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(54) CLEANING ASSEMBLY WITH SELF-CLEANING FUNCTION AND ELECTRICAL APPARATUS

(57) The present disclosure relates to a cleaning assembly (R) with a self-cleaning function, and an electrical apparatus (E). The cleaning assembly (R) with the self-cleaning function includes: a cylindrical rotating portion (1), a curved baffle (2), and an abutting portion (3). The cylindrical rotating portion (1) is used for cleaning a support surface (8), and has a column surface (11). The curved baffle (2) faces the column surface (11) of the cylindrical rotating portion (1), and is positioned above the cylindrical rotating portion (1) and spaced from the column surface (11) by a distance. The abutting portion (3) has a first end (31) and a second end (32), the first end (31) of the abutting portion (3) is coupled to the curved baffle (2), and the second end (32) of the abutting portion (3) abuts against the column surface (11) of the cylindrical rotating portion (1). A portion of the column surface (11) of the cylindrical rotating portion (1), the curved baffle (2), and the abutting portion (3) together form a channel (4). The channel (4) is configured such that the interior of the channel (4) is cleaned with a flowing liquid in an operating state. According to the embodiments of the present disclosure, the cleaning assembly with the self-cleaning function advantageously utilizes the flowing liquid in the channel to autonomously rinse a roller in the channel, the curved baffle and the abutting portion, thereby reducing the need for manual maintenance and improving user experience.

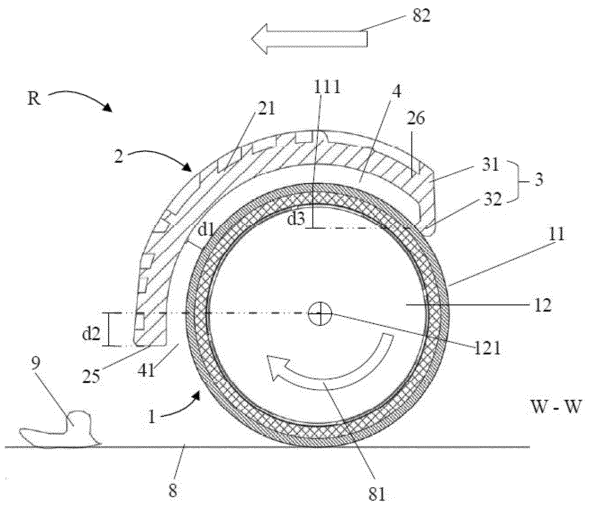

FIG. 3

EP 4 505 935 A1

Description

FIELD OF TECHNOLOGY

[0001] The present disclosure relates to cleaning electrical apparatuses, in particular to a cleaning assembly with a self-cleaning function and an electrical apparatus.

BACKGROUND

[0002] Support surface cleaning apparatuses such as a mopping and washing robot, a robot vacuum and mop combo, a floor cleaning machine, or a hand-held electric mop for cleaning a floor, a table, or other support surfaces have a real-time self-cleaning function. However, an existing cleaning apparatus, whether rotating a roller at a high speed to throw waste water out by centrifugal force, or rotating the roller at a low speed to squeeze waste water out by an abutting portion, the general process is that clear water is fed to the roller while the roller cleans a support surface, and then the abutting portion abuts against the roller to separate waste water out.

[0003] The separation process of waste water in some conventional designs is short and rushed. For example, the duration of the separation process is related to the speed of the roller, which is less than 0.1 seconds when the roller rotates, for example, at a rate of 400 rpm. Although real-time self-cleaning of the roller may be achieved by means of the process described above, since the separation duration is very short, which prevents a surface of the roller from being sufficiently wetted with clear water, a self-cleaning effect is unsatisfactory. In addition, the abutting portion of the existing cleaning apparatus also gradually sucks dirt during the process of separating waste water, and lacks effective self-cleaning capacity of the abutting portion.

SUMMARY

[0004] The objective of the present disclosure is to provide a cleaning assembly with a self-cleaning function and an electrical apparatus to solve the above problems in the prior art. For example, a roller surface of an existing cleaning apparatus is soaked by clear water for a very short time, so it is difficult to be fully wetted; and the existing cleaning apparatus is insufficient in self-cleaning capacity and lacks an effective self-cleaning function.

[0005] In one aspect of the present disclosure, a cleaning assembly with a self-cleaning function is provided. The cleaning assembly includes: a cylindrical rotating portion, a curved baffle, and an abutting portion. The cylindrical rotating portion may be used for cleaning a support surface, and has a column surface. The curved baffle faces the column surface of the cylindrical rotating portion, and may be positioned above the cylindrical rotating portion and spaced from the column surface by a distance. The abutting portion may have a first end and a second end, the first end of the abutting portion may be coupled to the curved baffle, and the second end of the abutting portion abuts against the column surface of the cylindrical rotating portion. A portion of the column surface of the cylindrical rotating portion, the curved baffle, and the abutting portion together form a channel. The channel may be configured such that the interior of the channel is cleaned with a flowing liquid in an operating state.

[0006] By means of the embodiments of the present disclosure, through high-speed rotation of the cylindrical rotating portion in a normal operating state of the cleaning assembly with the self-cleaning function, a liquid gathering in the channel may flow at a high speed with the cylindrical rotating portion. Thus, the liquid flowing in the channel of the cleaning assembly with the self-cleaning function is advantageously utilized to autonomously rinse the roller in the channel, the curved baffle and the abutting portion, thereby reducing the need for manual maintenance and improving the user experience.

[0007] According to one or more embodiments, the channel has an opening, and the abutting portion and the opening are positioned on two sides of a highest point of the cylindrical rotating portion respectively and are below the highest point. In this way, when the liquid flows from the opening on one side of the highest point of the cylindrical rotating portion to the abutting portion on the other side, due to the height difference between the abutting portion and the highest point of the cylindrical rotating portion, the liquid which flows through the highest point of the cylindrical rotating portion may accelerate to flow towards the abutting portion by utilizing the force of gravity, so that the intensify of rinsing the abutting portion is enhanced, thereby achieving a better self-cleaning effect.

[0008] According to one or more embodiments, in the operating state, the cylindrical rotating portion rotates in a direction from the opening of the channel to the abutting portion. Thus, the liquid may be fed from the opening of the channel to the abutting portion through the cylindrical rotating portion.

[0009] According to one or more embodiments, in response to the rotation of the cylindrical rotating portion, the liquid flows in the rotation direction and rinses a portion of the column surface of the cylindrical rotating portion, an inner surface of the curved baffle, and an inner surface of the abutting portion inside the channel. In this way, the liquid gathering in the channel may flow to the abutting portion with the rotation of the cylindrical rotating portion and thereby rinse the interior of the channel and the interior of the abutting portion, thereby achieving a better self-cleaning effect.

[0010] According to one or more embodiments, a shape of the curved baffle is adapted to a shape of the column surface of the cylindrical rotating portion. In this way, turbulence formed by the liquid flowing in the channel between the curved baffle and the cylindrical rotating portion may be reduced, and accordingly the kinetic

energy carried by the liquid is maintained as much as possible, thereby achieving a better self-cleaning effect.

