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(54) **SIDE BRUSH ASSEMBLY AND SELF-MOVING CLEANING DEVICE**

(57) The present disclosure provides a side brush assembly and a self-moving cleaning device. The brush of the side brush assembly can switch between a deployed state unfolded relative to the base and a folded state folded relative to the base. Therefore, the bristle length of the brush of the side brush assembly can be designed to be relatively long, which facilitates the brush in the deployed state to effectively clean junction areas such as wall corners and avoid the so-called cleaning dead zones. In addition, the brush can be folded and

retracted relative to the base in the folded state, thereby reducing the size of the entire side brush assembly. Furthermore, the rotation of the base of the side brush assembly drives the brush to switch between the deployed state and the folded state, eliminating the need for an additional power source for the above switching of the brush relative to the base, which is conducive to simplifying the structure for realizing the switching and saving corresponding costs.

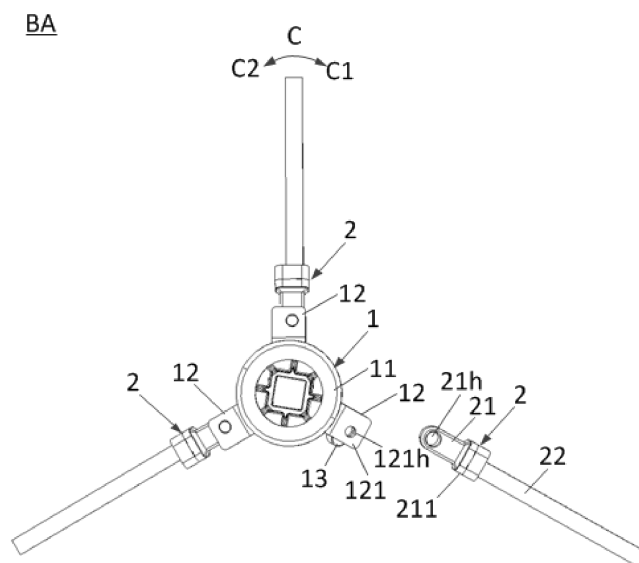


FIG. 1A

Description

TECHNICAL FIELD

[0001] The present disclosure relates to a structure of a cleaning assembly for a self-moving cleaning device, and in particular, to a side brush assembly and a self-moving cleaning device including the side brush assembly.

BACKGROUND

[0002] An autonomous mobile device refers to an intelligent mobile device that autonomously performs pre-set tasks, and the autonomous mobile device can move autonomously according to a result sensed by a sensing assembly thereof. At present, autonomous mobile devices generally include, but are not limited to, self-moving cleaning devices (such as intelligent sweeping robots and intelligent mopping robots), companion mobile robots (such as intelligent electronic pets and nanny robots), service mobile robots (such as reception robots in hotels, inns and meeting places), industrial inspection intelligent devices (such as power inspection robots and intelligent forklifts), and security robots (such as household or commercial intelligent guard robots).

[0003] For a self-moving cleaning device with a dry cleaning assembly, it can perform dry cleaning operations on a traveling surface (surface to be cleaned). Generally, the dry cleaning assembly comprises a main brush assembly and a side brush assembly mounted to a main body portion of the self-moving cleaning device. The main brush assembly comprises a main brush located at the bottom of the main body portion of a main body, and mainly uses the main brush to clean dry dirt on the surface to be cleaned. The side brush assembly comprises a brush protruding from the main body, and the brush can bring dry dirt at junction areas between vertical obstacles (such as building walls) and the surface to be cleaned (such as wall corners) to the main brush for cleaning, and further collect the dry dirt into a dust box in the main body by using a suction device of the self-moving cleaning device.

[0004] However, in existing self-moving cleaning devices, insufficient bristle length of the brush of the side brush assembly may result in insufficient protruding length of the brush relative to the main body. In this case, since the shape of the main body (such as a cylindrical shape) prevents the portion of the self-moving cleaning device where the side brush assembly is disposed from being too close to the above junction areas, the brush of the side brush assembly is difficult to effectively clean the above junction areas. If the bristle length of the brush of the side brush assembly is simply increased, although the cleaning effect on the above junction areas can be improved, the protruding length of the brush from the main body will be the same in both the working state and the non-working state, thus undesirably occupying additional space when the brush is in the non-working state.

SUMMARY OF THE INVENTION

[0005] Based on the above problems in the prior art, an object of the present disclosure is to provide a side brush assembly which can improve the cleaning effect on junction areas such as wall corners while not occupying additional space when the brush of the side brush assembly is in a non-working state. Another object of the present disclosure is to provide a self-moving cleaning device including the above side brush assembly.

[0006] To achieve the above objects, the present disclosure adopts the following technical solutions.

[0007] The present disclosure provides a side brush assembly as follows, the side brush assembly comprises: a base configured to be mounted to the main body portion of a self-moving cleaning device, the base being integrally rotatable bidirectionally toward two sides in a circumferential direction thereof about a rotational central axis thereof, and the base being formed with a first limiting portion; and a brush configured to be rotatably connected to the base so as to be rotatable relative to the base within a predetermined range, wherein rotation of the base toward one side in the circumferential direction can rotate the brush to a deployed state in which the brush is unfolded relative to the base, and the brush abuts against the first limiting portion to be maintained in the deployed state; and rotation of the base toward the other side in the circumferential direction can rotate the brush to a folded state in which the brush is folded relative to the base.

[0008] In an optional solution, the base comprises a base body portion and at least one arm portion fixed to each other, the arm portion is protruding from the base body portion toward outer side in a radial direction, the brush comprises a mounting portion and a bristle portion fixed to each other, the mounting portion is rotatably connected to the corresponding arm portion, the bristle portion is mounted to the mounting portion and protrudes from the mounting portion, in the deployed state of the brush, an extending direction of the bristle portion is the same as an extending direction of the corresponding arm portion; and in the folded state of the brush, the extending direction of the bristle portion is arranged at an angle to the extending direction of the corresponding arm portion.

[0009] In another optional solution, the arm portion comprises connecting walls and a limiting wall serving as the first limiting portion, the connecting walls are fixed to the limiting wall, the connecting walls extend from the base body portion toward outer side in a radial direction and are rotatably connected to the mounting portion, the limiting wall is fixed to an end edge portion of the connecting walls on the other side in the circumferential direction, in the deployed state of the brush, rotation of the base toward the one side in the circumferential direction makes the mounting portion to always abut against the limiting wall.

[0010] In another optional solution, the connecting walls comprise a first connecting wall and a second

connecting wall, the limiting wall is connected to end edges of the first connecting wall and the second connecting wall on the other side in the circumferential direction, such that a mounting cavity for insertion of the brush is defined and surrounded by the limiting wall, the first connecting wall and the second connecting wall, and the mounting cavity has a first opening opening toward the one side in the circumferential direction and a second opening opening toward the radial outer side..

[0011] In another optional solution, a portion of the first connecting wall protruding from the base body portion is formed with a first connecting hole, a portion of the second connecting wall protruding from the base body portion is formed with a second connecting hole, the second connecting hole is aligned to the first connecting hole, the mounting portion is formed with a through hole corresponding to the first connecting hole and the second connecting hole, the side brush assembly further comprises a connecting piece, the connecting piece passes through the first connecting hole, the second connecting hole and the through hole, such that the brush is rotatably connected to the corresponding arm portion in a manner rotatable about the connecting piece.

