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(54) ROTATING SHAFT ASSEMBLY FOR SHOWER DOOR AND SHOWER DOOR COMPRISING SAME

(57) A rotating shaft assembly for a shower door and a shower door including the same are provided according to the present application. The rotating shaft assembly includes a transition assembly, a shaft sleeve, a clamping device and an adjustment assembly. The transition assembly and the shaft sleeve are arranged side by side, and two ends of the transition assembly are hinged to two ends of the shaft sleeve respectively, and a groove is defined on a side, away from the transition assembly, of the shaft sleeve; the clamping device is located in the groove, and is configured to clamp a panel of the shower door; one end of the adjustment assembly is connected with the shaft sleeve, and the other end of the adjustment assembly is connected with a clamper; and a length of the adjustment assembly in a direction perpendicular to a rotating axis of the shaft sleeve is adjustable, so that a distance between the clamping device and the shaft sleeve is adjustable. The rotating shaft assembly realizes the adjustable width of the shower door.

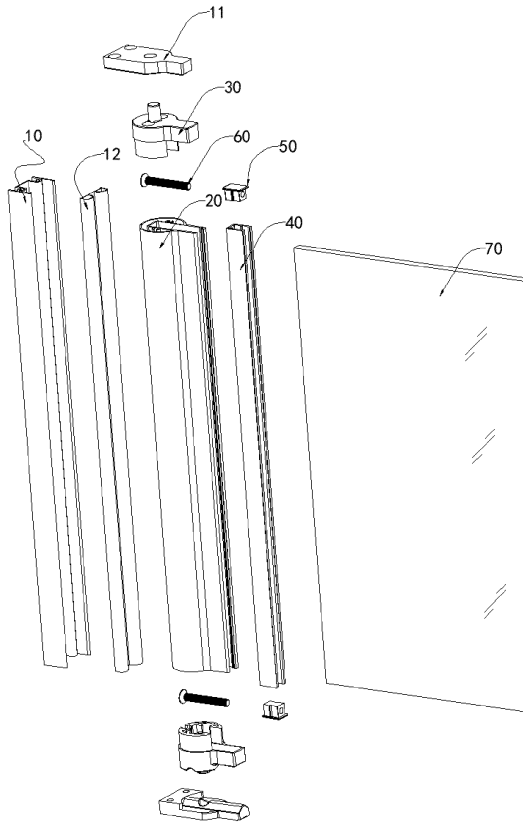

FIG. 3

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Description

TECHNICAL FIELD

[0001] The present application relates to the technical field of bathroom equipment, and in particular to a rotating shaft assembly for a shower door and a shower door including the same.

BACKGROUND ART

[0002] At present, the use of a shower room to achieve wet-dry separation is becoming increasingly common in the field of premises fitting out. The shower room is generally provided with a shower door with a glass plate. The existing shower door includes a sliding door with a rack and a revolving door with a hinge.

[0003] The existing revolving door includes a panel, a rotating shaft and a transition profile. The panel is generally made of glass, or made of plexiglass or other materials. The rotating shaft is generally a cylindrical or substantially cylindrical profile. Generally, two ends of the rotating shaft are hinged to the transition profile, and the transition profile is then fixed against the wall. The panel is connected with the rotating shaft and rotatable around a central axis of the rotating shaft. In the construction site, due to the verticality error of the wall and the dimension error of the revolving door, a mounting error such as the failure of the rotating shaft to abut against the wall or the excessive gap between the movable panel and the fixed panel of the shower door is formed. During construction, a wall-against profile is used to eliminate the mounting error. The wall-against profile is fixed against the wall, and then the transition profile is in sleeved connection with the wall-against profile, and the transition profile and the wall-against profile are fixed directly by screws. By adjusting the overlapping degree between the wall-against profile and the transition profile, the position of the panel can be adjusted, thereby eliminating the mounting error. There is no shower door with adjustable width in the conventional technology, and the method of providing the wall-against profile is a compromise in the face of mounting error during construction.

[0004] Therefore, there is an urgent need for a shower door that can eliminate the mounting error.

SUMMARY

[0005] In order to solve the problem of urgently needing a shower door that can eliminate the mounting error in the conventional technology, a rotating shaft assembly for a shower door and a shower door including the same are provided according to the present application.

[0006] According to an aspect of the present application, a rotating shaft assembly for a shower door is provided, which includes a transition assembly, a shaft sleeve, a clamping device and an adjustment assembly.

