripping the handle 17 without using two hands to operate, leading to convenient use and simple operations.

[0314] As shown in FIG. 1, FIG. 3, and FIG. 4, a motor unit 2 is disposed inside the housing 1, and is configured to produce a suction force in an energized state. Specifically, the motor unit 2 is located in a middle region of the housing 1, and an axis X1 of the motor unit 2 may be roughly in a vertical direction, that is, perpendicular to the upper end surface 15 and the lower end surface 16 of the housing 1, or may be roughly in a horizontal direc-

tion, that is, perpendicular to the third side wall 13 and the fourth side wall 14 of the housing 1. In this way, there may be a space in a circumferential direction of the motor unit 2 for mounting other parts. The motor unit disposed inside the housing 1 may be a brushed motor or a brushless motor, and an accommodating space inside the housing 1 is sufficient for accommodating either of the foregoing motors.

[0315] As shown in FIG. 4, when the axis X1 of the motor unit 2 may be roughly in the vertical direction, an axis X2 of the dust cup 3 may also be roughly in the vertical direction, that is, perpendicular to the upper end surface 15 and the lower end surface 16 of the housing 1, so that the motor unit 2 and the dust cup 3 are arranged along a direction of the axis X1 of the motor unit 2, and the axis X1 of the motor unit 2 and the axis X2 of the dust cup 3 are parallel to each other. Similarly, when the axis X1 of the motor unit 2 is in the horizontal direction, the axis X2 of the dust cup 3 is also roughly in the horizontal direction. The motor unit may include a motor and a fan. The dust cup includes a cross section. The cross section may have a plurality of cases, for example, is approximately a circle, a square, a rectangle, or the like. A ratio of the diameter of a fan to the diameter, the length, or the width of the dust cup may be controlled to range from 0.7:1 to 0.9:1.

[0316] As shown in FIG. 6 and FIG. 13 to FIG. 15, the motor unit 2 includes a fan 21 and a motor 24. The fan 21 includes blades 221. A vortex structure and an inner cavity wall 58 are disposed on the lower end surface 16 of the housing 1 corresponding to a position of the fan 21. A filter is disposed inside the dust cup 3, and the filter includes a first filter 34 and a second filter 35 located inside the first filter 34. In this embodiment of the present invention, the first filter 34 and the second filter 35 are both HEPA filters. In another embodiment, the first filter 34 may be a turbo-separator structure, and the second filter 35 may be a HEPA filter. As shown in FIG. 12, the first filter 34 includes a plurality of through holes, and an air flow enters the second filter 35 through the through hole. In an embodiment, the filter is a circular structure, an outer peripheral wall of the filter corresponds to a position of the inner cavity wall 58, and the filter is disposed at the position of the inner cavity wall. In an embodiment, a ratio of the diameter of the fan to the diameter, the length, or the width of the dust cup may be controlled to range from 0.7:1 to 0.9:1. As shown in FIG. 14, a rotary handle 351 is disposed on the filter, and the filter is disassembled by using the rotary handle 351. In this embodiment of the present invention, the first filter 34 and the second filter 35 are first mounted and fixed together, so that the first filter 34 and the second filter 35 can be disassembled at the same time by operating the rotary handle 351.

[0317] FIG. 15 shows a schematic diagram of a positional relationship between the fan 21 and the suction port 31. In this embodiment of the present invention, the vortex structure is an air channel formed through the po-

sitional relationship between the filter and the suction port 31. An axis of the suction port 31 is tangential to the peripheral wall of the filter. After a dust-containing air flow enters the dust cup 3 through the suction port 31, the air flow does not directly flow toward the filter, and instead, rotates around the peripheral wall of the filter along a tangential direction, then, after being filtered by the first filter 34, passes through the through holes to be filtered by the second filter 35 inside, and finally, flows toward the motor unit 2. Because the dust-containing air flow enters from the side, and in terms of the positional relationship, an axis of the suction port 31 is tangential to the vortex structure, the air flow can rotate around the filter, and after being filtered, finally, enter the motor unit 2. The air flow entering the motor unit 2 moves along the tangential direction, and through appropriate structural disposition, a full-flow air channel is directly formed, to prevent the air flow from being dispersed, thereby improving dust sucking efficiency and the performance of the whole vacuum cleaner.

[0318] As shown in FIG. 1 and FIG. 4, the dust cup 3 may be located at a lower end of the housing 1, that is, mounted at a position of the lower end surface 16 of the housing 1. The motor unit 2 is located above the dust cup 3. The motor unit 2 and the dust cup 3 are arranged along the axial direction of the motor unit, so that the two are more compact. In an embodiment, the dust cup 3 is formed separately from the housing 1, and the dust cup 3 is mounted on the housing 1 and is configured to collect particles that are sucked in. The housing 1 and the dust cup 3 are connected to each other. The dust cup 3 is disposed separately from the housing 1, so that the motor unit 2 can be easily mounted from the bottom, and an overall proportion is more appropriate from a perspective of the appearance. In addition, the separate disposition makes it convenient to make the housing 1 and the dust cup 3 from different materials. The housing 1 is generally made from a non-transparent material, while the dust cup 3 is usually made from a transparent or translucent material, to facilitate observing an amount of particles. In a further embodiment, the housing 1 and the dust cup 3 cannot be disassembled after being connected to each other. The dust cup 3 and the housing 1 are configured to be non-detachable, so that compared to the fact that the dust cup 3 in the prior art needs to be disassembled for dumping dust, this application reduces steps for dumping dust and ensures a complete and beautiful contour. Non-detachability can further ensure a sealing effect between the housing 1 and the dust cup 3.

[0319] As shown in FIG. 1 and FIG. 4, a horizontal cross section of the dust cup 3 can be roughly in the same shape as that of the lower end surface 16 of the housing 1, that is, the shape of a horizontal cross section of the housing 1 is the same as the shape of the horizontal cross section of the dust cup 3. In this way, a dust cup 3 is disposed on the entire lower end surface 16 of the housing 1, so that the volume of the dust cup 3 is maximized, and the volume of the entire vacuum cleaner can

be optimized, and then miniaturized. The dust cup 3 may be made from a transparent or translucent material, to facilitate observing an amount of particles in the dust cup 3. In an embodiment, to help the dust cup 3 to dump dust and clean, the dust cup 3 may be detachably mounted on the housing 1.

[0320] As shown in FIG. 11 and FIG. 12, the dust cup 3 may include a dust dumping cover 32 located below the lower end surface 16 and a fastener 33 for locking the dust dumping cover 32. The dust dumping cover 32 is disposed opposite to the lower end surface 16. The dust dumping cover 32 is located at the bottom of the dust cup 3 away from the lower end surface 16, that is, the dust dumping cover 32 and the fastener 33 are located below the lower end surface 16. The vacuum cleaner may include a dust dumping button 19 that controls the dust dumping cover 32 to open. The dust dumping button 19 is located on the upper end surface 15. The dust dumping button 19 can achieve press-to-dump dust, that is, the dust dumping cover 32 can be opened by pressing the dust dumping button 19 once. Specifically, the vacuum cleaner may include an intermediate rod 20 located between the dust dumping button 19 and the dust dumping cover 32, one end of the intermediate rod 20 is fixedly connected to the dust dumping button 19, and an other end of the intermediate rod 20 corresponds to a position of the fastener 33. Under the action of the dust dumping button 19, the intermediate rod 20 can abut against the fastener 33 to control the dust dumping cover 32 to open. The dust dumping button 19 is disposed on the top, to ensure a beautiful appearance of the entire vacuum cleaner. If the dust dumping button 19 is disposed on the dust cup 3 close to the position of the fastener 33, the dust dumping button 19 inevitably protrudes outward from the housing 1 and affects beauty of the entire vacuum cleaner. In addition, the dust dumping button 19 is disposed on the top, to make an operation position more obvious, and further facilitate a dust dumping operation of a user.

[0321] As shown in FIG. 1 and FIG. 4, the battery 4 is disposed on one side of the housing 1. The battery 4 is exposed, that is, the battery 4 is exposed from the housing 1. The upper end surface 15 is complete and unnotched corresponding to a position for mounting the battery 4, thereby ensuring the integrity of the overall appearance of the vacuum cleaner and improving the beauty. The battery 4 is detachable from the housing 1. A battery adapter is disposed on the housing 1. When being mounted, the battery 4 is slidably engaged with the battery adapter, and a sliding direction of the battery 4 is parallel to the axis of motor unit 2. Further, the sliding direction of the battery 4 is toward the upper end surface 15. Further, the battery 4 slides from the lower end surface 16 toward the upper end surface 15. Such disposition facilitates charging of the battery 4 and applying the battery 4 to another matching electric tool, or facilitates the vacuum cleaner in using a battery 4 of another matching electric tool, that is, a plurality of machines can share

one battery 4, thereby reducing costs. The battery 4 is disposed to slide from the lower end surface 16 toward the upper end surface 15, making it more convenient to configure the upper end surface 15 of the vacuum cleaner to a complete plane. If the battery 4 slides from the upper end surface 15 toward the lower end surface 16 to be plugged, there is inevitably a notch on an upper surface of the whole vacuum cleaner, which destroys the integrity of the vacuum cleaner. The design of the present embodiment can resolve the problem and ensure the integrity and beauty of the appearance of the whole vacuum cleaner.

[0322] In the foregoing embodiments, the battery 4 is vertically exposed from the housing 1. In other embodiments, the battery 4 may be placed horizontally at different positions of the vacuum cleaner, or may be vertically exposed from other positions of the housing 1.

[0323] As shown in FIG. 1, FIG. 6, and FIG. 12, the vacuum cleaner includes a recessed portion 111, the battery 4 is accommodated in the recessed portion 111, and the axis X3 of the battery 4 is parallel to the axis X1 of the motor unit 2. The recessed portion includes 111 a first recessed portion and a second recessed portion, the first recessed portion is formed by the housing 1 extending inward from the first side wall 11, and the second recessed portion is formed by the outer wall of the dust cup 3 depressing inward. The motor unit 2 and the dust cup 3 together form an accommodating cavity for accommodating the battery 4. The accommodating cavity is the recessed portion 111. The housing 1 may be roughly in a shape of a cuboid. The recessed portion 111 does not penetrate the upper end surface 15 of the housing 1, and the recessed portion 111 includes a top portion 112, and an upper the surface of the top portion 112 is the upper end surface 15 of the housing 1. Observed as a whole, the upper end surface 15 of the housing 1 is a complete surface without any notch. In an exemplary implementation, a cross section of the recessed portion 111 in a direction of the first side wall 11 may be similar to the shape of the first side wall 11, and may be a rectangle or a square. The overall shape of the battery 4 is similar to that of the recessed portion 111. In this way, the battery 4 may be mounted into recessed portion 111 while being maximized, without wasting a space at the first side wall 11 of the entire housing 1. The depth of the entire recessed portion 111 is relatively small, and the cross section of the recessed portion 111 in the direction of the first side wall 11 is relatively large, so that the length of the housing 1 in a direction perpendicular to the first side wall 11 is relatively small, to facilitate miniaturization of the vacuum cleaner.