[0011] According to one or more embodiments, the first end of the abutting portion is detachably coupled to the curved baffle. In this way, the abutting portion may be removed from the curved baffle for maintenance or be replaced with a new abutting portion, as needed.

[0012] According to one or more embodiments, the abutting portion and the curved baffle are formed as a whole. Thus, strong bonding between the abutting portion and the curved baffle is obtained, and this one-piece structure is capable of withstanding greater rinsing force than the removable abutting portion, thereby improving a self-cleaning effect.

[0013] According to one or more embodiments, the curved baffle further includes a diversion port. The diversion port is coupled to a surface of the curved baffle facing the cylindrical rotating portion, and configured to provide the liquid to the channel. In this way, by means of the embodiment of the present disclosure, a clean liquid (for example, water) may be fed directly from the diversion port into the channel for rinsing the interior of the channel and the interior of the abutting portion.

[0014] According to one or more embodiments, the abutting portion further includes a discharge port, and the discharge port is provided between the first end and the second end of a scraping strip to allow the liquid to flow out of the channel in the operating state. In this way, by means of the embodiment of the present disclosure, a dirty liquid (e.g., waste water) may be discharged directly out of the channel via the discharge port to achieve a better self-cleaning effect.

[0015] According to one or more embodiments, the cleaning assembly with the self-cleaning function further includes: a first vacuum source coupled to the discharge port, where the first vacuum source is in fluid communication with the channel through the discharge port. In this way, the first vacuum source in fluid communication with the discharge port is used to apply a negative pressure at the discharge port, thereby accelerating the discharge of the liquid flowing to the discharge port of the abutting portion to achieve a better self-cleaning effect.

[0016] According to one or more embodiments, the cleaning assembly with the self-cleaning function further includes: a second vacuum source having a vacuum opening, the vacuum opening being positioned on the curved baffle and adjacent to the abutting portion, where the second vacuum source is in fluid communication with the channel through the vacuum opening. By positioning the vacuum opening on a position of the curved baffle adjacent to the abutting portion, the speed of the liquid in the channel may be effectively controlled by controlling the strength of the vacuum source, thereby flexibly controlling the volume flow rate of the liquid discharged from the channel.

[0017] According to one or more embodiments, the distance has a length of 2 mm-8 mm. This distance enables a faster flow rate of the liquid in the channel than a larger separation distance, resulting in a stronger rinsing force on the inner surface of the channel and the abutting portion, thus achieving a better self-cleaning effect.

[0018] According to one or more embodiments, the second end of the abutting portion is provided with a scraping strip for squeezing and scraping the column surface of the cylindrical rotating portion. In this way, waste water and dirt adsorbed on and by the column surface of the cylindrical rotating portion may be effectively cleaned up.

[0019] In another aspect of the present disclosure, an electrical apparatus is provided. The electrical apparatus includes: a main body; the cleaning assembly with the self-cleaning function according to one or more embodiments described above, coupled to the main body; and a waste water tank, coupled to the main body and configured to receive waste water from the cleaning assembly with the self-cleaning function.

[0020] According to one or more embodiments, the electrical apparatus includes any one of the following: a robot vacuum cleaner, a mopping robot, a floor cleaning machine, a robot vacuum and mop combo, or a handheld electric mop.

[0021] The aspects and advantages previously described with respect to the cleaning assembly with the self-cleaning function are accordingly applicable to the electrical apparatus according to the present disclosure, which will thus not be repeated herein.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] Other advantages and designs of the present disclosure are described in detail below with reference to the accompanying drawings, wherein

FIG. 1 illustrates an electrical apparatus according to an embodiment of the present disclosure;

FIG. 2 illustrates a cleaning assembly with a self-cleaning function according to an embodiment of the present disclosure;

FIG. 3 illustrates a cross-sectional view of a cleaning assembly with a self-cleaning function according to an embodiment of the present disclosure;

FIG. 4 illustrates a cross-sectional view of a cleaning assembly with a self-cleaning function according to an embodiment of the present disclosure; and

FIG. 5A and FIG. 5B illustrate cross-sectional views of a cleaning assembly with a self-cleaning function with a vacuum source and a vacuum opening according to an embodiment of the present disclosure.

DESCRIPTION OF THE EMBODIMENTS

[0023] Corresponding numbers and symbols in different accompanying drawings generally refer to corresponding regions unless otherwise indicated. The accompanying drawings are drawn for the purpose of

clearly illustrating relevant aspects of the embodiments and need not be drawn to scale. The edges of features drawn in the accompanying drawings do not necessarily indicate the end of the range of features.

[0024] In the ensuing description, various specific details are shown to provide insight into various examples of embodiments according to the description. Embodiments may be obtained in the absence of one or more specific details, or by utilizing other methods, components, materials, and the like. In other cases, known structures, materials, or operations are not shown or described in detail so as not to obscure aspects of the embodiments.

[0025] References to "an embodiment" or "an implementation" in the framework of this specification are intended to indicate that a particular configuration, structure, or feature described with respect to that embodiment is included in at least one embodiment. Accordingly, phrases of "in embodiments," "in an embodiment," and the like that may appear in various aspects of this specification do not necessarily refer to the same embodiment exactly. Furthermore, particular configurations, structures, or features may be combined in one or more embodiments in any suitable manner.

[0026] Unless otherwise indicated, when reference is made to two elements joined together, this denotes a direct connection without any intermediate element, and when reference is made to two elements coupled together, this denotes that the two elements may be joined or that they may be coupled via one or more other elements.

[0027] The title/reference numerals used herein are provided solely for ease of reading and therefore do not limit the scope of protection or the scope of the embodiments. Identical or similar elements are identified using the same reference numerals.

[0028] In order to perform a floor cleaning operation, a cleaning electrical apparatus utilizes a drum to scrub a floor to remove dirt from the floor. After the dirt on the floor is scrubbed by the drum and adheres to a surface of the drum, the dirt adhering to the surface of the drum is typically removed by squeezing and scraping an abutting portion of the drum as the drum is further rotated. However, as the drum continues to scrub the floor, more and more dirt adheres to the surface of the drum, and as the abutting portion continues to squeeze and scrape the surface of the drum, a portion of the dirt turns to adhere to the surface of the abutting portion and is difficult to remove. Therefore, the known cleaning electrical apparatus still requires frequent manual maintenance to remove the dirt adhering to the surface of the abutting portion even after it has been used.

[0029] As previously mentioned, the self-cleaning capacity of the known cleaning electrical apparatus is unsatisfactory, and therefore the known cleaning electrical apparatus needs to be improved. The present disclosure provides a cleaning assembly with a self-cleaning function. The cleaning assembly cleans a cylindrical rotating portion and a curved baffle and an abutting portion matching therewith in real time during the normal operation of a cleaning electrical apparatus, thereby improving the self-cleaning capacity of the cleaning electrical apparatus and reducing the frequency and time of manual maintenance.