[0012] In another optional solution, the mounting portion is formed with a flange portion, a cross-sectional size of the flange portion is larger than that of other portion of the mounting portion, in the folded state of the brush, rotation of the base toward the other side in the circumferential direction can make the flange portion abut against the base body portion serving as a second limiting portion, and the flange portion abuts against the second limiting portion to maintain the brush in a fully folded state.

[0013] In another optional solution, the side brush assembly comprises three brushes, the three brushes are evenly distributed at intervals in the circumferential direction, and in the deployed state, the brush extends obliquely toward one side of the base in the axial direction while extending away from the base.

[0014] The present disclosure further provides a self-moving cleaning device, comprising a main body portion and the side brush assembly according to any one of the above technical solutions, the side brush assembly is mounted to the main body portion in a manner rotatable relative to the main body portion.

[0015] In an optional solution, when the self-moving cleaning device is placed on a horizontal surface to be cleaned, an included angle α between an extending direction of the brush of the side brush assembly in the deployed state and the surface to be cleaned satisfies $10^\circ \leq \alpha \leq 30^\circ$.

[0016] In another optional solution, the main body portion comprises a main body, a swing arm and a transmission mechanism, the transmission mechanism is disposed in the swing arm, one end portion of the swing arm is rotatably connected to the main body such that the swing arm can swing relative to the main body, the side brush assembly is mounted to the other end portion of the

swing arm, and the side brush assembly is in transmission connection with the transmission mechanism, the transmission mechanism is configured to drive the base of the side brush assembly to rotate bidirectionally, and the swing arm is configured to at least extend and retract the side brush assembly relative to the main body portion.

[0017] In another optional solution, a bottom of the main body is formed with a storage groove recessed toward an upper side, one end portion of the swing arm is mounted to a bottom of the storage groove, in a state where the side brush assembly is retracted relative to the main body portion, the swing arm and the base of the side brush assembly are received in the storage groove.

[0018] By adopting the above technical solutions, the present disclosure provides a side brush assembly and a self-moving cleaning device including the side brush assembly. The side brush assembly comprises a base and a brush assembled together. The base is configured to be mounted to the main body portion of the self-moving cleaning device, the base is integrally rotatable bidirectionally toward two sides in a circumferential direction thereof about a rotational central axis thereof, and the base is formed with a first limiting portion. The brush is rotatably connected to the base so as to be rotatable relative to the base within a predetermined range. Further, rotation of the base toward one side in the circumferential direction can rotate the brush to a deployed state in which the brush is unfolded relative to the base, and the brush abuts against the first limiting portion to be maintained in the deployed state. Rotation of the base toward the other side in the circumferential direction can rotate the brush to a folded state in which the brush is folded relative to the base.

[0019] In this way, the brush of the side brush assembly according to the present disclosure can switch between a deployed state unfolded relative to the base and a folded state (including fully folded and non-fully folded) folded relative to the base. Therefore, the bristle length of the brush of the side brush assembly can be designed to be relatively long, which facilitates the brush in the deployed state to effectively clean junction areas such as wall corners and avoid the so-called "cleaning dead zones". In addition, when the brush of the side brush assembly is in the deployed state, in addition to performing conventional cleaning on the surface to be cleaned, the brush can rub against the surface to be cleaned, which is conducive to sweeping up or patting up dry dirt attached to the surface to be cleaned. Further, the brush can be folded and retracted relative to the base in the folded state, thereby reducing the size of the entire side brush assembly. Furthermore, the rotation of the base drives the brush to switch between the deployed state and the folded state by means of inertia and/or friction force, so no additional power source is required for the above switching of the brush relative to the base, which is conducive to simplifying the structure for realizing the switching and saving corresponding costs.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020]

FIG. 1A is a schematic top view showing a structure of a side brush assembly according to an example of the present disclosure, wherein one brush is in a state detached from the base.

FIG. 1B is a schematic perspective view showing the structure of the side brush assembly in FIG. 1A, wherein one brush is in a state detached from the base.

FIG. 1C is a schematic perspective view showing the structure of the side brush assembly in FIG. 1A, wherein three brushes are all in a state detached from the base.

FIG. 2A is a schematic perspective view showing a structure of a self-moving cleaning device according to an example of the present disclosure, wherein a brush of the side brush assembly is in a deployed state unfolded relative to the base.

FIG. 2B is an enlarged schematic view showing a partial structure of the self-moving cleaning device in FIG. 2A.

FIG. 3A is a schematic perspective view showing a structure of a self-moving cleaning device according to an example of the present disclosure, wherein a brush of the side brush assembly is in a folded state fully folded relative to the base.

FIG. 3B is an enlarged schematic view showing a partial structure of the self-moving cleaning device in FIG. 3A.

Reference List

[0021]

BA-side brush assembly;
1-base;
11-base Body portion; 12-arm portion; 12o1-first Opening; 12o2-second Opening; 121-first connecting wall; 121h-first connecting hole; 122-second connecting wall; 122h-second connecting hole; 123-limiting wall; 13-connecting piece;
2-brush;
21-mounting portion; 21h-through hole; 211-flange portion; 22-bristle portion;
C-circumferential direction; C1-one side in the circumferential direction; C2-the other side in the circumferential direction;
MB-main body portion;
3-main body; 3c-storage groove;
4-swing arm

DETAILED DESCRIPTION OF EMBODIMENTS

[0022] Examples of the present disclosure will be described below with reference to the accompanying draw-

ings. For ease of understanding, elements shown in the drawings may include elements whose dimensions and scales are different from actual dimensions and scales.

[0023] In the present disclosure, unless otherwise specified, "front (front side)", "rear (rear side)", "left (left side)", "right (right side)", "upper (upper side)" and "lower (lower side)" are all defined relative to the normal operation state of the self-moving cleaning device according to the present disclosure. Specifically, the self-moving cleaning device has a forward movement direction (i.e., forward direction) in the normal operation state, and the "normal operation state" refers to a movement state of the self-moving cleaning device when performing a task, which is different from an abnormal operation state such as backward movement and swinging of the self-moving cleaning device in an escape mode. "Front (front side)" and "rear (rear side)" refer to the front side and rear side in the forward movement direction of the self-moving cleaning device when the self-moving cleaning device according to the present disclosure is in the normal operation state on the surface to be cleaned; "left (left side)" and "right (right side)" refer to the left side and right side when viewed toward the front side of the forward movement direction; "upper (upper side)" and "lower (lower side)" refer to the upper side and lower side in a height direction perpendicular to the surface to be cleaned when the self-moving cleaning device according to the present disclosure is in the normal operation state on the surface to be cleaned.

[0024] In the present disclosure, the self-moving cleaning device can move autonomously according to a preset control scheme in a processing unit thereof, and the surface to be cleaned on which the self-moving cleaning device moves autonomously may be a flat surface or a curved surface with a large curvature radius, typically such as the ground in each room of a building. In the present disclosure, the processing unit is a general term, and the type, quantity and form of the processing unit are not limited. Specifically, the processing unit may be one or more of MCU, DSP, FPGA, GPU, or various other hardware chips, processors or software algorithms with data processing and computing capabilities. Further, the processing unit may be a unified and single processor of the self-moving cleaning device, or a set of multiple processing units, and the connection mode and the allocation of functions and computing power of the multiple processing units may be adjusted as required. For example, in an optional solution, a first processing unit and a second processing unit may be included, and in this case, the first processing unit and the second processing unit collectively implement various functions of the above processing unit. In addition, the processing unit of the self-moving cleaning device can receive parameters from the sensing assembly, and can perform relevant control on the self-moving cleaning device through a preset program stored in a storage unit. Data, information and programs required by the processing unit during processing may be stored in the storage unit and ac-

quired from the storage unit as required, and the processing unit may store the processed data and information in the storage unit again. The storage unit may be RAM, ROM, or other devices and/or equipment with storage functions such as a cloud server/server/mobile terminal connected via a wired/wireless network.

