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(54) **CLEANING DEVICE**

(57) A cleaning device, comprising a housing (100), a dirty liquid containing mechanism (200), driving mechanisms (400), and a plurality of rolling brushes, wherein the dirty liquid containing mechanism (200) is mounted in the housing (100); the plurality of rolling brushes are all mounted on the housing (100); the rolling brushes comprise cleaning parts (330) and mounting parts (340); the cleaning parts (330) are provided on the peripheries of the mounting parts (340) in a surrounding manner, and the cleaning parts (330) all work in conjunction to the dirty liquid containing mechanism (200); the driving mechanisms (400) are connected to at least one mounting part (340) to drive the mounting parts (340) to rotate; the plurality of rolling brushes comprise a front rolling brush (310) and a rear rolling brush (320); in the movement direction of the rolling brushes, the front rolling brush (310) is located in front of the rear rolling brush (320), and at least a part of the projection of the front rolling brush (310) is located in the projection of the rear rolling brush (320). The cleaned surface cleaned by the cleaning device is relatively low in slippery degree, so that when a user walks, the cleaned surface which is cleaned is basically not stained again, and almost no threat is caused to the personal safety of the user.

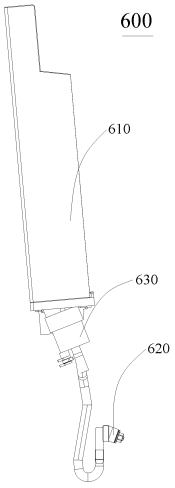

FIG. 2

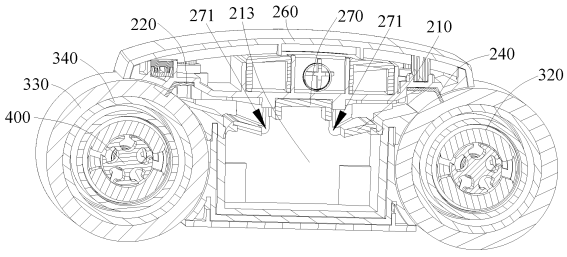

FIG. 3

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Description

TECHNICAL FIELD

[0001] The present invention relates to cleaning tools, in particular to a cleaning device.

BACKGROUND

[0002] Cleaning tools are an extremely important product in people's daily work and life. With the gradual advancement of the automation process, more and more electric cleaning tools have appeared in people's lives, such as vacuum cleaners, sweepers and mopping machines, etc. The mopping machine is usually provided with one rolling brush or two circular throwing discs, a surface to be cleaned is wiped by driving the rolling brush or the throwing disc to rotate. In addition, in order to improve the cleaning effect, water is usually sprayed before or during the wiping process. However, due to a limited ability of the mopping machine to recycle dirty liquid, the cleaned surface after wiping with the mopping machine is slippery. When the user walks on the cleaned surface, on the one hand, the cleaned surface may be soiled again, on the other hand, it may cause the user to slip, which adversely affects the personal safety of the user.

SUMMARY

[0003] The present invention discloses a cleaning device to solve a problem that because a cleaned surface is slippery after a mopping machine clean the surface, when a user walks on the cleaned surface, on the one hand, the cleaned surface may be soiled again, on the other hand, it may cause the user to slip, which adversely affects the personal safety of the user.

[0004] In order to solve the above problem, the present invention provides the following technical solution.

[0005] A cleaning device includes:

a housing;

a dirty liquid accommodating mechanism mounted in the housing;

a plurality of rolling brushes mounted in the housing, the rolling brush including a cleaning portion and a mounting portion, the cleaning portion surrounding an outer periphery of the mounting portion, each of the cleaning portions cooperating with the dirty liquid accommodating mechanism; and

a driving mechanism connected to at least one of the mounting portions to drive each of the mounting portions to rotate;

wherein the plurality of the rolling brushes comprises a front rolling brush and a rear rolling brush, in a moving direction of the rolling brushes, the front rolling brush is located in front of the rear rolling brush and at least a part of a projection of the front rolling brush is located within a projection of the rear rolling brush.

[0006] The technical solution provided in the present invention can achieve the following beneficial effects.

[0007] The plurality of rolling brushes in the cleaning device provided by the present invention can be rotated under the driving of the driving mechanism, and the dirty liquid adsorbed by the plurality of rolling brushes can be collected into the dirty liquid accommodating mechanism, thereby reducing the amount of dirty liquid remaining on the cleaned surface. Furthermore, the plurality of rolling brushes include the front rolling brush and the rear rolling brush. In the moving direction of the rolling brushes, the front rolling brush is located in front of the rear rolling brush, and at least a part of the projection of the front rolling brush is located in the projection of the rear rolling brush, which can ensure that the rear rolling brush can cover at least a part of the moving track of the front rolling brush during the movement process, so that under the action of the rear rolling brush, the cleaned surface that has been wiped by the front rolling brush is wiped twice, which can further absorb the dirty liquid on the surface to be cleaned, improve the dryness of the cleaned surface, prevent the cleaned surface from being soiled again and prevent the user from slipping because the cleaned surface is slippery when the user walks on the surface that has just been cleaned.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The above and other objects, features and advantages of the invention become clearer through a more specific description of the preferred embodiments of the invention shown in the accompanying drawings. In all the drawings, the same reference numerals indicate the same parts, and the drawings are not deliberately scaled according to the actual size, with the focus on showing the main thrust of the invention.

FIG. 1 is a schematic view of a cleaning device according to an embodiment of the present invention.

FIG. 2 is a schematic view of a liquid spraying mechanism in a cleaning device according to an embodiment of the present invention.

FIG. 3 is a cross-sectional view of a part of the cleaning device according to an embodiment of the present invention.

FIG. 4 is a cross-sectional view of a part of the cleaning device viewed from another aspect according to an embodiment of the present invention.

FIG. 5 is an exploded view of a part of the cleaning device according to an embodiment of the present invention.

FIG. 6 is a schematic view of an upper cover of the cleaning device according to an embodiment of the present invention.

FIG. 7 is a top view of a part of the cleaning device according to an embodiment of the present inven-

tion.

FIG. 8 is a top view of another part of the cleaning device according to an embodiment of the present invention.

FIG. 9 is a schematic view of a housing in the cleaning device according to an embodiment of the present invention.

FIG. 10 is an assembly view of a rolling brush and a dirty liquid accommodating mechanism of the cleaning device according to an embodiment of the present invention.

FIG. 11 is a schematic view of a dirty liquid accommodating mechanism of the cleaning device according to an embodiment of the present invention.

[0009] Description of reference numbers: 100, housing; 110, main body; 120, ending cover; 200, sewage liquid accommodating mechanism; 210, liquid collecting portion; 211, first liquid collecting area; 212, second liquid collecting area; 213, liquid collecting cavity; 215, avoidance notch; 216, pushing button; 217, handing element; 218, hinge; 220, front wiping strip; 230, liquid guiding portion; 240, rear wiping strip; 250, splash-proof flange; 260, upper cover 260; 270, top covering portion; 271, liquid collecting port; 272, capping wall; 273, blocking wall; 273a, first guiding section; 273b, second guiding section; 274, liquid guiding wall; 310, front rolling brush; 320, rear rolling brush; 330, cleaning portion; 340, mounting portion; 341, inner cavity; 400, driving mechanism; 410, motor; 411, casing; 412, driving shaft; 420, driving button; 430, bearing; 510, handle; 520, universal joint; 600, liquid spraying mechanism; 610, liquid supplying portion; 620, spraying portion; 630, pump.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0010] In order to make the objects, features and advantages of the present invention more obvious and easier to understand, the specific embodiments of the present invention are described in detail below in combination with the accompanying drawings. Many specific details are set forth in the following description to facilitate a full understanding of the invention. However, the present invention can be implemented in many ways different from those described herein, and those skilled in the art can make similar improvements without violating the connotation of the invention. Therefore, the invention is not limited by the specific embodiments disclosed below.

[0011] The technical solutions provided by some embodiments of the present invention will be described in detail below with reference to the accompanying drawings.

[0012] As shown in FIGS. 1 to 11, an embodiment of the present invention discloses a cleaning device including a housing 100, a dirty liquid accommodating mechanism 200, a driving mechanism 400, and a plurality of rolling brushes.

[0013] As shown in FIG. 9, as a mounting base for other components, the housing 100 can be made of materials such as plastic or metal, etc., and its size and shape can be flexibly selected according to the structure of other elements in the cleaning device.

[0014] The number of rolling brushes can be determined according to an actual situation, and it can be two, three, four or more. The plurality of rolling brushes are mounted on the housing 100, the plurality of rolling brushes can be cylindrical structures, and the sizes of the rolling brushes can be the same or different from each other. As shown in FIG. 3, the rolling brush includes a cleaning portion 330 and a mounting portion 340. The cleaning portion 330 surrounds an outer periphery of the mounting portion 340 and is mounted to the mounting portion 340.

[0015] When using the cleaning device, the cleaning portion 330 can absorb liquids such as water, and complete a cleaning work on a surface to be cleaned by contacting and moving relative to the surface to be cleaned. The cleaning portion 330 can be formed of fiber materials such as cotton, linen, wool, etc., and the material forming the cleaning portion 330 can be relatively soft in texture and have high water absorption performance, which can further improve the cleaning effect of the cleaning portion 330 on the surface to be cleaned.

[0016] The mounting portion 340 can be a cylindrical structure to provide the mounting base for the cleaning portion 330, and enable the entire rolling brush to have a rolling ability, so that the cleaning work can be performed on different areas of the surface to be cleaned by moving the entire cleaning device. In addition, the cleaning portion 330 can also be a cylindrical structure, so as to be sleeved and mounted to the mounting portion 340, and since the material forming the cleaning portion 330 usually has a certain elasticity, it can be ensured that the cleaning portion 330 can be reliably mounted to the mounting portion 340. In order to ensure high connection reliability between the cleaning portion 330 and the mounting portion 340, optionally, the cleaning portion 330 may be adhered to a surface of the mounting portion 340 through glue.

[0017] In order to ensure that the rolling brush can rotate automatically to clean different areas of the surface to be cleaned by moving the entire cleaning device, the driving mechanism 400 can be connected to at least one mounting portion 340, so as to drive the rolling brush to rotate under the action of the driving mechanism 400, so that each mounting portion 340 is rotatable.

[0018] Optionally, the driving mechanism 400 may be connected to only one rolling brush to drive the rolling brush to rotate. When one rolling brush actively rotates, the other rolling brushes can also rotate under the driving of the rolling brush, thereby ensuring that the entire cleaning device can move relative to the surface to be cleaned and complete the cleaning work on different areas on the surface to be cleaned.

[0019] The driving mechanism 400 may be a motor, which may be directly connected to the mounting portion

340 to drive the mounting portion 340 to rotate. Alternatively, the mounting portion 340 may also be indirectly connected to the motor by a transmission mechanism such as a belt, etc., which can ensure that the motor can drive the mounting portion 340 to rotate stably to perform cleaning work.

[0020] Before or during an operation of the cleaning device, the surface to be cleaned may need to be sprayed with water to improve cleaning results, in order to prevent a large amount of water from remaining on the cleaned surface after wiping, as shown in FIG. 3 and FIG. 5, the cleaning device according to the embodiment of the present invention is provided with the dirty liquid accommodating mechanism 200. The cleaning portion 330 of each rolling brush cooperates with the dirty liquid accommodating mechanism 200, so that the liquid such as dirty liquid absorbed by the cleaning portion 330 can be collected into the dirty liquid accommodating mechanism 200 to minimize the amount of dirty liquid remaining on the cleaned surface after wiping is completed.

[0021] The number of the dirty liquid accommodating mechanisms 200 can be determined according to actual needs. For example, each rolling brush can be provided with the dirty liquid accommodating mechanism 200 respectively, or multiple rolling brushes can share the same dirty liquid accommodating mechanism 200. The dirty liquid accommodating mechanism 200 can squeeze out the dirty liquid absorbed in the cleaning portion 330 by squeezing with the rolling brush, and store the dirty liquid in its own chamber. When the cleaning work is completed in stages or all the cleaning work is completed, the liquid such as dirty liquid stored in the chamber of the dirty liquid accommodating mechanism 200 are poured out. In order to keep the cleaning device clean and prolong the service life of the device, the dirty liquid accommodating mechanism 200 and the rest of the cleaning device can be deeply cleaned.

