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(54) **DRUM DEVICE AND CLEANING APPARATUS**

(57) Provided are a roller device (100) and a cleaning apparatus (200). The roller device (100) includes a main support (1) having a roller groove (10) and a roller assembly (2) including a roller (21), a locking component (22), and an ejection component (23). The locking component (22) is connected to the roller (21), and has a first position where the locking component (22) is locked to the main support (1) and a second position where the locking component (22) is released from the main support (1). The ejection component (23) is disposed at the main support (1) or the roller assembly (2) and configured to provide a force for the roller (21) to move out of the roller groove (10). In the cleaning apparatus (200) having the roller device (100), the roller device (100) is simply and conveniently removed and mounted in a labor-saving manner, and the roller (21) is locked more reliably, which can effectively avoid sliding-out of the roller (21) in non-use. Therefore, user experience is satisfactory.

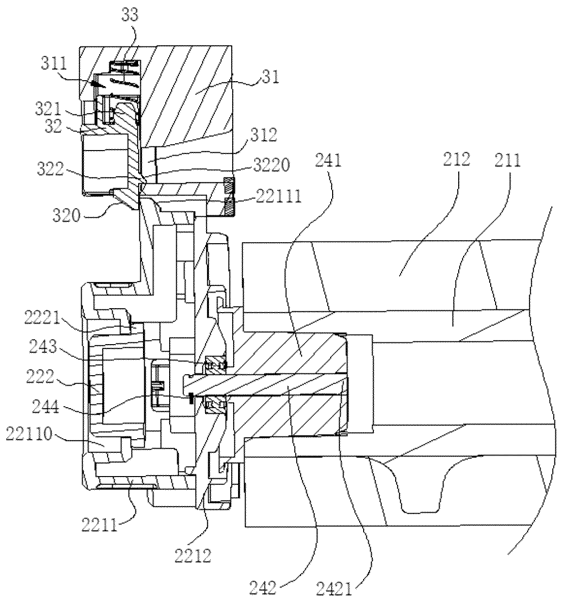

FIG. 10

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Description

[0001] This application claims priority to Chinese patent application 202111620476.1, filed with China National Intellectual Property Administration on December 27, 2021, and titled "ROLLER DEVICE AND CLEANING APPARATUS," the entire contents of which are incorporated herein by reference.

FIELD

[0002] The present disclosure relates to the field of cleaning apparatus, and more particularly, to a roller device and a cleaning apparatus.

BACKGROUND

[0003] The statements herein provide only background information in relation to the present disclosure and do not necessarily constitute the related art.

[0004] A floor washing machine generally collects, from floor surface, dust, leaves, garbage, etc. to a center position below the floor washing machine using a cleaning device, sucks the dust, the leaves, and the garbage into a dust box using a suction device, and cleans the floor surface using a roller device at a rear side of the floor washing machine. Therefore, the roller device needs to be taken out regularly for cleaning, drying, or replacement to ensure a good cleaning effect.

[0005] Commonly used floor washing machines usually have large volume and weight. Therefore, the roller device is required to be easily disassemble and assemble. At present, quick disassembly of the roller is implemented by means of magnetic attachment, knob, buckle, or the like. However, the magnetic attachment is not reliable, especially in commercial environments, the roller is likely to fall off the floor washing machine. The knob approach has problems of inconvenient disassembly, assembly, and grasping. The buckle approach has problems of improper mounting and a relatively short service life. Therefore, the roller device in the current floor washing machine still has the problems of inconvenient disassembly and assembly, and unreliable fixing.

SUMMARY

[0006] Embodiments of the present disclosure is to provide a roller device and a cleaning apparatus, aiming at solving the problems of inconvenient disassembly and assembly and unreliable fixing methods of a roller device of a floor scrubber in the related art.

[0007] According to embodiments of the present disclosure, there is provided a roller device. The roller device comprises a main support and a roller assembly. The main support has a roller groove. The roller assembly comprises a roller, a locking component, and an ejection component. The locking component is connected to the roller, and has a first position where the locking component is locked to the main support and a second position where the locking component is released from the main support. The ejection component is disposed at the main support or the roller assembly, and providing a force for the roller to move out of the roller groove.

[0008] In an embodiment, the locking assembly comprises a locking support, a button, and a swing arm jaw. The locking support is axially connected to the roller. The button is disposed at the locking support, and the button is movable in an axial direction of the roller. The swing arm jaw is rotatably disposed at the locking support. The button moves towards the roller to push the swing arm jaw to rotate, and the swing arm jaw is separated from the main support after rotating.

[0009] In an embodiment, the locking support comprises a first support portion and a second support portion. The first support portion has a button hole. The second support portion is disposed between the first support portion and the roller in the axial direction of the roller. The button is partially flared to form a flange, and the flange has an outer diameter greater than an outer diameter of the button hole. An end of the button located at an outer side of the flange is disposed in the button hole. The flange abuts against the swing arm jaw at a side of the flange away from the button hole.

[0010] In an embodiment, the swing arm jaw member comprises a swing arm body and a first resilient member. The swing arm body is formed with a first swing arm and a second swing arm. The first swing arm abuts against the button, and the second swing arm abuts against a side surface of the main support facing towards the roller to be locked to the locking support. The first resilient member is disposed between the swing arm body and the locking support. The first resilient member provides the swing arm body with a restoring force.

[0011] In an embodiment, the swing arm jaw further comprises a first connection shaft and a first stopper. A first through hole is formed at the swing arm body, the first connection shaft is disposed in the first through hole, and the connection shaft traverses the locking support and is connected to the first stopper, or a shaft body is formed at the swing arm body, and the shaft body is rotatably disposed in a through hole at the locking support.

[0012] In an embodiment, the ejection component comprises a second resilient member and a cap. The cap is slidably connected to the locking component or the main support in an axial direction of the roller, and the second resilient member is resiliently compressed in the cap.

[0013] In an embodiment, the locking component has an engagement groove. The engagement groove is formed at a side of the locking component facing towards the roller or at a side of the main support facing towards the locking component, and an inner wall of the engagement groove is flared to form a stepped surface. An end portion of the cap is formed as an overturned portion, and the overturned portion is slidable in the engagement groove and abutting against the stepped surface.

[0014] In an embodiment, an end of the cap facing towards the locking component comprises claws arranged at intervals in a circumferential direction of the cap, and an end portion of each of the claws is formed as the overturned portion.

[0015] In an embodiment, the roller device further comprises an anti-false triggering assembly disposed at the main support. The anti-false triggering assembly has a third position and a fourth position. The roller assembly is prevented from sliding outwards from the roller groove when the anti-false triggering assembly is located in the third position, and the roller assembly is released when the anti-false triggering assembly is located in the fourth position.

[0016] In an embodiment, the anti-false triggering assembly comprises an anti-false triggering support, a toggle block, and a third resilient member. The anti-false triggering support is fixed to the main support. The toggle block is slidably disposed at the anti-false triggering support. The third resilient member is disposed between the anti-false triggering support and the toggle block to provide a force for the toggle block to move towards the roller assembly.

[0017] In an embodiment, the anti-false triggering support has an opening adapted to the roller and is fixed to a side of the main support close to the locking component.

[0018] In an embodiment, the toggle block has a first guide surface, and the first guide surface is inclined gradually towards the roller from outward to inward. The locking component has a second guide surface, and the second guide surface is inclined gradually away from the toggle block from outward to inward. The first guide surface and the second guide surface slidably abutting against each other.

[0019] In an embodiment, the toggle block is formed with a mounting engagement portion. The mounting engagement portion has a mounting engagement surface, the mounting engagement surface is inclined gradually towards the roller in a direction from the mounting engagement portion to the anti-false triggering support, and the anti-false triggering support having a mounting groove for accommodating the mounting engagement surface; or the anti-false triggering support is formed with a mounting engagement portion, the mounting engagement portion has a mounting engagement surface, the mounting engagement surface is inclined gradually away from the roller in a direction from the mounting engagement portion to the anti-false triggering support, and the toggle block has a mounting groove for accommodating the mounting engagement surface.

[0020] In an embodiment, the roller device further comprises a connection assembly. The connection assembly comprises a bearing, a first end cap, and a second connection shaft. The first end cap is fixedly connected to a side of the roller facing towards the locking component. The second connection shaft traverses the first end cap and the bearing and is connected to the locking component. The bearing is disposed between the second connection shaft and the locking component.

[0021] In an embodiment, the roller device further comprises a drive assembly fixedly disposed at the main support and located at a side of the roller away from the locking component. The drive assembly drives the roller to rotate and be disconnected from the roller when the roller slides outwardly.

[0022] According to some embodiments of the present disclosure, there is provided a cleaning apparatus. The cleaning apparatus comprises a body housing and the roller device according to the above embodiments. The main support is fixedly disposed at the body housing.

[0023] The roller device and the cleaning apparatus according to the embodiments of the present disclosure can provide the following advantageous effects. In the roller device according to the embodiments of the present disclosure, the roller assembly comprises the locking component and the ejection component. The locking component is connected to the roller, and has a first position where the locking component is locked to the main support and a second position where the locking component is released from the main support. The ejection component is disposed at the main support or the roller assembly, and providing a force for the roller to move out of the roller groove. Therefore, when the locking component is moved to the second position by a user, the roller can automatically slide out of the roller groove by means of the ejection component. When the roller is pushed into the roller groove by the user, the roller can be held in the roller groove by moving the locking component to the first position. In this way, the roller device can be simply and conveniently removed and mounted in a labor-saving manner. In addition, the roller can be locked more reliably, effectively avoiding sliding-out of the roller in non-use. Therefore, user experience can be enhanced. For the cleaning apparatus having the roller device, the roller device can be simply and conveniently removed and mounted in a labor-saving manner. In addition, the roller can be locked more reliably, which effectively avoids the sliding-out of the roller in non-use. Therefore, user experience is satisfactory.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] To more clearly explain the embodiments of the present disclosure, the following below is a brief description of the accompanying drawings that need to be used in the embodiments or the exemplary description. The accompanying drawings in the following description are only some embodiments of the present disclosure.

FIG. 1 is a side view of a cleaning apparatus according to an embodiment of the present disclosure.

FIG. 2 is a schematic structural view of a roller device according to an embodiment of the present disclosure.

FIG. 3 is a schematic partial exploded view of the roller device illustrated in FIG. 2.

FIG. 4 is a schematic exploded view of a roller assembly in the roller device illustrated in FIG. 2.

FIG. 5 is a schematic exploded view of an anti-false triggering assembly of the roller assembly in the roller device illustrated in FIG. 2 in a direction.