[0025] In the present disclosure, the brush of the side brush assembly may be in an "deployed state" and a "folded state" relative to the base. Only when the brush is in the deployed state, the brush can be in a working state for cleaning the surface to be cleaned. When the brush is in the state which is a non-deployed state, the brush is in the folded state, wherein the folded state includes a fully folded state (a limit state where the brush can be folded relative to the base) and a non-fully folded state (other folded states except the above fully folded state), and the brush in the folded state is generally in a non-working state.

[0026] In the present disclosure, unless otherwise specified, "axial direction", "radial direction" and "circumferential direction" refer to the axial direction, radial direction and circumferential direction of the side brush assembly (base) respectively.

[0027] In the present disclosure, "transmission connection" means that two components are connected in a torque-transmittable manner, including direct connection and indirect connection between the two components.

[0028] A side brush assembly according to an example of the present disclosure will be described below with reference to the accompanying drawings.

[0029] As shown in FIGs. 1A to 1C, the side brush assembly BA according to the example of the present disclosure comprises a base 1 and a plurality of (three in this example) brushes 2 assembled together. When the side brush assembly BA is in the deployed state unfolded relative to the base 1, the brush 2 can rotate together with the base 1, so as to perform dry cleaning on the surface to be cleaned; when the side brush assembly BA is in the folded state folded relative to the base 1, the brush 2 can be retracted toward the base 1 relative to the deployed state.

[0030] In this example, as shown in FIGs. 1A to 1C, the base 1 is configured to be mounted to the main body portion MB of the self-moving cleaning device (see FIGs. 2A to 3B). Specifically, the base 1 comprises a base body portion 11, a plurality of (three in this example) arm portions 12 and a plurality of (three in this example) connecting pieces 13 fixed to each other.

[0031] As shown in FIGs. 1A to 1C, the base body portion 11 is formed as a rotating body with a central axis, and the base body portion 11 can be driven to rotate bidirectionally along the circumferential direction C thereof toward two sides about the central axis thereof, so that the entire base 1 rotates bidirectionally about the above central axis. A central portion of the base body portion 11 is formed with a square hole for connection with a transmission shaft of the following transmission mechanism,

whereby torque from the transmission shaft can drive the base body portion 11 to rotate bidirectionally. It can be understood that the structure of the base body portion 11 is not limited to the specific shape shown in the drawings, and the base body portion 11 may have different shapes as required as long as the base body portion 11 can be smoothly connected with other components and rotate about the central axis thereof.

[0032] As shown in FIGs. 1A to 1C, the number of the arm portions 12 may be the same as the number of the brushes 2, the plurality of arm portions 12 extend divergently from the base 1 toward the outer side in radial directions, and the plurality of arm portions 12 are evenly distributed at intervals in the circumferential direction C. Each arm portion 12 extends toward the outer side in different radial directions from the base 1 and protrudes obliquely toward the same side relative to the axial direction. Further, each arm portion 12 comprises a first connecting wall 121, a second connecting wall 122 and a limiting wall 123 serving as a first limiting portion, which are fixed to each other. The first connecting wall 121 and the second connecting wall 122 are both formed in a flat plate shape and arranged parallel to each other, both the first connecting wall 121 and the second connecting wall 122 extend from the base body portion 11 toward the outer side in a radial direction and obliquely toward the same side relative to the axial direction, and the first connecting wall 121 and the second connecting wall 122 are rotatably connected with the mounting portion 21 of the brush 2 via the connecting piece 13. The limiting wall 123 is formed in a flat plate shape and arranged perpendicular to the first connecting wall 121 and the second connecting wall 122, and the limiting wall 123 serves as the first limiting portion for the brush 2 to abut against the limiting wall 123 in the deployed state to define the position and posture of the brush 2. In addition, the limiting wall 123 is fixedly connected with end edge portions of the first connecting wall 121 and the second connecting wall 122 on the other side in the circumferential direction, so that a mounting cavity for insertion of the brush 2 is defined and surrounded by the limiting wall 123, the first connecting wall 121 and the second connecting wall 122, and the mounting cavity has a first opening 12o1 opening toward the one side in the circumferential direction C1 and a second opening 12o2 opening toward outer side in a radial direction. The second opening 12o2 opening toward the outer side in a radial direction allows the brush 2 to be inserted into the mounting cavity, so that the brush 2 is connected with the arm portion 12 of the base 1; the first opening 12o1 opening toward the one side C1 in the circumferential direction facilitates the brush 2 to be folded relative to the base 1 after the base 1 rotates toward the other side C2 in the circumferential direction.

[0033] In addition, as shown in FIGs. 1A and 1B, both the radial inner end portion of the first connecting wall 121 and the radial inner end portion of the second connecting wall 122 are fixedly connected with the base body portion

11. For mounting the connecting piece 13, a portion of the first connecting wall 121 extending from the base body portion 11 is formed with a first connecting hole 121h, a portion of the second connecting wall 122 extending from the base body portion 11 is formed with a second connecting hole 122h, and the second connecting hole 122h is aligned to the first connecting hole 121h.

[0034] Thus, with the above arm portions 12, the brushes 2 are connected with the base 1 with a relatively simple structure, and the positions and postures of the brushes 2 in the deployed state are defined, so as to prevent the brushes 2 from rotating excessively relative to the base 1 after the base 1 rotates toward the one side C1 in the circumferential direction, and the mounting portion 21 can be always maintained in the deployed state by rotating the base 1 toward the one side C1 in the circumferential direction.

[0035] In this example, as shown in FIGs. 1B and 1C, the connecting piece 13 is formed as a cylindrical connecting pin. The connecting piece 13 is inserted into the first connecting hole 121h of the first connecting wall 121, passes through the through hole 21h of the following mounting portion 21 of the brush 2, and is inserted into the second connecting hole 122h of the second connecting wall 122. The connecting piece 13 may be in interference fit with the first connecting hole 121h and the second connecting hole 122h, and the connecting piece 13 is in clearance fit with the through hole 21h, so that the brush 2 is connected with the corresponding arm portion 12 in a manner rotatable about the connecting piece 13. In this way, the connecting piece 13 connects the mounting portion 21 of the brush 2 with the arm portion 12, and enables the mounting portion 21 to rotate relative to the arm portion 12 about the connecting piece 13. Such a connection structure is simple in structure, convenient in installation, and conducive to smooth switching of the brush 2 between the deployed state and the folded state.

[0036] In this example, as shown in FIGs. 1A to 1C, the three brushes 2 are evenly distributed at intervals in the circumferential direction C, and each brush 2 is rotatably connected with the corresponding arm portion 12. In the deployed state, the brushes 2 extend obliquely toward the same side relative to the axial direction while extending away from the base 1, and the extending direction of the brush 2 is the same as the extending direction of the corresponding arm portion 12. Thus, the brush 2 is configured to be inclined toward one side in the axial direction in the deployed state. Compared with a solution in which the brush 2 is configured to be non-inclined (i.e., parallel to the surface to be cleaned after being mounted in place) in the deployed state, the bristle portion 22 of the brushes 2 can be reliably contacted with the surface to be cleaned during operation of the side brush assembly BA, the contact pressure between the brush 2 and the surface to be cleaned is improved, the risk of the bristle portion 22 being undesirably bounced up from the surface to be cleaned is greatly reduced, and thus the cleaning effect of the self-moving cleaning device including the side brush

assembly BA on the surface to be cleaned is improved. Specifically, each brush 2 comprises a mounting portion 21 and a bristle portion 22 fixed to each other.