[0324] As shown in FIG. 4, FIG. 13, and FIG. 14, in an embodiment, the housing 1 is of a square or quasi-square structure. A corner between two adjacent side walls of the housing 1 is filleted, and the dust cup 3 is mounted at the bottom of the housing 1, and has a shape matching that of the housing 1. The dust cup 3 includes a dust collection and separation cavity inside for collecting and

separating dust particles. The dust collection and separation cavity is circular or quasi-circular (non-square). By means of the shape design, without increasing a structural size, the housing 1 may have a space for mounting the battery 4, and in addition, the housing 1 and the dust cup 3 may also have a storage groove 18 for storing accessories 200 (which is described below).

[0325] As shown in FIG. 1 and FIG. 5, the vacuum cleaner may include a suction pipe unit 5, and the suction pipe unit 5 includes a hose 51 and a rigid pipe 52. The vacuum cleaner is provided with a pipe groove unit 22 capable of storing the suction pipe unit 5. When the vacuum cleaner needs to be used, the suction pipe unit 5 may be removed from the housing 1. When the use finishes or the vacuum cleaner is stored or moved, the suction pipe unit 5 may be mounted at the pipe groove unit 22 of the housing 1, so that the vacuum cleaner enters a storage state. In this case, the suction pipe unit 5 at least partially bypasses the upper end surface 15, that is, the suction pipe unit 5 extends from the suction port 31 on one side of the dust cup 3 over the handle 17 and extends along a length direction of the handle 17 to an other side of the dust cup 3. One end portion of the suction pipe unit 5 is at least partially accommodated into the pipe groove unit 22. In this way, parts of the entire vacuum cleaner can be placed together to miniaturize the vacuum cleaner, and further prevent omission of the parts and facilitate storing and moving the vacuum cleaner.

[0326] In an implementation, as shown in FIG. 1 and FIG. 5, the pipe groove unit 22 may include: a first pipe groove 131 formed on the third side wall 13 and a second pipe groove 141 formed on the fourth side wall 14. One end of the suction pipe unit 5 can be engaged in the first pipe groove 131, an other end of the suction pipe unit 5 can be engaged in the second pipe groove 141, and a middle portion of the suction pipe unit 5 bypasses the upper end surface 15. The first pipe groove 131 extends roughly along the vertical direction, and is roughly located in a middle portion of the third side wall 13, in which there is no recessed portion for mounting the battery 4. and there is enough space on the housing 1 to open the first pipe groove 131. Likewise, the second pipe groove 141 extends roughly along the vertical direction, and is roughly located in a middle portion of the fourth side wall 14. When the suction pipe unit 5 needs to be stored, one end of the suction pipe unit 5 can be engaged in the first pipe groove 131, and an other end of the suction pipe unit 5 can be engaged in the second pipe groove 141, so that the two ends of the suction pipe unit 5 are fixed in position. The middle portion of the suction pipe unit 5 bypasses the upper end surface 15, so that the entire suction pipe unit 5 can be stored on the housing 1.

[0327] Because the suction pipe unit 5 generally includes a hose 51 and a rigid pipe 52 used for a user to grip. The rigid pipe 52 cannot be bent. Therefore, the rigid pipe 52 is engaged in the first pipe groove 131 extending along a straight line. The hose 51 can be bent casually, so that the hose 51 bypasses the upper end

surface 15 and corners between different surfaces. Certainly, the hose 51 and the rigid pipe 52 of the suction pipe unit 5 can be connected together. In an embodiment, one end of the hose 51 is at least partially retractable into the rigid pipe 52. Such disposition can ensure the length required by the hose 51 in use, and can also partially store the hose 51 when not in use, to ensure a storage effect of the suction pipe unit 5, thereby further ensuring miniaturization of an appearance and a layout of the entire vacuum cleaner.

[0328] In an implementation, as shown in FIG. 1 and FIG. 5, a handle 17 may be formed on the upper end surface 15 of the housing 1, and the handle 17 may be roughly in a shape of an inverted U or an arc. There is a gap between the handle 17 and the main body of the housing 1. When a user grips the handle 17, fingers are inserted into the gap, so that the handle 17 can be gripped. A third pipe groove 171 is formed on one side of the handle 17 away from the housing 1. One end of the third pipe groove 171 may be connected to the first pipe groove 131, an other end of the third pipe groove 171 is connected to the second pipe groove 141, and the middle portion of the suction pipe unit 5 can be engaged in the third pipe groove 171. To better position the middle portion of the suction pipe unit 5 (that is, the portion that bypasses the upper end surface 15 of the housing 1), and help a user to pick up the vacuum cleaner, in the foregoing implementation, a portion of the third pipe groove 171 has a curvature, and the hose 51 in the middle portion of the suction pipe unit 5 can be partially engaged in the third pipe groove 171 for positioning while not affecting a user picking up the vacuum cleaner.

[0329] As shown in FIG. 5, in an implementation, the vacuum cleaner includes an air outlet 113, and a dust (or particle)-containing air flow sucked in from the suction pipe unit 5 enters the dust cup 3 through the suction port 31, flows toward the motor unit 2, and then, is discharged from the vacuum cleaner through an air outlet 113. The air outlet 113 is located beside the motor unit 2. Specifically, the air outlet 113 is provided on the third side wall 13. More specifically, the air outlet 113 is disposed at a position of the first pipe groove 131, and the suction port 31 is close to the fourth side wall 14. To appropriately use space and ensure beauty of an overall appearance of the vacuum cleaner, when the suction pipe unit 5 is stored, one end of the suction pipe unit 5 is engaged in the first pipe groove 131, and the suction pipe unit 5 covers the air outlet 113. That is, in the storage state, the suction pipe unit 5 extends from the suction port 31 on one side of the dust cup 3 over the handle 17, extends along a length direction of the handle 17 to an other side of the dust cup 3, and covers the air outlet 113, to ensure beauty. When the suction pipe unit 5 is used, the suction pipe unit 5 is removed from the first pipe groove 131. In this case, the air outlet 113 is exposed, which does not affect air discharge of the vacuum cleaner, thereby while ensuring the basic performance of the vacuum cleaner, making, by appropriately using space, the appearance

of the entire vacuum cleaner more beautiful, and the design of each main component or structure of the vacuum cleaner more appropriate.

[0330] In an implementation, as shown in FIG. 1 and FIG. 5, one end of the hose 51 is at least partially retractable into the rigid pipe 52. In this way, the space in the rigid pipe 52 can also store a part of the hose 51. The length of the hose 51 can be further increased without changing the size of the housing 1. When the suction pipe unit 5 is used, the hose 51 is pulled out from the rigid pipe 52, to maximize the length of the hose 51. An end portion of the hose 51 and an end portion of the rigid pipe 52 are fixed to each other, so that when the hose 51 is pulled out, it can be ensured that the hose 51 may not be separated from the rigid pipe 52. The hose 51 has relatively good flexibility and may have a relatively large extended length. When not in use, the hose 51 can retract well into the rigid pipe 52, to ensure a storage effect of the suction pipe unit 5.

[0331] In an implementation, as shown in FIG. 9, the rigid pipe 52 includes a first pipe end portion 522 and a first fastener groove 523, and the hose 51 includes a second pipe end portion 513. An abutting portion 5131 and a first fastener protruding portion 5132 are disposed on the second pipe end portion 513. The second pipe end portion 513 is closer to dust particles than the first pipe end portion 522. When the hose 51 is pulled, the abutting portion 5131 abuts against the first pipe end portion 522, so that the hose 51 may not be separated from the rigid pipe 52. In an embodiment, the second pipe end portion 513 and the first pipe end portion 522 are fixedly connected to each other. When the rigid pipe 52 and the hose 51 are mounted in an engaged manner, the first fastener protruding portion 5132 is located in the first fastener groove 523 to fixing the rigid pipe 52 and the hose 51 to each other.

[0332] In an implementation, as shown in FIG. 5, FIG. 8 and FIG. 10, the vacuum cleaner may include: a fixed pipe 6 mounted at the suction port 31 of the dust cup 3, where the fixed pipe 6 is in communication with the suction port 31 of the dust cup 3. An other end of the hose 51 and the fixed pipe 6 are detachably connected to each other and can rotate relative to each other. An end portion at an other end of the hose 51 is connected to a rigid connector 511. An outer side wall of the connector 511 is provided with a fixed ring 512 with a notch. The connector 511 can rotate relative to the fixed ring 512. An outer side wall of the fixed ring 512 includes a fastener portion 5121. An inner side wall of the fixed pipe 6 is provided with a fastener groove 62 matching the fastener portion 5121. After the fixed ring 512 of the hose 51 is inserted into the fixed pipe 6, the fastener portion 5121 is embedded into the fastener groove 62, so that the hose 51 and the fixed pipe 6 are detachably connected. To ensure air tightness between the fixed ring 512 and the fixed pipe 6 of the hose 51, a seal ring 61 may be disposed between the fixed ring 512 and the fixed pipe 6. There is a notch 5122 on the fixed ring 512, so that the fixed ring

512 can be loosely sleeved over the connector 511, to facilitate the connector 511 in rotating relative to the fixed ring 512 and/or the fixed pipe 6 by a specific angle, thereby avoiding problems, such as knotting and entanglement, of the hose 51 in use by a user.

[0333] In an implementation, when the rigid pipe 52 is stored in the first pipe groove 131 of the housing 1, to prevent the rigid pipe 52 from casually leaving the first pipe groove 131, as shown in FIG. 7, where FIG. 7 is an enlarged schematic structural diagram of a portion A in FIG. 6, a magnet 132 may be disposed at the first pipe groove 131 of the third side wall 13, an attractive member 53 is disposed on one end of the suction pipe unit 5, for example, the attractive member 53 may be disposed on the rigid pipe 52, and when the one end of the suction pipe unit 5, for example, the rigid pipe 52, is stored in the first pipe groove 131, the magnet 132 attracts the attractive member 53. The attractive member 53 may be made of a ferromagnetic material, for example, metal such as iron, nickel, or cobalt, or may be another magnet. A threaded connecting pipe may be disposed inside the rigid pipe 52, and is configured to connect another suction head, and the attractive member 53 may be sandwiched between an outer wall of the connecting pipe and an inner wall of the rigid pipe 52. Through the foregoing implementation, when a user needs to remove the rigid pipe 52 from the first pipe groove 131 of the housing 1, the user only needs to remove the rigid pipe 52 with a little force.