[0030] According to the embodiments of the present disclosure, by using the surface of the cylindrical rotating portion, the curved baffle, and the abutting portion to form a channel that may temporarily gather and direct a flowing liquid (such as clear water or a cleaning liquid) to prolong the contact time of the liquid with the surface of the cylindrical rotating portion, the wettability of the cylindrical rotating portion is improved. In addition, the liquid flowing in the channel is able to continuously rinse the surfaces of the cylindrical rotating portion, the curved baffle, and the abutting portion in the channel in an operating state, thereby effectively achieving a self-cleaning function of the cleaning electrical apparatus. In addition, the embodiments of the present disclosure do not require any change in the original structure and positional layout of the cylindrical rotating portion and a cylindrical rotating portion holder.

[0031] FIG. 1 illustrates a schematic diagram of an electrical apparatus E according to an embodiment of the present disclosure. The electrical apparatus E includes a main body 91, a cleaning assembly R with a self-cleaning function, and a waste water tank 92. The cleaning assembly R with the self-cleaning function and the waste water tank 92 are coupled to the main body 91, and the waste water tank 92 is configured to receive waste water from the cleaning assembly with the self-cleaning function in a cleaning operating state. In the cleaning operating state, the cleaning assembly R with the self-cleaning function may perform a self-cleaning function in real time while cleaning a support surface as the main body 91 moves on the support surface. After the cleaning operation, waste water in the waste water tank 92 may be discharged by the electrical apparatus E autonomously, or by means of manual operation.

[0032] FIG. 1 illustrates an example of the electrical apparatus E as a robot vacuum cleaner, however, the scope of the present disclosure is not limited thereto. For example, the electrical apparatus E according to the present disclosure includes any of the following: a robot vacuum cleaner, a mopping robot, a floor cleaning machine, a robot vacuum and mop combo, a hand-held electric mop, or any apparatus with a cylindrical rotating portion for cleaning a support surface. Advantages of the electrical apparatus E according to the present disclosure will be specifically described in conjunction with the cleaning assembly R with the self-cleaning function with specific reference to FIG. 2 to FIG. 5B.

[0033] FIG. 2 to FIG. 5B illustrate a cleaning assembly R with a self-cleaning function according to various embodiments of the present disclosure. For example, the cleaning assembly R with the self-cleaning function illustrated in FIG. 2 includes a cylindrical rotating portion 1, a

curved baffle 2, and an abutting portion 3. In the cleaning operating state, the cylindrical rotating portion 1 may rotate and scrub a support surface in contact therewith. The curved baffle 2 may be configured to prevent dirt (or waste water) adhering to a surface of the cylindrical rotating portion 1 during scrubbing of the support surface from being thrown out when the cylindrical rotating portion 1 rotates at a high speed (e.g., 400 rpm). The abutting portion 3 may abut against the surface of the cylindrical rotating portion 1, and may scrape the surface of the cylindrical rotating portion 1 as the cylindrical rotating portion 1 rotates, so as to remove the dirt adhering to the surface of the cylindrical rotating portion 1.

[0034] In some embodiments, the abutting portion 3 may have a discharge port 33. The discharge port 33 may be provided at a middle position of the abutting portion 3 in a direction extending along the rotation axis of the cylindrical rotating portion 1. After being removed from the surface of the cylindrical rotating portion 1, the dirt may be discharged out of the cleaning assembly R with the self-cleaning function via the discharge port 33. In some embodiments, a waste water tank that cooperates with the discharge port 33 may be provided to collect the dirt from the discharge port 33.

[0035] FIG. 3 exemplarily illustrates a cross-section of the cleaning assembly R with the self-cleaning function intercepted along a plane W-W in FIG. 2 in an operating state. For example, FIG. 3 illustrates dirt 9 (or waste water) located on the support surface 8. The cylindrical rotating portion 1 of the cleaning assembly R with the self-cleaning function may be used for removing the dirt 9 from the support surface 8 by means of rotation. In some embodiments, the cylindrical rotating portion 1 may have a column surface 11, and the column surface 11 may have a rough but soft surface. For example, the column surface 11 may be provided with a cleaning cloth to scrub the support surface 8 as the cylindrical rotating portion 1 rotates. In addition, although the present disclosure illustrates the dirt 9, the scope of the present disclosure is not limited thereto. For example, the dirt 9 may also be clear water, or other cleaning liquids, or the like.

[0036] As illustrated in FIG. 3, the curved baffle 2 may face the column surface 11 of the cylindrical rotating portion 1 and may be positioned above the cylindrical rotating portion 1 and spaced from the column surface 11 by a first distance d1. According to an embodiment of the present disclosure, the value of the first distance d1 may significantly affect the flow rate of a liquid in a channel 4. For example, a small first distance d1, compared to a larger first distance d1 results in a faster flow rate of the liquid in the channel 4, thereby obtaining stronger rinsing force for an inner surface of the channel 4 and the abutting portion 3. According to some embodiments of the present disclosure, the first distance d1 may be less than 8 millimeters, for example, 6-7 millimeters. In other embodiments, the first distance d1 may be less than 2 millimeters. For example, when the column surface 11 is provided with a cleaning cloth, the curved baffle 2 may have an interference contact with the column surface 11 having the cleaning cloth in a dry state. Thus, even when the cleaning cloth of the column surface 11 is wetted and the size is reduced, the first distance d1 between the column surface 11 and the curved baffle 2 is still kept no more than 8 millimeters, for example, 6-7 millimeters.

[0037] In addition, the curved baffle 2 is provided with a low side end 25 and a high side end 26. For example, in some embodiments, the low side end 25 of the curved baffle 2 may extend downward to a height below a rotation axis 121 of the cylindrical rotating portion 1. Thus, as the cylindrical rotating portion 1 rotates at, for example, a speed of about 400 rpm, dirt 9 (or waste water) that is not successfully sucked to the cylindrical rotating portion 1 but splashed as the cylindrical rotating portion rotates may be effectively blocked by the low side end 25 of the curved baffle 2, so as to prevent the spreading of the dirt 9. The high side end 26 of the curved baffle 2 is coupled to the first end 31 of the abutting portion 3. The second end 32 of the abutting portion 3 which is not coupled to the curved baffle 2 abuts against the column surface 11 of the cylindrical rotating portion 1. As the cleaning operation proceeds, the dirt 9 sucked by the column surface 11 of the cylindrical rotating portion 1 causes clear water previously wetting the column surface 11 to turn into waste water. In some embodiments, the second end 32 of the abutting portion 3 interferes with and squeezes the column surface 11 in a position against the column surface 11. For example, when the column surface 11 is provided with the cleaning cloth, waste water in the cleaning cloth is discharged by squeezing of the second end 32 of the abutting portion 3 for re-wetting and absorbing clear water. In addition, the second end 32 of the abutting portion 3 is also configured to scrape the column surface 11 duration rotation of the cylindrical rotating portion 1, so as to remove the dirt 9 sucked by the column surface 11 from the column surface 11.