[0022] Referring to FIG. 11, the dirty liquid accommodating mechanism 200 may include a liquid collecting portion 210 and a top covering portion 270. The top covering portion 270 and the liquid collecting portion 210 enclose a liquid collecting cavity 213, and the top covering portion 270 is provided with a liquid collecting port 271. In a direction perpendicular to the circumferential direction of the rolling brush, the liquid collecting port 271 is located in a middle portion of the top covering portion 270, so that when using the cleaning device, even if the cleaning device is inclined, it can prevent the dirty liquid from splashing out of the liquid collecting cavity 213 to a certain extent. It should be noted that the middle portion of the top covering portion 270 is a concept relative to the edge of the top covering portion 270. That is, the liquid collecting port 271 is not provided on the edge of the top covering portion 270, so as to prevent the dirty liquid in the liquid collecting cavity 213 from being easily splashed from the liquid collecting port 271 when the cleaning device is inclined. In addition, the direction perpendicular to the circumferential direction of the rolling brush may be the direction A shown in FIG. 11.

[0023] Specifically, the liquid collecting portion 210 and the top covering portion 270 can be formed separately, then the top covering portion 270 can be detachably connected to the liquid collecting portion 210 by a structure such as a buckle, so that in a process of processing dirty liquid, an area of the liquid collecting portion 210 in communication with the outside can be increased by removing the top covering portion 270, so that the dirty liquid can be discharged out of the liquid collecting cavity 213 more quickly.

[0024] Alternatively, as shown in FIG. 10, the top covering portion 270 can also be movably mounted to the liquid collecting portion 210 through elements such as hinges 218. An area of the liquid collecting portion 210 in communication with the outside can also be increased by rotating the top covering portion 270 to speed up the discharge speed of dirty liquid. In addition, when the above-mentioned connection method is adopted, the top covering portion 270 can be prevented from being lost, and a difficulty of disassembling and assembling between the top covering portion 270 and the liquid collecting portion 210 can be reduced, and the user experience can be improved. In addition, as shown in FIG. 8, a pushing button 216 may be provided on the top covering portion 270, and a pushing direction may be marked on the top covering portion 270, so as to provide instructions for the user and facilitate the use of the user. Specifically, during the use of the cleaning device, when discharging dirty liquid, the user can push the top covering portion 270 to rotate relative to the liquid collecting portion 210 according to the indicated direction though the pushing button 216, so as to increase an cross-section area of the liquid collecting cavity 213 in communication with the outside. Then the liquid collecting portion 210 is tilted to pour out the dirty liquid. After cleaning the liquid collecting portion 210, the top covering portion 270 can be reversely rotated though the pushing button 216, so that the top covering portion 270 and the liquid collecting portion 210 can be fixed as a whole.

[0025] Of course, in order to make a fixed connection between the top covering portion 270 and the liquid collecting portion 210 more stable, elastic buckles can be provided on the top covering portion 270 or the liquid collecting portion 210, so as to ensure that when using the cleaning device, the top covering portion 270 will not be automatically separated from the liquid collecting portion 210, and the dirty liquid is prevented from splashing out of the liquid collecting cavity 213.

[0026] The liquid collecting port 271 can be integrally formed with the top covering portion 270, the top covering portion 270 can have a substantially rectangular structure as a whole. The liquid collecting port 271 can be located in the center of the top covering portion 270, so that after the top covering portion 270 and the liquid collecting portion 210 are connected to each other to form the liquid collecting cavity 213, even if the dirty liquid accommodating mechanism 200 is tilted with the cleaning device,

because a distance between the liquid collecting port 271 and a supporting surface such as the surface to be cleaned is relatively large, the dirty liquid in the liquid collecting cavity 213 is prevented from splashing out as much as possible. Optionally, one or more liquid collecting ports 271 may be provided, and each liquid collecting port 271 cooperates with the rolling brush to collect liquid such as dirty liquid squeezed out from the rolling brush.

[0027] As shown in FIG. 11, the top covering portion 270 may include a capping wall 272, a blocking wall 273 and a liquid guiding wall 274. The capping wall 272 is disposed facing a bottom of the liquid collecting portion 210. Optionally, the capping wall 272 is parallel to the bottom of the liquid collecting portion 210. The blocking wall 273 is connected to an edge of the capping wall 272, and the blocking wall 273 extends in a direction adjacent to the bottom of the liquid collecting portion 210. The liquid guiding wall 274 is connected to the blocking wall 273, and the liquid guiding wall 274 extends obliquely in a direction away from the bottom of the liquid collecting portion 210, which enables the liquid guiding wall 274 and the blocking wall 273 to form an inclined sink. The inclined sink is recessed relative to the cap wall 272, so that during the operation of the cleaning device, the liquid guiding wall 274 can provide a guiding effect for the dirty liquid extruded from the rolling brush. The blocking wall 273 can prevent the dirty liquid from continuing to flow. Under the cooperation of the liquid guiding wall 274 and the blocking wall 273, the dirty liquid can be collected into the liquid collecting cavity 213 from the liquid collecting port 271 located at a junction between the liquid guiding wall 274 and the blocking wall 273.

[0028] Optionally, the liquid collecting portion 210 may be a rectangular or approximately rectangular structure, which includes four side portions and a bottom portion. The four side portions may all be connected to the capping wall 272. The capping wall 272 is provided with a notch, the blocking wall 273 and the liquid guiding wall 274 can be arranged at the notch. The liquid guiding wall 274 is connected to one side portion of the liquid collecting portion 210, so as to ensure that the top covering portion 270 and the liquid collecting portion 210 can be connected to each other to form the liquid collecting cavity 213. Of course, the actual structures of the capping wall 272, the blocking wall 273, and the liquid guiding wall 274 can be determined according to specific conditions, which are not limited herein. Specifically, the capping wall 272, the blocking wall 273, and the liquid guiding wall 274 may be integrally formed, so as to improve the structural stability of the entire top covering portion 270.

[0029] Optionally, as shown in FIG. 11, the blocking wall 273 may extend in a vertical direction. Compared with an inclined arrangement of the blocking wall 273, the vertically extending blocking wall 273 can provide a better blocking effect for the dirty liquid, and can also ensure that there is a large space between the blocking wall 273 and the liquid guiding wall 274, so that when a flow rate of the dirty liquid is large, it can basically ensure that the dirty liquid can flow into the liquid collecting cavity from the liquid collecting port 271 without sputtering.

[0030] In order to prevent the liquid collecting port 271 from being blocked when an instantaneous flow of dirty liquid is large, the gas remaining in the liquid collecting cavity 213 cannot be discharged in time, resulting in frequent bubbling at the liquid collecting port 271 and sputtering of the dirty liquid, as shown in FIG. 11, at least a part of the liquid collecting port 271 can be located on the blocking wall 273, so that during the process that the dirty liquid is squeezed out from the rolling brush and flows to the liquid collecting port 271 along the liquid guide wall 274, an interior of the liquid collecting cavity 213 can be in communication with the outside of the liquid collecting cavity 213 through a part of the liquid collecting port 271 located on the blocking wall 273, as the dirty liquid flows into the liquid collecting cavity 213, the gas in the liquid collecting cavity 213 can escape from an upper area of the liquid collecting port 271, which can also improve a collection speed of the dirty liquid, and can prevent the dirty liquid from colliding with the blocking wall 273 to a large extent to cause sputtering when the dirty liquid flows from the liquid guiding wall 274 to the blocking wall 273.

[0031] Specifically, a part of the liquid collecting port 271 may be located on the blocking wall 273, and another part of the liquid collecting port 271 may be located on the liquid guiding wall 274, such that the dirty liquid will be collected to the liquid collecting cavity 213 more quickly under the action of gravity.

[0032] Further, the blocking wall 273 may be a flared structure, and the blocking wall 273 may face the rolling brush that is matched with the blocking wall 273. The blocking wall 273 includes a first guiding section 273a and a second guiding section 273b, and the liquid collecting port 271 is located between the first guiding section 273a and the second guiding section 273b. Optionally, both the first guiding section 273a and the second guiding section 273b can be inclined relative to a moving direction of the rolling brush to achieve diversion effect.

[0033] When the blocking wall 273 adopts the above-mentioned structure, the blocking wall 273 also has a guiding function, so that during a process of the dirty liquid flowing to the blocking wall 273 through the guiding of the liquid guiding wall 274, the first guiding section 273a and the second guiding section 273b can provide a blocking effect for the dirty liquid, and can also guide the dirty liquid on both sides of the liquid collecting port 271 to flow to the liquid collecting port 271 to further increase the speed of collecting the dirty liquid.

[0034] In the direction perpendicular to the circumferential direction of the rolling brush, a size of a side of the liquid guiding wall 274 away from the blocking wall 273 can be similar to a length of the rolling brush, so as to ensure that the dirty liquid at any position on the rolling brush can flow from the liquid guide wall 274 to the liquid collecting port 271. The first guiding section 273a and the second guiding section 273b can be substantially

symmetrically arranged, so as to ensure that the dirty liquid extruded from different positions on the rolling brush can flow into the liquid collecting cavity 213 from the liquid collecting port 271 evenly.

[0035] Optionally, as shown in FIG. 5 to FIG. 7, the dirty liquid accommodating mechanism 200 may further include an upper cover 260, the upper cover 260 coveres a side of the top covering portion 270 away from the liquid collecting portion 210, so as to prevent the liquid contained in the liquid collecting cavity 213 from splashing out from the liquid collecting port 271 by the upper cover 260. Furthermore, the upper cover 260 can also cover the liquid collecting cavity 213 containing the liquid such as dirty liquid, so as to improve the overall appearance of the entire cleaning device when the entire cleaning device is used, thereby further improving the user experience of the product. Specifically, the upper cover 260 may be connected to the liquid collecting portion 210 or the top covering portion 270, and of course, the upper cover 260 may also be directly connected to the housing 100.

[0036] More specifically, as shown in FIG. 3, in the case where the dirty liquid accommodating mechanism 200 is located between the front rolling brush 310 and the rear rolling brush 320, the upper cover 260 can be extended to the front rolling brush 310 and the rear rolling brush 320 at the same time, so that the upper cover 260 can also cover a part of the front rolling brush 310 and a part of the rear rolling brush 320, so as to shield the front rolling brush 310 and the rear rolling brush 320, which prevents the liquid adsorbed on the front rolling brush 310 and the rear rolling brush 320 from splashing when the front rolling brush 310 and the rear rolling brush 320 rotate.

[0037] In order to further prevent the liquid collected in the liquid collecting cavity 213 from splashing out from the liquid collecting port 271 when the entire cleaning device moves, preferably, as shown in FIG. 6, the cleaning device may further include a splash-proof flange 250. The splash-proof flange 250 is connected to a side of the upper cover 260 facing the liquid collecting portion 210. As shown in FIG. 3, the splash-proof flange 250 is provided facing the liquid collecting port 271, the splash-proof flange 250 and the blocking wall 273 of the top covering portion 270 are attached to each other. Furthermore, during the operation of the cleaning device, the liquid collecting port 271 can be shielded to a certain extent by the splash-proof flange 250, which can substantially prevent the liquid such as dirty liquid contained in the liquid collecting cavity 213 from flowing out or splashing out when the cleaning device moves, so as to ensure that the cleaned surface will not be re-contaminated. In addition, a contact area between the splash-proof flange 250 and the top covering portion 270 is relatively large, the upper cover 260 is sustainably not separated from the top covering portion 270 during the operation of the cleaning device, thereby further preventing the dirty liquid from splashing out of the liquid collecting port 271.

[0038] Specifically, the splash-proof flange 250 may be fixed to a surface of the side of the upper cover 260 by bonding or thermal fusion, or the splash-proof flange 250 and the upper cover 260 can be integrally formed. A size of the splash-proof flange 250 can be adjust according to the actual situation, and, in the case where the splash-proof flange 250 and the liquid collecting port 271 cooperate with each other, it is necessary to ensure that the liquid collecting port 271 is in communication with the outside of the liquid collecting cavity 213, so that the liquid squeezed out from the front rolling brush 310 and the rear rolling brush 320 is collected. In addition, in the case where a plurality of liquid collecting ports 271 are provided, the splash-proof flanges 250 may be provided corresponding to the liquid collecting ports 271, so as to prevent the liquid such as dirty liquid from splashing out from the liquid collecting ports 271.