[0037] As shown in FIGs. 1A to 1C, the mounting portion 21 is rotatably connected with the corresponding arm portion 12, and the mounting portion 21 is formed with a through hole 21h corresponding to the first connecting hole 121h of the first connecting wall 121 and the second connecting hole 122h of the second connecting wall 122. In a state where the mounting portion 21 is inserted into the mounting cavity formed by the arm portion 12, the through hole 21h of the mounting portion 21 is aligned to the first connecting hole 121h and the second connecting hole 122h, so that the connecting piece 3 can be inserted into the through hole 21h, the first connecting hole 121h and the second connecting hole 122h.

[0038] In addition, the mounting portion 21 is formed with a flange portion 211, and a cross-sectional size of the flange portion 211 is larger than that of other portion of the mounting portion 21. The base 1 rotates toward the other side C2 in the circumferential direction to bring the brush 2 into a fully folded state (see FIG. 3B), and the flange portion 211 always abuts against the base body portion 11 in the fully folded state. At this time, the base body portion 11 of the base 1 serves as a second limiting portion to perform a limiting function, so that the flange portion 211 abuts against the second limiting portion to be maintained in the folded state. Using the Base Body portion 11 as the second limiting portion can not only make the brush 2 rotate from the deployed state relative to the arm portion 12 by a sufficient angle to the fully folded state, so as to minimize the space occupied by the brush 2 in the fully folded state, but also prevent the brush 2 from rotating excessively.

[0039] As shown in FIGs. 1A and 1C, the bristle portion 22 may comprise a plurality of bundles of hard bristles. The bristle portion 22 is mounted to the corresponding mounting portion 21 and extends from the mounting portion 21. In the deployed state of the brush 2, the extending direction of the bristle portion 22 of the brush 2 is the same as the extending direction of the corresponding arm portion 12; in the folded state of the brush 2, the extending direction of the bristle portion 22 of the brush 2 is arranged at an angle to the extending direction of the corresponding arm portion 12. In the deployed state, the extending direction of the bristle portion 22 of the brush 2 is the same as the extending direction of the arm portion 12, which facilitates the entire brush 2 to extend with a sufficient length. In the folded state, the extending direction of the bristle portion 22 of the brush 2 is arranged at an angle to the extending direction of the arm portion 12, which facilitates reducing the overall size of the brush 2. In addition, in this example, the overall extending direction of the mounting portion 21 and the bristle portion 22 is consistent with the extending direction of the bristle portion 22.

[0040] By adopting the above solution, the brush 2 is

rotatably connected with the base 1, and the brush 2 can be rotated relative to the base 1 within a predetermined range defined by the limiting wall 123 serving as the first limiting portion and the base body portion 11 serving as the second limiting portion. Specifically, referring to FIGs. 2A and 2B, rotation of the base 1 toward the one side C1 in the circumferential direction can rotate the brush 2 from the folded state to the deployed state relative to the base 1, and at this time, the brush 2 abuts against the first limiting portion and can perform normal cleaning operations. Moreover, in a state where the base 1 keep rotating toward the one side C1 in the circumferential direction, the brush 2 abuts against the first limiting portion to be maintained in the deployed state. Referring to FIGs. 3A and 3B, rotation of the base 1 toward the other side C2 in the circumferential direction can rotate the brush 2 from the deployed state to the folded state relative to the base 1, and in a state where the base 1 keep rotating toward the other side C2 in the circumferential direction, the brush 2 can abut against the second limiting portion to be maintained in the fully folded state.

[0041] In this way, the brush 2 of the side brush assembly BA according to the present disclosure can switch between a deployed state unfolded relative to the base 1 and a folded state (including fully folded and non-fully folded) folded relative to the base 1. Therefore, the bristle length of the brush 2 of the side brush assembly BA can be designed to be relatively long, which facilitates the brush 2 in the deployed state to effectively clean junction areas such as wall corners and avoid the so-called "cleaning dead zones", and can also reduce the size of the entire side brush assembly BA when the brush 2 is in the folded state. Furthermore, the rotation of the base 1 drives the brush 2 to switch between the deployed state and the folded state, eliminating the need for an additional power source for the above switching of the brush 2 relative to the base 1, which is conducive to simplifying the structure for realizing the switching and saving corresponding costs. In addition, when the brush 2 of the side brush assembly BA is in the deployed state, in addition to performing conventional cleaning on the surface to be cleaned, the brush 2 of the side brush assembly BA can contact and rub against the surface to be cleaned, which is conducive to sweeping up or patting up dry dirt attached to the surface to be cleaned, so that the dry dirt can be sucked into the dust box by the suction device of the self-moving cleaning device including the side brush assembly BA.

[0042] As shown in FIGs. 2A to 3B, an example of the present disclosure further provides a self-moving cleaning device. In addition to the side brush assembly BA described in the above detailed description, the self-moving cleaning device further comprises a main body portion MB, and the side brush assembly BA is mounted to the main body portion MB in a manner rotatable relative to the main body portion MB.

[0043] In this example, as shown in FIGs. 2A and 3A, the main body portion MB may comprise a main body 3

having a substantially cylindrical shape as a whole (circular in a top view). The shape of the main body 3 is not limited thereto, and in an optional solution, the main body 3 may also have other shapes, such as square, oval, D-shaped in a top view. When the self-moving cleaning device according to the example of the present disclosure is in the normal operation state, a bottom surface of the main body 3 is opposite to the surface to be cleaned, and the bottom surface of the main body 3 is parallel to the surface to be cleaned. Here, "parallel" includes not only a geometric parallel relationship between the bottom surface of the main body 3 and the surface to be cleaned, but also a substantially parallel relationship between the two. The term "substantially" means that the parallel relationship between the two can be determined within a reasonable error recognized by those skilled in the art. In addition, other components of the self-moving cleaning device may be disposed in the main body 3, and for supporting and protecting other components, most structures of the self-moving cleaning device are mounted inside or on the surface of the main body 3, or connected with the main body 3. A processing unit and a sensing assembly may also be disposed in the main body 3 of the self-moving cleaning device. In addition, the self-moving cleaning device may further comprise a dry cleaning member such as a main brush and a wet cleaning member such as a mop or a rolling brush. Thus, the processing unit can obtain environmental parameters via the sensing assembly, and the processing unit can control the entire self-moving cleaning device to move autonomously on the surface to be cleaned based on the obtained environmental parameters, so as to perform cleaning operations on the surface to be cleaned by the dry cleaning member and/or the wet cleaning member in this process. In different working modes, the cleaning operations include, but are not limited to, one or more of sweeping, mopping, dust suction and other operations.

[0044] In addition, the main body portion MB further comprises a swing arm 4 and a transmission mechanism. One end portion of the swing arm 4 is rotatably connected to the main body 3 such that the swing arm 4 can swing relative to the main body 3, and the side brush assembly BA is mounted to the other end portion of the swing arm 4. In this example, the transmission mechanism is at least partially disposed in the swing arm 4, and the side brush assembly BA is in transmission connection with the transmission mechanism. The transmission mechanism is configured to drive the side brush assembly BA to rotate bidirectionally; the swing arm 4 enables the side brush assembly BA to extend and retract relative to the main body portion MB, and can make the bristles of the side brush assembly BA extend to a farther position relative to the main body portion MB, which facilitates the brush 2 in the deployed state to extend relative to the main body 3 to junction areas such as wall corners (corners defined by two walls and the surface to be cleaned), so as to effectively clean these junction areas and avoid the so-called "cleaning dead zones", thereby

further improving the cleaning effect of the automatic cleaning device.