FIG. 6 is a schematic exploded view of the anti-false triggering assembly of the roller assembly in the roller device illustrated in FIG. 2 in another direction.

FIG. 7 is a schematic exploded view of a drive assembly of the roller assembly of the roller device illustrated in FIG. 2.

FIG. 8 is a schematic structural view of a locking component of the roller assembly of the roller device illustrated in FIG. 2.

FIG. 9 is a schematic structural exploded view of the roller assembly of the roller device illustrated in FIG. 2.

FIG. 10 is a partial sectional view of the roller assembly of the roller device illustrated in FIG. 2.

FIG. 11 is another partial sectional view of the roller assembly of the roller device illustrated in FIG. 2.

FIG. 12 is a cross-sectional view of an ejection assembly in the roller device illustrated in FIG. 2.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0025] Embodiments of the present disclosure more clear, the present disclosure is further described in detail in conjunction with the accompanying drawings and embodiments below. It should be understood that specific embodiments described herein are intended to explain the present disclosure only, rather than to limit the present disclosure.

[0026] It should be noted that when a component is described as being "fixed to" or "arranged at" another component, it may be directly fixed to or arranged at the other component or indirectly fixed to or arranged at the other component. When a component is described as being "connected to" another component, it may be directly or indirectly connected to the other component. The orientation or the position indicated by terms such as "over," "below," "left," "right," should be construed to refer to the orientation or the position as shown in the drawings, and is only for the convenience of describing the present disclosure, rather than indicating or implying that the pointed device or element must have a specific orientation, or be constructed and operated in a specific orientation, and therefore cannot be understood as a limitation of the present disclosure. The terms "first" and "second" are only used for the convenience of descriptive purposes, and cannot be understood as indicating or implying relative importance or implicitly indicating the number of features. "Plurality" means two or more, unless otherwise specifically defined.

[0027] Embodiments of the present disclosure, detailed descriptions will be set forth in conjunction with specific accompanying drawings and embodiments.

[0028] As illustrated in FIG. 1 and FIG. 2, a roller device 100 applied to a cleaning apparatus 200 is provided according to an embodiment of the present disclosure. The roller device 100 is configured to clean (sweeping, washing, etc.) a floor during movement of the cleaning apparatus 200.

[0029] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 2 and FIG. 3, the roller device 100 may comprise a main support 1 and a roller assembly 2. The main support 1 is configured to be fixedly mounted at a body housing 2001 of the cleaning apparatus 200 (as illustrated in FIG. 1) for example. The main support 1 internally has a roller groove 10. As illustrated in FIG. 4 and FIG. 9, the roller assembly 2 comprises a roller 21, a locking component 22, and an ejection component 23. The locking component 22 is connected to the roller 21. The locking component 22 has a first position and a second position. When the locking component 22 is located at the first position, the locking component 22 is locked to the main support 1. In this case, the locking component 22 is kept stationary relative to the main support 1, the roller 21 is also kept axially stationary relative to the main support 1, and the roller 21 is located in the roller groove 10 and cannot move out of the roller groove 10. When the locking component 22 is located at the second position, the locking component 22 is unlocked from the main support 1 to be released from the main support 1. In this case, the locking assembly 22 and the roller 21 can slide axially relative to the main support 1 to allow the roller 21 to slide out of the roller groove 10. The ejection component 23 is configured to provide a force for the roller 21 to slide out of the roller groove 10. That is, when the locking component 22 is located at the second position, the force provided by the ejection component 23 can cause the roller 21 and the locking component 22 to automatically move outwards, realizing disassembly of the roller assembly 2 from the main support 1.

[0030] Before the roller 21 slides out of the roller groove 10, the locking component 22 may be always kept at the second position manually by a user, and the ejection component 23 may provide an outward force for the roller 21. After the roller 21 slides outwards by a predetermined distance, a predetermined distance is generated between the locking component 22 and the main support 1. In this case, the locking component 22 and the main support 1 cannot be locked to each other. After the roller 21 completes a tasks such as cleaning, drying, or replacement, the roller 21 can be pushed into the roller groove 10 by the user. During the pushing, after the roller 21 is pushed into place, the locking component 22 is locked to the main support 1. In this case, the locking component 22 exerts an inward force on the ejection component 23.

[0031] In the roller device 100 according to the embodiment of the present disclosure, the roller assembly 2 comprises the roller 21, the locking component 22, and the ejection component 23. The locking component 22 has the first position where the locking component 22 is

locked to the main support 1 and the second position where the locking component 22 is released from the main support 1. The ejection component 23 can provide the force for the roller 21 to slide out of the roller groove 10. Therefore, when the locking component 22 is moved to the second position by the user, the roller 21 can automatically move out of the roller groove 10 by means of the ejection component 23. When the roller 21 is pushed into the roller groove 10 by the user, the roller 21 can be kept in the roller groove 10 by moving the locking component 22 to the first position. As a result, the roller device 100 can be removed and mounted simply and conveniently in a labor-saving manner. In addition, the roller 21 can be locked more reliably, which effectively avoids the sliding-out of the roller 21 in non-use. Therefore, user experience is satisfactory.

[0032] It should be noted that both "inward" and "outward" used in the above description are based on a space of the roller groove 10. That is, "inward" refers to an interior of the roller groove 10, and "outward" refers to an exterior of the roller groove 10.

[0033] In addition, it should be also noted that the roller 21 has a central axis. The roller 21 needs to rotate around its central axis during use. In the following description, unless otherwise specified, "axial," "radial," and "circumferential" should be construed to refer to an axial direction, a radial direction, and a circumferential direction of the roller 21. That is, the axial direction is a direction parallel to the central axis of the roller 21, the circumferential direction is a direction of a circumference surrounding the central axis of the roller 21, and the radial direction is a radial direction of a circle centered at any point at the central axis of the roller 21 perpendicular to the central axis of the roller 21 and.

[0034] As illustrated in FIG. 3, the roller groove 10 in the main support 1 is adapted to a shape of the roller 21. In addition, the main support 1 has two openings in communication with the roller groove 10. One of the two openings is formed at an axial end (an outer end) of the main support 1, and the opening is in communication with the axial end (the outer end) of the roller groove 10 to allow the roller 21 to slide out or be pushed in the roller groove 10. Another one of the two openings is formed at a side wall of the main support 1 and extends in an axial direction of the main support 1, to allow the roller 21 to be in contact with the ground during operation of the cleaning apparatus 200 to clean the ground.

[0035] It should also be noted that the main support 1 is configured to carry the roller 21, the locking component 22, the ejection assembly 23, and the like. The main support 1 may be a separate component from the body housing 2001, or may be assembled with the body housing 2001. When it is required to mount the roller device 100, such an amounting of the roller device 100 may be implemented by connecting and fixing the main support 1 to the body housing 2001. In another embodiment, the main support 1 may be a part of the body housing 2001. For example, the main support 1 may be integrally formed with at least part of the body housing 2001. When it is required to mount the roller device 100, the roller 21, the locking component 22, the ejection component 23, or the like are assembled to the main support 1 of the body housing 2001. In an example, a form of the main support 1 may be designed based on product requirements, and the present disclosure is not limited in this regard.

[0036] As illustrated in FIG. 8 and FIG. 9, in an embodiment, the locking component 22 comprises a locking support 221, a button 222, and a swing arm jaw 223. The button 222 is disposed at the locking support 221, and is movable in an axial direction of the roller 21. The swing arm jaw 223 is rotatably disposed at the locking support 221, and a central axis of the rotation of the swing arm jaw 223 is perpendicular to the axial direction of the roller 21. The button 222 can move towards (move inwardly) the roller 21 to push the swing arm jaw 223 to rotate, and the swing arm jaw 223 is separated from the main support 1, that is, to reach the second position. The ejection component 23 is disposed between the locking support 221 and the main support 1, and is configured to provide an outward pushing force for the locking support 221.

[0037] That is, when the button 222 is pressed by the user inwardly, the swing arm jaw 223 can be unlocked from the main support 1. Then, the ejection component 23 pushes the locking support 221 outwards. As long as the locking support 221 moves outwards by a predetermined distance, a predetermined distance can be generated between the swing arm jaw 223 and the main support 1. In this case, even if the swing arm jaw 223 rotates reversely and returns to the first position, the swing arm jaw 223 can no longer be locked to the main support 1, and the roller 21 is in a free state in this case. Thereafter, the locking support 221 can be held by the user in such a manner that the locking component 22 and the roller 21 inside the locking component 22 can be further drawn out.

[0038] When the user holds the locking support 221 and pushes the roller 21 inwardly, the swing arm jaw 223 is not locked to the main support 1 during the pushing. Upon the roller 21 is pushed into place, that is, there is a minimum distance between the swing arm jaw 223 and the main support 1, the swing arm jaw 223 is located at the first position, and can automatically be locked to the main support 1. As a result, assembly of the roller assembly 2 can be completed.

[0039] It should be understood that the above swing arm jaw 223 can implement locking and unlocking to the main support 1 during its rotation, and has a critical point as a boundary between the first position and the second position. That is, unlocking and/or locking can only be achieved when the rotation reaches a predetermined level. Each of the first position and the second position may be a determined position point, or may be a combination of a series of position points, rather than a determined position point.

[0040] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 9 and FIG. 10, in an em-

bodiment, the locking support 221 comprises a first support portion 2211 and a second support portion 2212. The second support portion 2212 is disposed between the first support portion 2211 and the roller 21 in an axial direction of the second support portion 2212. In addition, the first support portion 2211 is fixedly connected to the second support portion 2212. The first support portion 2211 has a button hole 22110. An end of the button 222 facing towards the second support portion 2212 is flared to form a flange 2221 having a large diameter. The flange 2221 has an outer diameter greater than an outer diameter of the button hole 22110. In this way, the flange 2221 of the button 222 is blocked by the button hole 22110, and cannot enter the button hole 22110, while an outer end of the button 222 is disposed in the button hole 22110. In this way, on the one hand, the button 222 is restrained between the first support portion 2211 and the second support portion 2212, and cannot be separated from the locking support 221. In this way, the button 222 can be removed only when the first support portion 2211 and the second support portion 2212 are disassembled. On the other hand, user can be allowed to touch the button 222. In this way, a connection between the button 222 and the locking support 221 is relatively simple.