[0039] Optionally, the outer circumference of the liquid collecting portion 210 may be a square structure, which enables the liquid collecting portion 210 to better cooperate with the front rolling brush 310, the rear rolling brush 320 and an ending cover 120 in the housing 100, and the shape of the cleaning device is substantially square, and the cleaning device of this structure has a relatively good cleaning effect on areas such as corners of the house, moreover, the cleaning device of this structure has a relatively high aesthetics, which can improve the competitiveness of the product.

[0040] Considering that during the cleaning process, a single adsorption may not be able to completely absorb the clean water or dirty liquid attached to the cleaned surface, therefore, as shown in FIG. 3 and FIG. 5, the plurality of rolling brushes of the cleaning device include the front rolling brush 310 and the rear rolling brush 320. In the moving direction of the rolling brush, the front rolling brush 310 is located in front of the rear rolling brush 320, meanwhile, at least a part of a projection of the front rolling brush 310 is located within a projection of the rear rolling brush 320, so that a movement track of the rear rolling brush 320 can cover at least a part of the movement track of the front rolling brush 310, such that the cleaned surface adsorbed by the front rolling brush 310 can be adsorbed and cleaned again by the rear rolling brush 320, so as to further reduce the amount of water remaining on the cleaned surface, and even enable the cleaned surface wiped by the rear rolling brush 320 is almost free of water.

[0041] In addition, when the front rolling brush 310 and the rear rolling brush 320 are provided, the front rolling brush 310 can perform preliminary cleaning of the surface to be cleaned. While cleaning most of the stains on the surface to be cleaned, most of the dirty liquid can also be adsorbed and collected into the cleaning portion 330, and the rear rolling brush 320 can perform secondary cleaning on the cleaned surface cleaned by the front rolling brush 310, which enable the cleaning device to have a better cleaning effect on the surface to be cleaned.

In addition, the rear rolling brush 320 can also adsorb the remaining dirty liquid on the surface to be cleaned for a second time, so as to further reduce the amount of dirty liquid remaining on the surface to be cleaned, and even in some cases, there can be substantially no dirty liquid on the surface to be cleaned. On the one hand, it can prevent the stains from being adhered to the wet cleaned surface again when the user steps on the cleaned surface that has just been wiped and cleaned, on the other hand, the wetness of the cleaned surface can be reduced, reducing or even eliminating a risk of slipping when the user walks on the cleaned surface that has just been wiped.

[0042] Further, as shown in FIG. 3 and FIG. 4, the mounting portion 340 may be provided with an inner cavity 341, and in a process of assembling the cleaning device, the driving mechanism 400 is mounted in the inner cavity 341, so that the mounting portion 340 can provide a certain protective effect for the driving mechanism 400. Meanwhile, by placing the driving mechanism 400 in the mounting portion 340, a security threat caused by the driving mechanism 400 that rotates at high speed when the cleaning device is used for cleaning work can be reduced.

[0043] Optionally, as shown in FIG. 4, the driving mechanism 400 may include a motor 410, a driving button 420, and a bearing 430. The driving button 420 may be fixed to a middle portion of the mounting portion 340 in an axial direction thereof. In this way, the motor 410 drives the middle of the mounting portion 340 to rotate the entire rolling brush, so that a force of the motor 410 acting on the mounting portion 340 can be relatively balanced, and the mounting portion 340 can rotate more stably. In addition, with the above structure, a proportion of the cleaning portion 330 in the entire cleaning device can be increased to a certain extent along a width direction of the cleaning device, so that when the cleaning device is fixed, a cleaning efficiency of the cleaning device can be improved.

[0044] Specifically, the motor 410 includes a casing 411 and a driving shaft 412. When the motor 410 works, the driving shaft 412 rotates relative to the casing 411. The casing 411 can be fixed to the housing 100 of the cleaning device, and the casing 411 can also be connected to the mounting portion 340 through the bearing 430. Specifically, the casing 411 can extend through an inner ring of the bearing 430, and an outer ring of the bearing 430 is fixed to an inner surface of the mounting portion 340, so as to ensure that the mounting portion 340 has an ability to rotate relative to the casing 411. The driving shaft 412 can be fixed to the driving button 420, so that when the driving shaft 412 rotates, the mounting portion 340 fixed to the driving button 420 can be driven to rotate, so as to achieve a purpose of driving the rolling brush to rotate. In addition, since the casing 411 is connected to the mounting portion 340 through the bearing 430, and the casing 411 is fixed to the housing 100, even if the mounting portion 340 rotates, the casing 411 and the housing 100 can be kept relatively still.

[0045] More specifically, as shown in FIG. 9, the housing 100 may include a main body 110 and the ending cover 120. The ending covers 120 are provided on opposite sides of the main body 110, and the ending covers 120 are connected to the main body 110. Both the rolling brush and the driving mechanism 400 may be provided between the two ending covers 120. As shown in FIG. 4, the casing 411 can be fixed to the ending cover 120, and the driving shaft 412 can extend into the inner cavity 341 of the mounting portion 340 to be fixed to the driving button 420. The driving button 420 and the mounting portion 340 may be integrally formed, so as to improve a reliability of a connection between the driving button 420 and the mounting portion 340.

[0046] In order to ensure higher stability of a rotating action of the mounting portion 340, preferably, as shown in FIG. 4, two bearings 430 may be provided, and the two bearings 430 may be respectively disposed on opposite sides of the driving button 420 to provide stability for a rotation process of the mounting portion 340. Specifically, as shown in FIG. 4, another bearing 430 may be connected to a side of the driving button 420 away from the motor 410, the outer ring of the bearing 430 may be fixed to the inner surface of the mounting portion 340, and the inner ring of the bearing 430 may be fixed to the ending cover 120 to ensure that the mounting portion 340 can rotate relative to the ending cover 120, the reliability of the entire rolling brush during rotation is further improved.

[0047] Alternatively, the driving mechanism 400 may also have other structures, and the purpose of driving the mounting portion 340 can be achieved through other connection methods. Optionally, the driving mechanism 400 may include a stator and a rotor, the stator of the motor 410 may be connected to the housing 100 of the cleaning device, and the rotor may be connected to the mounting portion 340. In this way, the driving mechanism 400 can also achieve the purpose of driving the mounting portion 340 to rotate. Specifically, the stator may be fixed to the ending cover 120 of the housing 100, and the rotor may be connected to the mounting portion 340. An assembly method of the driving mechanism 400 is relatively simple, and spare elements and installation costs are relatively low.

[0048] Further, a plurality of driving mechanisms 400 may be provided, and the plurality of driving mechanisms 400 may be connected to the plurality of rolling brushes in one-to-one correspondence. In this way, each rolling brush can have the ability to operate autonomously, so that under a power provided by the driving mechanism 400, an interaction force between each rolling brush and the surface to be cleaned becomes larger, so as to further improve the cleaning effect of the entire cleaning device. At the same time, under the action of the plurality of the driving mechanisms 400, a normal operation of the entire cleaning device can be prevented from being affected by a failure of a single driving mechanism 400.

[0049] Specifically, the structures of each driving mechanism 400 may be completely the same, and the driving mechanisms 400 are connected to the mounting portion 340 in the same or similar mounting manner. Alternatively, the structures of the plurality of driving mechanisms 400 may also be different from each other, and connection manners between different driving mechanisms 400 and different mounting portions 340 may also be different from each other. For a sake of brevity, the description will not be repeated herein. Those skilled in the art can determine the connection manners between the driving mechanism 400 with different structures and the mounting portion 340 according to the aforementioned embodiments.

[0050] More specifically, each of the plurality of rolling brushes may be provided with the inner cavity 341, and then the plurality of driving mechanisms 400 may be respectively mounted in the inner cavities 341 of the plurality of rolling brushes, so that the driving mechanism of the entire cleaning device is not exposed to the outside, so as to further improve a safety performance of the entire cleaning device.

[0051] Considering that during the cleaning process, the area contacted by the rear rolling brush 320 is the area that has been cleaned by the front rolling brush 310, therefore, compared with the rear rolling brush 320, the area contacted by the front rolling brush 310 is dirtier. In order to further improve the cleaning effect of the entire cleaning device, a linear velocity of the front rolling brush 310 can be set to be larger than a linear velocity of the rear rolling brush 320, which enables a relative movement speed between the front rolling brush 310 and the surface to be cleaned larger, so that the stains attached to the surface to be cleaned can be removed more easily and thoroughly.

[0052] Specifically, when only one driving mechanism 400 is provided, the driving mechanism 400 can be directly connected to the front rolling brush 310, the front rolling brush 310 is driven to rotate by the driving mechanism 400, and the rear rolling brush 320 is driven by the front rolling brush 310 to rotate. Since the rear rolling brush 320 needs to overcome a resistance to rotate, the linear velocity of the front rolling brush 310 can be ensured to be greater than the linear velocity of the rear rolling brush 320. When the front rolling brush 310 and the rear rolling brush 320 are both equipped with the driving mechanism 400, and the structure and size of the front rolling brush 310 and the rear rolling brush 320 are the same, it can be ensured that the linear velocity of the front rolling brush 310 is greater than the linear velocity of the rear rolling brush 320 by the rotational speed of the driving mechanism 400 matched with the front rolling brush 310 being greater than the rotational speed of the driving mechanism 400 connected to the rear rolling brush 320. For another example, when a rotational speed of each driving mechanism 400 is the same, a circumference of the rear rolling brush 320 may be greater than a circumference of the front rolling brush 310. Of course, by combining the above-mentioned methods, the linear velocity of the front rolling brush 310 can also be larger than the linear velocity of the rear rolling brush 320.

[0053] Alternatively, in some cases, the linear velocity of the rear rolling brush 320 may be greater than the linear velocity of the front rolling brush 310. In this way, the relative movement speed between the rear rolling brush 320 and the surface to be cleaned is relatively large, so that the dirty liquid on the surface to be cleaned wiped by the front rolling brush 310 can be absorbed faster and more thoroughly when the rear rolling brush 320 rotates multiple times, thereby further reducing a slippery degree of the cleaned surface wiped by the cleaning device, and it can also achieve a certain polishing effect on the cleaned surface and improve a smoothness of the cleaned surface. Specifically, the control method of the linear velocity of the rear rolling brush 320 to be greater than the linear velocity of the front rolling brush 310 may be similar to that in the aforementioned embodiments. For a sake of brevity, it will not be repeated herein.

[0054] In addition, the cleaning device may also be provided with a control mechanism, and the control mechanism may be connected to each driving mechanism 400, so that the user can control the linear velocities of the front rolling brush 310 and the rear rolling brush 320 under different conditions, respectively.

[0055] In order to further improve the processing and assembly efficiency of the entire cleaning device and reduce the cost, preferably, as shown in FIG. 3, two rolling brushes are provided, which are the front rolling brush 310 and the rear rolling brush 320, respectively. The front rolling brush 310 mainly plays a role of cleaning and adsorbing dirty liquid, and the rear rolling brush 320 mainly plays a role of secondary cleaning and drying the surface to be cleaned. In order to enable the cleaned surface wiped by the front rolling brush 310 to be completely wiped again by the rear rolling brush 320, preferably, in the moving direction of the rolling brush, the projection of the front rolling brush 310 and the projection of the rear rolling brush 320 can be coincided. Since rotation directions of the front rolling brush 310 and the rear rolling brush 320 are the same, in this way, it can be ensured that the cleaned surface wiped by the front rolling brush 310 can be wiped again by the rear rolling brush 320, so that a high cleaning effect on everywhere on the surface to be cleaned can be obtained, and the wetness on the cleaned surface is low.

[0056] Specifically, the structure and size of the front rolling brush 310 and the rear rolling brush 320 can be the same, and ends of the front rolling brush 310 and the rear rolling brush 320 can be aligned in the moving direction. When the rotation directions of the front rolling brush 310 and the rear rolling brush 320 are the same, it can basically ensure that the rear rolling brush 320 can completely move along the movement track of the front rolling brush 310, so as to perform secondary wiping on the cleaned surface wiped by the front rolling brush 310. It should be noted that, in order to improve the cleaning

effect, the cleaning portion 330 can be made of a soft fiber material. When the cleaning portion 330 of the front rolling brush 310 or the rear rolling brush 320 is curly, etc., the projections of the front rolling brush 310 and the rear rolling brush 320 in the moving direction will be slightly misaligned, which is also falls within the protection scope of the embodiments of the present invention.