[0334] As shown in FIG. 1, FIG. 3, FIG. 6, and FIG. 12, when an axis X1 of the motor unit 2 extends along the vertical direction, an accessory storage recess 18 is formed on the housing 1 or inside the housing 1, the accessory storage recess 18 extending along the axis of the motor unit 2 is formed between the motor unit 2 on the housing 1 and at least one side wall of the housing 1. Preferably, the accessory storage recess 18 extending along the axis of the motor unit 2 is formed on at least one of two sides between the motor unit 2 and the second side wall 12. Because a horizontal cross section of the motor unit 2 is roughly circular, a corner between two adjacent side walls of the housing 1 is provided with the accessory storage recess 18. Specifically, there is a specific space at a corner between the second side wall 12 and the third side wall 13, and there is also a specific space at a corner between the second side wall 12 and the fourth side wall 14, so that the spaces can be used to form the accessory storage recess 18 on the housing 1. The accessory storage recess 18 is provided on the upper end surface 15. The accessory storage recess 18 extends from the upper end surface 15 toward the lower end surface 16. When the axis X1 of the motor unit 2 extends along the vertical direction, an extending direction of the accessory storage recess 18 and the axis X1 of motor unit 2 are parallel to each other. The accessory storage recess 18 extends in a direction perpendicular to the upper end surface 15. In an embodiment, an extending direction of the accessory storage recess 18 is

parallel to the axis X2 of the dust cup 3. Further, the extending direction of the accessory storage recess 18 is parallel to an axis X4 of the filter. The filter is the first filter 34 or the second filter 35. A layout of components of the entire vacuum cleaner is optimized through the implementations, to maximize use of the space inside the housing 1, thereby miniaturizing the vacuum cleaner. The battery 4 is disposed on one side of the housing 1, and the accessory storage recess 18 is provided on an other side of the housing 1 opposite to the battery 4. The handle 17 is provided with a grip region 1711 and a connection region 1712, and the battery 4 and the accessory storage recess 18 are respectively provided on two sides of the grip region 1711. The switch 56 is disposed in the connection region 1712 and is located above the upper end surface 15. The handle 17 is located on the upper end surface 15, the connection region 1712 is connected to the upper end surface 15, and the switch 56 is disposed at a position at which the handle 17 is connected to the upper end surface 15. By means of the layout, the space between the housing 1 and the motor unit 2 may be fully utilized to dispose the battery 4 and provide the accessory storage recess 18 respectively, so that the structure of the vacuum cleaner is more compact, thereby achieving a miniaturization effect.

[0335] As shown in FIG. 1 and FIG. 3, an opening of the accessory storage recess 18 is formed on the upper end surface 15. The accessory storage recess 18 extends from the upper end surface 15 into the housing 1, and the extending direction of the accessory storage recess 18 is parallel to the axis X1 of the motor unit 2. In another embodiment, the accessory storage recess 18 may alternatively be externally hung on the housing 1.

[0336] As shown in FIG. 13, as stated above, in an embodiment, the dust cup 3 is mounted at the bottom of the housing 1. Specifically, the dust cup 3 is disposed on the lower end surface 16, and the accessory storage recess 18 extends into the dust cup 3. The shape of the dust cup 3 matches that of the housing 1. The dust cup 3 includes a dust-cup outer wall 36 located on an outer side and a dust collection and separation cavity 37 located in a middle portion, a gap 38 is provided between the dust-cup outer wall 36 and an inner wall of the dust collection and separation cavity 37, and the accessory storage recess 18 extends into the gap 38. In an embodiment, the housing 1 is square. The dust collection and separation cavity 37 is circular or quasi-circular. The housing 1 and the dust cup 3 are mounted corresponding to shapes of cross sections. An outer wall of the housing and the dust-cup outer wall 36 are coplanar along the same straight line. With such disposition, the housing 1 and the dust cup 3 match with and correspond to each other in structure, to ensure a harmonious and beautiful appearance of the entire vacuum cleaner. In addition, the shape of the dust collection and separation cavity 37 is set to be different from that of the housing 1, so that the gap 38 can be formed through a difference in shape, to form a part of accessory storage recess 18. Furthermore, the

square housing and the circular or quasi-circular dust collection and separation cavity 37 are more convenient to form by using molds. The circular or quasi-circular dust collection and separation cavity 37 is more beneficial to rotation of an air flow. The gap 38 is naturally formed through a shape difference between a square and a circle. This application is simple in structure, is convenient to implement, and not only beautifies the shape of the entire vacuum cleaner and ensures a cyclone separation effect, but also can indirectly store accessories.

[0337] As shown in FIG. 13, in an embodiment, the dust collection and separation cavity 37 of the dust cup 3 is circular or quasi-circular (non-square). If the dust collection and separation cavity is square, movement of an air flow is likely to be hindered. However, a circle or a quasi-circle have arc-shaped walls, to facilitate flowing of the air flow, thereby avoiding hindering the air flow too much, and ensuring the performance of the vacuum cleaner. Because the shape of the dust cup 3 matches that the housing 1, and is square in this embodiment, and the dust collection and separation cavity is circular or quasi-circular, there is also a specific space outside the dust collection and separation cavity on the dust cup 3, so that the accessory storage recess 18 can extend into the dust cup 3. With such disposition, when miniaturization of the entire vacuum cleaner is achieved, enough long accessories can be stored to ensure the normal use of the accessories.

[0338] In the foregoing embodiment, the accessory storage recess 18 is provided by using the space formed by the shape difference between the motor unit 2 and the housing 1, to store accessories, thereby ensuring beauty and portability of the entire vacuum cleaner. In an embodiment, a specific accessory storage recess may alternatively protrude from the housing 1. Although the accessory storage recess protrudes from the housing 1, the accessory storage recess can be integrally formed with the housing 1 in the overall design, to ensure that larger or more accessories can be stored, thereby enhancing the application breadth of the vacuum cleaner and satisfying diversified use requirements. In an embodiment, an accessory hanger may be disposed on an outer side of the housing 1, and the accessories are fixed onto the hanger. In this way, more accessories can be placed, and there are no excessive requirements on the sizes of the accessories, so that the application breadth of the vacuum cleaner is greatly improved.

[0339] As shown in FIG. 1, FIG. 2, FIG. 6, and FIG. 12, the vacuum cleaner in this application is particularly suitable for an in-vehicle vacuum cleaner. The size of the vacuum cleaner may be miniaturized to the following parameters: a range of a length L may reach 150 mm to 200 mm, where the length L is a straight-line distance between two side walls of the housing 1 in the front and back direction, a range of a width W may reach 160 mm to 200 mm, and a suction power range of the vacuum cleaner may reach 15 W to 50 W. Specifically, the suction power of the vacuum cleaner may be 36 W. The width

W is a straight-line distance between the two side walls of the housing 1 in the left and right direction. A range of a height H1 reaches 220 mm to 250 mm, where the height H1 is a height that includes the handle 17, and the height H1 is a straight-line distance in an up and down direction between an upper surface of the grip region of the handle 17 and a support surface located at the bottom that supports the vacuum cleaner. A higher suction power indicates a larger volume of the entire vacuum cleaner. In the present embodiments, setting of the suction power is supported by setting an appropriate suction power and through an appropriate layout among parts of the entire vacuum cleaner, to miniaturize the overall volume of the vacuum cleaner without sacrificing a function, so that the vacuum cleaner is in a relatively appropriate size.

[0340] As shown in FIG. 6, the height H2 of the handle 17 relative to the upper end surface 15 of the housing 1 is in the range 20 mm to 40 mm, where the height H2 is a straight-line distance in the up and down direction between a lower surface of the grip region of the handle 17 and the upper end surface 15 of the housing 1.

[0341] The vacuum cleaner has a flow rate range of 10 l/s to 25 l/s. Specifically, the flow rate of the vacuum cleaner may be 12 l/s. In the present embodiments, while the suction power is appropriate, the flow rate meets the use requirement of the vacuum cleaner, and while the volume is miniaturized, the flow rate is not reduced due to miniaturization of the volume. On the contrary, while the volume is miniaturized, the suction power is appropriately set, and the entire vacuum cleaner has an appropriate layout, the flow rate can be ensured within an appropriate range.

[0342] The dust cup has an effective volume range of 0.1 L to 0.5 L. Specifically, the effective volume of the dust cup may be 0.2 L. In the present embodiments, when the overall volume is so small, the effective volume of the dust cup is not sacrificed, and the effective volume of the dust cup is neither too small nor too large, to ensure functions of the vacuum cleaner while miniaturizing the overall volume of the vacuum cleaner.

[0343] The suction pipe unit includes a rigid pipe and a hose that is at least partially retractable into the rigid pipe, the hose has a length range of 240 mm to 400 mm, and the hose has a working radius range of 0.9 m to 1.6 m. Specifically, the length of the hose may be 300 mm, and the working radius of the hose may be 1.2 m. In the present embodiments, the hose is partially retracted into the rigid pipe, to make the structure of the suction pipe unit more compact while ensuring the working radius of the hose, thereby satisfying the requirement for miniaturizing the overall volume of the vacuum cleaner and making it more convenient to store the suction pipe unit.

[0344] The height proportion of the housing 1 to the dust cup 3 is in the range 1.5:1 to 2.5:1, where the height of the housing 1 is a straight-line distance between the upper end surface 15 and the lower end surface 16 of the housing 1, and the height of dust cup 3 is a straight-line distance in the up and down direction between the

upper surface and the lower surface of the dust cup. The width by which the suction pipe unit 5 is exposed relative to a side wall of the housing 1 is in the range 12 mm to 35 mm, where the width is a straight-line distance between a tangent line of the suction pipe unit 5 located farthest away from the side wall and the side wall. A ratio of the diameter of the HEPA filter in the vacuum cleaner to the diameter of the dust cup, or the length of the dust cup, or the width of the dust cup is in the range 0.5:1 to 0.7:1. A ratio of the diameter of the suction pipe unit 5 to the diameter of the dust cup 3, or the length of the dust cup 3, or the width of the dust cup 3 is in the range 0.3:1 to 0.4:1. A ratio of the diameter of the motor in the motor unit 2 to the diameter of the dust cup 3, or the length of the dust cup 3, or the width of the dust cup 3 is in the range 0.3:1 to 0.4:1. A ratio of the diameter of the fan in the motor unit 2 to the diameter of the dust cup 3, or the length of the dust cup 3, or the width of the dust cup 3 is in the range 0.7:1 to 0.9:1. A ratio of the volume of the dust cup 3 to the volume of a body of the vacuum cleaner is in the range 1:8 to 1:20, where the volume of the body of the vacuum cleaner does not include the handle 17 and the suction pipe unit 5. While the entire vacuum cleaner reaches the foregoing parameter targets of miniaturization, when the input power of the motor is controlled between 130 W and 220 W, and a rotation speed range of the motor is controlled between 30000 RPM and 40000 RPM, the vacuum cleaner can be still enabled to produce a relatively strong suction force, where the input power of the motor may be 140 W or 150 W. The vacuum of the suction force can reach a range of 8 kPa to 20 kPa or higher. Specifically, for a brushed motor, the vacuum of the suction force may be 10 kPa, and for a brushless motor, the vacuum of the suction force may be 15 kPa or 16 kPa. A suction power range of the vacuum cleaner can reach 15 W to 50 W. A ratio of the rotation speed of the motor of the motor unit 2 to the vacuum may be in the range 1500:1 rpm/kPa to 5000:1 rpm/kPa. A ratio of the power of the motor of the motor unit 2 to the vacuum may be in the range 3:1 W/kPa to 16:1 W/kPa. A ratio of the vacuum of the vacuum cleaner to the suction power of the vacuum cleaner may be in the range 1/2 W/kPa to 1/6 W/kPa. In conclusion, this application optimizes a layout of components of the entire vacuum cleaner, and still ensures the performance of the vacuum cleaner while miniaturizing the vacuum cleaner.