[0041] As illustrated in FIG. 2 to FIG. 4 and FIG. 9, indication information may be arranged on an outer surface of the button 222 and/or on an outer surface of the first support portion 2211 for prompting the user to withdraw the roller 21 by pressing the button 222 inwards. In an exemplary embodiment of the present disclosure, the indication information may be words, such as "open" "press to withdraw" that are formed on the outer surface of the button 222, and "close" formed on the outer surface of the first support portion 2211. In another embodiment, the indication information may be a pattern, such as a finger pattern and an arrow pattern that are formed on the outer surface of the button 222. In an example, the indication patterns may be designed based on product requirements and habits of the user, and thus details thereof will be omitted here.

[0042] As illustrated in FIG. 9, in an embodiment, the swing arm jaw 223 comprises a swing arm body 2231 and a first resilient member 2232. The swing arm body 2231 has two swing arms 22311 formed at the swing arm body 2231. One swing arm 22311 is configured to abut against an inner surface of the button 222, and another swing arm 22311 is configured to abut against an inner surface of the main support 1 to be locked to the main support 1. The first resilient member 2232 is disposed between the swing arm body 2231 and the locking support 221, and is configured to provide a force for the swing arm body 2231 to restore rotation. Therefore, when the button 222 moves inwards, an inner surface of the button 222 can push the first swing arm 22311 to rotate, and the second swing arm 22311 rotates accordingly. After the second swing arm 22311 rotates, a tip of the second swing arm 22311 may not be located inside the main support 1. Therefore, the main support 1 fails to affect an outward movement of the swing arm jaw 223. That is, in this case, the locking component 22 entirely moves outwards. When the locking component 22 entirely moves outwards, a force exerted by the button 222 on the first swing arm 22311 is relieved. By means of the first resilient member 2232, the swing arm jaw 223 rotates reversely as a whole (rotates outwards), and returns to the first position.

[0043] The first resilient member 2232 may be a torsion spring for providing a rotational force for the swing arm body 2231. Without limitation, in some other embodiments, the first resilient member 2232 may be in a form of other structural members such as a torsion spring and a leaf spring that can push the swing arm body 2231 back to rotation.

[0044] In an embodiment, the swing arm jaw 223 further comprises a first connection shaft 2233. A first through hole (not illustrated) is formed at the swing arm body 2231. A second through hole is formed at the locking support 221. The first connection shaft 2233 is disposed in the first through hole and the second through hole. Therefore, the swing arm body 2231 is mounted to the locking support 221 by the first connection shaft 2233.

[0045] In an exemplary embodiment of the present disclosure, the second through hole may be formed at the first support portion 2211. In other embodiments of the present disclosure, the second through hole may be formed at the second support portion 2212 if possible, which depends on a size configuration, or the second through hole may be formed at both the first support portion 2211 and the second support portion 2212. The present disclosure is not limited in this regard.

[0046] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 9 and FIG. 10, the swing arm jaw 223 further comprises a first stopper 2234. An end of the first connection shaft 2233 is formed as the first stopper 22331 with a large diameter. The first connection shaft 2233 passes through the second through hole and the first through hole and extends out of the second through hole and the first through hole. The first stopper 2234 is disposed at another end of the first connection shaft 2233 to restrict the first connection shaft 2233 in the second through hole and the first through hole, to prevent the first connection shaft 2233 from escaping from the first through hole and the second through hole in a direction of a central axis of the first connection shaft 2233.

[0047] The first stopper 2234 may be a clip spring, and an annular groove (not illustrated) is formed at the other end of the first connection shaft 2233, and is engaged with the clip spring. In another embodiment, the first stopper 2234 may be a pin. The other end of the first connection shaft 2233 has a through hole, into which the pin is inserted. In other embodiments, the first stopper 2234 may be available in many other forms, and thus details thereof will be omitted here.

[0048] In this embodiment, two swing arm jaws 223 may be provided, and are disposed at two opposite sides

of the locking support 221, respectively. The two swing arm jaws 223 are configured to clamp and lock the main support 1 at the two opposite sides of the locking support 221 to allow for a balanced and stable locking connection between the locking component 22 and the main support 1.

[0049] Without limitation to the foregoing, in some other embodiments, more swing arm jaws 223, such as three, four, may be provided and distributed at the two opposite sides of the locking support 221.

[0050] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 9 and FIG. 10, the first support portion 2211 has two second through holes on each side thereof. The first connection shaft 2233 passes through the two second through holes and the first through hole. In addition, the swing arm body 2231 is located between the two second through holes. With this arrangement, the swing arm jaw 223 can be more stably disposed at the locking support 221.

[0051] When the swing arm jaw 223 is assembled to the locking support 221, the first resilient member 2232 is fitted in the first through hole, the swing arm body 2231 and the first resilient member 2232 are disposed between two second through holes of the first support portion 2211, and then the first connection shaft 2233 is inserted into the second through hole, the first through hole, and the second through hole sequentially. Thereafter, the first stopper 2234 is connected to the other end of the first connection shaft 2233.

[0052] Without limitation to the foregoing, in some other embodiments, two opposite sides of the swing arm body 2231 may protrude to form a shaft body (not illustrated). The shaft body is inserted into the two second through holes, respectively. The first resilient member 2232 is disposed between the shaft body and the locking support 221. In this way, automatic return of the swing arm body 2231 can be realized, and the first connection shaft 2233 mentioned above may be omitted.

[0053] Next, as illustrated in FIG. 12, in an embodiment, the ejection component 23 comprises a second resilient member 232 and a cap 231. The cap 231 is slidably connected to the locking component 22, in particular to the locking support 221 of the locking component 22 in an axial direction of the roller 21. The second resilient member 232 is resiliently compressed between the cap 231 and the locking component 22.

[0054] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 8 and FIG. 12, an inner surface of the second support portion 2212 is concave to form a groove hole 22121. An inner wall of the groove hole 22121 at a side of the groove hole 22121 away from the roller 21 is flared in a radial direction of the groove hole 22121 to form a stepped surface 22122. An end portion of the cap 231 at an end of the cap 231 facing towards the locking support 221 is formed as an overturned portion 2312, and the overturned portion 2312 extends outwards in a radial direction thereof. The second resilient member 232 is disposed in the cap 231 and the groove hole 22121. The second resilient member 232 is kept to be compressed throughout the axial sliding of the cap 231 in the axial direction of the roller 21. When the overturned portion 2312 abuts against the stepped surface 22122, the second resilient member 232 has a minimum compression.

[0055] When the locking support 221 and the main support 1 are locked to each other, there is a minimum distance between the locking support 221 and the main support 1. The cap 231 is pushed outwards by the main support 1 in such a manner that the second resilient member 232 has a maximum compression. When the locking support 221 is unlocked from the main support 1, an outward pushing force provided by the second resilient member 232 is acted on the locking support 221. Therefore, the locking support 221 can move outwards. Also, the second resilient member 232 moves outwards with the locking support 221.

[0056] As illustrated in FIG. 12, an end of the cap 231 facing towards the locking support 221 comprises claws 2311 arranged at intervals in a circumferential direction of the cap 231. An end portion of each of the claws 2311 is formed as the above overturned portion 2312. With this arrangement, the end of the cap 231 facing towards the locking support 221 can be deformed in a radial direction of the cap 231. Therefore, when the cap 231 is fitted into the groove hole 22121, the cap 231 can easily pushed into the groove and reaches an outer side of the stepped surface 22122 only by pressing the claws 2311 inwards in a radial direction of each of the claws 2311, to allow the cap 231 to be partially restrained in the groove hole 22121.

[0057] In other embodiments of the present disclosure, without limitation to the foregoing, the ejection component 23 may be disposed at the main support 1, and provide an outward force for the locking support 221. When the locking support 221 is unlocked from the main support 1, a resilient component does not move with the locking support 221. For example, the groove hole 22121 is formed at an outer side surface of the main support 1. The cap 231 may compress the second resilient member 232 when moving inwards. In this case, the cap 231 may rotate by an angle of 180°, and details of the arrangement may refer to the above description. In other embodiments of the present disclosure, the ejection component 23 may have various other implementations, not all of which is enumerated herein.

[0058] As illustrated in FIG. 9, in an embodiment, two ejection components 23 may be provided. A connection line between the two ejection components 23 intersects the axial direction of the roller 21. With this arrangement, the ejection components 23 are arranged at two opposite sides of the roller 21, which can provide a relatively balanced pushing force for the locking support 221, to allow the locking support 221 to be ejected outwards stably. In other embodiments of the present disclosure, ejection components 23 of other numbers may be provided, and may be uniformly distributed in a circumferential direction

of the roller 21.

[0059] With continued reference to FIG. 8, in an embodiment, guide holes 22123 are formed at the inner surface of the second support portion 2212. First guide posts 313 are formed at the main support 1 (in conjunction with FIG. 5 and FIG. 6, and detailed description will be set forth later). The guide holes 22123 and the first guide posts 313 are arranged in the axial direction of the roller 21. When the locking support 221 is relatively close to the main support 1, the first guide posts 313 may be slidable in the respective guide holes 22123 to provide a predetermined guiding for the locking support 221, in such a manner that the locking support 221 does not displace when being ejected and pushed in. Therefore, the ejecting of the roller 21 in an initial stage of an ejecting process and the pushing-in of the roller 21 in a final stage of a pushing-in process of the roller 21 can be ensured to be relatively smooth, and thus the roller 21 is more likely to be unlocked from the main support 1 and is locked to the main support 1 again. In another exemplary embodiment of the present disclosure, the guide holes 22123 and the first guide posts 313 may be uniformly distributed in the circumferential direction of the roller 21 to ensure balance of guidance.

[0060] Without limitation to the foregoing, in some other embodiments, the guide holes 22123 may be formed at an outer surface of the main support 1. The first guide posts 313 may be formed at the second support portion 2212.

[0061] In this embodiment, two groove holes 22121 and two guide holes 22123 are formed at the second support portion 2212. In addition, the two groove holes 22121 are diagonally distributed, and the two guide holes 22123 are diagonally distributed.

[0062] As illustrated in FIG. 2 to FIG. 4, in an embodiment, the roller device 100 further comprises an anti-false triggering assembly 3. The anti-false triggering assembly 3 is mounted at the main support 1, and has a third position and a fourth position. When the anti-false triggering assembly 3 is located in the third position, the anti-false triggering assembly 3 can prevent the locking component 22 and the roller 21 from being withdrawn outwards. When the anti-false triggering assembly 3 is located in the fourth position, the anti-false triggering assembly 3 cam release the locking component 22 in such a manner that the locking component 22 and the roller 21 can be withdrawn outwards.