[0057] In addition, the structure and size of the front rolling brush 310 and the rear rolling brush 320 are the same, which is convenient to prepare the spare elements. Meanwhile, when the cleaning portion 330 of the front rolling brush 310 and/or the rear rolling brush 320 is dirty or damaged, the cleaning portion 330 of the same structure can be replaced with the mounting portion 340 of the front rolling brush 310 and/or the rear rolling brush 320, which reduces a maintenance cost of the entire cleaning device and improves a usability of the entire cleaning device.

[0058] In addition, when the structure and size of the front rolling brush 310 and the rear rolling brush 320 are the same, a center of gravity of the entire cleaning device is relatively centered, so that it will not occur that an interaction force between one of the two rolling brushes and the surface to be cleaned is much smaller than an interaction force between the other rolling brush and the surface to be cleaned duo to the size of one of the two rolling brushes being larger than that of the other rolling brush, reducing the cleaning or drying effect of the cleaned surface. When the structure and size of the front rolling brush 310 and the rear rolling brush 320 are the same, since load-bearings of the two rolling brush are relatively balanced, it is ensured that the interaction forces between the front rolling brush 310 and the rear rolling brush 320 and the surface to be cleaned are basically the same, which can improve the cleaning and drying effect of the entire cleaning device on the surface to be cleaned to a certain extent.

[0059] In order to further reduce the number of elements in the cleaning device, so as to reduce the overall size of the cleaning device, make the cleaning device to be more convenient to use, and enable the cleaning device to enter relatively small gaps for cleaning work, optionally, as shown in FIG. 3, only one dirty liquid accommodating mechanism 200 is provided. In order to ensure that the dirty liquid absorbed by the front rolling brush 310 and the rear rolling brush 320 can be collected into the dirty liquid accommodating mechanism 200, so as to improve the drying of the cleaned surface, preferably, in the process of designing and assembling the front rolling brush 310 and the rear rolling brush 320, a preset interval is provided between the front rolling brush 310 and the rear rolling brush 320, so that the dirty liquid accommodating mechanism 200 can be mounted between the front rolling brush 310 and the rear rolling brush 320. It can ensure that both the front rolling brush 310 and the rear rolling brush 320 can cooperate with the dirty liquid accommodating mechanism 200 to squeeze and discharge the liquid such as dirty liquid into the dirty liquid accommodating mechanism 200, which prevents the front rolling brush 310 and the rear rolling brush 320 from already adsorbing more liquid before contacting the surface to be cleaned, and improves the dryness of the surface to be cleaned after being wiped.

[0060] Based on the above embodiment, as shown in FIG. 11, two liquid collecting ports 271 may be provided. One liquid collecting port 271 may be provided facing the front rolling brush 310, while the other liquid collecting port 271 may be provided facing the rear rolling brush 320, so as to ensure that liquids such as water adsorbed by the front rolling brush 310 and the rear rolling brush 320 can be collected into the liquid collecting cavity 213. When two liquid collecting ports 271 are provided, the two liquid collecting ports 271 can both be located in the middle of the top covering portion 270. Further, the two liquid collecting ports 271 can be provided opposite to each other on the capping wall 272 to ensure that distances between the plurality of liquid collecting ports 271 and the surface to be cleaned are relatively large.

[0061] In order to further improve the cleaning effect, preferably, as shown in FIG. 1, the cleaning device may further include a handle 510. The handle 510 is mounted in the housing 100. When the cleaning device is provided with the handle 510, the user can apply a preset force to the housing 100 through the handle 510 during the process of using the cleaning device to clean the surface to be cleaned. Since both the front rolling brush 310 and the rear rolling brush 320 are connected to the housing 100, the interaction force between the front rolling brush 310 and the rear rolling brush 320 and the surface to be cleaned can be increased to a certain extent, which can further increase the cleaning effect and drying effect of the cleaning device on the surface to be cleaned.

[0062] In addition, when the handle 510 is provided, it is also convenient for the user to operate the entire cleaning device, so as to perform multiple cleanings on the area on the surface to be cleaned with more stains or stubborn stains, and the entire cleaning device can also be operated to perform more precise cleaning work in corners or crevices, which can further improve a usability of the cleaning device and enhance the user experience.

[0063] Specifically, the length and shape of the handle 510 can be determined according to actual requirements. Preferably, the handle 510 can be a cylindrical rod-shaped structure, and the handle 510 of this structure is convenient for the user to grasp. The handle 510 may form a reliable connection relationship with the housing 100 though a hinge. In order to further improve the usability of the entire cleaning device, preferably, a reliable connection relationship can be formed between the handle 510 and the housing 100 through a universal joint 520, which can further improve the convenience of use of the cleaning device.

[0064] In order to further improve the usability and using range of cleaning device, preferably, as shown in FIGS. 7 to 10, an avoidance notch 215 may be formed on the liquid collecting portion 210. During the mounting

process of the handle 510, a part of the handle 510 is located at the avoidance notch 215, so that when the handle is connected to the housing 100 through the universal joint 520, the handle 510 can be inclined at a larger angle relative to the housing. The handle 510 can even be parallel to the surface, so that the places such as under the bed, under the table, etc., can be cleaned.

[0065] When the liquid collecting portion 210 is provided with the avoidance notch 215, as shown in FIG. 10, the liquid collecting portion 210 includes a first liquid collecting area 211 and a second liquid collecting area 212. The first liquid collecting area 211 and the second liquid collecting area 212 are located on opposite sides of the avoidance notch 215, respectively, which enables the avoidance notch 215 between the front rolling brush 310 and the rear rolling brush 320 more centered relative to the housing 100, so as to further improve the convenience of operation of the handle 510 mounted at the avoidance notch 215. At the same time, both the first liquid collecting area 211 and the second liquid collecting area 212 can cooperate with the front rolling brush 310 and the rear rolling brush 320. In this way, the entire liquid collecting portion 210 can better collect liquid such as dirty liquid squeezed out from the front rolling brush 310 and the rear rolling brush 320.

[0066] Specifically, the liquid collecting portion 210 may be formed of plastic and other materials by integral molding. By connecting the first liquid collecting area 211 and the second liquid collecting area 212 to each other, the process of disassembling and assembling the liquid collecting portion 210 is more convenient. Volumes of the first liquid collecting area 211 and the second liquid collecting area 212 can be determined according to the actual situation. Preferably, the volumes of the first liquid collecting area 211 and the second liquid collecting area 212 can be the same, and the sizes of the portions thereof matching with the front rolling brush 310 and the rear rolling brush 320 can be substantially the same, so that the amount of dirty liquid collected by the first liquid collecting area 211 and the second liquid collecting area 212 is the same or similar. During the operation of the cleaning device, a situation in which one of the first liquid collecting area 211 and the second liquid collecting area 212 has been filled or even overflowed, while the other has not been filled, is prevented.

[0067] In addition, when the liquid collecting portion 210 includes the first liquid collecting area 211 and the second liquid collecting area 212, two top covering portions 270 may be provided, and each top covering portion 270 may be provided with at least two liquid collecting ports 271. Taking the top covering portion 270 matched with the first liquid collecting area 211 as an example, in the two liquid collecting ports 271, one is provided facing the front rolling brush 310, the other is provided facing the rear rolling brush 320, so as to ensure that the liquid squeezed by the front rolling brush 310 and the rear rolling brushes 320 can be collected into the first liquid collecting area 211 through the corresponding liquid collecting ports 271. Correspondingly, the top covering portion 270 corresponding to the second liquid collecting area 212 may also be provided with at least two liquid collecting ports 271, which are respectively provided facing the front rolling brush 310 and the rear rolling brush 320. Similarly, the liquid collecting ports 271 on each top covering portion 270 are all provided in the middle of the top covering portion 270.

[0068] In addition, as shown in FIG. 8, two pushing buttons 216 may be provided, and the two pushing buttons 216 may be respectively provided on the top covering portions 270 corresponding to the first liquid collecting area 211 and the second liquid collecting area 212 to improve the convenience of disassembling each top covering portion 270.

[0069] In order to enable the amount of dirty liquid collected by the first liquid collecting area 211 and the second liquid collecting area 212 to be more balanced, preferably, the first liquid collecting area 211 and the second liquid collecting area 212 can be in communication with each other. In this way, even if more the liquid such as dirty liquid flow into the first collecting area 211 at the same time, since the first liquid collecting area 211 and the second liquid collecting area 212 are in communication with each other, there is no large difference in the amount of the liquid remaining in the first liquid collecting area 211 and the second liquid collecting area 212.

[0070] Specifically, in a direction of gravity, bottoms of the first liquid collecting area 211 and the second liquid collecting area 212 may be in communication with each other, or the first liquid collecting area 211 and the second liquid collecting area 212 may have bottom-up communication structure, so as to increase a flow rate of the dirty liquid between the first liquid collecting area 211 and the second liquid collecting area 212. Optionally, a cavity may be formed in the structure in which the first liquid collecting area 211 and the second liquid collecting area 212 are connected to each other to communicate the first liquid collecting area 211 and the second liquid collecting area 212 through the cavity, which further reduce a number of the structure connected between the first liquid collecting area 211 and the second liquid collecting area 212.

[0071] When the first liquid collecting area 211 and the second liquid collecting area 212 are in communication with each other, the first liquid collecting area 211 and the second liquid collecting area 212 are both provided with a top covering portion 270, and any second flow guiding section 273b is located between the first guiding section 273a and the avoidance notch 215. Optionally, in a direction perpendicular to the circumferential direction of the rolling brush, a size of the second guiding section 273b is less than that of the first guiding section 273a.

[0072] With the above structure, when the cleaning device is inclined, the dirty liquid contained in the first liquid collecting area 211 and the second liquid collecting area 212 will first flow to the lower one. For example, in the

direction of gravity, the first liquid collecting area 211 is lower than the second liquid collecting area 212, the dirty liquid in the second liquid collecting area 212 will first gather in the first liquid collecting area 211, the amount of the dirty liquid in the first liquid collecting area 211 is greater than the amount of dirty liquid in the second liquid collecting area 212. In this way, as shown in FIG. 11, the amount of dirty liquid that can be retained in the first liquid collecting area 211 is related to the size of the first guiding section 273a in the direction A, the amount of dirty liquid that can be retained in the second liquid collecting area 212 is related to the size of the second guiding section 273b in the direction A. Compared with the situation that the size of the first guiding section 273a is less than or equal to the size of the second guiding section 273b, since the size of the first guiding section 273a is greater than the size of the second guiding section 273b, the amount of dirty liquid remaining in the first liquid collecting area 211 and the second liquid collecting area 212 can be relatively large, thereby preventing the dirty liquid from splashing out when the cleaning device is inclined.

[0073] In addition, the volume of the liquid collecting cavity 213 can also be enlarged by protruding the top covering portion 270 in a direction away from the liquid collecting portion 210, which can also solve the problem of splashing dirty liquid when the cleaning device is inclined to a certain extent. Specifically, the distance between the capping wall 272 and the bottom of the liquid collecting portion 210 can be increased, so that the volume of the liquid collecting cavity 213 can be increased.

[0074] During the operation of the cleaning device, since the front rolling brush 310 adsorbs the dirty liquid on the cleaned surface prior to the rear rolling brush 320, at the same time point, the amount of dirty liquid adsorbed by the front rolling brush 310 is usually larger than that of the rear rolling brush 320. Then under the action of a front liquid scraping strip and a rear liquid scraping strip, the amount of dirty liquid squeezed out from the front rolling brush 310 is greater than the amount of dirty liquid squeezed out from the rear rolling brush 320. In order to enable the dirty liquid squeezed out from the front rolling brush 310 can be better collected into the liquid collecting portion 210, preferably, as shown in FIG. 10, the avoidance notch 215 may be provided on a side of the liquid collecting portion 210 adjacent to the rear rolling brush 320.