[0345] The technical features in the foregoing embodiments may be randomly combined. For concise description, not all possible combinations of the technical features in the embodiments are described. However, provided that combinations of the technical features do not conflict with each other, the combinations of the technical features are considered as falling within the scope described in this specification.

[0346] The foregoing embodiments only describe several implementations of the present disclosure, and their description is specific and detailed, but cannot therefore be understood as a limitation to the patent scope of the

present embodiments. It should be noted that, a person of ordinary skill in the art may further make some variations and improvements without departing from the concept of the present embodiments, and the variations and improvements belong to the protection scope of the present embodiments. Therefore, the protection scope of the patent of the present embodiments shall be topic to the claims.

Claims

1. A vacuum cleaner, comprising:

a housing including an upper end surface;
a motor unit, disposed within the housing, and configured to produce a suction force;
a dust cup, disposed on the housing, and configured to collect particles that are suctioned therein,
wherein the dust cup comprises a suction port;
a battery configured to supply power for the vacuum cleaner;
a handle located on the housing; and
a suction pipe unit having a storage state,
wherein when in the storage state, the suction pipe unit extends from the suction port on one side of the dust cup over the handle and along a length direction of the handle to the other side of the dust cup, and
wherein the motor unit and the dust cup are arranged along an axial direction of the motor unit, and the battery is disposed on one side of the housing.

2. The vacuum cleaner according to claim 1, wherein the upper end surface is provided with an accessory storage recess,
wherein the accessory storage recess extending along the axial direction of the motor unit and is provided between the motor unit and at least one side wall of the housing.

3. The vacuum cleaner according to claim 2, wherein a corner between two adjacent side walls of the housing is provided with the accessory storage groove.

4. The vacuum cleaner according to claim 2, wherein the housing comprises:

a lower end surface opposite the upper end surface,
wherein the dust cup is disposed on the lower end surface,
wherein the dust cup comprises a dust-cup outer wall and a dust collection and separation cavity,
wherein a gap space is provided between the dust-cup outer wall and a wall of the dust collec-

- tion and separation cavity, and wherein the accessory storage recess extends into the gap space.
5. The vacuum cleaner according to claim 1, wherein the battery is exposed from the housing,
- wherein one side of the vacuum cleaner comprises a recessed portion, and wherein the battery is accommodated in the recessed portion.
6. The vacuum cleaner according to claim 5, wherein a top portion is disposed on the recessed portion, and the top portion is located below the upper end surface.
7. The vacuum cleaner according to claim 5, wherein the recessed portion comprises:
- a first recessed portion, and
a second recessed portion,
wherein the first recessed portion is formed through depression of the housing, and the second recessed portion is formed through depression of the dust cup.
8. The vacuum cleaner according to claim 1, wherein the dust cup comprises:
- a dust dumping cover, and
a fastener for locking the dust dumping cover, and
wherein the vacuum cleaner further comprises:
- a dust dumping button that controls the dust dumping cover to open, and an intermediate rod located between the dust dumping button and the dust dumping cover,
- wherein the dust dumping button is located on the upper end surface,
wherein the dust dumping cover is located on a lower bottom surface of the dust cup,
wherein one end of the intermediate rod is fixedly connected to the dust dumping button,
wherein the other end of the intermediate rod corresponds to a position of the fastener, and wherein based on activation of the dust dumping button, the intermediate rod is capable of abutting against the fastener to control the dust dumping cover to open.
9. The vacuum cleaner according to claim 1, wherein the suction pipe unit comprises:
- a hose, and
- a rigid pipe configured for gripping, wherein one end of the hose is at least partially retractable into the rigid pipe.
10. The vacuum cleaner according to claim 1, wherein the housing comprises:
- a first pipe groove and an air outlet disposed within the first pipe groove,
a magnet disposed at the first pipe groove, and an attracted member disposed on one end of the suction pipe unit,
wherein when the one end of the suction pipe unit is stored in the first pipe groove, the one end of the suction pipe unit covers the air outlet, and the magnet attracts the attracted member.
11. A vacuum cleaner, comprising:
- a housing having an upper end surface and a lower end surface opposite each other;
a motor unit, disposed inside the housing, and configured to produce a suction force;
a dust cup, disposed on the housing and configured to collect particles suctioned therein;
a battery configured to supply power for the vacuum cleaner;
a handle located above an upper end surface; and
a suction pipe unit, having a storage state, wherein when in the storage state, the suction pipe unit at least partially bypasses the upper end surface,
wherein the motor unit and the dust cup are located in the same linear direction, and the battery is disposed on a side of the housing, wherein the vacuum cleaner has a length range of 150 mm to 200 mm, a width range of 160 mm to 200 mm, and a height range of 220 mm to 250 mm, and
wherein the vacuum cleaner has a suction power range of 15 W to 50 W.
12. The vacuum cleaner according to claim 11, wherein a height of the handle relative to the upper end surface ranges from 20 mm to 40 mm.
13. The vacuum cleaner according to claim 11, wherein a height ratio of a housing height to a dust cup height ranges from 1.5:1 to 2.5:1.
14. The vacuum cleaner according to claim 11, wherein a width by which the suction pipe unit is exposed relative to a side wall of the housing ranges from 12 mm to 35 mm.
15. The vacuum cleaner according to claim 11, wherein a ratio of the diameter of the suction pipe unit to the

diameter of the dust cup, or the length of the dust cup, or the width of the dust cup ranges from 0.3:1 to 0.4:1.

16. The vacuum cleaner according to claim 11, wherein the motor unit has a motor power range of 130 W to 220 W. 5
17. The vacuum cleaner according to claim 11, wherein the vacuum cleaner has suction force of 8 kPa to 20 kPa. 10
18. The vacuum cleaner according to claim 11, wherein the vacuum cleaner has a flow rate range of 10 l/s to 25 l/s. 15
19. The vacuum cleaner according to claim 11, wherein the dust cup has an effective volume range of 0.1 L to 0.5 L. 20
20. The vacuum cleaner according to claim 11, wherein the suction pipe unit comprises a rigid pipe and a hose that is at least partially retractable into the rigid pipe, and wherein the hose has a length range of 240 mm to 400 mm, and the hose has a working radius range of 0.9 m to 1.6 m. 25

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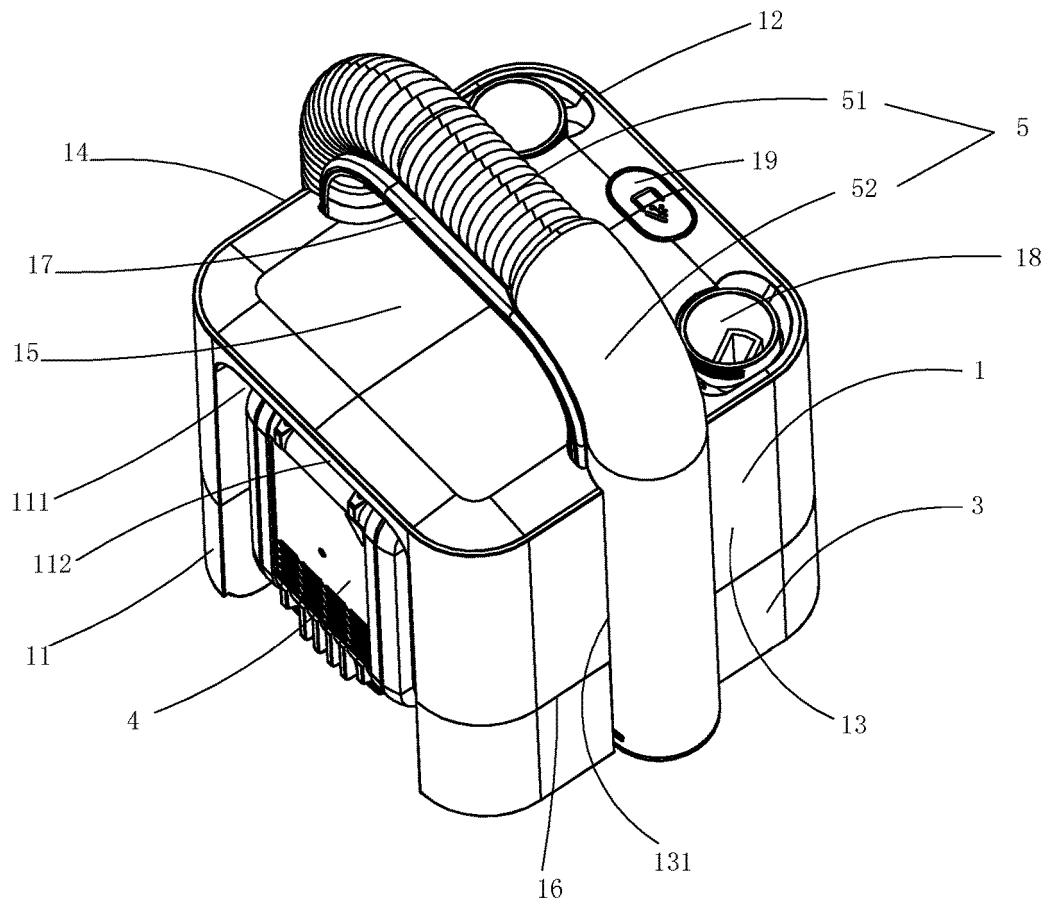
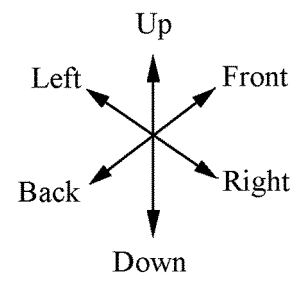