[0063] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 5 and FIG. 6, the anti-false triggering assembly 3 comprises an anti-false triggering support 31, a toggle block 32, and a third resilient member 33. The anti-false triggering support 31 is fixed to the main support 1. For example, the anti-false triggering support 31 may be fixed to an outer end surface of the main support 1. The toggle block 32 is slidably disposed at the anti-false triggering support 31. The third resilient member 33 is disposed between the anti-false triggering support 31 and the toggle block 32 to provide a force for the toggle block 32 to move towards the roller 21. That is, the user may apply a force to the toggle block 32 through his/her hand to allow the toggle block 32 to move away from the roller 21 and reach the fourth position. In this case, the toggle block 32 is away from the roller 21 and the locking component 22, and cannot block the locking component 22. When the toggle block 32 moves towards the roller 21, the toggle block 32 can reach a position where the locking component 22 can be blocked, that is, a third position.

[0064] When the toggle block 32 is at the third position, a lower end of the toggle block 32 is located at an outer side of the locking support 221. Therefore, the locking support 221 can be prevented from moving outwards, as illustrated in FIG. 10.

[0065] Likewise, it should be understood that the above-mentioned toggle block 32 can implement locking and unlocking to the locking support 221 during the movement of the toggle block 32. There is also a critical point as a boundary between the third position and the fourth position. That is, the unlocking and/or the locking can be implemented only when the movement reaches a predetermined level. Each of the third position and the fourth position may be a determined position point, or may be combination of a series of position points, rather than the determined position point.

[0066] In an example, a sliding direction of the toggle block 32 is perpendicular to the axial direction of the roller 21. For example, the toggle block 32 is disposed at a side of the roller 21 away from the ground. The toggle block 32 is slidable in an up-and-down direction, and reach the fourth position when sliding upwards and reach the third position when sliding downwards. The third resilient member 33 is arranged in the sliding direction of the toggle block 32 and is compressed.

[0067] The third resilient member 33 is arranged in such a manner that the blocking on the locking component 22 can be released only when the user actively exerts a force on the toggle block 32. When the user cancels the operation on the toggle block 32, the toggle block 32 automatically returns to the third position by means of a pushing force of the third resilient member 33. In this way, a safety barrier to the locking component 22 can be further provided, which can avoid accidental ejection of the roller 21 when vibration or jolting occurs during use of the cleaning apparatus 200, and can also avoid misoperation by children or the like in complex environments such as commercial environments. Therefore, safety of the roller device 100 can be improved.

[0068] As illustrated in FIG. 5 and 6, the anti-false triggering support 31 has an opening 310 adapted to the roller 21. The opening 310 is configured to allow the roller 21 to pass therethrough, which can cause the anti-false triggering support 31 to be substantially disposed between the locking support 221 and the main support 1. It should be noted here that the anti-false triggering support 31 and the main support 1 may be integrally formed, or may be separate structural members that are formed

separately and connected to each other.

[0069] It should also be noted that since the anti-false triggering support 31 is disposed at the outer side of the main support 1 and is fixedly connected to the main support 1, the anti-false triggering support 31 may essentially be a part of the main support 1. Therefore, a connection and a locking relationship between the locking component 22 and the main support 1 described above may be replaced by a connection and a locking relationship between the locking component 22 and the anti-false triggering support 31. For example, as illustrated in FIG. 5 and FIG. 6, in this case, the first guide posts 313 may be formed at an outer side surface of the anti-false triggering support 31.

[0070] As illustrated in FIG. 6 and FIG. 10, a lower end of the toggle block 32 has a first guide surface 320. The first guide surface 320 is inclined gradually towards the roller 21 from outward to inward. As illustrated in FIG. 8 and FIG. 10, an upper end of the locking support 221 has a second guide surface 22111. The second guide surface 22111 is inclined gradually away from the toggle block 32 from outward to inward. With this arrangement, when the user needs to reassemble the roller 21 into the roller groove 10, the user can directly push the locking component 22 inwards. The second guide surface 22111 and the first guide surface 320 slidably abut against each other. With the movement of the locking component 22, the toggle block 32 is pushed to move upwards by the locking support 221. The third resilient member 33 is gradually compressed. A lowermost end of the toggle block 32 gradually slides to an uppermost end of the second guide surface 22111. Upon the roller 21 is pushed into place, the lowermost end of the toggle block 32 moves across the second guide surface 22111. By means of a downward force provided by the third resilient member 33, the lowermost end of the toggle block 32 automatically moves downwards. In this case, the lowermost end of the toggle block 32 is located at an outer surface of the locking support 221, realizing the blocking to the locking support 221, as illustrated in FIG. 1.

[0071] In an embodiment, as illustrated in FIG. 5, a mounting recess 311 opened downwards is formed at the anti-false triggering support 31. The toggle block 32 is disposed in the mounting recess 311 and slidable in the mounting recess 311. In other embodiments of the present disclosure, the mounting recess 311 further has an open outer side. In this way, an outer surface of the toggle block 32 is partially exposed for the user to toggle by his/her hand.

[0072] As illustrated in FIG. 6 and FIG. 10, the toggle block 32 has a mounting engagement portion 322. The mounting engagement portion 322 has a mounting engagement surface 3220. The mounting engagement surface 3220 is gradually downwardly inclined away from the toggle block 32 and towards the anti-false triggering support 31. That is, the mounting engagement surface 3220 is inclined towards the open side of the mounting recess 311 or towards the roller 21. As illustrated in FIG. 5, the anti-false triggering support 31 has an engagement groove 312 for accommodating the mounting engagement surface 3220. With this arrangement, when the toggle block 32 is fitted to the mounting recess 311, the toggle block 32 is placed in the mounting recess 311 from the opening at a lower side of the mounting recess 311, and the toggle block 32 is pushed upwards. Due to the arrangement of the mounting engagement surface 3220, although the mounting engagement portion 322 and the anti-false triggering support 31 are pressed against each other, the mounting engagement portion 322 may continue to slide upwards until the mounting engagement portion 322 fully enters the engagement groove 312. The engagement groove 312 has a height (a size of the toggle block 32 in a sliding direction) greater than a height of the mounting engagement portion 322. As a result, the mounting engagement portion 322 is slidable in the engagement groove 312, and is not likely to be disengaged from the engagement groove 312.

[0073] Without limitation to the foregoing, in some other embodiments, the mounting engagement portion 322 may be formed at the anti-false triggering support 31. The engagement groove 312 may be formed at the toggle block 32. Accordingly, the mounting engagement surface 3220 is inclined gradually away from the roller 21 in a direction from the toggle block 32 to the anti-false triggering support 31.

[0074] Further, as illustrated in FIG. 5, FIG. 6, and FIG. 11, in an embodiment, the third resilient member 33 is a spring, and a second guide post 321 is disposed at the toggle block 32. The second guide post 321 extends in the sliding direction of the toggle block 32. A part of the spring is sleeved around the second guide post 321. The second guide post 321 is configured to provide a predetermined guidance for the compression of the spring when the toggle block 32 slides upwards and the spring is compressed, to avoid torsion of the spring, which would affect automatic return of the toggle block 32.

[0075] Without limitation to the foregoing, in some other embodiments, the second guide post 321 may be also disposed at the anti-false triggering support 31, and details thereof will be omitted here.

[0076] As illustrated in FIG. 3, FIG. 4, and FIG. 7, in an embodiment, the roller assembly 2 further comprises a drive assembly 4. The drive assembly 4 is fixedly disposed at the main support 1 and located at a side of the roller 21 away from the locking component 22. The drive assembly 4 is configured to drive the roller 21 to rotate. The drive assembly 4 and the locking component 22 are located at two sides of the roller 21 in the axial direction of the roller 21, respectively, which can avoid interaction between the drive assembly 4 and the locking component 22. In other embodiments of the present disclosure, it should be understood that the drive assembly 4 needs to be connected to a power supply (not illustrated). When the roller 21 and the locking component 22 are withdrawn outwards, the drive assembly 4 is disconnected from the roller 21, and the drive assembly 4 remains on the body

housing 2001.

[0077] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 7 and FIG. 11, the drive assembly 4 comprises a motor 41, a first gear 42, a synchronous belt 43, a second gear 44, and a first end cap 45. The motor 41 is fixedly disposed at the main support 1. The first gear 42 is coaxially connected to an output shaft of the motor 41. The second gear 44 is disposed at the main support 1, and connected to the first gear 42 by the synchronous belt 43. The first end cap 45 is coaxially connected to the second gear 44 and located at a side of the second gear 44 facing towards the roller 21. An outer circumferential surface of the first end cap 45 has a concave-convex structure adapted to a shape of an inner wall of the roller 21. Therefore, when the motor 41 rotates, the first gear 42, the synchronous belt 43, the second gear 44, and the first end cap 45 rotate sequentially, in such a manner that the first end cap 45 drives the roller 21 to rotate. Moreover, the concave-convex structure of the outer circumferential surface of the first end cap 45 does not affect the outward movement of the roller 21 in the axial direction of the roller 21.

[0078] Without limitation, in some other embodiments, the drive assembly 4 may has other configurations based on product design requirements and the space on the body housing 2001, and details thereof will be omitted here.

[0079] As illustrated in FIG. 7 and FIG. 11, in an embodiment, the drive assembly 4 may further comprise a motor support 46. The motor 41, the first gear 42, the second gear 44, and the like may be disposed at the motor support 46. The motor support 46 is fixedly connected to the main support 1, or the motor support 46 and the main support 1 are integrally formed. A specific form of the motor support 46 is not particularly limited. For example, the motor support 46 may comprise two parts connected to each other. As illustrated in FIG. 7, the motor support 46 may comprise a third support portion 461 and a fourth support portion 462. The motor 41, the first gear 42, the synchronous belt 43, the second gear 44, or the like are sandwiched between the third support portion 461 and the fourth support portion 462. The first end cap 45 traverses the motor support 46 and is connected to the roller 21. In other embodiments of the present disclosure, based on product requirements and spatial arrangement of the body housing 2001, the motor support 46 may have various other arrangement forms, and details thereof will be omitted here.

[0080] As illustrated in FIG. 9, in an embodiment, the roller device 100 further comprises a connection component 24 for being connected between the roller 21 and the locking component 22. The connection component 24 can allow the roller 21 to rotate circumferentially with respect to the locking component 22 while being axially connected to the locking component 22.

[0081] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 9, the connection component 24 comprises a bearing 243, a second end cap 241, and a second connection shaft 242. A part of the second end cap 241 is fixedly connected to the inner wall of the roller 21 in the circumferential direction and in the axial direction. The second connection shaft 242 traverses the second end cap 241 and is connected to the locking component 22. The bearing 243 is disposed between the second connection shaft 242 and the locking component 22 to enable the second connection shaft 242 to rotate together with the roller 21.