[0075] In this way, since a side of the liquid collecting portion 210 adjacent to the front rolling brush 310 is not provided with the avoidance notch 215, the dirty liquid squeezed out from the front rolling brush 310 can enter the first liquid collecting area 211 and the second liquid collecting area 212 through a side with a relatively large cross-sectional area, so as to ensure that a large amount of dirty liquid squeezed out from the front rolling brush 310 can be quickly collected into the liquid collecting section 210. At the same time, since the amount of dirty liquid absorbed by the rear rolling brush 320 is relatively small, although the avoidance notch 215 occupies a part of the liquid collecting portion 210, it will not have a great adverse effect on the dirty liquid squeezed out from the rear rolling brush 320 flowing into the first liquid collecting area 211 and the second liquid collecting area 212. Therefore, the liquid collecting portion 210 of this structure can ensure that the dirty liquid squeezed out from the front rolling brush 310 and the rear rolling brush 320 can be collected quickly and thoroughly.

[0076] As aforementioned, both the front rolling brush 310 and the rear rolling brush 320 and the dirty liquid accommodating mechanism 200 can be squeezed against each other, such that the liquid such as dirty liquid adsorbed by the front rolling brush 310 and the rear rolling brush 320 is collected into the dirty liquid accommodating mechanism 200. Of course, other methods may also be used to collect the liquid adsorbed by the front rolling brush 310 and the rear rolling brush 320, such as vacuum suction, etc. For a sake of brevity, it will not be listed herein.

[0077] Further, the dirty liquid accommodating mechanism 200 may further include a liquid scraping strip, and at least one of the front rolling brush 310 and the rear rolling brush 320 may be provided with the liquid scraping strip, so that the speed and thoroughness of the dirty liquid from the rolling brush can be further improved by the liquid scraping strip.

[0078] Optionally, as shown in FIG. 3, a front liquid scraping strip 220 may be provided for the front rolling brush 310, and the front liquid scraping strip 220 is squeezed with the front rolling brush 310, such that the thoroughness of the liquid being squeezed out from the front rolling brush 310 can be improved, and the front rolling brush 310 can absorb more dirty liquid in the subsequent wiping and cleaning process. In addition, as the front rolling brush 310 rotates, liquid such as dirty liquid on the front rolling brush 310 can be squeezed out into the liquid collecting portion 210 immediately, which can prevent the surface to be cleaned that has been wiped by the front rolling brush 310 from being too slippery.

[0079] When the front rolling brush 310 is rotated counterclockwise to enable the cleaning device to have a tendency to move forward, the front liquid scraping strip 220 may be provided on a side of the front rolling brush 310 adjacent to the liquid collecting portion 210. Specifically, the front liquid scraping strip 220 can extend along most of the front rolling brush 310, and part of the front liquid scraping strip 220 is squeezed with the front rolling brush 310, so that after the front rolling brush 310 absorbs the liquid, as the front rolling brush 310 rotates, the front liquid scraping strip 220 squeezes the front rolling brush 310 to squeeze out the liquid absorbed by the front rolling brush 310. Moreover, the liquid squeezed out from the front rolling brush 310 can flow on the surface of the front rolling brush 310, and finally flows into the liquid collecting cavity 213 through the liquid collecting port 271. Optionally, the front liquid scraping strip 220 may be connected to the upper cover 260 through a connecting structure, or the front liquid scraping strip 220 and the upper cover

260 may be integrally formed.

[0080] Further, the liquid collecting portion 210 can be arranged as close to the front liquid scraping strip 220 as possible, so that the liquid squeezed out by the front liquid scraping strip 220 can flow into the liquid collecting portion 210 more quickly and thoroughly, thus preventing liquid such as dirty liquid from sputtering, or flowing out of the cleaning device, or flowing to the surface to be cleaned, after escaping from the front rolling brush 310, which affects the cleaning effect of the surface to be cleaned.

[0081] Further, the liquid collecting portion 210 for collecting dirty liquid can be detachably connected to the housing 100. In this way, when the dirty liquid in the liquid collecting cavity 213 is poured out, the liquid collecting portion 210 only needs to be removed from the housing 100, the liquid collecting portion 210 is cleaned separately, which further improves the convenience of use of the cleaning device. In order to facilitate the removal of the liquid collecting portion 210 from the housing 100, preferably, as shown in FIG. 11, a handing element 217 may be provided on the liquid collecting portion 210, a difficulty of removing the liquid collecting portion 210 can be reduced by the handing element 217.

[0082] Optionally, as shown in FIG. 11, the dirty liquid accommodating mechanism 200 may further include a liquid guiding portion 230. The liquid guiding portion 230 may be connected to the liquid collecting portion 210, and the front liquid scraping strip 220 may be provided with the liquid guiding portion 230. In a process of squeeze between the front liquid scraping strip 220 and the front rolling brush 310, the liquid guiding portion 230 can be configured to provide guidance for the squeezed the liquid such as dirty liquid, which allows the dirty liquid to flow into the liquid collecting cavity 213 more quickly and directly through the liquid collecting port 271. At the same time, in a process from when the liquid such as dirty liquid is squeezed out to flow into the liquid collecting cavity 213, the liquid guiding portion 230 can also prevent the liquid such as dirty liquid from being absorbed into the front rolling brush 310 again, which enables the dirty liquid in the front rolling brush 310 to be squeezed out more thoroughly, so as to further improve the cleaning and drying degree of the cleaned surface after wiping.

[0083] Optionally, a side wall of the liquid collecting portion 210 may extend obliquely to form the liquid guiding portion 230, so as to reduce the difficulty of forming and mounting the liquid guiding portion 230. In addition, the liquid guiding portion 230 cooperates with an upper portion of the front rolling brush 310 adjacent to the liquid collecting portion 210 in the direction of gravity, so that the liquid guiding portion 230 can not only provide a guiding function, but also can be squeezed with the front rolling brush 310 to further squeeze out the dirty liquid adsorbed in the front rolling brush 310.

[0084] Further, after working for a period of time, the amount of liquid such as dirty liquid adsorbed in the rear rolling brush 320 may also be relatively large, the dirty liquid in the rear rolling brush 320 may be difficult to squeeze out only by the way that it squeezes with the side wall of the liquid collecting portion 210. In order to ensure that the dirty liquid adsorbed by the rear rolling brush 320 can be quickly and thoroughly collected into the liquid collecting cavity 213, in the case that both the front rolling brush 310 and the rear rolling brush 320 are provided with the driving mechanism 400, the front rolling brush 310 can be rotated counterclockwise, and the rear rolling brush 320 can be rotated clockwise, so that both the front rolling brush 310 and the rear rolling brush 320 are provided with liquid scraping strips.

[0085] Specifically, as similar to the front liquid scraping strip 220, a position of the rear liquid scraping strip 240 corresponds to a position of the front liquid scraping strip 220, that is, the rear liquid scraping strip 240 may be provided on the rear rolling brush 320 adjacent to the liquid collecting portion 210, and the rear liquid scraping strip 240 can extend along most of the rear rolling brush 320. Part of the rear liquid scraping strip 240 can be squeezed with the rear rolling brush 320, so that the rear liquid scraping strip 240 can be squeezed with the rear rolling brush 320 mutually when the rear rolling brush 310 rotates clockwise after absorbing the liquid, so that the liquid absorbed by the rear rolling brush 320 is squeezed out. The liquid squeezed out from the rear rolling brush 320 can be attached to the rear rolling brush 320, and finally flows into the liquid collecting cavity 213 through the liquid collecting port 271 corresponding to the rear rolling brush 320. In addition, the rear liquid scraping strip 240 may also be provided with the liquid guiding portion 230, so that the dirty liquid squeezed out from the rear liquid scraping strip 240 can also be quickly and thoroughly collected into the liquid collecting cavity 213.

[0086] Optionally, both the front liquid scraping strip 220 and the rear liquid scraping strip 240 may be provided on the upper cover 260. The front liquid scraping strip 220, the rear liquid scraping strip 240 and the upper cover 260 can be integrally formed, and the front liquid scraping strip 220 and the rear liquid scraping strip 240 can be symmetrically arranged, so that when the front rolling brush 310 rotates counterclockwise and the rear rolling brush 320 rotates clockwise, the dirt liquid is squeezed out from the front rolling brush 310 and the rear rolling brush 320 though the front liquid scraping strip 220 and the rear liquid scraping strip 240 respectively.

[0087] In addition, when the front rolling brush 310 and the rear rolling brush 320 rotate in opposite directions, under the driving action of each driving mechanism 400, a direction of the force between the front rolling brush 310 and the surface to be cleaned, such as floor, is opposite to a direction of the force between the rear rolling brush 320 and the surface to be cleaned. When the user moves the cleaning device through the handle 510, the force required for the forward movement and the backward movement is substantially equal, no more force is required for the forward movement (or backward move-

ment). In addition, parameters such as the friction coefficient and contact area of the front rolling brush 310 and the rear rolling brush 320 and a driving force of each driving mechanism 400 can be designed, so that the force between the front rolling brush 310 and the rear rolling brush 320 and the surface to be cleaned can be equal in magnitude and opposite in direction, so that the force used by the user in the process of pushing the cleaning device forward and pulling the cleaning device back is basically the same, so that the use of the cleaning device is more labor-saving and user experience is improved.

[0088] In order to further prevent the splashing of dirty liquid, optionally, a flexible sealing strip may be provided between the upper cover 260 and the liquid collecting portion 210. An airtightness between the upper cover 260 and the liquid collecting portion 210 can be improved by the flexible sealing strip, thus preventing the dirty liquid in the liquid collecting cavity 213 from splashing out from the liquid collecting port 271. Specifically, the flexible sealing strip may be made of materials such as rubber or silicone, a shape thereof may be determined according to the shape of a connection between the upper cover 260 and the liquid collecting portion 210.

[0089] As aforementioned, before or during the cleaning the surface to be cleaned, the cleaning effect of the cleaning device can be improved by spraying clean water. In order to further improve the convenience of the cleaning, preferably, as shown in FIG. 1 and FIG. 2, the cleaning device may further include a liquid spraying mechanism 600. The liquid spraying mechanism 600 may be mounted in the housing 100, and the liquid spraying mechanism 600 may include a liquid supplying portion 610, a switch, and a spraying portion 620. The spraying portion 620 is connected to the liquid supplying portion 610 though the switch, and the spraying portion 620 cooperates with the front rolling brush 310.

[0090] The liquid supplying portion 610 can accommodate a preset volume of clean water. Before cleaning, the user can put clean water or clean water mixed with detergent into the liquid supplying portion 610. The user can turn on the switch when cleaning, the clean water contained in the liquid supplying portion 610 can be sprayed to the front of the front rolling brush 310 through the spraying portion 620. When the front rolling brush 310 moves relative to the surface to be cleaned, under the action of the cleaning water, a contact effect between the front rolling brush 310 and the surface to be cleaned can be improved, and the clean water can have a certain dissolving effect on the stains, so that the cleaning device has a better cleaning effect on the surface to be cleaned.

[0091] Specifically, the liquid supplying portion 610 can be mounted in the housing 100. When the cleaning device is provided with the handle 510, the liquid supplying portion 610 can also be mounted to the handle 510. The spraying portion 620 can also be mounted to the handle 510, which can increase a range that the spraying portion 620 can spray to a certain extent, and ensure that the surface to be cleaned in front of the front rolling brush 310 can be sprayed with a certain amount of cleaning water, so as to improve the cleaning effect of all parts of the surface to be cleaned. In addition, in the process of secondary cleaning or drying of the surface to be cleaned, the switch can be turned off to prevent the clean water from being continuously sprayed on the surface to be cleaned.

[0092] In order to further improve the spraying uniformity and spraying effect of the clean water, preferably, as shown in FIG. 2, the liquid spraying mechanism 600 may further include a pump 630. Parameters such as the power of the pump 630 may be determined according to actual needs. The liquid supplying portion 610 can be connected to the spraying portion 620 through the pump 630, and the opening and closing of the pump 630 can be controlled by the switch, so that under the action of the pump 630, a spraying range of the clean water is increased. Under the action of the pump 630, the cleaning water has a large initial kinetic energy, and then the cleaning water can be used to produce a pre-cleaning effect on the stains on the surface to be cleaned, so as to further improve the cleaning ability of the cleaning device.

[0093] The above embodiments of the present invention mainly describe the differences between the various embodiments. As long as the different optimized features among the various embodiments are not contradictory, they can be combined to form a better embodiment. For a sake of brevity, it will not be repeated herein.