FIG. 1

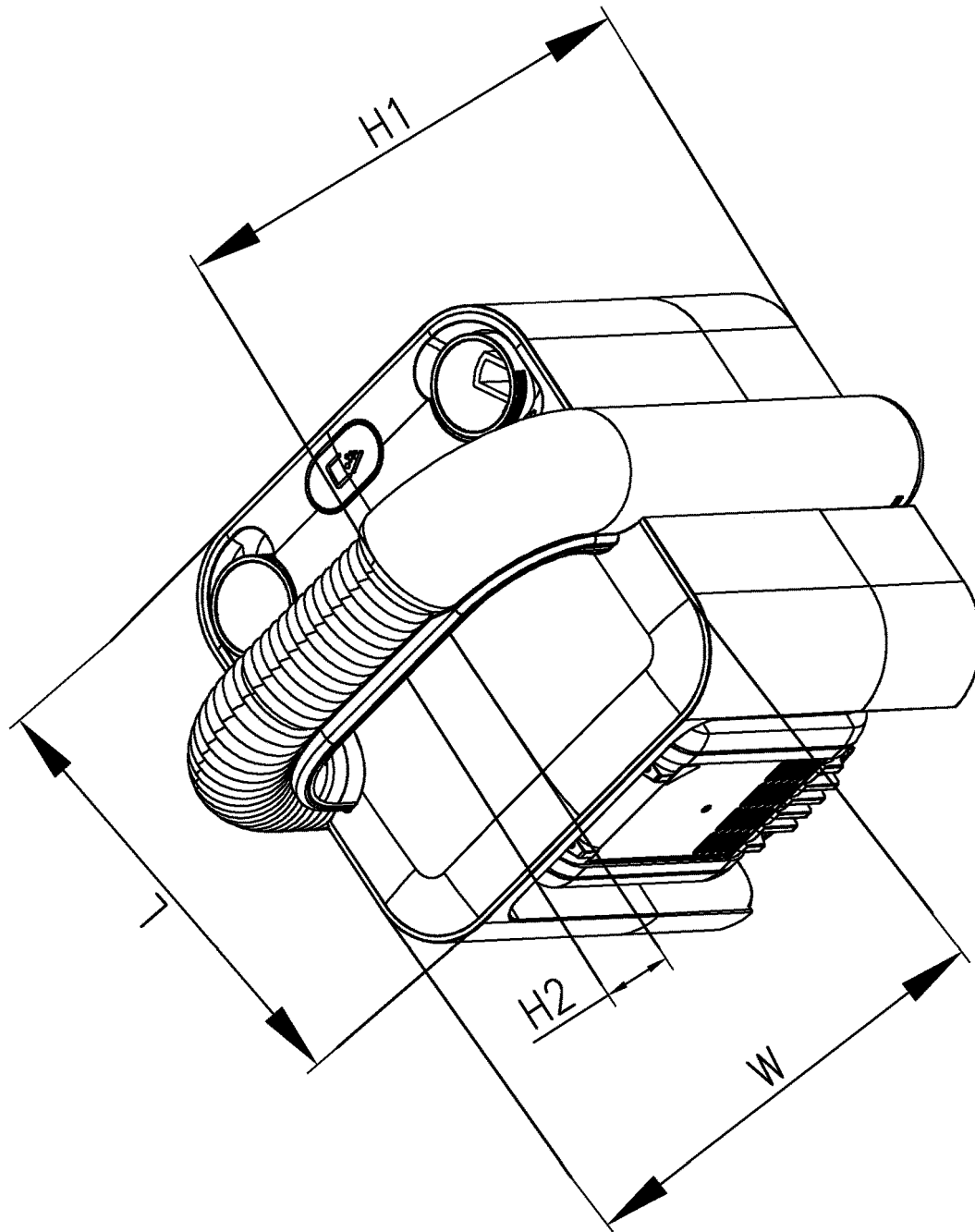


FIG. 2

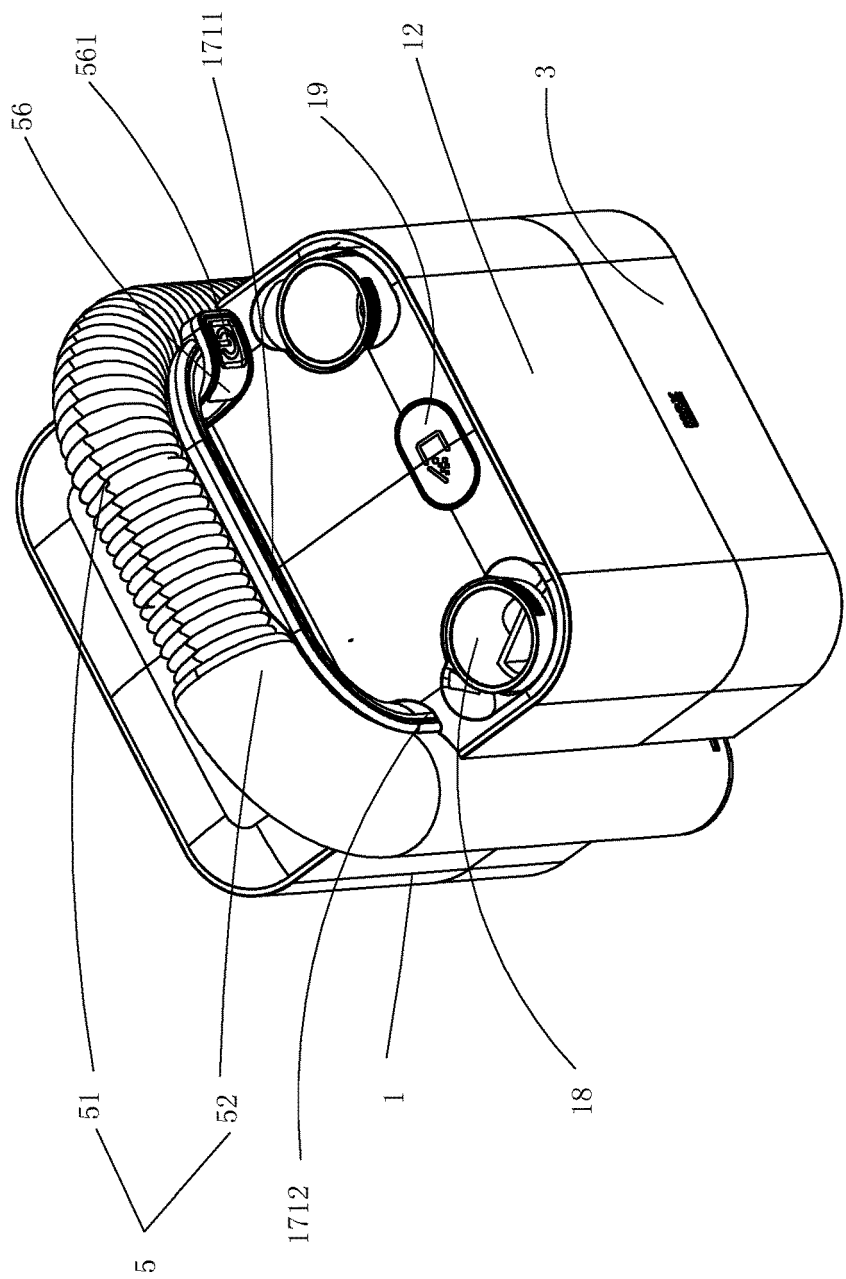


FIG. 3

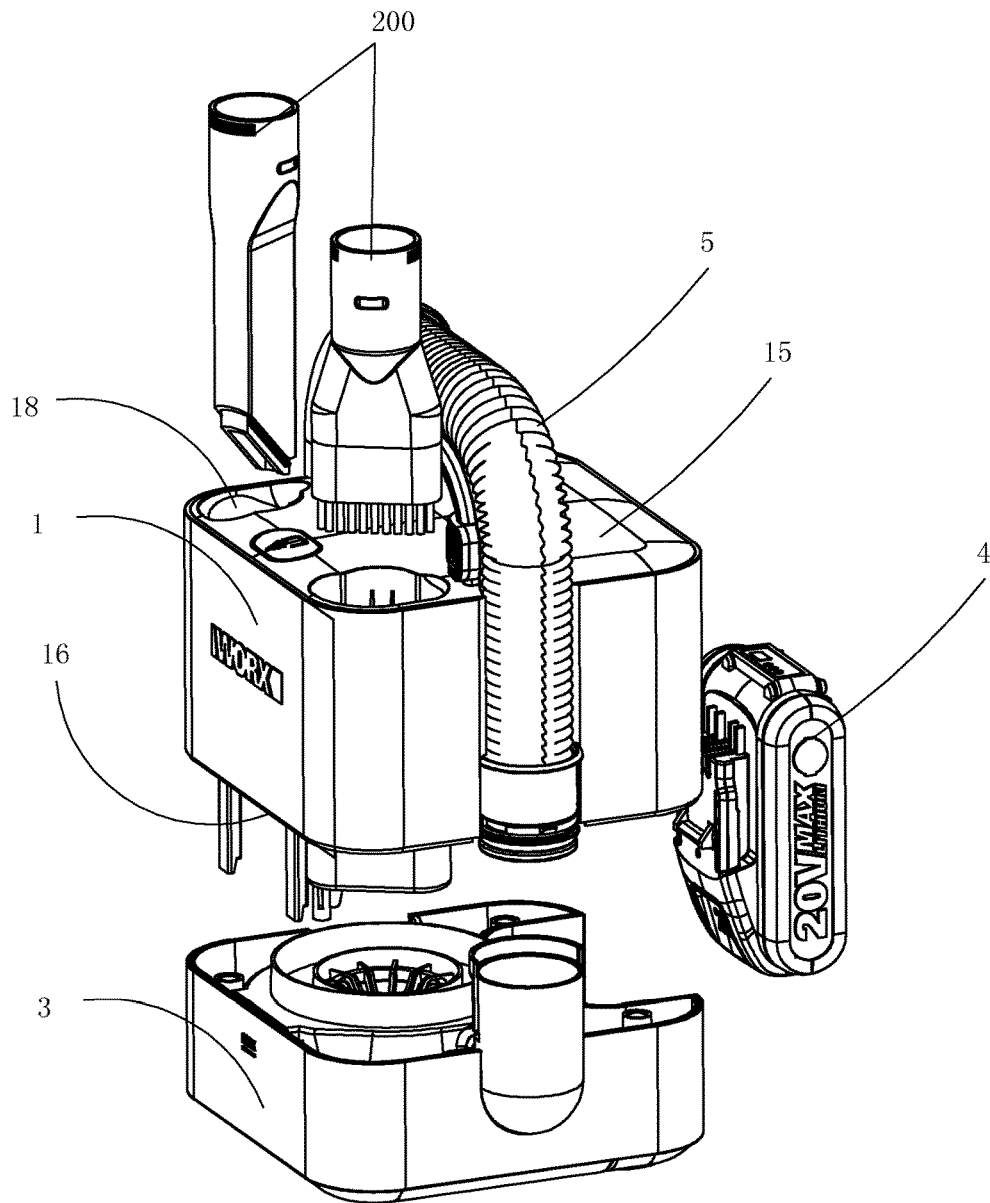


FIG. 4

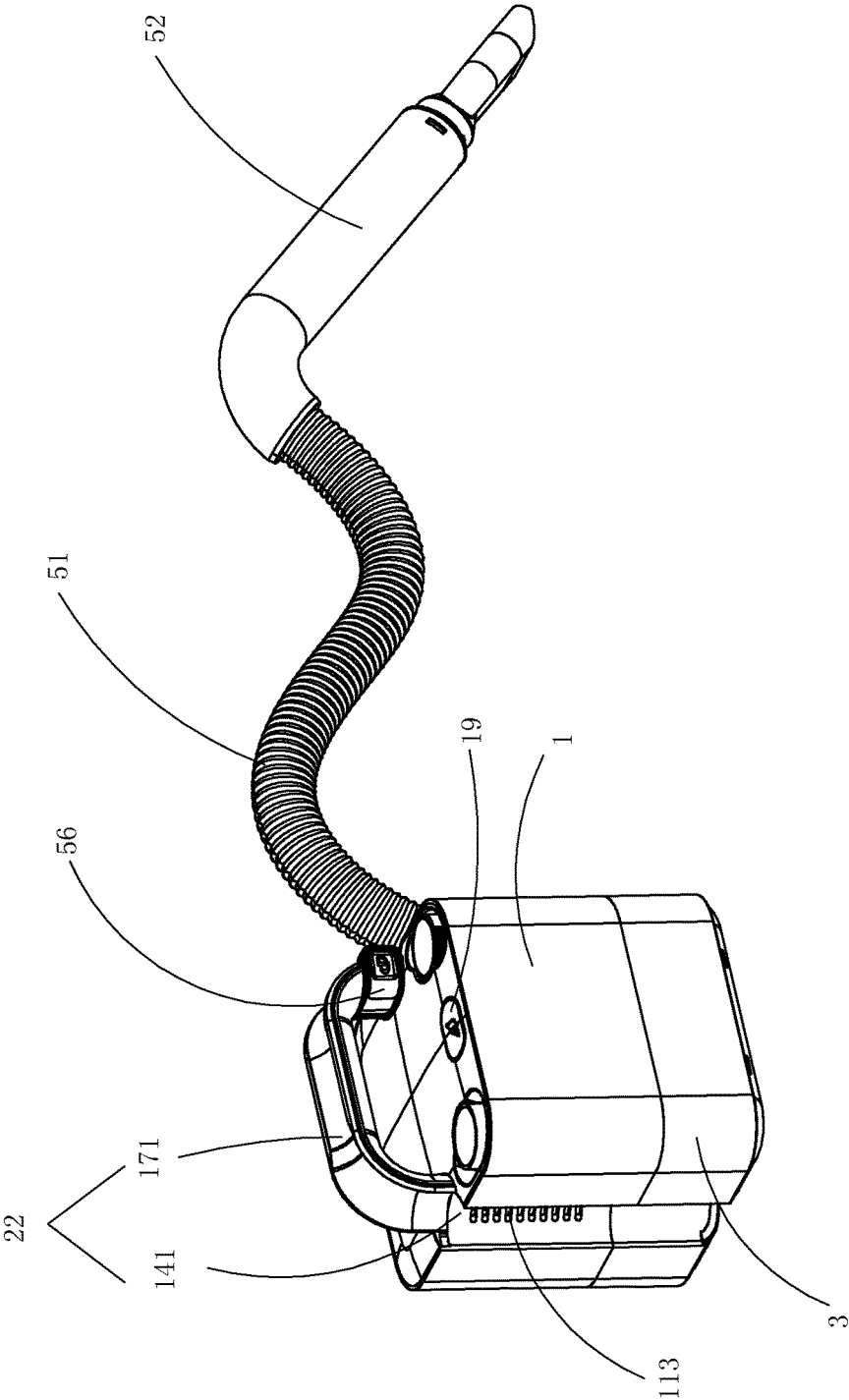


FIG. 5

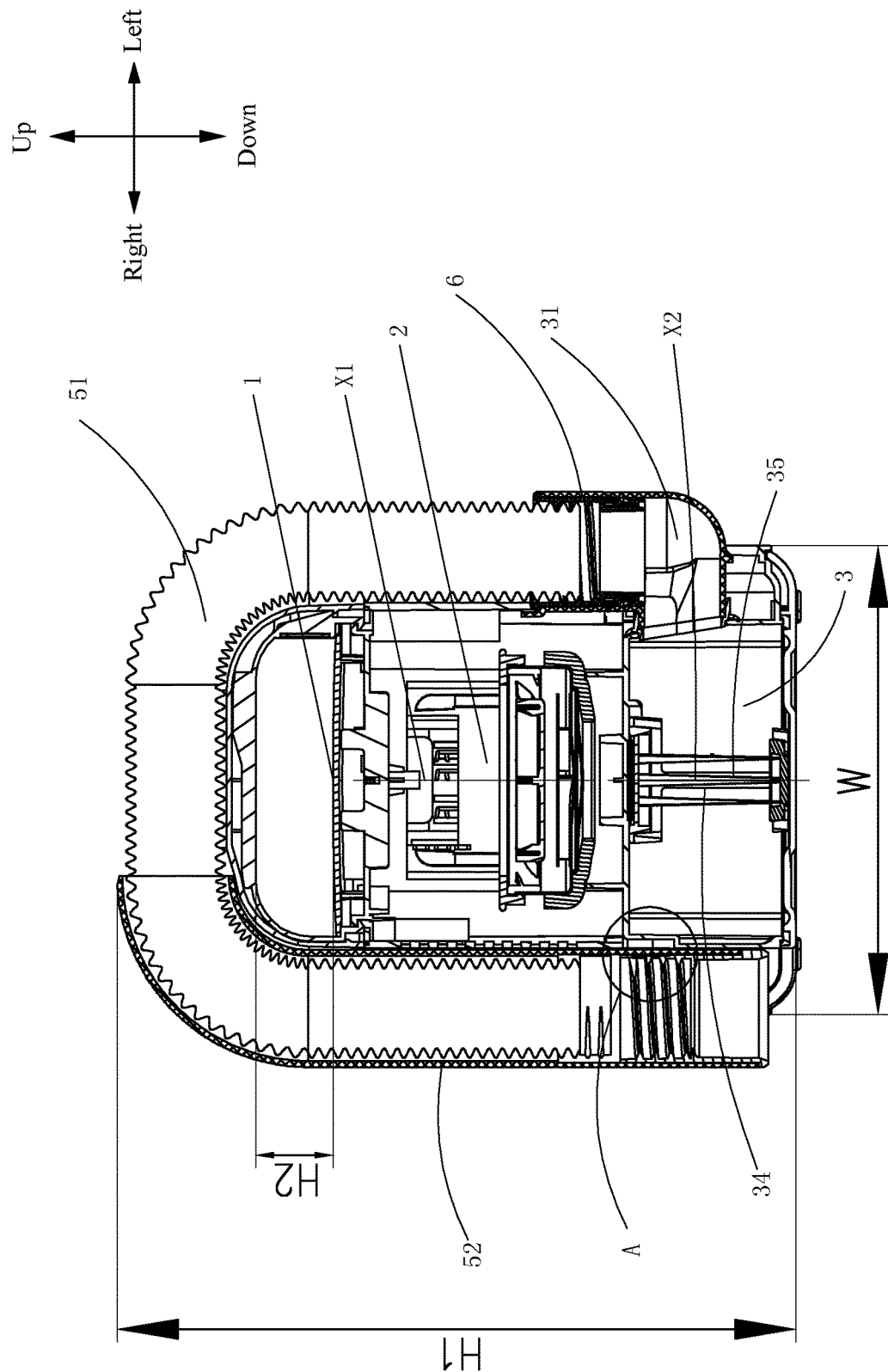


FIG. 6

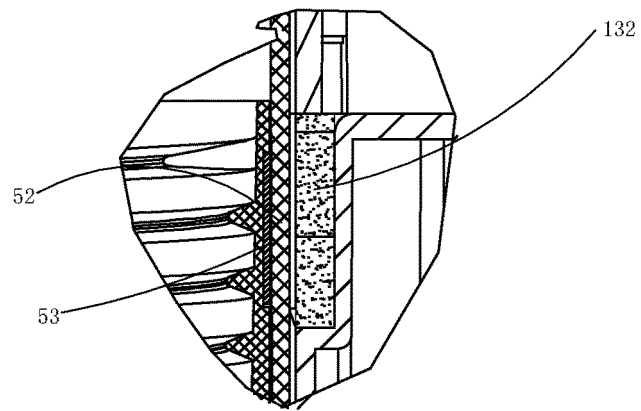


FIG. 7

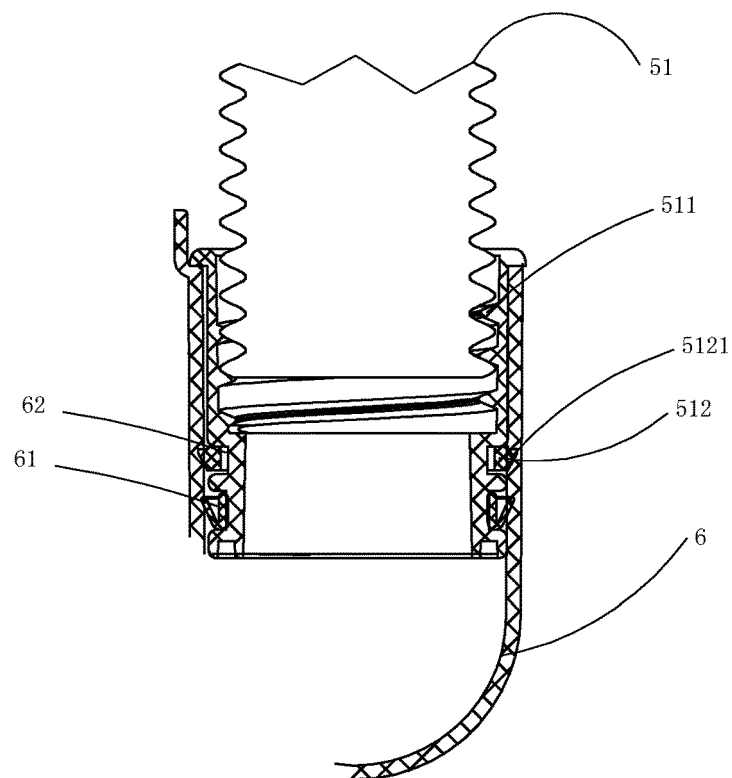


FIG. 8

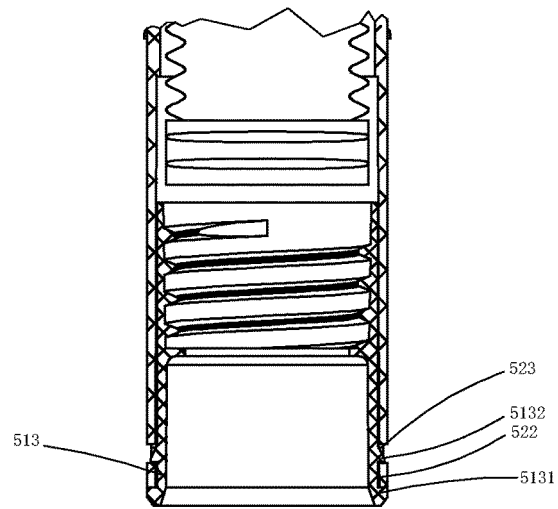


FIG. 9

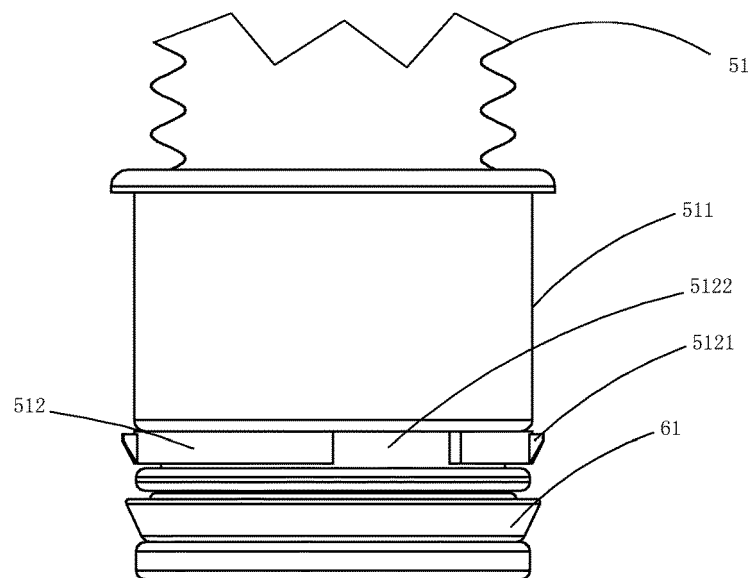


FIG. 10

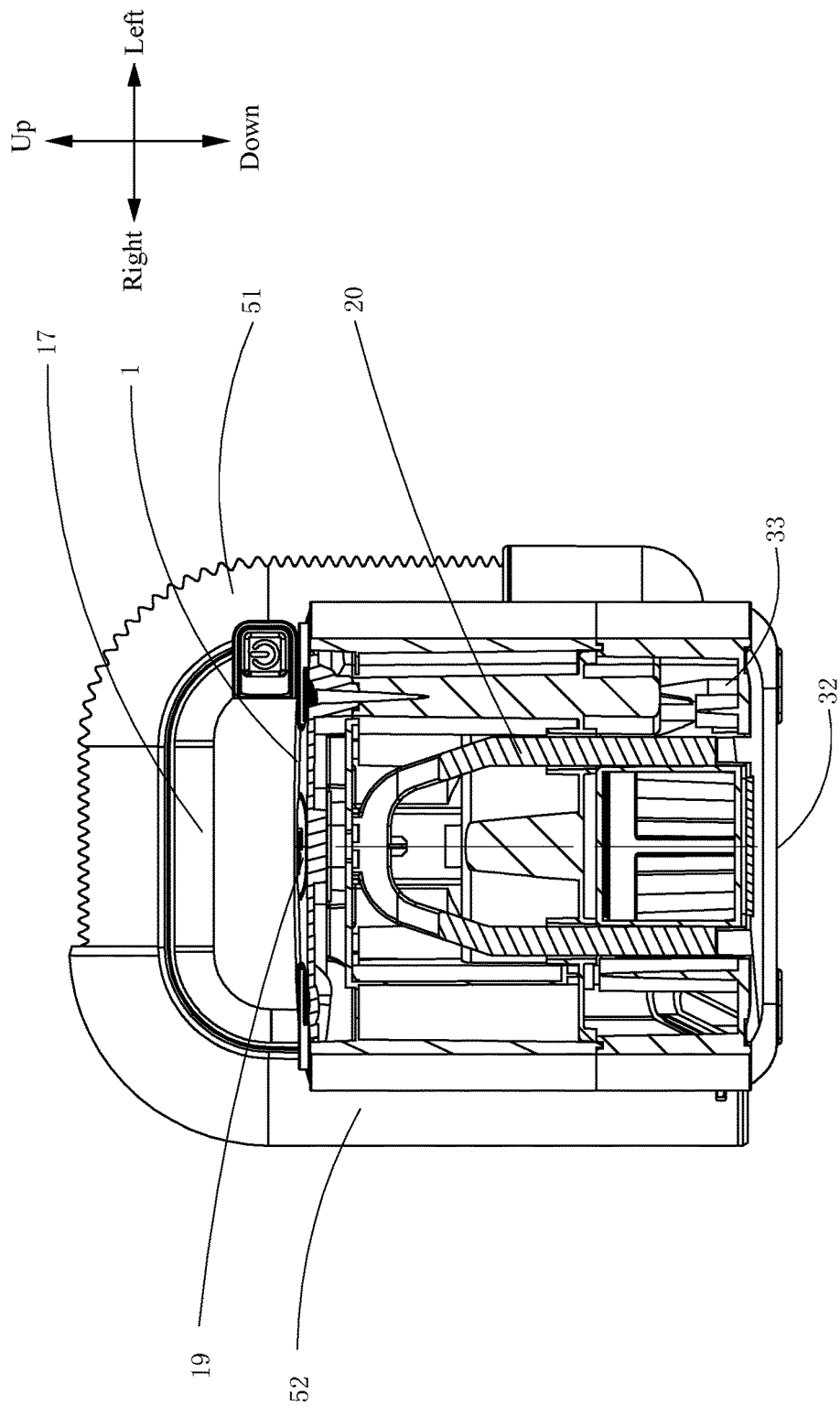


FIG. 11

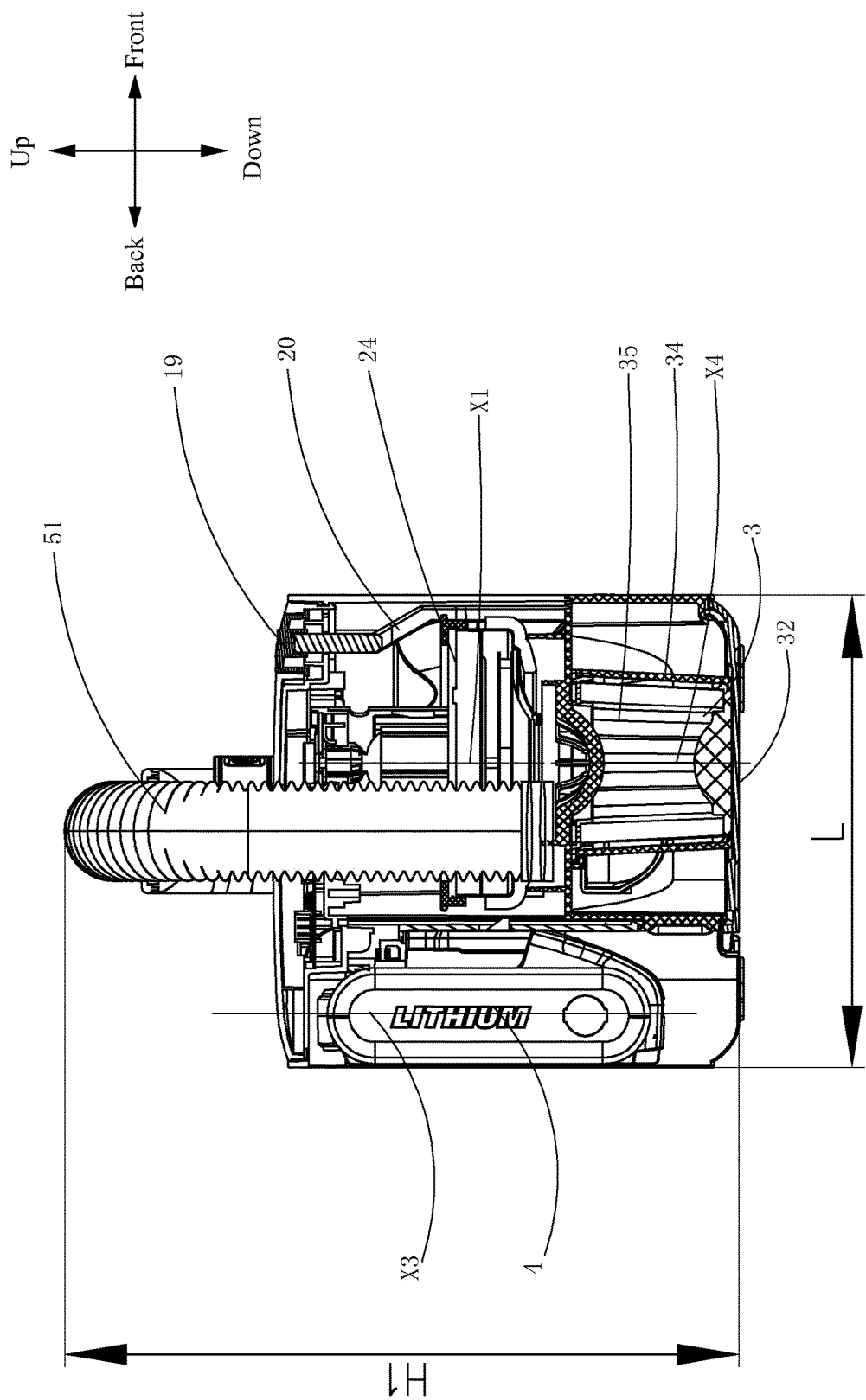


FIG. 12

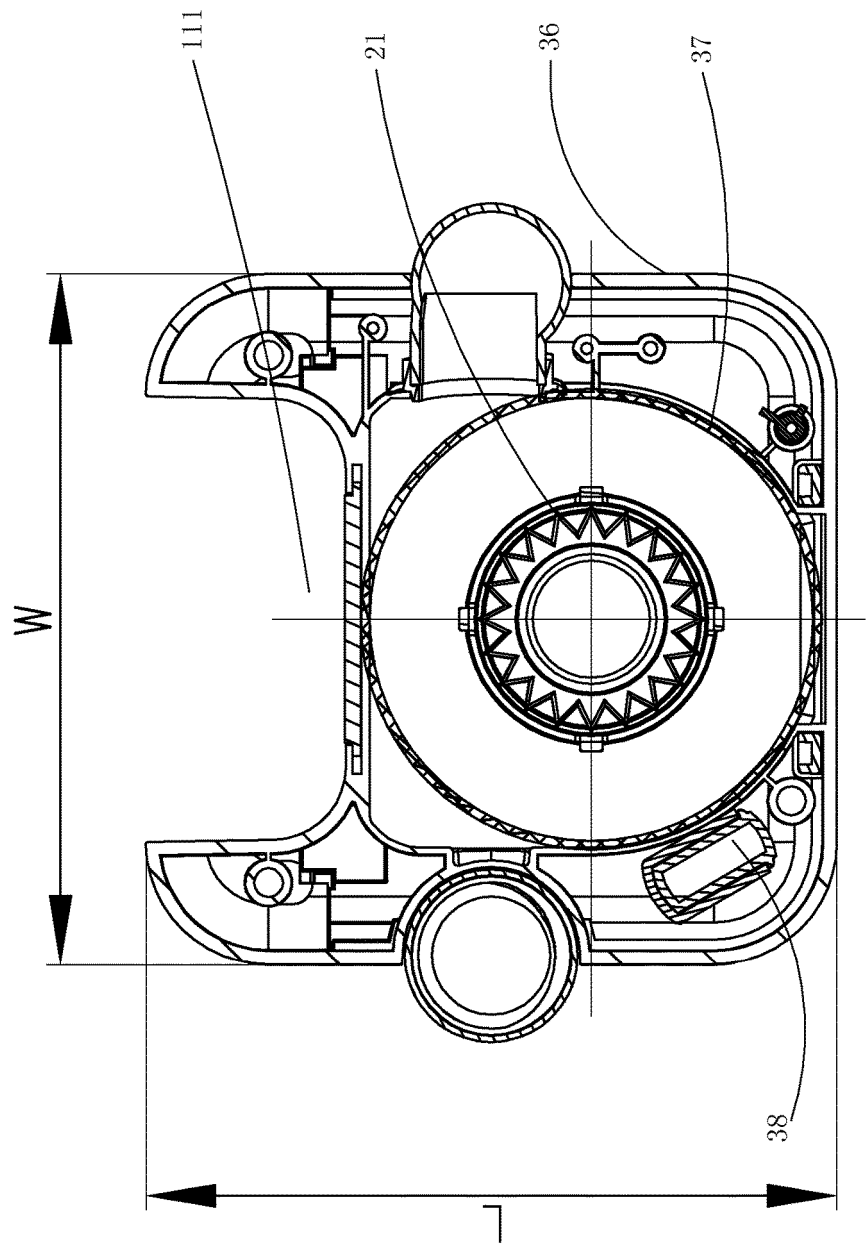


FIG. 13

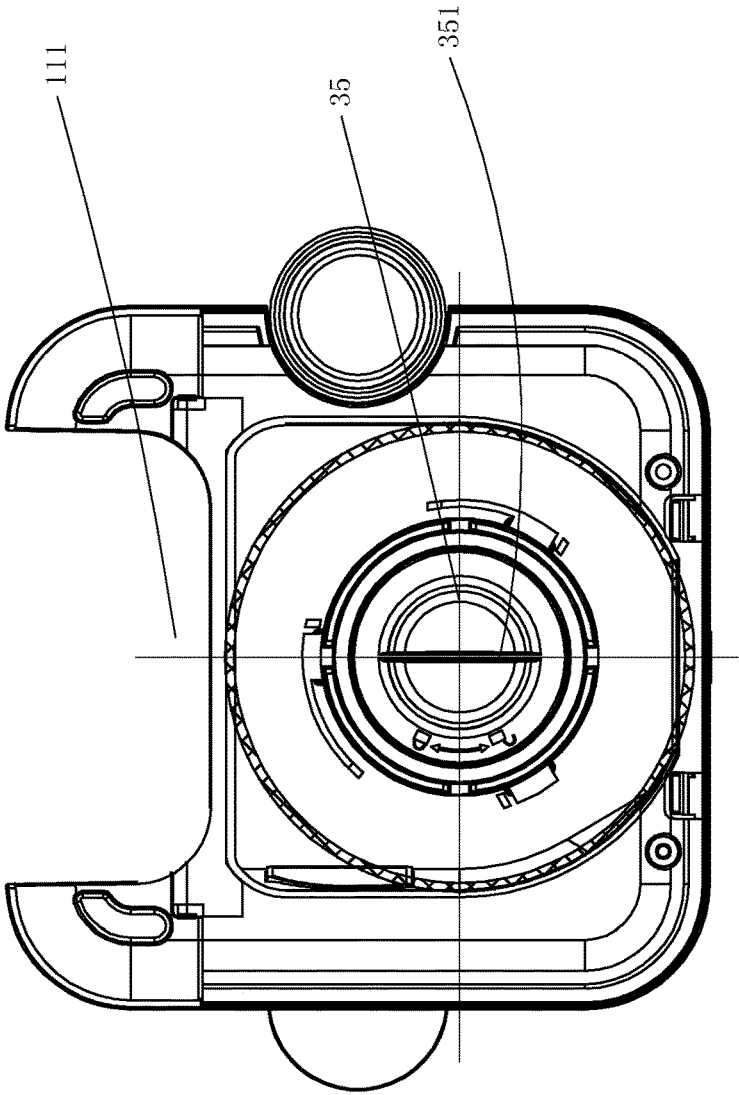


FIG. 14

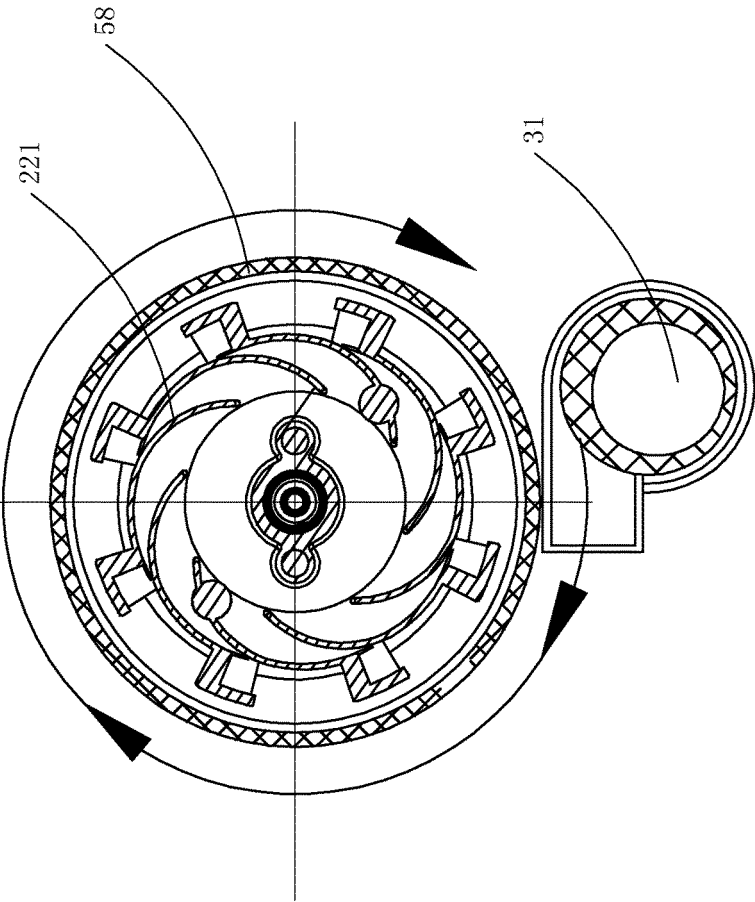


FIG. 15

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2019/123472