[0007] The transition assembly and the shaft sleeve are arranged side by side, and two ends of the transition assembly are hinged to two ends of the shaft sleeve respectively.

[0008] A groove is defined on a side, away from the transition assembly, of the shaft sleeve.

[0009] The clamping device is located in the groove, and is configured to clamp a panel of the shower door.

[0010] One end of the adjustment assembly is connected with the shaft sleeve, and the other end of the adjustment assembly is connected with a clamper; and a length of the adjustment assembly in a direction perpendicular to a rotating axis of the shaft sleeve is adjustable, so that a distance between the clamping device and the shaft sleeve is adjustable.

[0011] In some embodiments, the transition assembly includes a frame and a base; the shaft sleeve includes a rotating shaft and an end cover; the clamping device includes at least one clamper; the adjustment assembly includes a first adjustment member and a second adjustment member.

[0012] Each of two ends of the frame is provided with the base. Each of two ends of the rotating shaft is hinged to the base by means of the end cover.

[0013] A sliding groove extending through two end surfaces of the rotating shaft is defined on a side, away from the frame, of the rotating shaft; and a sliding groove bottom of the sliding groove is parallel to a rotating axis of the rotating shaft.

[0014] The clamper is fitted in the sliding groove and is slidable in a direction perpendicular to the sliding groove bottom, and the clamper has a clamping groove.

[0015] The first adjustment member is block-shaped, and an embedded end of the first adjustment member is connected with an end of the clamper.

[0016] The second adjustment member is strip-shaped, a first end of the second adjustment member is connected with the end cover, and a second end of the second adjustment member is away from the sliding groove bottom.

[0017] A main body of the second adjustment member is detachably connected with a main body of the first adjustment member, and an axial position of the first adjustment member along the second adjustment member is adjustable.

[0018] A side surface, facing toward the rotating shaft, of the base is provided with a first hinge member; a side surface, away from the rotating shaft, of the end cover is provided with a second hinge member; the first hinge member is hinged to the second hinge member, and a hinge rotating axis is parallel to the rotating axis of the rotating shaft.

[0019] One of the first hinge member and the second hinge member is a pin, and the other is a hole.

[0020] Optionally, a threaded hole is defined in a main body of the first adjustment member, the second adjustment member is a worm or screw, and the first adjustment member and the second adjustment member form a worm-slider fit or a screw-slider fit; or

one of the first adjustment member and the second adjustment member has a dovetail structure or a fishbone structure, and the other one of the first adjustment member and the second adjustment member is provided with a dovetail groove or fishbone groove.

[0021] Optionally, the rotating shaft is a profile, a contour of the end cover matches a contour of the rotating shaft, and an end, close to the rotating shaft, of the end cover is in sleeved connection with an end of the rotating shaft.

[0022] The end, facing toward the rotating shaft, of the end cover is provided with an accommodating groove; and the accommodating groove is configured to accommodate the first adjustment member and the second adjustment member.

[0023] Optionally, the frame includes a bottom plate, side plates, surrounding plates and bending plates.

[0024] The bottom plate is provided with fixing holes close to two ends of the bottom plate, and the fixing holes are configured to fix the bottom plate.

[0025] Each of two sides of the bottom plate is provided with the side plate, and the side plates and the bottom plate form a semi-enclosed structure in the shape of " ".

[0026] A side, away from the bottom plate, of each side plate is connected with the surrounding plate by means of the bending plate; and a threaded hole is formed in an inner wall of the bending plate.

[0027] A width of the surrounding plate is greater than a width of the side plate.

[0028] Optionally, the rotating shaft further includes a housing, a cross-sectional contour of the housing in a direction perpendicular to the rotating axis of the rotating shaft is in a shape of major arc; and end points of the major arc are connected with an outer wall of the sliding groove.

[0029] An end, close to the sliding groove bottom, of the outer wall of the sliding groove is provided with a connecting hole.

[0030] A first side wall and a second side wall of the sliding groove exceed a rear end of the housing; and a rear end of the first side wall and a rear end of the second side wall are provided with a first blocking strip and a second blocking strip respectively.

[0031] Along a direction toward the sliding groove bottom, a position-limiting protrusion is formed on an inner wall of the first side wall.

[0032] Optionally, each side inner wall of the clamping groove is provided with a first position-limiting strip and a second position-limiting strip along a clamping groove bottom to a groove opening.

[0033] A via hole is provided at a position, close to the first adjustment member, of the clamping groove bottom.