[0038] As illustrated in the embodiment in FIG. 3, the column surface 11, the curved baffle 2, and the abutting portion 3 form the channel 4. As shown in FIG. 4, in some embodiments, the channel 4 may have an opening 41, and the channel 4 may be configured to gather and direct a flowing fluid 93 in the operating state. For example, when the cleaning assembly R with the self-cleaning function is moved on the support surface 8 along a direction 82, the cylindrical rotating portion 1 may rotate from the opening 41 toward the abutting portion 3 along a rotation direction 81. In some embodiments, the liquid 93 may come from the cleaning liquid 93 provided on the support surface 8. The liquid 93 wets the column surface 11 and is adsorbed by the column surface 11 as making contact with the column surface 11 of the cylindrical rotating portion 1, and then enters the channel 4 as the cylindrical rotating portion 1 rotates. In other embodiments, as will be specifically described below with reference to FIG. 4, the liquid 93 may also be a cleaning liquid 93, e.g., clear water, that is fed directly into the channel 4.

[0039] The flowing liquid 93 in the channel 4 is config-

ured to flow with the rotation of the cylindrical rotating portion 1, so as to rinse the column surface 11 of the cylindrical rotating portion as well as surfaces of the curved baffle 2 and the abutting portion 3 in the channel 4. In this way, the cleaning assembly R with the self-cleaning function according to an embodiment of the present disclosure achieves the self-cleaning function, and the service life is prolonged.

[0040] With continued reference to FIG. 3, the low side end 25 of the curved baffle 2 and the column surface 11 of the cylindrical rotating portion 1 form the opening 41 of the channel 4. In some embodiments, since the low side end 25 of the curved baffle 2 is positioned at the height below the rotation axis 121 of the cylindrical rotating portion 1, the opening 41 is also positioned at a height below the rotation axis 121. For example, in the embodiment illustrated in FIG. 3, a height difference between the opening 41 or the low side end 25 and the rotation axis 121 is d2. In this way, it is possible to receive as early and as much as possible the dirt (or waste water) splashed by the rotation of the cylindrical rotating portion 1 with the opening 41. In addition, the high side end 26 of the curved baffle 2 may be positioned on the other side opposite to the side of the opening 41 and is below the highest point 111 of the cylindrical rotating portion 1. That is, the abutting portion 3 is coupled to a position that is below the highest point 111 of the cylindrical rotating portion 1 and above the rotation axis 121, and the abutting portion and the opening 41 are located on two sides of the highest point 111 respectively. For example, in the embodiment illustrated in FIG. 3, the abutting portion 3 is coupled such that a height difference between the second end 32 thereof and the highest point 111 of the cylindrical rotating portion 1 is a distance d3. Thus, when the cylindrical rotating portion rotates in the direction 81 from the opening 41 to the abutting portion 3, and when the liquid 93 flows in the channel 4 and flows from the opening 41 on one side of the highest point 111 of the cylindrical rotating portion 1 to the abutting portion 3 on the other side, due to the height difference between the abutting portion 3 and the highest point 111 of the cylindrical rotating portion 1, the liquid 93 which flows through the highest point 111 of the cylindrical rotating portion 1 may accelerate to flow towards the abutting portion 3 by utilizing the force of gravity, so that the intensify of rinsing the abutting portion 3 is enhanced, thereby achieving a better self-cleaning effect. Although the present disclosure illustrates that the high side end 26 is higher than the rotation axis 121, the scope of the present disclosure is not limited thereto. For example, the high side end 26 may alternatively be lower than the rotation axis 121.

[0041] In some embodiments, the high side end 26 and the first end 31 may be coupled together in a removable manner. In this way, the abutting portion 3 may be easily removed from the cleaning assembly R with the self-cleaning function and maintained, or replaced with a spare abutting portion 3. For example, the second end 32 of the abutting portion 3 may have a scraping strip made of different materials. For example, depending on different cleaning needs, a user of the cleaning assembly R with the self-cleaning function may have the flexibility to select the abutting portion 3 with a metal scraping strip, a hard rubber scraping strip, a plastic scraping strip, or a scraping strip made of any other suitable material to be mounted to the cleaning assembly R with the self-cleaning function. Thus, the embodiments of the present disclosure have the flexibility to select the material of the abutting portion as needed.

[0042] In yet other embodiments, the curved baffle 2 and the abutting portion 3 may be formed into a whole. Thus, strong bonding between the abutting portion 3 and the curved baffle 2 is obtained, and this one-piece structure is capable of withstanding greater rinsing force than the removable abutting portion 3, thereby improving a self-cleaning effect.

[0043] In some embodiments, the shape of the curved baffle 2 may be configured to adapt to the shape of the column surface 11 of the cylindrical rotating portion 1. For example, by configuring the shape of the surface of the curved baffle 2 in the channel 4, the flowing performance of the liquid 93 in the channel 4 may be improved. By adapting the shape of the curved baffle 2 to the shape of the column surface 11, the velocity difference in the profile of the liquid 93 flowing in the channel 4 may be reduced, and accordingly the pressure difference is reduced, thereby reducing local turbulence of the liquid 93 flowing in the channel 4. In this way, the kinetic energy carried by the liquid is maintained as much as possible, thus achieving a better self-cleaning effect.

[0044] FIG. 4 illustrates a cross-sectional view of a cleaning assembly R with a self-cleaning function according to another embodiment of the present disclosure. The same components as those described above with respect to the embodiment illustrated in FIG. 3 will be identified with the same reference numerals and will not be repeated herein.

[0045] The curved baffle 2 illustrated in FIG. 4 may further include a diversion port 23. The diversion port 23 is coupled to the surface of the curved baffle 2 in the channel 4 and is configured to provide the liquid 93 to the channel 4. For example, the liquid 93 may be clear water, or a cleaning liquid having a cleaning agent. When the liquid 93 is provided into the channel 4, the liquid flows from the column surface 11 towards the second end 32 of the abutting portion 3 as the cylindrical rotating portion 1 rotates. According to some embodiments of the present disclosure, the amount of the liquid 93 provided by the diversion port 23 may be adjusted in real time. For example, the diversion port 23 may be configured to increase the amount of the liquid 93 provided by the diversion port 23 when it is detected by the cleaning assembly R with the self-cleaning function that dirt fails to be removed from the surfaces of the curved baffle 2 and the abutting portion 3 in the channel 4 with a relatively small amount of liquid 93. In other embodiments, the diversion port 23 may be configured to increase the