[0094] The above-mentioned embodiments do not constitute a limitation on the protection scope of the technical solution. Any modifications, equivalent replacements and improvements made within the spirit and principles of the above-mentioned embodiments shall be included within the protection scope of this technical solution.

Claims

1. A cleaning device comprising:

a housing (100);
a dirty liquid accommodating mechanism (200) mounted in the housing (100);
a plurality of rolling brushes mounted in the housing (100), the rolling brush comprising a cleaning portion (330) and a mounting portion (340), the cleaning portion (330) surrounding an outer periphery of the mounting portion (340), each of the cleaning portions (330) cooperating with the dirty liquid accommodating mechanism (200); and
a driving mechanism (400) connected to at least one of the mounting portions (340) to drive each of the mounting portions (340) to rotate;
wherein the plurality of the rolling brushes comprises a front rolling brush (310) and a rear rolling brush (320), in a moving direction of the rolling

brushes, the front rolling brush (310) is located in front of the rear rolling brush (320), and at least a part of a projection of the front rolling brush (310) is located within a projection of the rear rolling brush (320).

2. The cleaning device according to claim 1, wherein the mounting portion (340) has an inner cavity (341), the driving mechanism (400) is mounted in the inner cavity (341).

3. The cleaning device according to claim 2, wherein the driving mechanism (400) comprises a motor (410), a driving button (420), and a bearing (430), the driving button (420) is connected to a middle portion of the mounting portion (340) along an axial direction thereof, the motor (410) comprises a casing (411) and a driving shaft (412), the casing (411) is fixed to the housing (100), the casing (411) is connected to the mounting portion (340) through the bearing (430), and the driving shaft (412) is connected to the driving button (420).

4. The cleaning device according to claim 2, wherein the driving mechanism (400) comprises a stator and a rotor, the stator is connected to the housing (100), and the rotor is connected to the mounting portion (340).

5. The cleaning device according to claim 1, wherein a plurality of the driving mechanisms (400) are provided, and the plurality of the driving mechanisms (400) are connected to the plurality of the mounting portions (340) in one-to-one correspondence.

6. The cleaning device according to claim 5, wherein a linear velocity of the front rolling brush (310) is greater than a linear velocity of the rear rolling brush (320), or a linear velocity of the rear rolling brush (320) is greater than a linear velocity of the front rolling brush (310).

7. The cleaning device according to claim 1, wherein two rolling brushes are provided, which are the front rolling brush (310) and the rear rolling brush (320), respectively, in the moving direction of the rolling brush, the projection of the front rolling brush (310) coincides with the projection of the rear rolling brush (320).

8. The cleaning device according to claim 7, wherein a preset interval is provided between the front rolling brush (310) and the rear rolling brush (320), and one dirty liquid accommodating mechanism (200) is provided, the dirty liquid accommodating mechanism (200) is located between the front rolling brush (310) and the rear rolling brush (320).

9. The cleaning device according to claim 8, wherein the dirty liquid accommodating mechanism (200) comprises a liquid collecting portion (210) and a front liquid scraping strip (220), the liquid collecting portion (210) is located between the front rolling brush (310) and the rear rolling brush (320), the liquid collecting portion (210) has a liquid collecting cavity (213), the liquid collecting cavity (213) is provided with a liquid collecting port (271), the front liquid scraping strip (220) is squeezed with the front rolling brush (310) to squeeze out liquid in the front rolling brush (310) to the liquid collecting cavity (213).

10. The cleaning device according to claim 9, wherein the dirty liquid accommodating mechanism (200) further comprises a liquid guiding portion (230) connected to a side of the liquid collecting portion (210) adjacent to the front liquid scraping strip (220).

11. The cleaning device according to claim 10, wherein a side wall of the liquid collecting portion (210) extends obliquely to form the liquid guiding portion (230), the liquid guiding portion (230) cooperates with an upper portion of a side of the front rolling brush (310) adjacent to the liquid collecting portion (210) in a direction of gravity.

12. The cleaning device according to claim 9, wherein the dirty liquid accommodating mechanism (200) further comprises a rear liquid scraping strip (240), the rear liquid scraping strip (240) is squeezed with the rear rolling brush (320) to squeeze out liquid in the rear rolling brush (320) to the liquid collecting cavity (213).

13. The cleaning device according to claim 9, further comprising a handle (510) mounted in the housing (100).

14. The cleaning device according to claim 13, wherein the liquid collecting portion (210) is detachably connected to the housing (100), the liquid collecting portion (210) is provided with an avoidance notch (215), a part of the handle (510) is located in the avoidance notch (215), the liquid collecting portion (210) comprises a first liquid collecting area (211) and a second liquid collecting area (212) that are located on opposite sides of the avoidance notch (215), respectively, both the first liquid collecting area (211) and the second liquid collecting area (212) cooperate with the front rolling brush (310) and the rear rolling brush (320).

15. The cleaning device according to claim 14, wherein the avoidance notch (215) is provided on a side of the liquid collecting portion (210) adjacent to the rear rolling brush (320).

16. The cleaning apparatus according to claim 14, wherein the first liquid collecting area (211) is in communication with the second liquid collecting area (212).

17. The cleaning device according to claim 10, wherein the dirty liquid accommodating mechanism (200) further comprises an upper cover (260) covering the liquid collecting portion (210).

18. The cleaning device according to claim 17, wherein the dirty liquid accommodating mechanism (200) further comprises a splash-proof flange (250), the splash-proof flange (250) is connected to a side of the upper cover (260) facing the liquid collecting portion (210), and the splash-proof flange (250) is provided facing the liquid collecting port (271).

19. The cleaning device according to claim 1, further comprises a liquid spraying mechanism (600) mounted in the housing (100), the liquid spraying mechanism (600) comprises a liquid supplying portion (610), a switch, and a spraying portion (620), the spraying portion (620) is connected to the liquid supplying portion (610) through the switch, the spraying portion (620) cooperates with the front rolling brush (310).

20. The cleaning device according to claim 19, wherein the liquid spraying mechanism (600) further comprises a pump (630), the liquid supplying portion (610) is connected to the spraying portion (620) through the pump (630), the switch is configured to turn on or off the pump (630).