[0045] As shown in FIGs. 2A and 3A, the side brush assembly BA is positioned at the bottom of the main body 3 and at a position close to one side (such as the left side) relative to a center line of the main body 3 extending in the front-rear direction, so that the brush 2 of the side brush assembly BA in the deployed state can protrude relative to the outer contour of the main body 3. Further, when the self-moving cleaning device is placed on a horizontal surface to be cleaned, an acute included angle α between the extending direction of each brush 2 of the side brush assembly BA in the deployed state and the surface to be cleaned satisfies $10^\circ \leq \alpha \leq 30^\circ$. In this way, on the one hand, the brush 2 of the side brush assembly BA can be reliably contacted with the surface to be cleaned, and the cleaning effect of the side brush assembly BA on the surface to be cleaned is improved. On the other hand, since the extending directions of both the arm portion 12 of the base 1 and the brush 2 of the side brush assembly BA are the same in the deployed state, the extending direction of the arm portion 12 also has the above acute angle α with the surface to be cleaned. Therefore, after the brush 2 configured as above is switched from the deployed state to the folded state, the position of the bristle portion 22 in the up-down direction when the brush 2 is in the folded state is closer to the upper side (i.e., relatively raised) relative to the position of the bristle portion 22 when the brush 2 is in the deployed state, so that the bristle portion 22 can be as far away from the surface to be cleaned as possible when the side brush assembly BA is in the folded state. This is conducive to preventing the carpet on the surface to be cleaned from contacting the bristle portion 22 and hindering the travel of the self-moving cleaning device when the brush 2 is in the folded state, and also preventing wet dirt on the surface to be cleaned from contaminating the bristle portion 22 when the self-moving cleaning device travels over the wetted surface to be cleaned during normal cleaning or recharging. In addition, when the bristle portion 22 of the brush 2 has been contaminated, since the bristle portion 22 is relatively raised away from the surface to be cleaned when the brush of the side brush assembly BA is in the folded state, the bristle portion 22 can be prevented from contaminating the surface to be cleaned. It can be understood that by configuring the arm portion 12 of the base 1 for connecting with the brush 2 as described above, the brush 2 can be switched between different states relative to the base 1 by bidirectional rotation of the base 1, and at the same time, the brush 2 can be relatively raised in the folded state, so that the brush 2 can be further reliably separated from the surface to be cleaned when needed in cooperation with other mechanical lifting mechanisms.

[0046] In addition, as shown in FIGs. 2B and 3B, the bottom of the main body 3 is formed with a storage groove 3c recessed toward the upper side, and the shape of the storage groove 3c may be configured to be substantially

the same as that of the swing arm. Further, one end portion of the swing arm 4 is mounted to the bottom of the storage groove, so that the swing arm 4 and the base 1 of the side brush assembly BA can be received in the storage groove 3c in a state where the swing arm 4 is retracted relative to the main body 3. In this way, the distance between the brush 2 and the surface to be cleaned in the retracted state can be further reduced, the space occupied by the autonomous mobile device in the non-working state can be reduced, and the swing arm 3 and the side brush assembly BA can be protected to a certain extent.

[0047] It should be understood that the above examples are exemplary and not intended to limit the present disclosure. Those skilled in the art can make various modifications and changes to the above examples under the teaching of the present disclosure without departing from the scope of the present disclosure. The following supplementary explanations are made for the technical solution of the present disclosure.

[0048] i. It can be understood that the present disclosure does not limit the number and arrangement of the bristle portions 22 of the brush 2, and the number of the bristle portions 22 and their arrangement can be adjusted as required to further improve the cleaning effect of the brush 2.

[0049] Moreover, the present disclosure does not limit the connection mode between the brush 2 and the base 1, nor the specific structure of the limiting portion, as long as the brush 2 can be switched between different states relative to the base 1 by bidirectional rotation of the base 1.

[0050] ii. It can be understood that in the self-moving cleaning device of the present disclosure, a plurality of side brush assemblies BA may be provided, and the cleaning effect of the self-moving cleaning device can be further improved by using these side brush assemblies BA.

[0051] iii. It can be understood that in the self-moving cleaning device of the present disclosure, the transmission mechanism comprises a motor for driving the base 1 of the side brush assembly BA to rotate. The motor can be used not only as a power source for driving the base 1 to rotate, but also as a power source for extending, retracting and lifting the swing arm 4, thereby further reducing the corresponding cost. To this end, the transmission mechanism may further comprise a gear transmission assembly or a belt transmission assembly for transmitting the torque of the motor to the brush 2, and a mechanism for extending, retracting and lifting the swing arm 4, so as to smoothly transmit the torque of the motor to the side brush assembly BA and the swing arm 4.

[0052] iv. In addition, to realize autonomous movement of the self-moving cleaning device, in the above self-moving cleaning device, the main body portion MB may further comprise a wheel assembly. The wheel assembly may be mounted to the main body 3 and protrude relative to the bottom surface of the main body

3, and is configured to drive the entire self-moving cleaning device to travel on the traveling surface under the control of the processing unit. The self-moving cleaning device can be driven to move linearly in the forward movement direction by rotating two wheels (driving wheels) of the wheel assembly in the same direction at the same speed (such as rotating clockwise or counterclockwise at the same time); the self-moving cleaning device can be driven to steer in different directions relative to the forward movement direction by rotating the two wheels of the wheel assembly at different speeds and/or in different directions (such as one wheel rotating clockwise and the other wheel rotating counterclockwise). The self-moving cleaning device may further comprise a universal wheel (not shown) disposed on the main body 3, so that the universal wheel can support the entire self-moving cleaning device no matter how the wheels roll on the traveling surface.

Claims

1. A side brush assembly comprising:

a base (1) configured to be mounted to a main body portion (MB) of a self-moving cleaning device, the base (1) being integrally rotatable bidirectionally toward two sides (C1, C2) in a circumferential direction (C) thereof about a rotational central axis thereof, and the base (1) being formed with a first limiting portion; and a brush (2) configured to be rotatably connected to the base (1) so as to be rotatable relative to the base (1) within a predetermined range, wherein rotation of the base (1) toward one side (C1) in the circumferential direction can rotate the brush (2) to a deployed state in which the brush (2) is unfolded relative to the base (1), and the brush (2) abuts against the first limiting portion to be maintained in the deployed state; and rotation of the base (1) toward the other side (C2) in the circumferential direction can rotate the brush (2) to a folded state in which the brush (2) is folded relative to the base (1).

2. The side brush assembly according to claim 1, wherein

the base (1) comprises a base body portion (11) and at least one arm portion (12) fixed to each other, the arm portion (12) is protruding from the base body portion (11) toward outer side in a radial direction, the brush (2) comprises a mounting portion (21) and a bristle portion (22) fixed to each other, the mounting portion (21) is rotatably connected to the corresponding arm portion (12), the bristle portion (22) is mounted to the mounting portion

(21) and protrudes from the mounting portion (21), in the deployed state of the brush (2), an extending direction of the bristle portion (22) is the same as an extending direction of the corresponding arm portion (12); and in the folded state of the brush (2), the extending direction of the bristle portion (22) is arranged at an angle to the extending direction of the corresponding arm portion (12).