5	A. CLASSIFICATION OF SUBJECT MATTER A47L 7/00(2006.01)i According to International Patent Classification (IPC) or to both national classification and IPC	
10	B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) A47L Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched	
15	Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) CNPAT, CNKI, EPODOC, WPI: 吸尘器, 软管, 吸管, 收纳, 收容, 手柄, 手持, 手握, 电机, 集尘, 尘杯, cleaner, collector, hose, tube, pipe, stor+, accomodat+, handle, motor, dust	
20	C. DOCUMENTS CONSIDERED TO BE RELEVANT	
25	Category*	Citation of document, with indication, where appropriate, of the relevant passages
30		Relevant to claim No.
	X	JP 2009261501 A (YAMADA DENKI KOGYO K.K.) 12 November 2009 (2009-11-12) description, paragraphs [0021]-[0032], and figures 1-4
	X	US 6175988 B1 (OVERHEAD DOOR CORPORATION) 23 January 2001 (2001-01-23) description, columns 2-6, and figures 1-4
25	A	CN 203591223 U (SKYBEST ELECTRIC APPLIANCE (SUZHOU) CO., LTD.) 14 May 2014 (2014-05-14) entire document
	A	CN 2922757 Y (SHEN, Jinhuan) 18 July 2007 (2007-07-18) entire document
30	A	CN 208582327 U (NANIWA ASIA ENTERPRISE) 08 March 2019 (2019-03-08) entire document
35	A	CN 207768301 U (JIANGSU MIDEA CLEAN ELECTRIC APPLIANCE CO., LTD.) 28 August 2018 (2018-08-28) entire document
40	☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.	
45	* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "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	
50	Date of the actual completion of the international search 03 March 2020	Date of mailing of the international search report 26 March 2020
55	Name and mailing address of the ISA/CN China National Intellectual Property Administration (ISA/CN) No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088 China	Authorized officer
	Facsimile No. (86-10)62019451	Telephone No.

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/CN2019/123472

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
JP	2009261501	A	12 November 2009	None			
US	6175988	B1	23 January 2001	CA	2314046	A1	14 January 2001
				CA	2314046	C	20 September 2005
CN	203591223	U	14 May 2014	None			
CN	2922757	Y	18 July 2007	None			
CN	208582327	U	08 March 2019	None			
CN	207768301	U	28 August 2018	None			

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