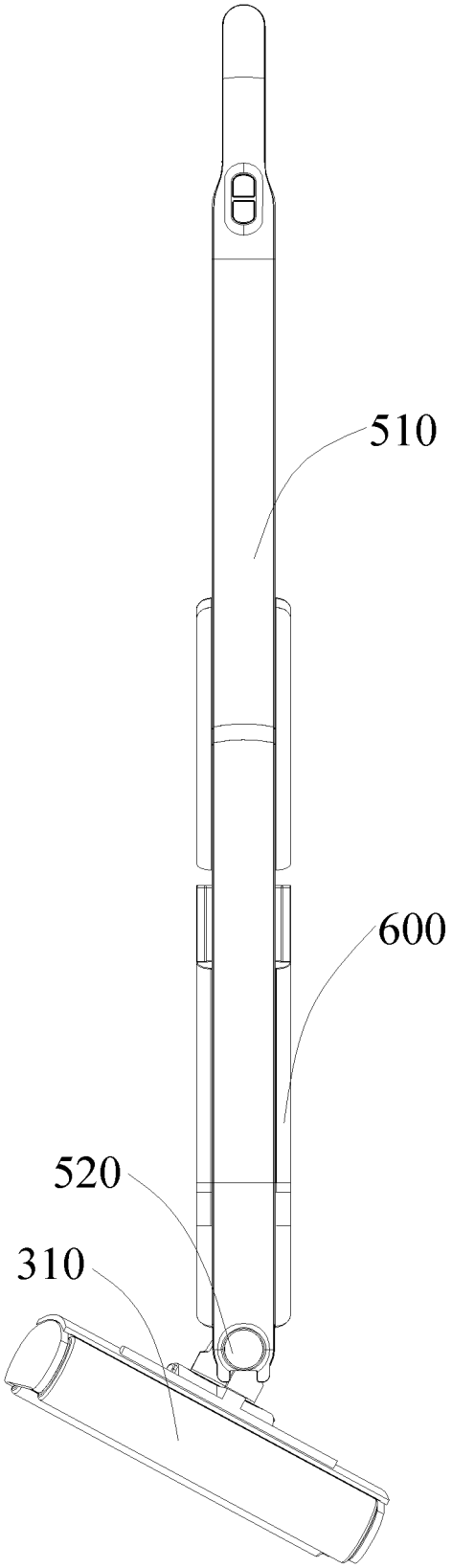

FIG. 1

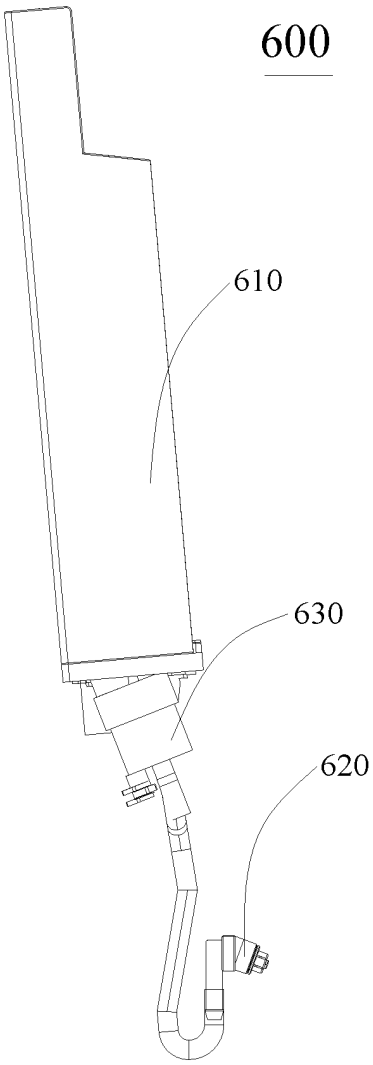

FIG. 2

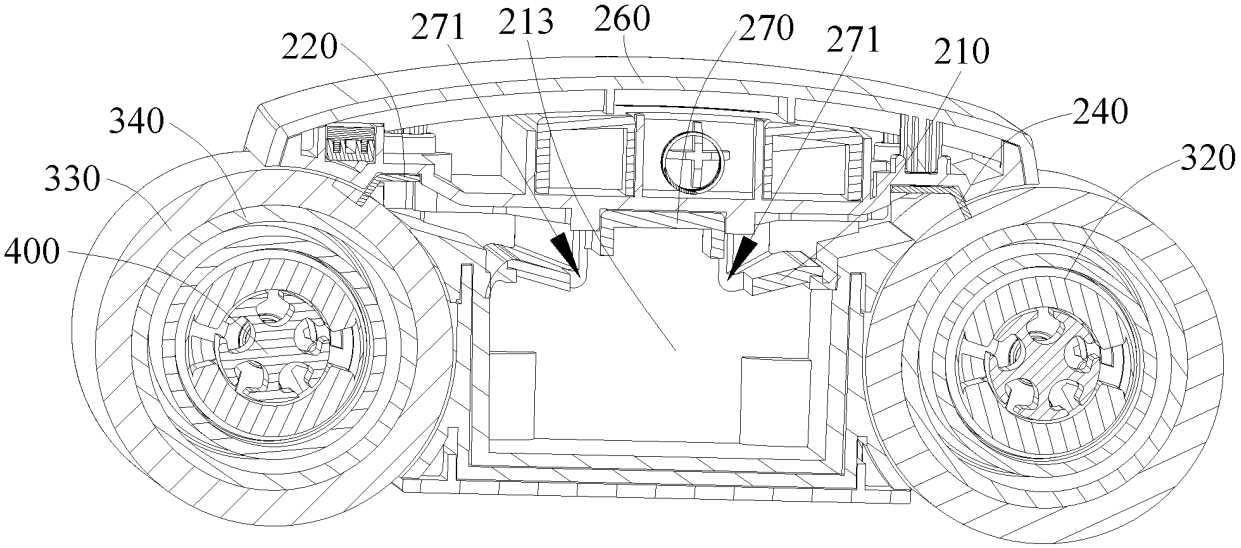

FIG. 3

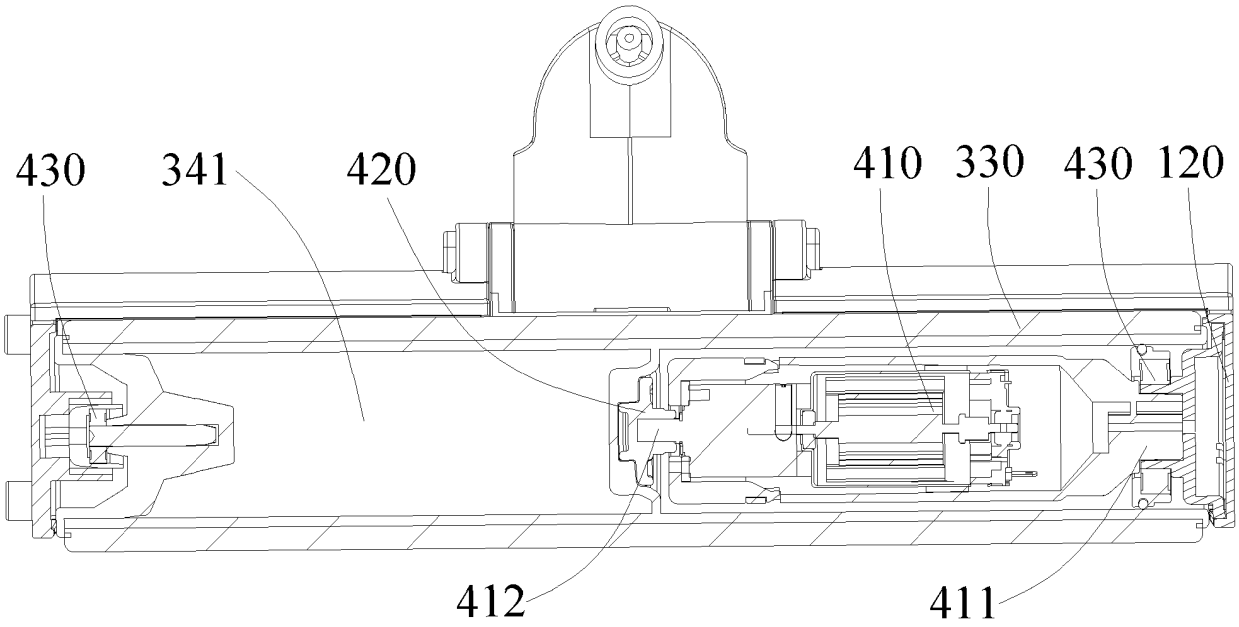

FIG. 4

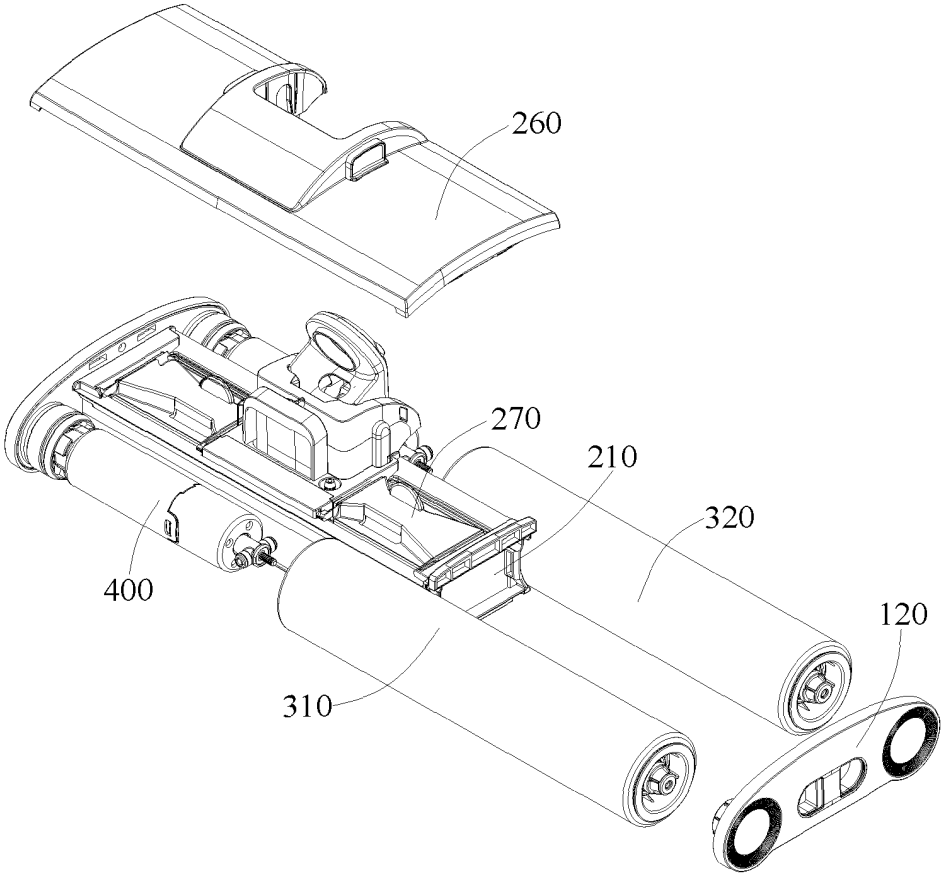

FIG. 5

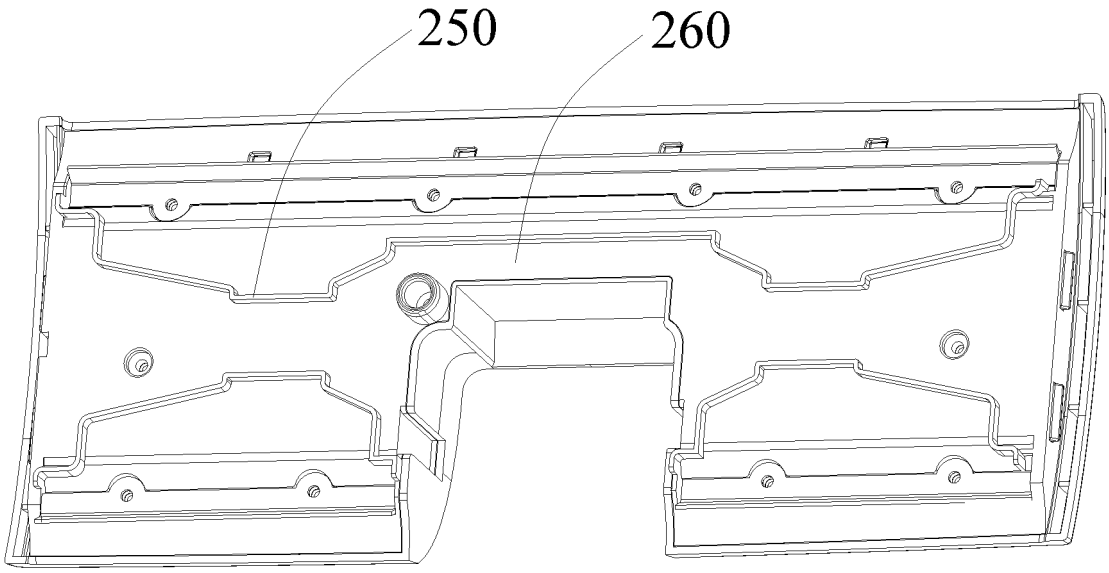

FIG. 6

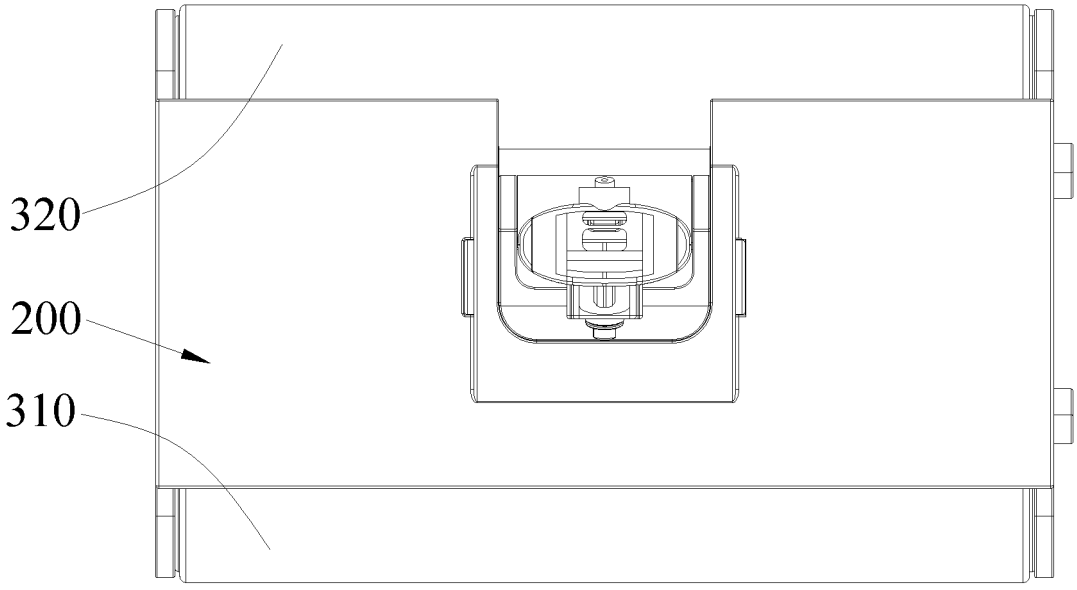

FIG. 7

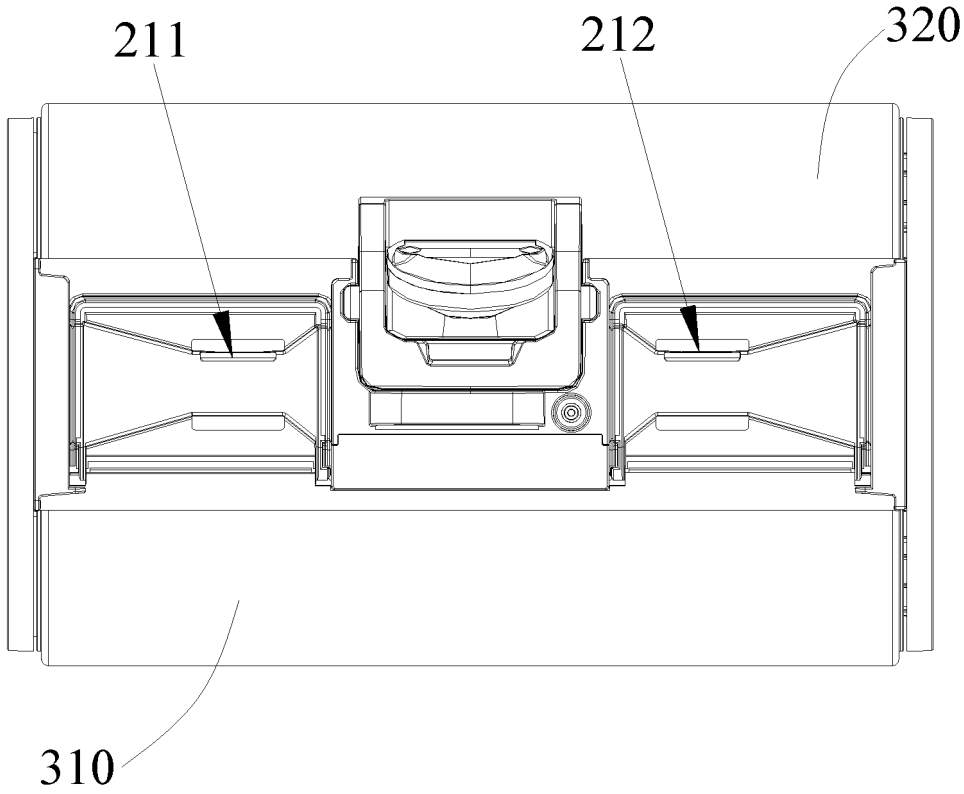

FIG. 8

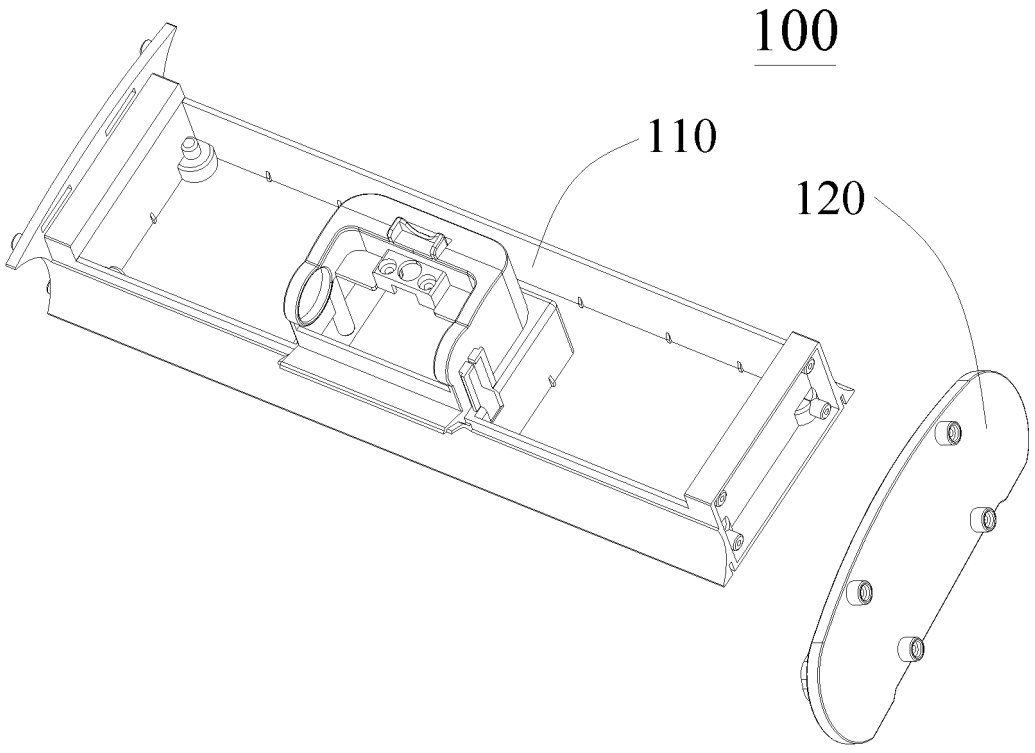

FIG. 9

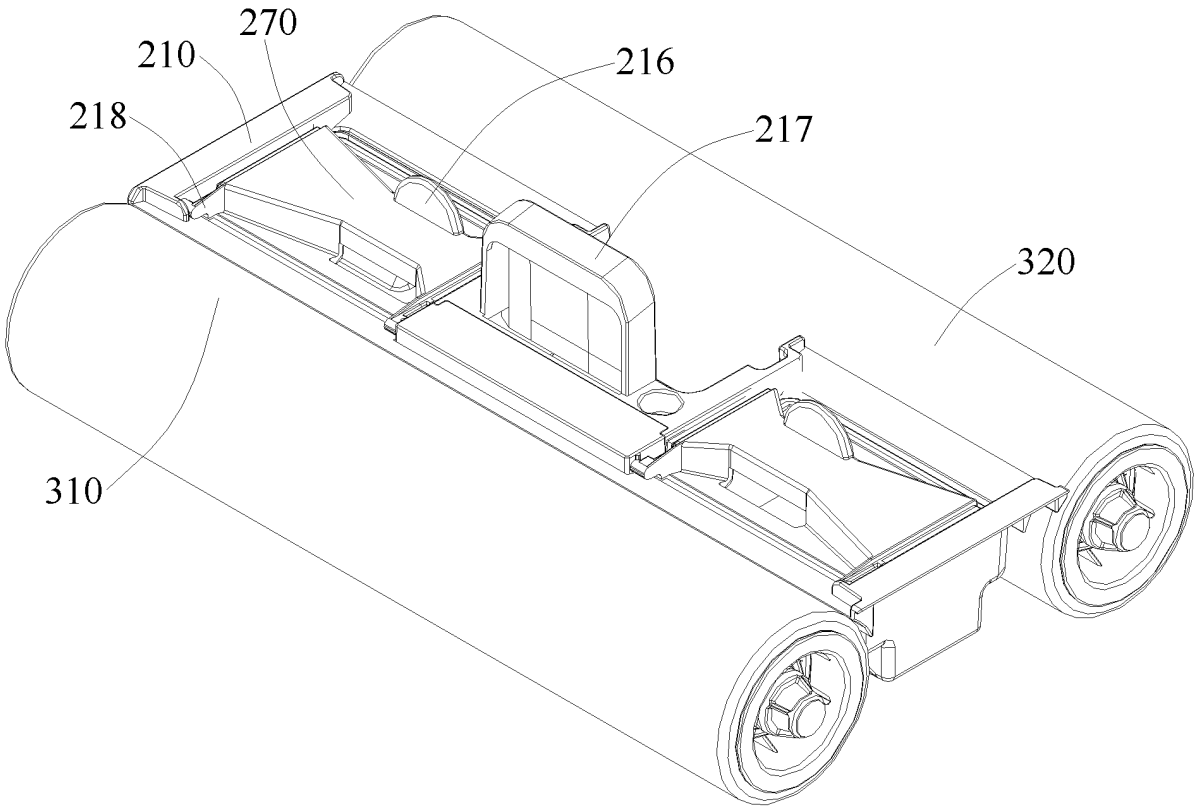
270
210
216
218
217
320
310

FIG. 10

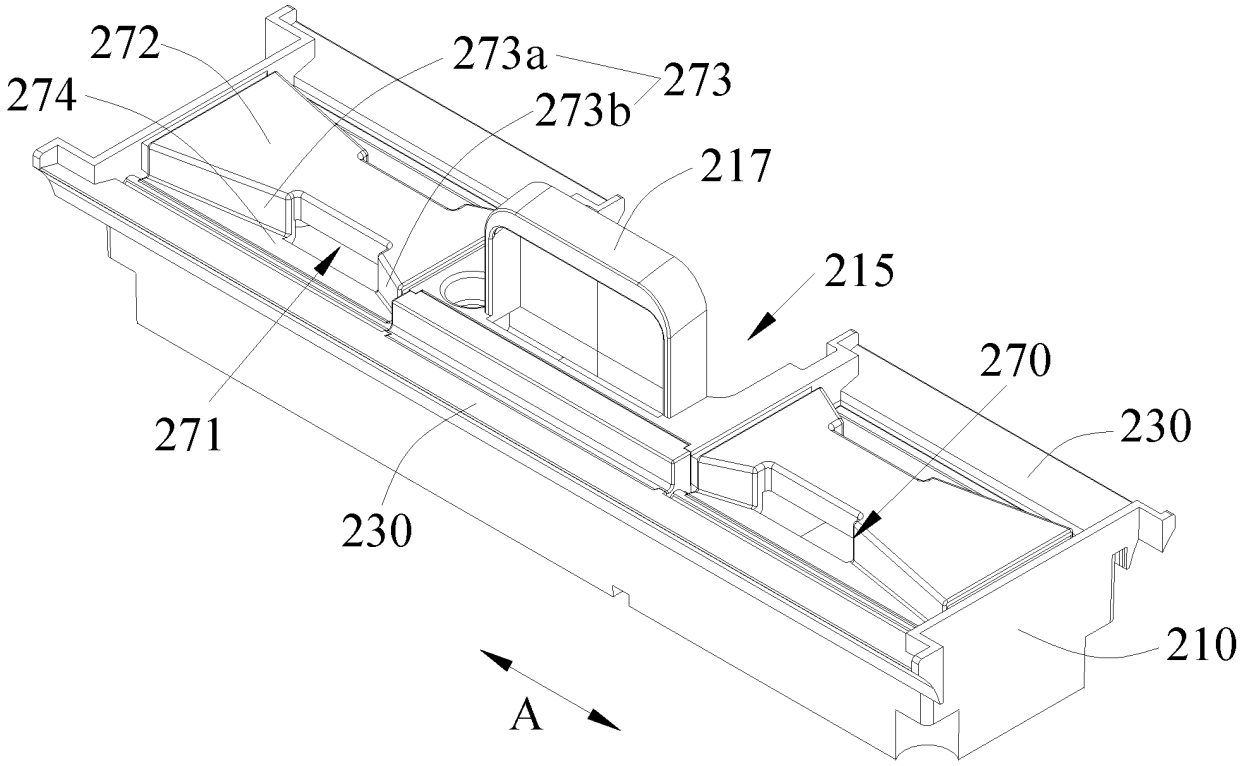
272
273a
273
274
273b
217
215
270
271
230
230
210
A

FIG. 11

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2020/138237

A. CLASSIFICATION OF SUBJECT MATTER

A47L 11/292(2006.01)i; A47L 11/282(2006.01)i; A47L 11/40(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A47L

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

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

VEN; CNABS; CNTXT: 清洁, 滚刷, 辊, 污水, 脏水, 污液, 脏液, 积液, 积水, 二次, 滑, 前滚刷, 后滚刷, 电机, 驱动, 刮, 导, clean+, roll+, brush, front, rear, dirty, water, liquid, fluid, sewage, driv+, motor, slid+, dry, wiper

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 208851399 U (NINGBO FUJIA INDUSTRIAL CO., LTD.) 14 May 2019 (2019-05-14) description, paragraphs [0004]-[0024], figure 1	1, 5-8, 19-20
Y	CN 208851399 U (NINGBO FUJIA INDUSTRIAL CO., LTD.) 14 May 2019 (2019-05-14) description, paragraphs [0004]-[0024], figure 1	2-4, 9-18
X	CN 109044210 A (NINGBO FUJIA INDUSTRIAL CO., LTD.) 21 December 2018 (2018-12-21) description, paragraphs [0021]-[0023], and figures 1-3	1, 5-8
Y	CN 109044210 A (NINGBO FUJIA INDUSTRIAL CO., LTD.) 21 December 2018 (2018-12-21) description, paragraphs [0021]-[0023], and figures 1-3	2-4, 9-18
Y	CN 110352029 A (ALFRED KAERCHER SE & CO. KG) 18 October 2019 (2019-10-18) description, paragraphs [0003]-[0120], and figures 1-8	2-4, 9-18
X	CN 208958009 U (NINGBO FUJIA INDUSTRIAL CO., LTD.) 11 June 2019 (2019-06-11) description paragraph [0013], figure 1	1, 5, 7-8
X	CN 209932608 U (RAO, Zhangkui) 14 January 2020 (2020-01-14) description paragraphs [0020]-[0021], figures 1, 4-5	1, 5, 7-8