3. The side brush assembly according to claim 2, wherein the arm portion (12) comprises connecting walls (121, 122) and a limiting wall (123) serving as the first limiting portion, the connecting walls (121, 122) are fixed to the limiting wall (123), the connecting walls (121, 122) extend from the base body portion (11) toward outer side in a radial direction and are rotatably connected to the mounting portion (21), the limiting wall (123) is fixed to an end edge portion of the connecting walls (121, 122) on the other side in the circumferential direction, in the deployed state of the brush (2), rotation of the base (1) toward the one side (C1) in the circumferential direction makes the mounting portion (21) to always abut against the limiting wall (123).

4. The side brush assembly according to claim 3, wherein the connecting walls comprise a first connecting wall (121) and a second connecting wall (122), the limiting wall (123) is connected to end edges of the first connecting wall (121) and the second connecting wall (122) on the other side in the circumferential direction, such that a mounting cavity for insertion of the brush (2) is defined and surrounded by the limiting wall (123), the first connecting wall (121) and the second connecting wall (122), and the mounting cavity has a first opening (1201) opening toward the one side (C1) in the circumferential direction and a second opening (1202) opening toward the radial outer side.

5. The side brush assembly according to claim 4, wherein a portion of the first connecting wall (121) protruding from the base body portion (11) is formed with a first connecting hole (121h), a portion of the second connecting wall (122) protruding from the base body portion (11) is formed with a second connecting hole (122h), the second connecting hole (122h) is aligned to the first connecting hole (121h), the mounting portion (21) is formed with a through hole (21h) corresponding to the first connecting hole (121h) and the second connecting hole (122h), the side brush assembly (BA) further comprises a connecting piece (13), the connecting piece (13) passes through the first connecting hole (121h), the second connecting hole (122h) and the through hole (21h), such that the brush (2) is rotatably con-

nected to the corresponding arm portion (12) in a manner rotatable about the connecting piece (13).

6. The side brush assembly according to any one of claims 2 to 5, wherein the mounting portion (21) is formed with a flange portion (211), a cross-sectional size of the flange portion (211) is larger than that of other portion of the mounting portion (21), in the folded state of the brush (2), rotation of the base (1) toward the other side (C2) in the circumferential direction can make the flange portion (211) abut against the base body portion (11) serving as a second limiting portion, and the flange portion (211) abuts against the second limiting portion to maintain the brush (2) in a fully folded state. 5 10 15
7. The side brush assembly according to any one of claims 1 to 5, wherein the side brush assembly (BA) comprises three brushes (2), the three brushes (2) are evenly distributed at intervals in the circumferential direction (C), and in the deployed state, the brush (2) extends obliquely toward one side of the base (1) in the axial direction while extending away from the base (1). 20 25
8. A self-moving cleaning device, comprising a main body portion (MB) and the side brush assembly (BA) according to any one of claims 1 to 7, wherein the side brush assembly (BA) is mounted to the main body portion (MB) in a manner rotatable relative to the main body portion (MB). 30
9. The self-moving cleaning device according to claim 8, wherein when the self-moving cleaning device is placed on a horizontal surface to be cleaned, an included angle α between an extending direction of the brush (2) of the side brush assembly (BA) in the deployed state and the surface to be cleaned satisfies $10^\circ \leq \alpha \leq 30^\circ$. 35 40
10. The self-moving cleaning device according to claim 8 or 9, wherein the main body portion (MB) comprises a main body (3), a swing arm (4) and a transmission mechanism, the transmission mechanism is disposed in the swing arm (4), 45

one end portion of the swing arm (4) is rotatably connected to the main body (3) such that the swing arm (4) can swing relative to the main body (3), the side brush assembly (BA) is mounted to the other end portion of the swing arm (4), and the side brush assembly (BA) is in transmission connection with the transmission mechanism, the transmission mechanism is configured to drive the base (1) of the side brush assembly (BA) to rotate bidirectionally, and the swing arm (4) is configured to at least extend and retract the 50 55

side brush assembly (BA) relative to the main body portion (MB).

11. The self-moving cleaning device according to claim 10, wherein a bottom of the main body (3) is formed with a storage groove (3c) recessed toward an upper side, one end portion of the swing arm (4) is mounted to a bottom of the storage groove (3c), in a state where the side brush assembly (BA) is retracted relative to the main body portion (MB), the swing arm (4) and the base (1) of the side brush assembly (BA) are received in the storage groove (3c).