amount of the liquid 93 provided by the diversion port 23 when it is detected by the cleaning assembly R with the self-cleaning function that the column surface 11 is dry and needs to be wetted. It is to be understood that the diversion port 23 may also decrease the amount of the liquid 93 provided by the diversion port based on the conditions detected by the cleaning assembly R with the self-cleaning function. According to yet other embodiments, the diversion port 23 may be configured to selectively provide various liquids 93 based on set conditions. For example, the diversion port 23 may be configured to provide clear water, a cleaning liquid, a support surface care liquid, or a mixture of the above to assist the cleaning assembly R with the self-cleaning function in a variety of different cleaning tasks. In addition, it is to be understood that while FIG. 4 illustrates the diversion port 23 being positioned over the cylindrical rotating portion 1, the scope of the present disclosure is not limited thereto. For example, the diversion port 23 may also be provided at the low side end 25 of the curved baffle 2 in the channel 4, so as to provide the liquid 93 with more time to be in contact with and wet the column surface 11 of the cylindrical rotating portion 1 before reaching the abutting portion 3. In other embodiments not shown, the diversion port 23 may also be provided on a surface of a side opposite to the side of the curved baffle 2 facing the interior of the channel 4 (i.e., provided on an outer side of the curved baffle 2), so as to provide the liquid 93 directly to the support surface 8. FIG. 4 illustrates only a cross-section of an exemplary embodiment of the present disclosure. It is to be understood that the cleaning assembly R with the self-cleaning function according to the present disclosure may have a plurality of diversion ports 23, and that the plurality of diversion ports 23 may be arranged on the surface of the curved baffle 2 along the entire extension length of the curved baffle 2 in the direction of the rotation axis 121 of the cylindrical rotating portion 1.

[0046] FIG. 5A and FIG. 5B illustrate cross-sections of the cleaning assembly R with the self-cleaning function intercepted at a plane Z-Z shown in FIG. 2 according to various embodiments. The same components as those described above with respect to the embodiment illustrated in FIG. 3 will be identified with the same reference numerals and will not be repeated herein.

[0047] In the embodiment illustrated in FIG. 5A, after the liquid 93 rinses the interior of the channel 4 and the abutting portion 3, the liquid may be discharged via the discharge port 33. As described in conjunction with FIG. 2 above, the discharge port 33 may be located at a middle position of the abutting portion 3 in the extension direction of the rotation axis 121 of the cylindrical rotating portion 1. By providing the discharge port 33 at the middle position of the abutting portion 3, the liquid 93 arriving at both sides of the abutting portion 3, and a liquid 93 seeping out by squeezing the column surface 11 through the abutting portion may also flow from the portions on both sides of the abutting portion 3 toward the discharge port 33 located at the middle position respectively in the extension direction of the rotation axis 121 of the cylindrical rotating portion 1, and are then discharged via the discharge port 33. In some embodiments, the first vacuum source 22 may be coupled to the discharge port 33, whereby fluid communication between the first vacuum source 22 and the channel 4 may be obtained. Through the negative pressure generated by a first vacuum source 22, the flowing of the fluid 93 towards the abutting portion 3, as well as the flow rate of the fluid 93 from the portions on both sides of the abutting portion 3 towards the discharge port 33 in the extension direction of the rotation axis 121 of the cylindrical rotating portion 1 may be further accelerated.

[0048] In the embodiment illustrated in FIG. 5B, the abutting portion 3 does not have a discharge port 33. Accordingly, the cleaning assembly R with the self-cleaning function according to FIG. 5B may have a second vacuum source 24, and a vacuum opening 221 that is positioned on the curved baffle 2 in the channel 4 and adjacent to the abutting portion 3. For example, the vacuum opening 221 may be configured to achieve fluid communication between the second vacuum source 24 and the channel 4. In this case, the discharge of the fluid 93 in the channel 4 relies primarily on the negative pressure generated by the second vacuum source 24. Therefore, it is advantageous to be able to effectively control the speed of the liquid 93 flowing in the channel 4 by controlling the strength of the second vacuum source 24, thereby effectively controlling the strength of rinsing the surfaces of the curved baffle 2 and the abutting portion 3 as well as the column surface 11 of the cylindrical rotating portion 1 in the channel 4. In addition, in this way, the second vacuum source 24 may also be configured to flexibly control the volume flow rate of the liquid 93 discharged from the channel 4.

[0049] Many of the modified forms and other implementations of the present disclosure given herein will be realized by those skilled in the art to which the present disclosure pertains through the teachings given in the foregoing description and the related accompanying drawings. Thus, it is to be understood that the implementations of the present disclosure are not limited to the specific implementations disclosed, and that the modified forms and other implementations are intended to fall in the scope of the present disclosure. Moreover, while the above description and the associated accompanying drawings describe exemplary implementations in the context of certain exemplary combination forms of components and/or functionality, it should be appreciated that different combination forms of components and/or functionality may be provided by alternative implementations without departing from the scope of the present disclosure. In this regard, for example, other combination forms of components and/or features that differ from those explicitly described above are also anticipated to fall in the scope of the present disclosure. Although specific terms are used herein, they are used in a general and

descriptive sense only and are not intended to be limiting.

Claims

1. A cleaning assembly (R) with a self-cleaning function, comprising:

   a cylindrical rotating portion (1) for cleaning a support surface (8), having a column surface (11);
   a curved baffle (2), facing the column surface (11) of the cylindrical rotating portion (1) and being positioned above the cylindrical rotating portion (1) and spaced from the column surface (11) by a distance (d1); and
   an abutting portion (3) having a first end (31) and a second end (32), the first end (31) of the abutting portion (3) being coupled to the curved baffle (2), and the second end (32) of the abutting portion (3) abutting against the column surface (11) of the cylindrical rotating portion (1) wherein a portion of the column surface (11) of the cylindrical rotating portion (1), the curved baffle (2), and the abutting portion (3) together form a channel (4), and the channel (4) is configured such that the interior of the channel (4) is cleaned with a flowing liquid (93) in an operating state.

2. The cleaning assembly (R) with the self-cleaning function according to claim 1, wherein the channel (4) has an opening (41), and the abutting portion (3) and the opening (41) are positioned on two sides of a highest point (111) of the cylindrical rotating portion (1) respectively and are below the highest point (111).

3. The cleaning assembly (R) with the self-cleaning function according to claim 2, wherein in the operating state, the cylindrical rotating portion (1) rotates in a direction (81) from the opening (41) of the channel (4) to the abutting portion (3).

4. The cleaning assembly (R) with the self-cleaning function according to claim 3, wherein in response to the rotation of the cylindrical rotating portion (1), the liquid (93) flows in the rotation direction (81) and rinses a portion of the column surface of the cylindrical rotating portion, an inner surface of the curved baffle (2), and an inner surface of the abutting portion (3) inside the channel (4).

5. The cleaning assembly (R) with the self-cleaning function according to any one of claims 1 to 4, wherein a shape of the curved baffle (2) is adapted to a shape of the column surface (11) of the cylindrical rotating portion (1).

6. The cleaning assembly (R) with the self-cleaning function according to any one of claims 1 to 4, wherein the first end (31) of the abutting portion (3) is detachably coupled to the curved baffle (2).