[0082] In an exemplary embodiment of the present disclosure, as illustrated in FIG. 9 and FIG. 10, a flat portion 2421 is formed on an inner end of the second connection shaft 242. A flat groove (not illustrated) adapted to a shape of the flat portion 2421 is formed at the second end cap 241. After the second connection shaft 242 traverses the second end cap 241, the flat portion 2421 is located in the flat groove, in such a manner that the second connection shaft 242 and the second end cap 241 are kept relatively fixed in the circumferential direction. The second connection shaft 242 further pass through a shaft hole 22120 on the second support portion 2212, and the bearing 243 is located in the shaft hole 22120. A second stopper 244 is disposed at a part of the second connection shaft 242 at an outer side of the second support portion 2212. The second stopper 244 is configured to keep the axial connection between the second connection shaft 242 and the locking support 221.

[0083] The second stopper 244 may be a clip spring. The second connection shaft 242 has an annular groove (not illustrated) into which the clip spring is engaged. In another embodiment, the second stopper 244 is a pin or the like, and details thereof will be omitted here.

[0084] As illustrated in FIG. 9 to FIG. 11, the roller 21 may comprise a roller base 211 and a cleaning outer layer 212 around the roller base 211. Two ends of the roller base 211 are connected to the first end cap 45 and the second end cap 241, respectively. The cleaning outer layer 212 rotates with the roller base 211 to sweep and wash the floor. The cleaning outer layer 212 may be a mop cloth for cleaning the floor after water is sprayed, or a roller brush for sweeping the floor. The cleaning outer layer 212 may be designed to be detachable from the roller base 211.

[0085] As illustrated in FIG. 1, embodiments of the present disclosure is further to provide a cleaning apparatus 200. The cleaning apparatus 200 comprises a body housing 2001 and the roller device 100 according to the above-mentioned embodiments. The main support 1 of the roller device 100 is fixedly connected to the body housing 2001. The main support 1 and the body housing 2001 are separate components and connected to each other, or are integrally formed.

[0086] In the roller device 100 of the cleaning apparatus 200 according to the embodiment of the present disclosure, the roller assembly 2 can be easily and simply removed and mounted, which is labor-saving. In addition, the roller 21 can be reliably locked, which effectively avoids the sliding-out of the roller 21 in non-use. There-

fore, user experience is satisfactory.

[0087] The cleaning apparatus 200 may be a mobile floor scrubber, a floor mopping robot, a hand-held floor scrubber, or the like. Any cleaning apparatus that requires the roller device 100 to washing and sweep the floor may be applicable.

[0088] For example, as illustrated in FIG. 1, the cleaning apparatus 200 is a mobile floor scrubber. The cleaning apparatus 200 also comprises a sweeping device 2002. The sweeping device is generally disposed at two sides of a lower part of the body housing 2001 for sweeping garbage on the road surface inwards, and then sucking the collected garbage by a suction device (not illustrated). Then, the roller device 100 wash the swept ground.

[0089] When the roller 21 needs to be cleaned, dried, and replaced, the user is required to perform operation as follows.

[0090] The toggle block 32 is toggled upwards by a first finger of the user, and the button 222 is pushed inwards by a second finger of the user. The second finger is released to release the pressing on the button 222, and then the roller 21 automatically ejects. The first finger is released to release the toggling on the toggle block 32, and the roller 21 is withdrawn by holding the locking support 221.

[0091] The roller 21 is pushed towards the roller groove 10 until the roller 21 reaches an innermost position and is connected to the drive assembly 4. The anti-false triggering assembly 3 automatically blocks the locking support 221.

[0092] The above are merely some embodiments of the present disclosure and are not intended to limit the present disclosure. Any modification, equivalent substitution, and improvement made within the spirit and principles of the present disclosure shall fall within the scope of the present disclosure.

Claims

1. A roller device, comprising:

a main support having a roller groove; and
a roller assembly comprising a roller, a locking component, and an ejection component, wherein:

the locking component is connected to the roller, and has a first position where the locking component is locked to the main support and has a second position where the locking component is released from the main support; and
the ejection component is disposed at the main support or the roller assembly, and providing a force for the roller to move out of the roller groove.

2. The roller device according to claim 1, wherein the locking component comprises a locking support, a button, and a swing arm jaw, wherein:

the locking support is axially connected to the roller;
the button is disposed at the locking support, the button being movable in an axial direction of the roller;
the swing arm jaw is rotatably disposed at the locking support; and
the button moves towards the roller to push the swing arm jaw to rotate, and the swing arm jaw is separable from the main support after rotating.

3. The roller device according to claim 2, wherein the locking support comprises a first support portion and a second support portion, wherein:

the second support portion is disposed between the first support portion and the roller in the axial direction of the roller; and
the first support portion has a button hole;
the button is partially flared to form a flange, the flange having an outer diameter greater than an outer diameter of the button hole, an end of the button located at an outer side of the flange being disposed in the button hole, and the flange abutting against the swing arm jaw at a side of the flange away from the button hole.

4. The roller device according to claim 2, wherein the swing arm jaw comprises a swing arm body and a first resilient member, wherein:

the swing arm body is formed with a first swing arm and a second swing arm, the first swing arm abutting against the button, and the second swing arm abutting against a side surface of the main support facing towards the roller to be locked to the locking support; and
the first resilient member is disposed between the swing arm body and the locking support, the first resilient member providing the swing arm body with a restoring force.

5. The roller device according to claim 4, wherein the swing arm jaw further comprises a first connection shaft and a first stopper, wherein:

a first through hole is formed at the swing arm body, the first connection shaft being disposed in the first through hole, and the first connection shaft traversing the locking support and being connected to the first stopper; or
a shaft body is formed at the swing arm body, the shaft body being rotatably disposed in a through hole at the locking support.

6. The roller device according to claim 1, wherein the ejection component comprises a cap and a second resilient member, wherein:

the cap is slidably connected to the locking component or the main support in an axial direction of the roller; and
the second resilient member is resiliently compressed in the cap.

7. The roller device according to claim 6, wherein:

the locking component has an engagement groove, the engagement groove being formed at a side of the locking component facing towards the roller or at a side of the main support facing towards the locking component, an inner wall of the engagement groove being flared to form a stepped surface; and
an end portion of the cap is formed as an overturned portion, the overturned portion being slidable in the engagement groove and abutting against the stepped surface.

8. The roller device according to claim 7, wherein an end of the cap facing towards the locking component comprises a plurality of claws arranged at intervals in a circumferential direction of the cap, an end portion of each of the plurality of claws being formed as the overturned portion.

9. The roller device according to any one of claims 1 to 8, further comprising an anti-false triggering assembly disposed at the main support, the anti-false triggering assembly having a third position and a fourth position, wherein:
the roller assembly is prevented from sliding outwards from the roller groove when the anti-false triggering assembly is disposed in the third position, and the roller assembly is released when the anti-false triggering assembly is disposed in the fourth position.

10. The roller device according to claim 9, wherein the anti-false triggering assembly comprises an anti-false triggering support, a toggle block, and a third resilient member, wherein:

the anti-false triggering support is fixed to the main support;
the toggle block is slidably disposed at the anti-false triggering support; and
the third resilient member is disposed between the anti-false triggering support and the toggle block, and providing a force for the toggle block to move towards the roller assembly.

11. The roller device according to claim 10, wherein the anti-false triggering support has an opening adapted to the roller and is fixed to a side of the main support close to the locking component.

12. The roller device according to claim 10, wherein:

the toggle block has a first guide surface, the first guide surface being inclined gradually towards the roller from outward to inward; and
the locking component has a second guide surface, the second guide surface being inclined gradually away from the toggle block from outward to inward, the first guide surface and the second guide surface slidably abutting against each other.

13. The roller device according to claim 10, wherein:

the toggle block is formed with a mounting engagement portion, the mounting engagement portion having a mounting engagement surface, the mounting engagement surface being inclined gradually towards the roller in a direction from the mounting engagement portion to the anti-false triggering support, and the anti-false triggering support having a mounting groove for accommodating the mounting engagement surface; or
the anti-false triggering support is formed with a mounting engagement portion, the mounting engagement portion having a mounting engagement surface, the mounting engagement surface being inclined gradually away from the roller in a direction from the mounting engagement portion to the anti-false triggering support, and the toggle block having a mounting groove for accommodating the mounting engagement surface.

14. The roller device according to any one of claims 1 to 8, further comprising a connection assembly, the connection assembly comprising a bearing, a first end cap, and a second connection shaft, wherein:

the first end cap is fixedly connected to a side of the roller facing towards the locking component; and
the second connection shaft traverses the first end cap and the bearing and is connected to the locking component, the bearing being disposed between the second connection shaft and the locking component.

15. The roller device according to any one of claims 1 to 8, further comprising a drive assembly fixedly disposed at the main support and located at a side of the roller away from the locking component, the drive assembly driving the roller to rotate and be disconnected from the roller when the roller slides outward-

ly.

16. A cleaning apparatus, comprising:

a body housing; and
a roller device according to any one of claims 1 to 15, a main support being fixedly disposed at the body housing.