BA

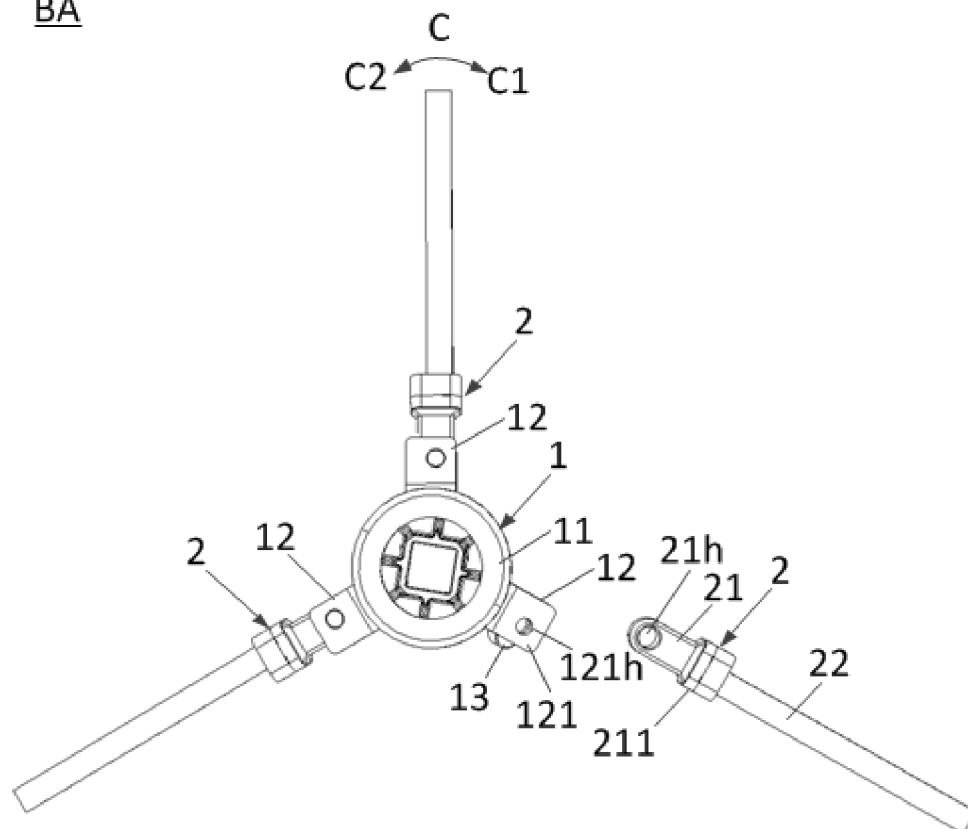


FIG. 1A

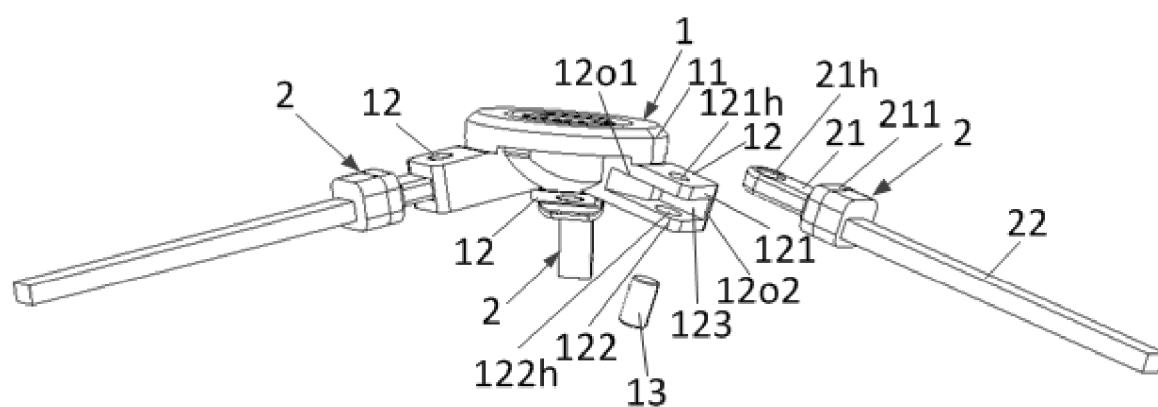
BA

FIG. 1B

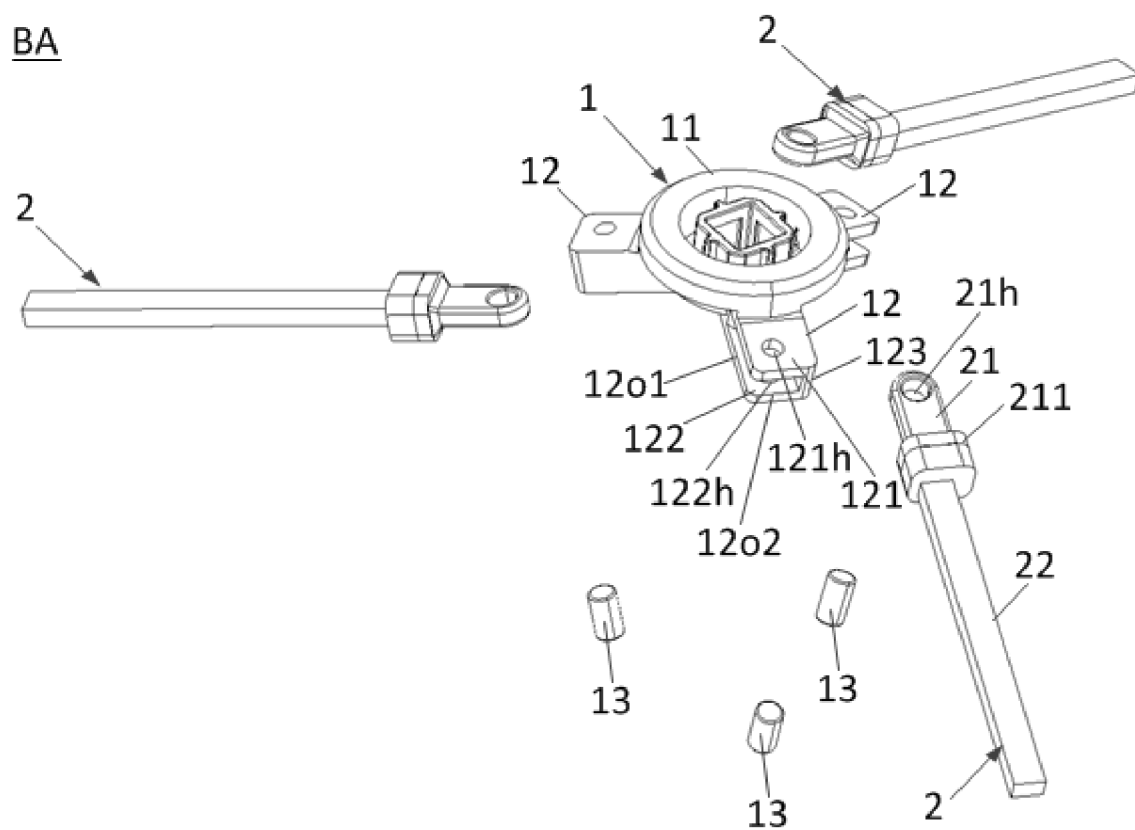


FIG. 1C

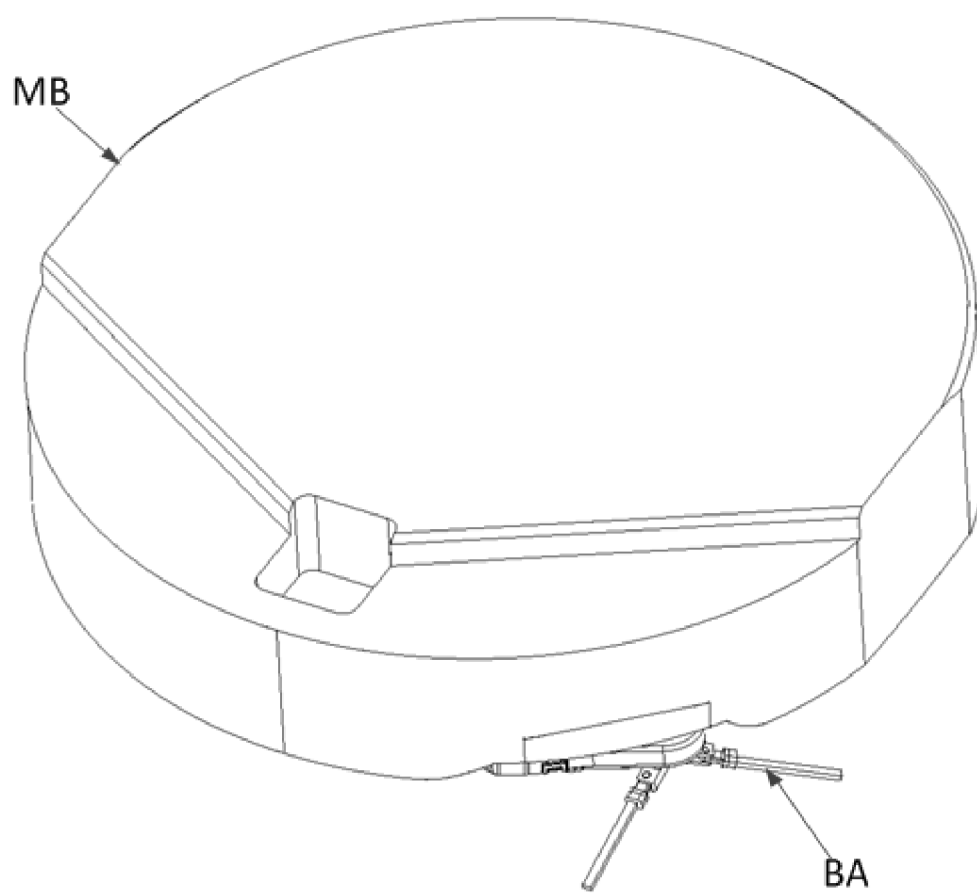


FIG. 2A

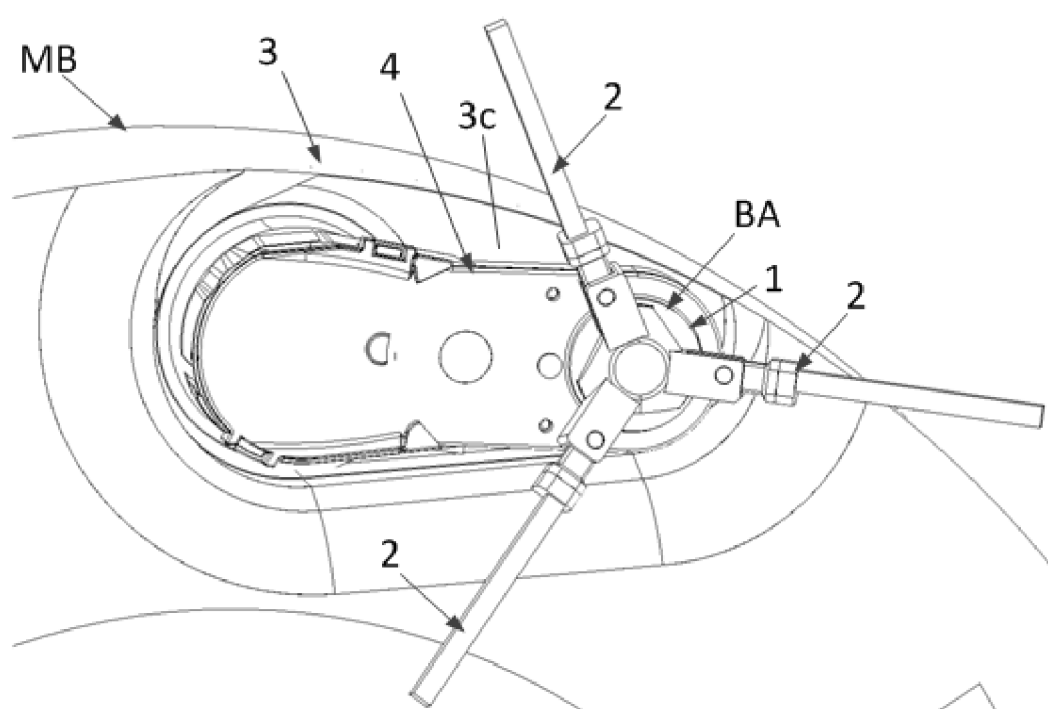


FIG. 2B

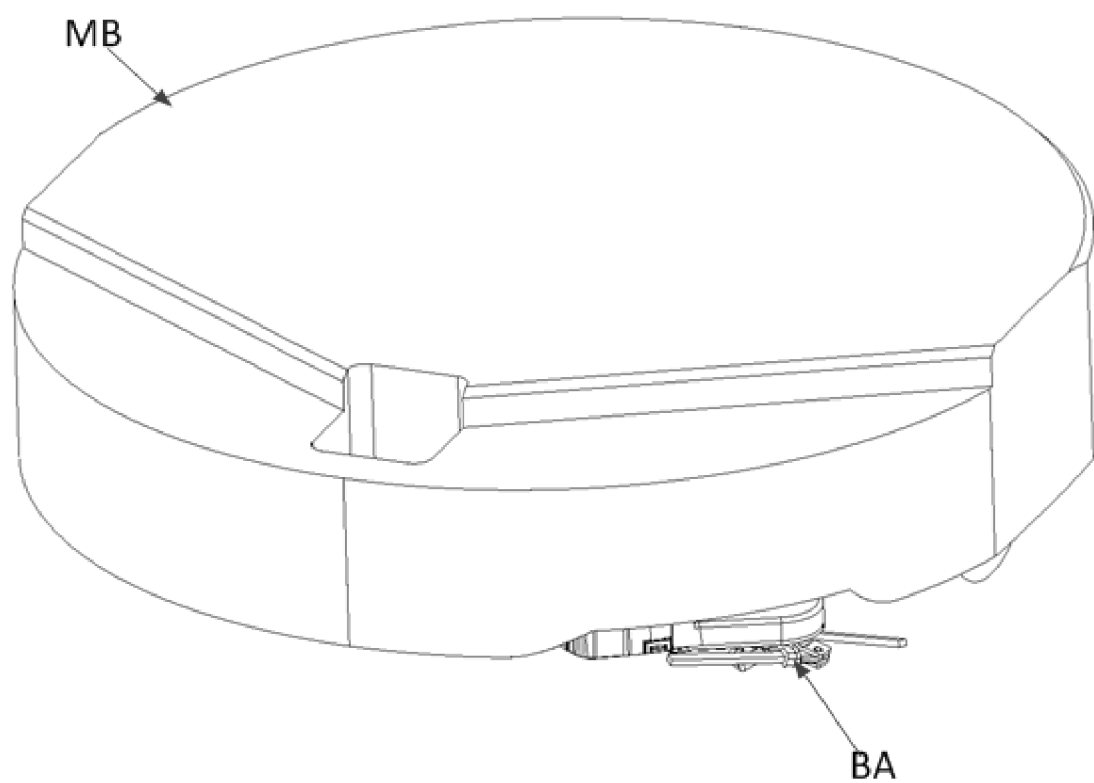


FIG. 3A

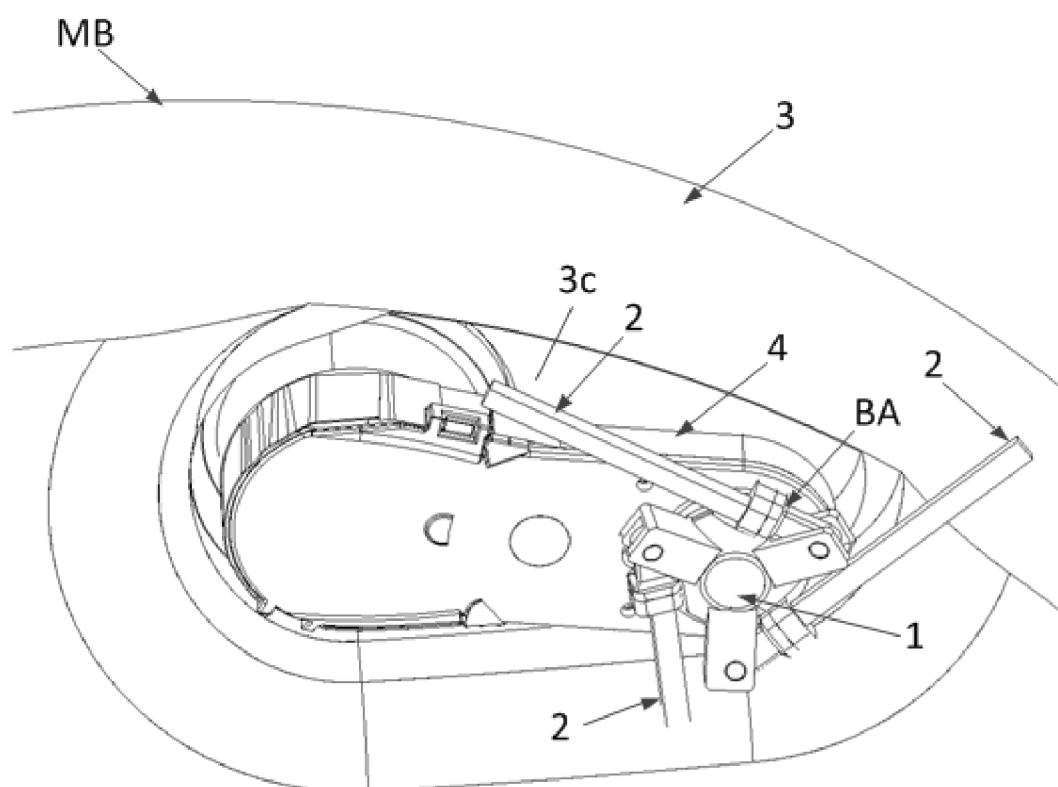


FIG. 3B



EUROPEAN SEARCH REPORT

Application Number
EP 26 17 0662

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			TECHNICAL FIELDS SEARCHED (IPC)
			A47L
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 5 August 2026	Examiner Werner, Christopher
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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ON EUROPEAN PATENT APPLICATION NO.

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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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05-08-2026

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