7. The cleaning assembly (R) with the self-cleaning function according to any one of claims 1 to 4, wherein the abutting portion (3) and the curved baffle (2) are formed as a whole.

8. The cleaning assembly (R) with the self-cleaning function according to any one of claims 1 to 4, wherein the curved baffle (2) further comprises a diversion port (23), and the diversion port (23) is coupled to a surface of the curved baffle (2) facing the cylindrical rotating portion (1), and configured to provide the liquid (93) to the channel (4).

9. The cleaning assembly (R) with the self-cleaning function according to any one of claims 1 to 4, wherein the abutting portion (3) further comprises a discharge port (33), and the discharge port (33) is provided between the first end (31) and the second end (32) to allow the liquid (93) to flow out of the channel (4) in the operating state.

10. The cleaning assembly (R) with the self-cleaning function according to claim 9, further comprising:
    a first vacuum source (22) coupled to the discharge port (33), wherein the first vacuum source (22) is in fluid communication with the channel (4) through the discharge port (33).

11. The cleaning assembly (R) with the self-cleaning function according to any one of claims 1 to 4, further comprising:
    a second vacuum source (24) having a vacuum opening (221), the vacuum opening (221) being positioned on the curved baffle (2) and adjacent to the abutting portion (3), wherein the second vacuum source (24) is in fluid communication with the channel (4) through the vacuum opening (221).

12. The cleaning assembly (R) with the self-cleaning function according to any one of claims 1 to 4, wherein the distance (d1) has a length of 2 mm-8 mm.

13. The cleaning assembly (R) with the self-cleaning function according to any one of claims 1 to 4, wherein the second end (32) of the abutting portion (3) is provided with a scraping strip for squeezing and scraping the column surface (11) of the cylindrical rotating portion (1).

14. An electrical apparatus (E), comprising:

    a main body (91);
    the cleaning assembly (R) with the self-cleaning

function according to any one of claims 1 to 13, coupled to the main body (91); and
a waste water tank (92), coupled to the main body (91) and configured to receive waste water from the cleaning assembly with the self-cleaning function.

15. The electrical apparatus (E) according to claim 14, wherein the electrical apparatus (E) comprises any one of the following: a robot vacuum cleaner, a mopping robot, a floor cleaning machine, a robot vacuum and mop combo, or a hand-held electric mop.