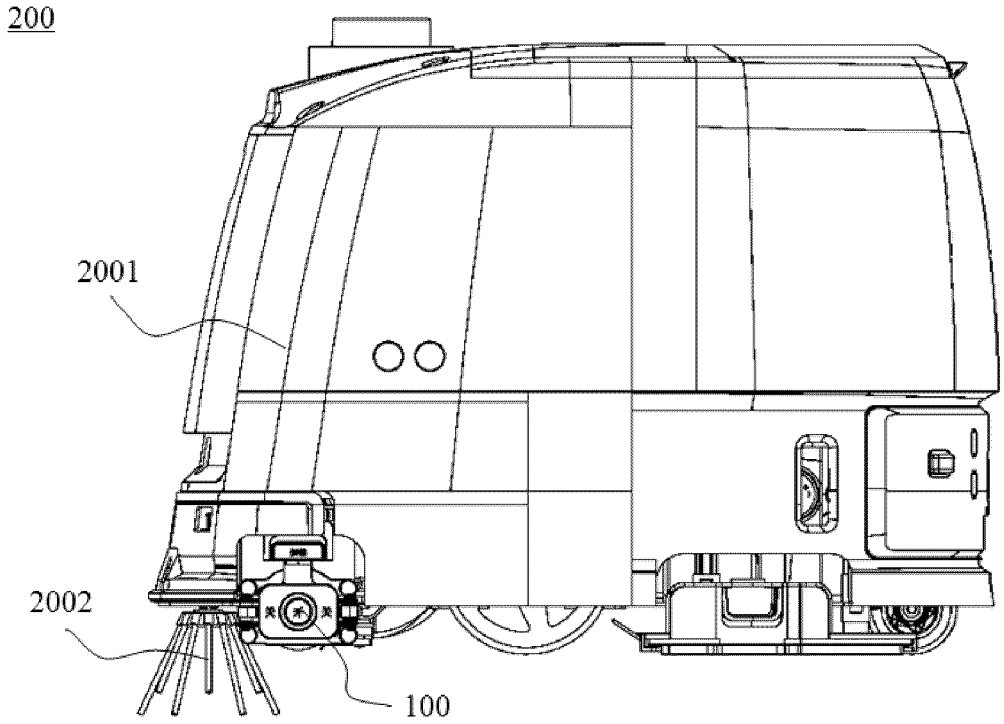

FIG. 1

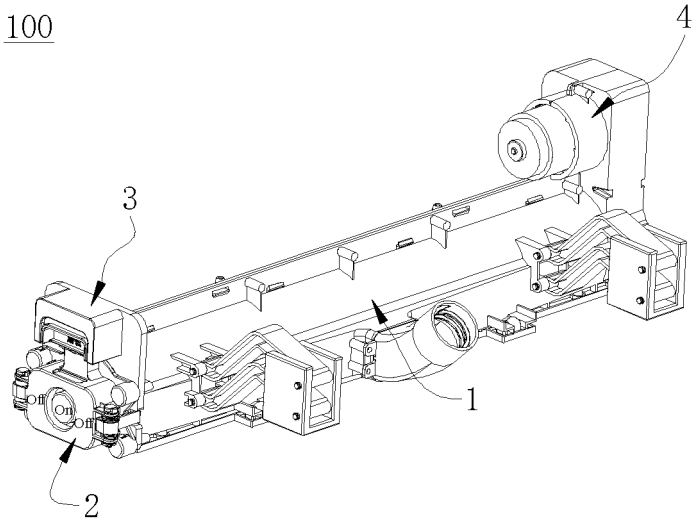

FIG. 2

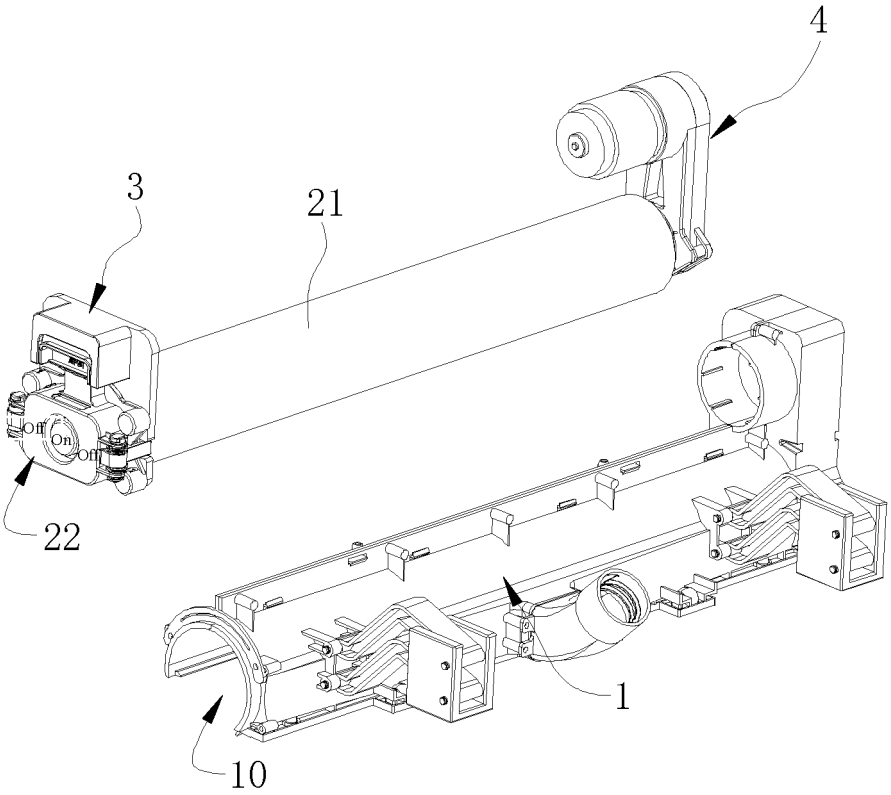

FIG. 3

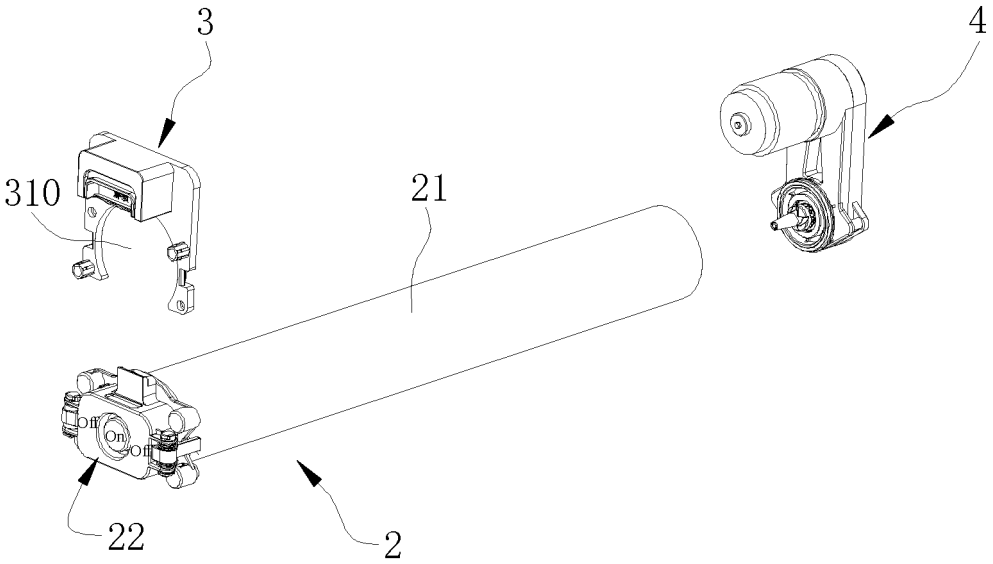

FIG. 4

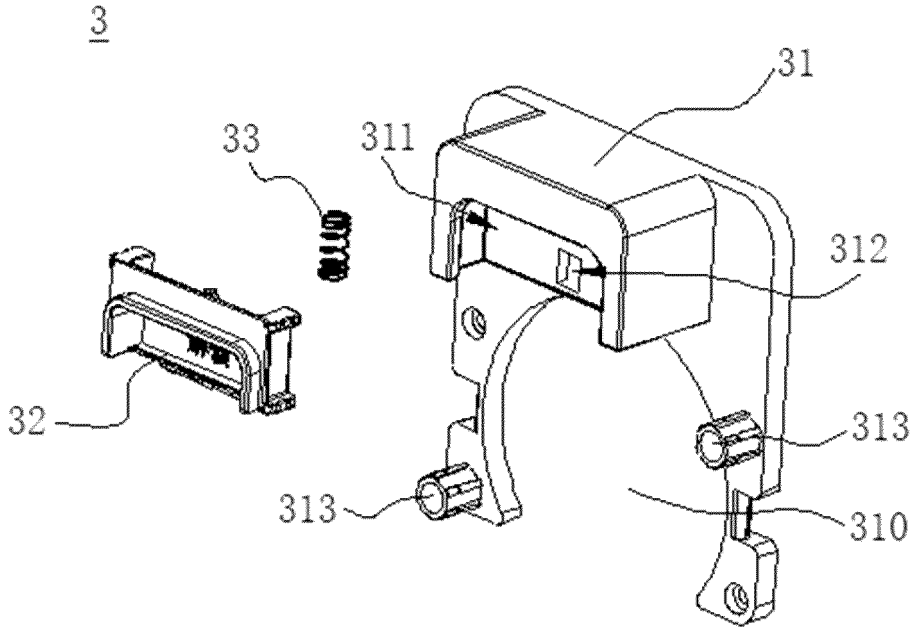
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FIG. 5

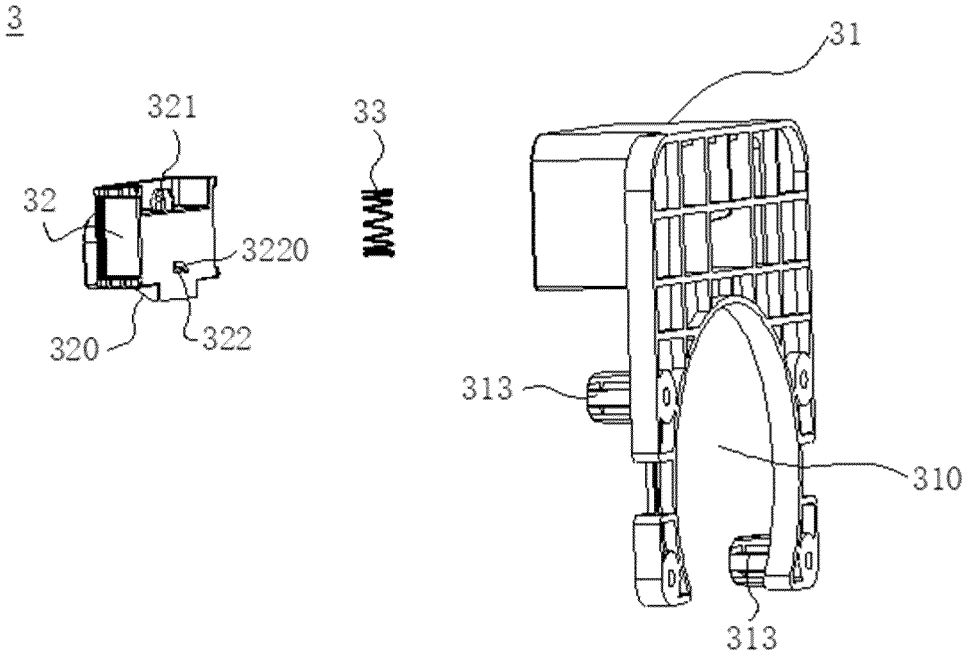
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FIG. 6