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

* Special categories of cited documents:
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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
04 March 2021	**12 March 2021**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088** **China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2020/138237

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	CN 102512120 A (LIN, Zhiyong) 27 June 2012 (2012-06-27) entire document	1-20
A	CN 208910073 U (SUZHOU CHENGHE CLEANING EQUIPMENT CO., LTD.) 31 May 2019 (2019-05-31) entire document	1-20
A	CN 208876407 U (NINGBO FUJIA INDUSTRIAL CO., LTD.) 21 May 2019 (2019-05-21) entire document	1-20
A	WO 2019213970 A1 (HIZERO TECHNOLOGIES CO., LTD.) 14 November 2019 (2019-11-14) entire document	1-20
A	FR 2952293 B1 (ARODI J L) 18 November 2011 (2011-11-18) entire document	1-20

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2020/138237

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CN	208851399	U	14 May 2019	None			
CN	109044210	A	21 December 2018	None			
CN	110352029	A	18 October 2019	WO	2018162091	A1	13 September 2018
				WO	2018162092	A1	13 September 2018
				EP	3592193	A1	15 January 2020
				DE	112017007192	A5	21 November 2019
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CN	209932608	U	14 January 2020	None			
CN	108882821	A	23 November 2018	EP	3426123	A1	16 January 2019
				WO	2017152970	A1	14 September 2017
				EP	3426121	A1	16 January 2019
				WO	2017153450	A1	14 September 2017
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CN	102512120	A	27 June 2012	CN	102512120	B	25 December 2013
CN	208910073	U	31 May 2019	None			
CN	208876407	U	21 May 2019	None			
WO	2019213970	A1	14 November 2019	CN	110691541	A	14 January 2020
				US	10765287	B2	08 September 2020
				US	2019343362	A1	14 November 2019
				JP	2019195610	A	14 November 2019
				EP	3566629		13 November 2019
				GB	2573587	A	13 November 2019
FR	2952293	B1	18 November 2011	FR	2952293	A1	13 May 2011

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