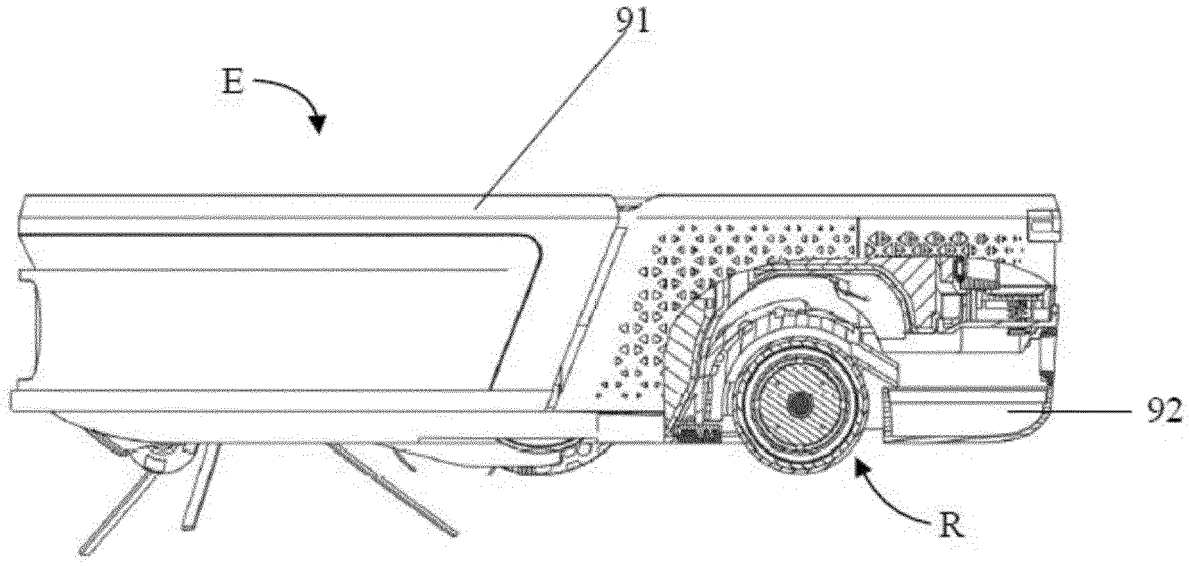

FIG. 1

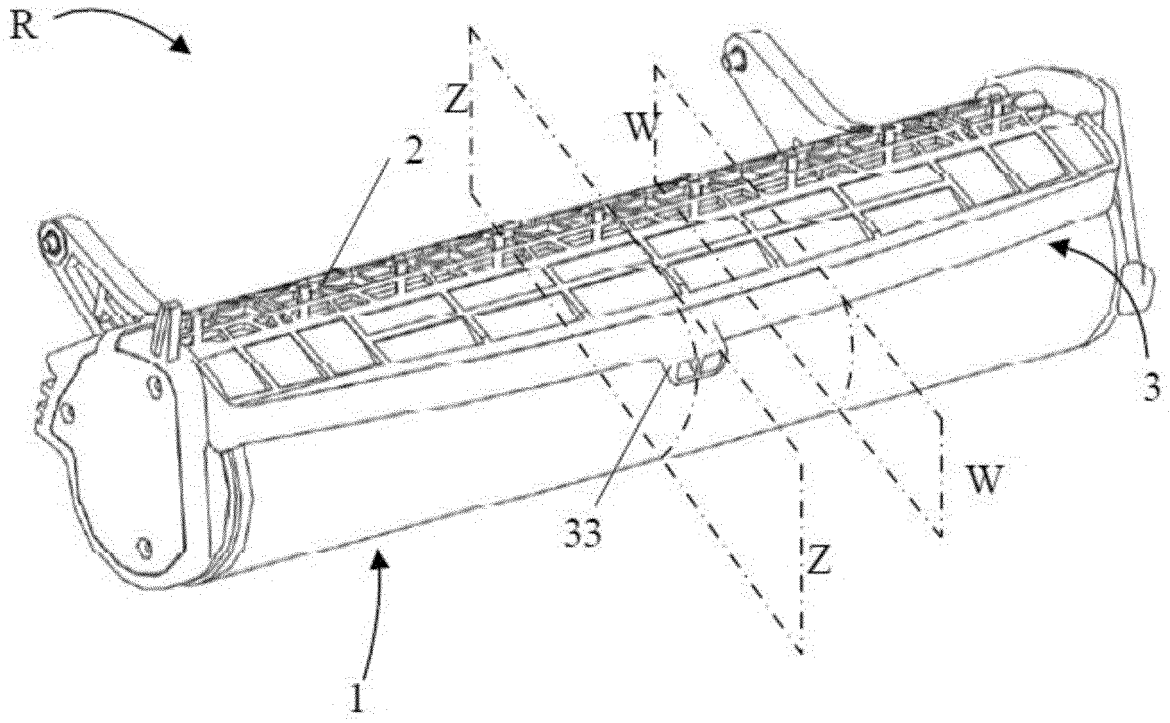

FIG. 2

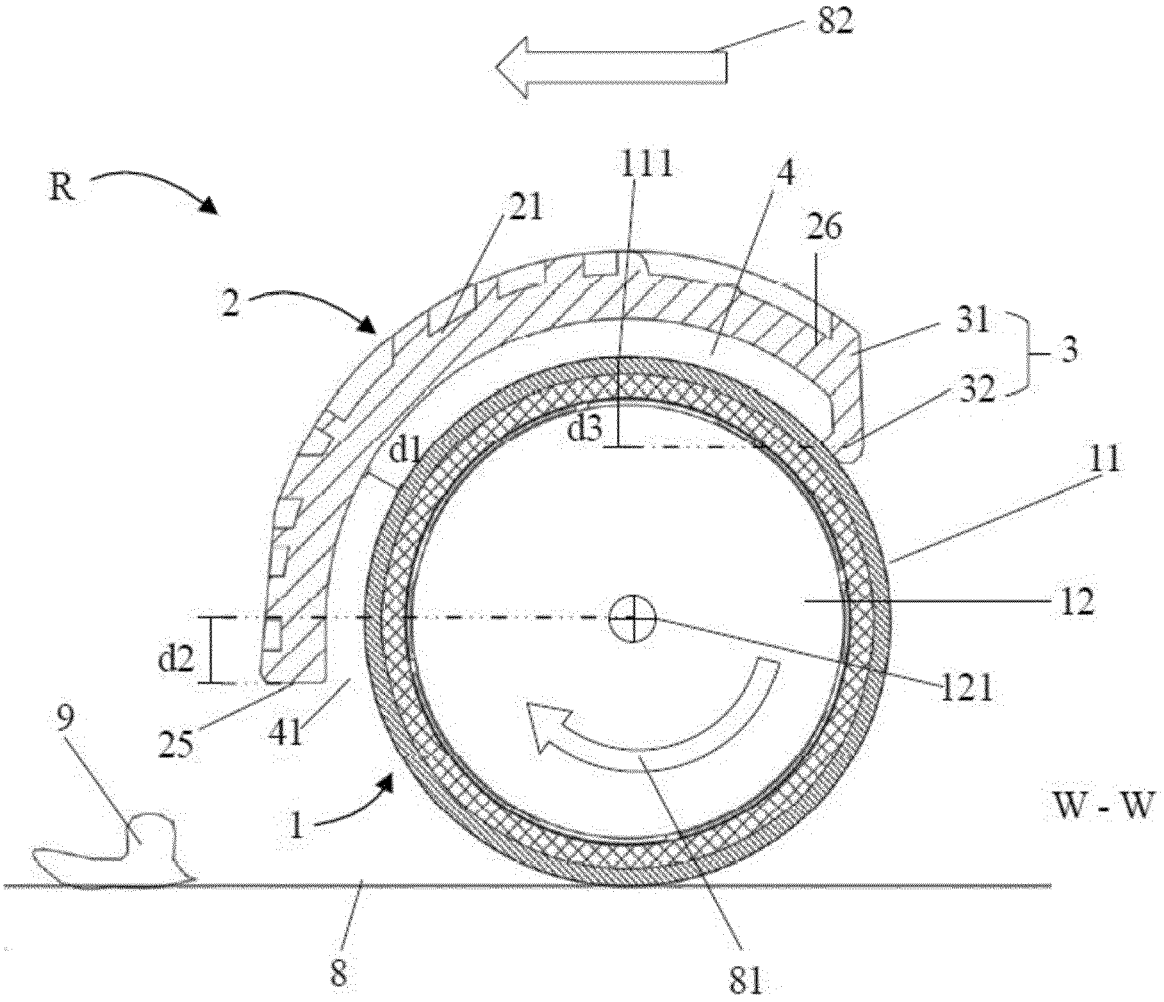

FIG. 3

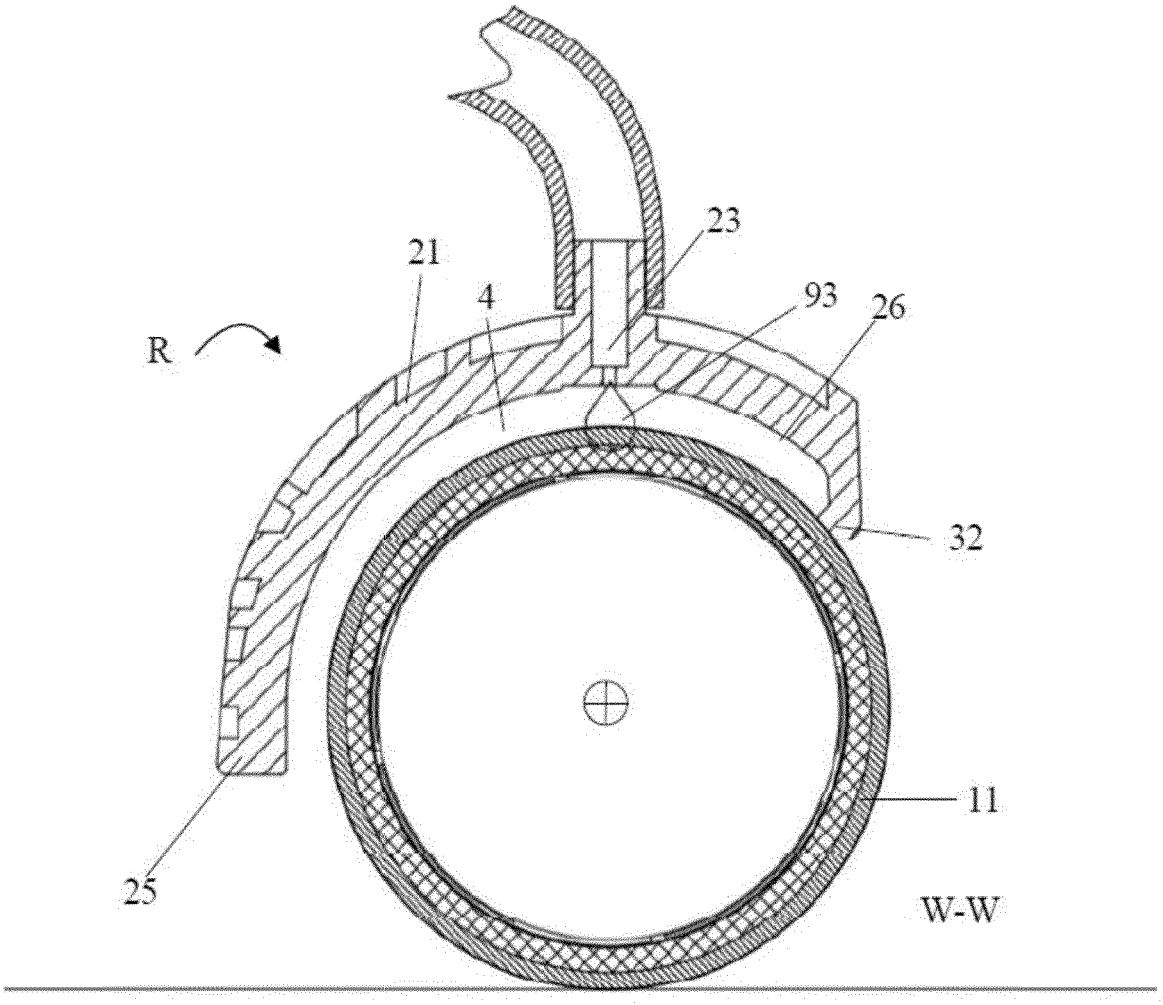

FIG. 4

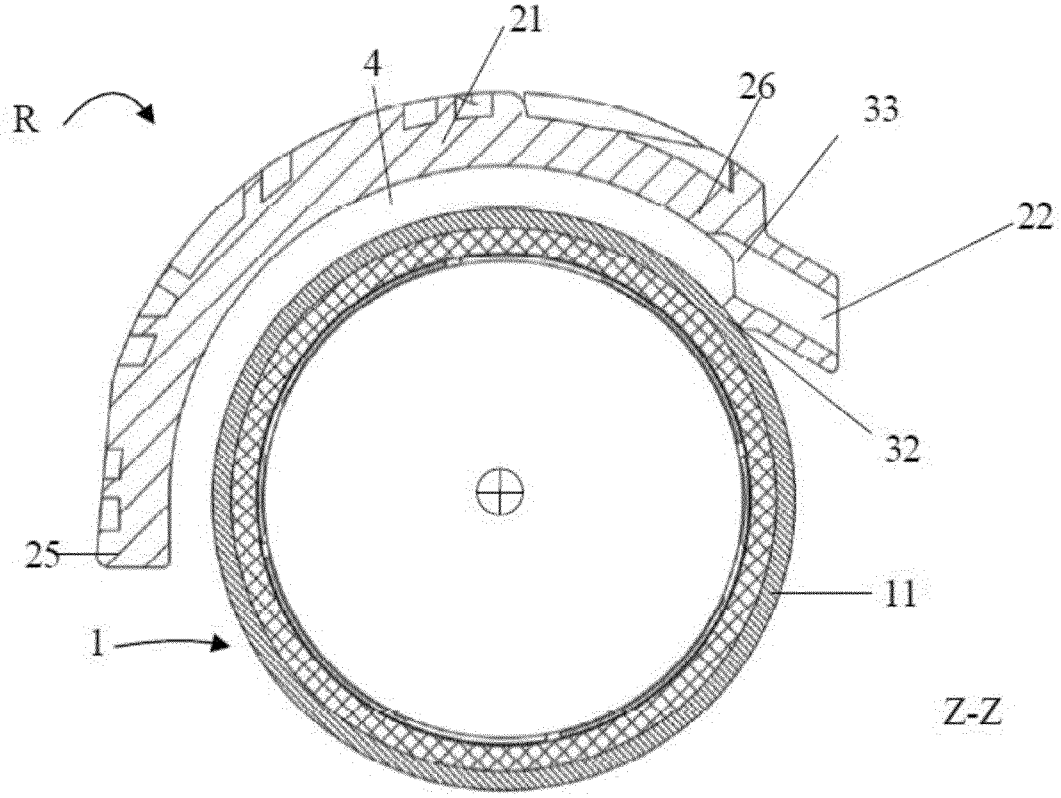

FIG. 5A

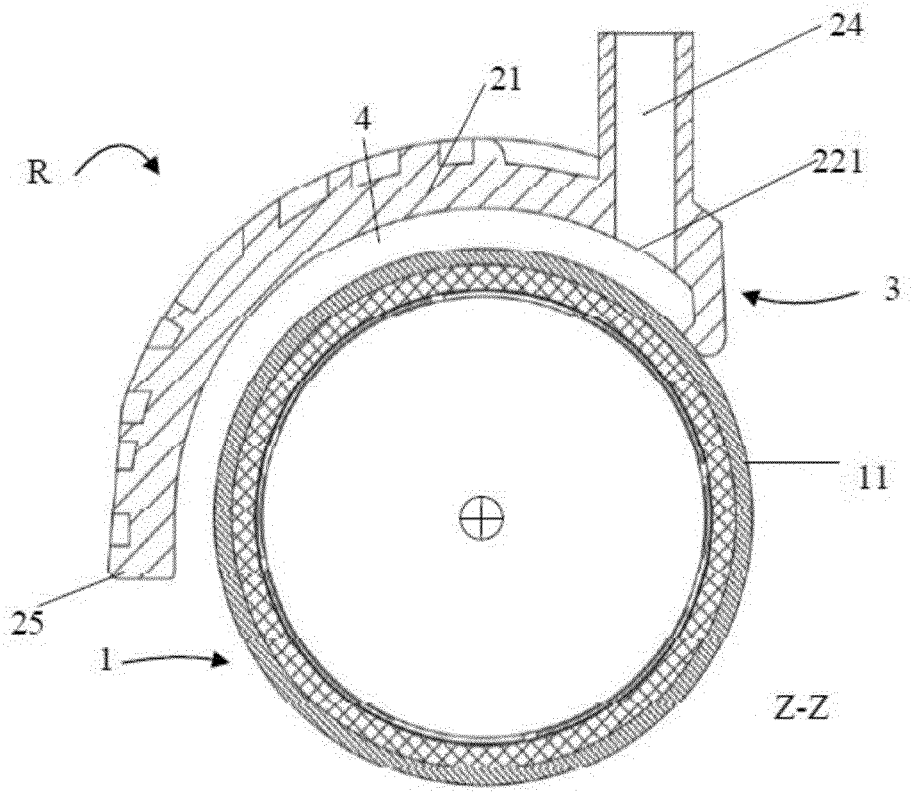

FIG. 5B

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EUROPEAN SEARCH REPORT

Application Number
EP 23 19 8633

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 4 162 854 A1 (SUZHOU EUP ELECTRIC CO LTD [CN]) 12 April 2023 (2023-04-12) * paragraphs [0040] - [0077] * * figures 1-12 *	1-15	INV. A47L11/40
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A	CN 215 272 514 U (HANGZHOU JOLOG ROBOT TECH CO LTD) 24 December 2021 (2021-12-24) * paragraphs [0042] - [0081] * * figures 1-5 *	1,14,15	
A	US 6 026 529 A (CARUSO STEVEN JEROME [US]) 22 February 2000 (2000-02-22) * column 6, line 55 - column 9, line 24 * * figures 1-6 *	1,14,15	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	1 March 2024	Weidner, Maximilian

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 23 19 8633

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