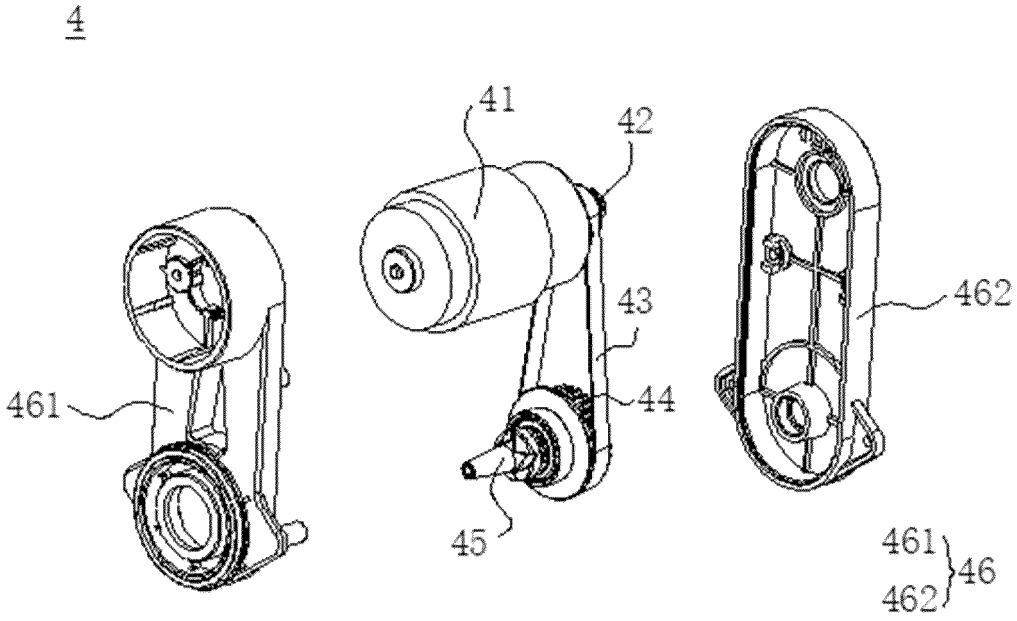
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FIG. 7

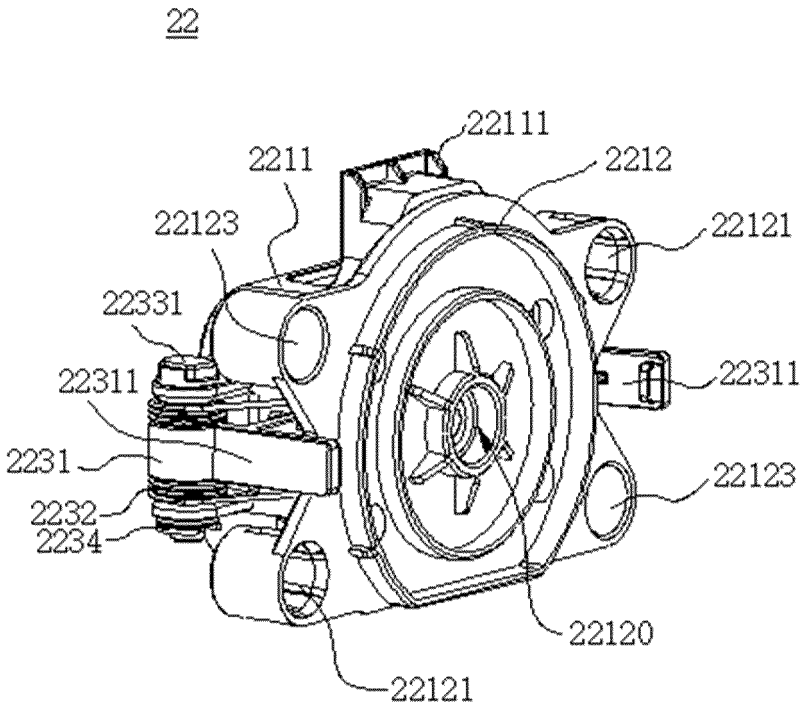
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FIG. 8

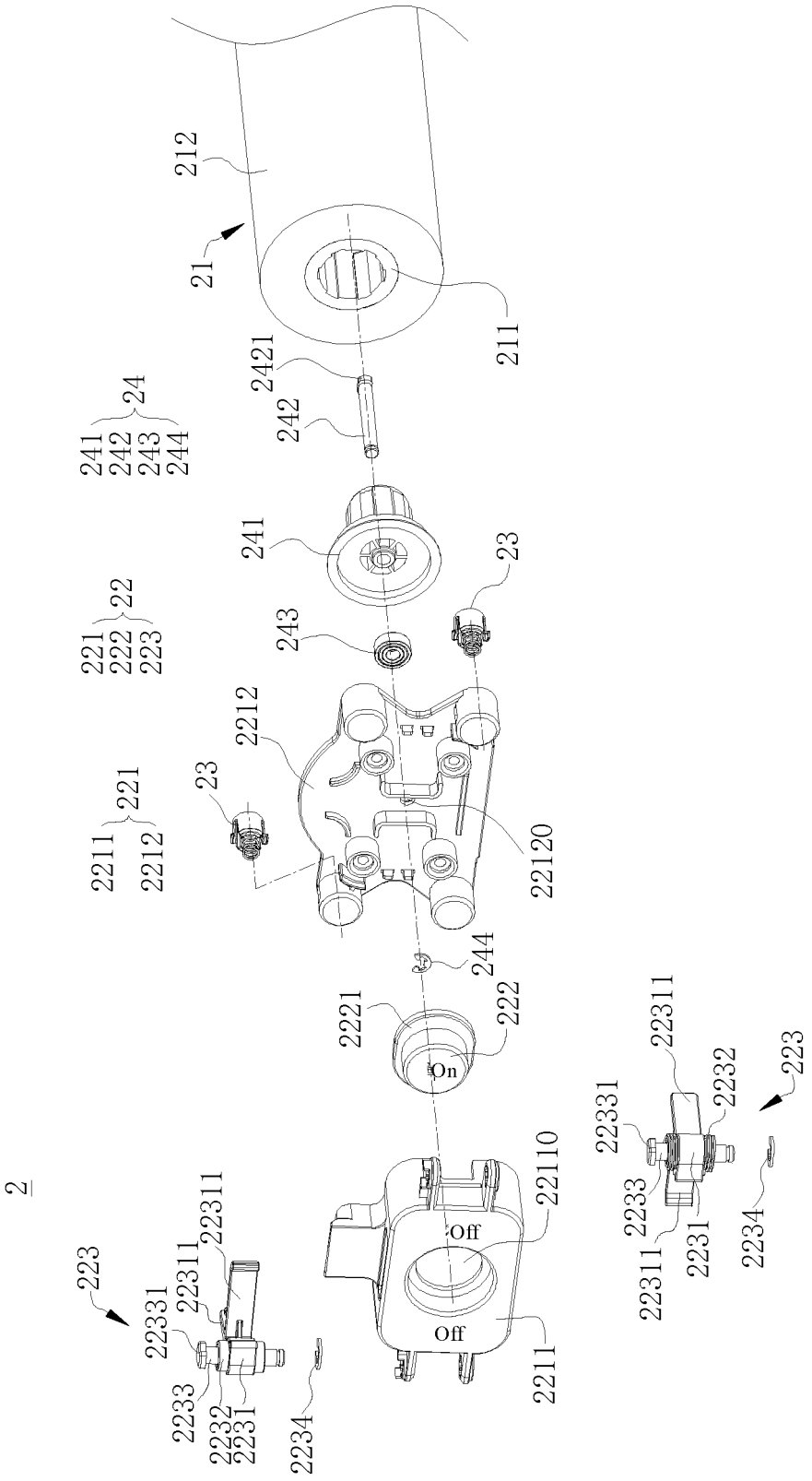
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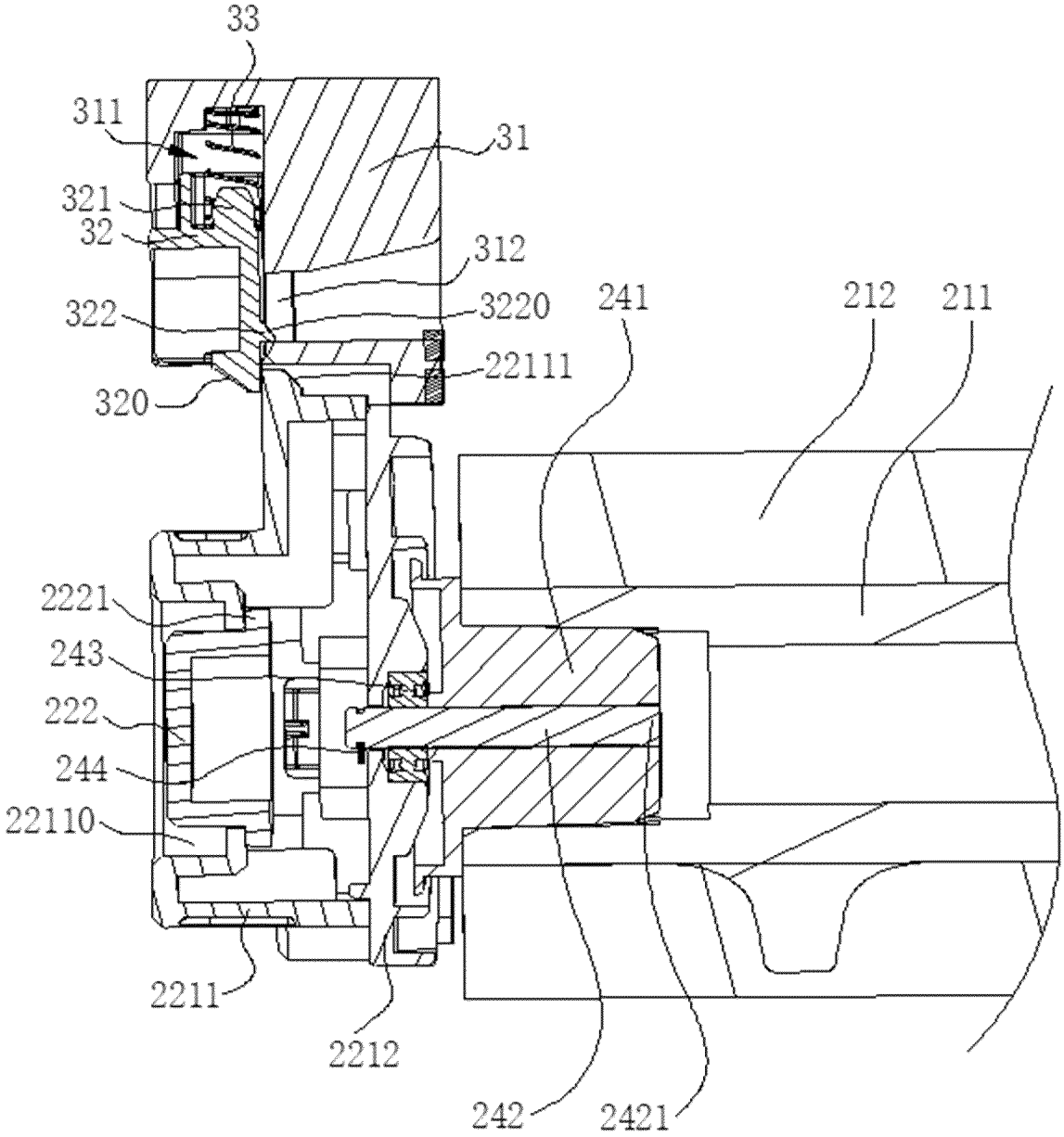
FIG. 9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2421

FIG. 10

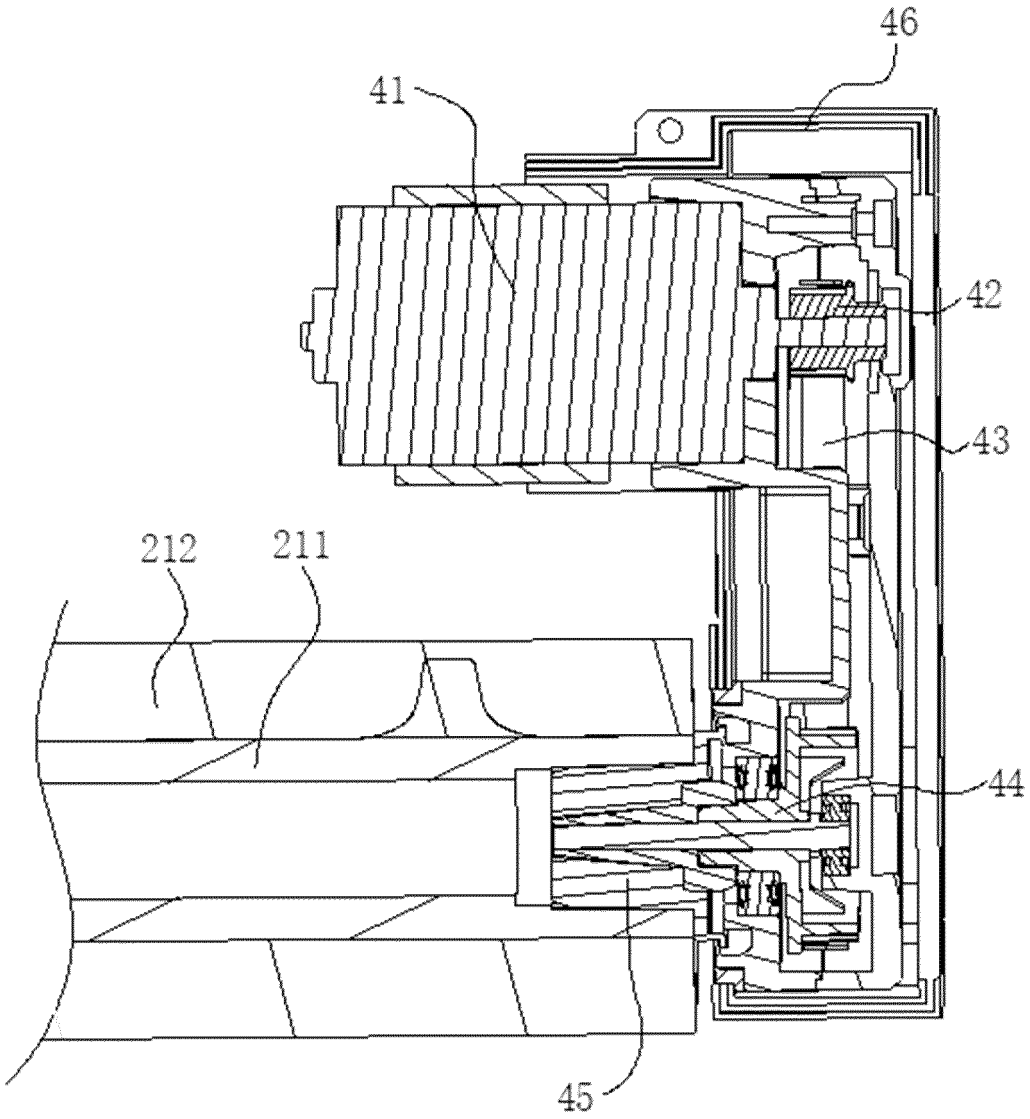

FIG. 11

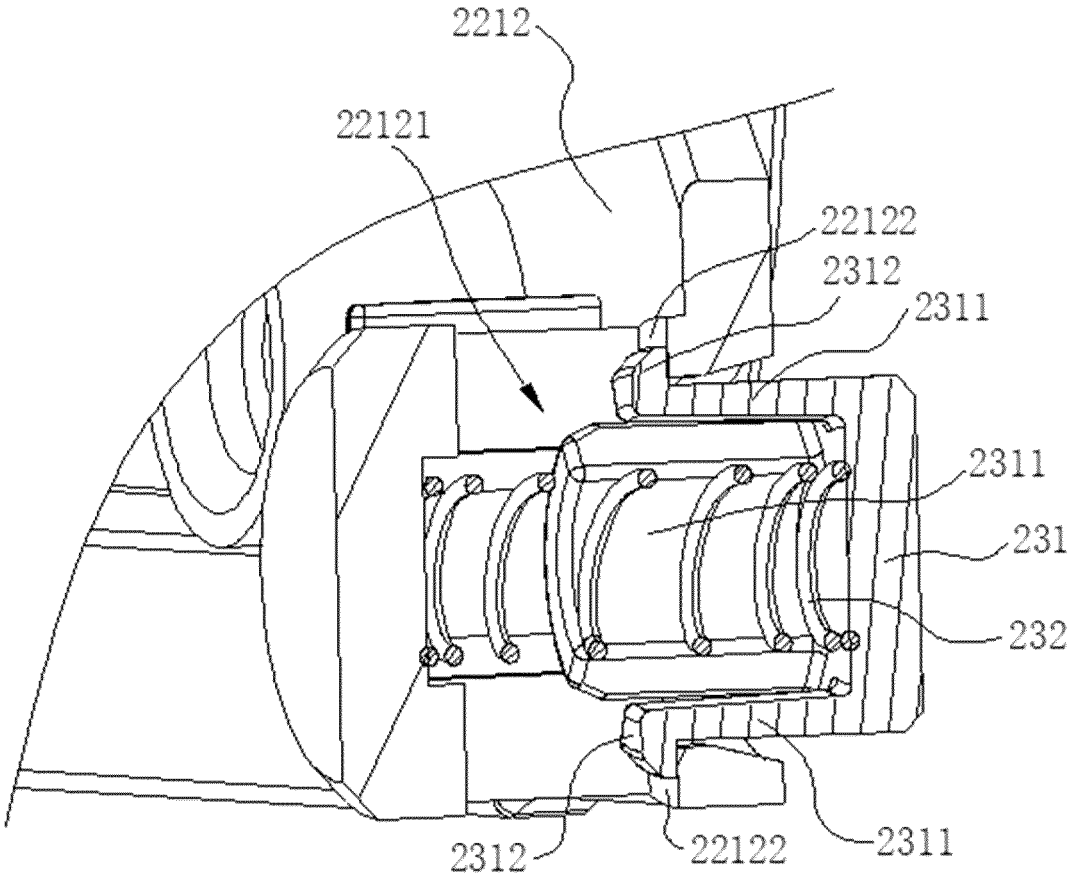

FIG. 12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/079645

A. CLASSIFICATION OF SUBJECT MATTER

E01H 1/05(2006.01)i; A47L 9/06(2006.01)i; A47L 9/04(2006.01)i; A47L 11/292(2006.01)i; A47L 9/28(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)

E01H, 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)

CNTXT, ENTXTC, VEN, CNKI: 滚筒, 辊, 槽, 摆, 臂, 锁, 弹出, 支架, 弹性, 轴, 盖, 误触, 驱动, roller, drum, groove, punch, swing arm, lock, eject, bracket, elastic, shaft, cover, mistouch, drive

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 111685647 A (JIANGSU MIDEA CLEAN ELECTRIC APPLIANCE CO., LTD.; MIDEA GROUP CO., LTD.) 22 September 2020 (2020-09-22) description, "specific embodiments", and figures 1-15	1-8, 14-16
Y	CN 111685647 A (JIANGSU MIDEA CLEAN ELECTRIC APPLIANCE CO., LTD.; MIDEA GROUP CO., LTD.) 22 September 2020 (2020-09-22) description, "specific embodiments", and figures 1-15	9-13
Y	CN 113768425 A (ZHUHAI GREE ELECTRIC APPLIANCES INC.) 10 December 2021 (2021-12-10) description, "specific embodiments", and figures 1-7	9-13
A	US 2017188766 A1 (JIANGSU MIDEA CLEANING APPLIANCES CO., LTD.) 06 July 2017 (2017-07-06) entire document	1-16
A	US 2017274640 A1 (MPS HOLDING B.V.) 28 September 2017 (2017-09-28) entire document	1-16
A	CN 205094325 U (JIANGSU MIDEA CLEAN ELECTRIC APPLIANCE CO., LTD.; MIDEA GROUP CO., LTD.) 23 March 2016 (2016-03-23) entire document	1-16

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

* Special categories of cited documents:
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"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
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"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
14 September 2022	**26 September 2022**
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/CN2022/079645

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 20040058826 A (SAMSUNG KWANGJU ELECTRONICS CO.) 05 July 2004 (2004-07-05) entire document	1-16

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2022/079645

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 111685647 A	22 September 2020	None	
CN 113768425 A	10 December 2021	None	
US 2017188766 A1	06 July 2017	EP 3187082 A1	05 July 2017
		WO 2017117899 A1	13 July 2017
		CA 2971301 A1	04 July 2017
		JP 2017121466 A	13 July 2017
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		WO 2016159764 A2	06 October 2016
		CN 106794694 A	31 May 2017
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		DK 3164267 T3	20 July 2020
		EP 3164267 A2	10 May 2017
CN 205094325 U	23 March 2016	None	
KR 20040058826 A	05 July 2004	None	

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 202111620476 **[0001]**