[0034] Optionally, the rotating shaft assembly further includes a sealing member.

[0035] The sealing member is arranged between the frame and the rotating shaft, to prevent dust and water from entering a gap between the frame and the rotating shaft.

[0036] Optionally, a first contact surface, facing toward the base, of the end cover is provided with a first contact portion; and a second contact surface, facing toward a surface of the end cover, of the base is provided with a second contact portion.

[0037] The first contact portion and the second contact portion form a protrusion-recess fit, to realize locking and positioning during rotation.

[0038] According to another aspect, a shower door is further provided according to an embodiment of the present application, which includes the rotating shaft assembly according to any preceding embodiment and a panel.
one side or either side of the panel is located in the clamping groove.

[0039] In the rotating shaft assembly for the shower door according to the embodiments of the present application, the shaft sleeve and the transition assembly are arranged side by side, and the two ends of the transition assembly are hinged to the two ends of the shaft sleeve respectively. The groove is defined on the side, away from the transition assembly, of the shaft sleeve. The clamping device is provided in the groove. One end of the adjustment assembly with the adjustable length is connected with the clamping device, and the other end is connected with the shaft sleeve, so that a relative position between the clamping device and the shaft sleeve is adjustable. Therefore, the distance between the panel of the shower door and the shaft sleeve is adjustable.

[0040] In the shower door according to the embodiments of the present application, the groove is defined on the side, away from the transition assembly, of the shaft sleeve, and the clamping device is placed in the groove. The position between the clamping device and the shaft sleeve is adjusted by the adjustment assembly with adjustable length, so that the position of the panel is adjustable, so as to eliminate the mounting error by adjusting the width of the shower door.

BRIEF DESCRIPTION OF THE DRAWINGS

[0041] The drawings described herein are for illustrative purposes only, and are not intended to limit the scope of the

present application in any way.

FIG. 1 is a schematic view showing a mounting position of a rotating shaft assembly for a shower door according to an embodiment of the present application;

FIG. 2 is an assembly diagram of an optional structure of the rotating shaft assembly for the shower door according to an embodiment of the present application;

FIG. 3 is an exploded view of the rotating shaft assembly for the shower door according to an embodiment of the present application;

FIG. 4 is a schematic structural view of an optional structure of a frame according to an embodiment of the present application;

FIG. 5 is a schematic structural view of an optional structure of a base according to an embodiment of the present application;

FIG. 6 is a schematic structural view of an optional structure of a rotating shaft according to an embodiment of the present application;

FIG. 7 is a schematic structural view of an optional structure of an end cover according to an embodiment of the present application;

FIG. 8 is a schematic structural view of another optional structure of the end cover according to an embodiment of the present application;

FIG. 9 is a schematic structural view of an optional structure of a clamper according to an embodiment of the present application; and

FIG. 10 is a schematic structural view of an optional structure of a first adjustment member according to an embodiment of the present application.

[0042] Reference numerals in the drawings are listed as follows:

10	frame;	11	base;	12	sealing member;	20	rotating shaft;
30	end cover;	40	clamper;	50	first adjustment member;	60	second adjustment member;
70	panel;	101	bottom plate;	102	side plate;	103	surrounding plate;
104	bending plate;	111	first hinge member;	201	sliding groove;	202	housing;
203	sliding groove bottom;	204	connecting hole;	205	first side wall;	206	second side wall;
207	position-limiting protrusion;	208	first blocking strip;	209	second blocking strip;	301	second hinge member;
302	engagement section;	303	limiting section;	304	first avoidance groove;	305	accommodating groove;
306	positioning groove;	307	first contact surface;	308	positioning hole;	309	second contact portion;
310	second avoidance groove;	401	clamping groove;	402	clamping groove bottom;	403	clamping groove wall;
404	via hole;	405	first position-limiting strip;	406	second position-limiting strip;	501	embedded end;
502	threaded hole;	503	positioning groove;	504	blocking sheet;	1011	fixing hole.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0043] The following description is merely exemplary in nature and is not intended to limit the present application and an application or use thereof. It should be understood that the corresponding reference numerals in the drawings always indicate the same or corresponding parts and features.

[0044] Exemplary embodiments are provided so that the disclosure of the present application is sufficient and the scope is fully conveyed to those skilled in the art. Many specific details, such as examples of specific components, devices, and methods, are clarified here to provide a comprehensive understanding of embodiments of the present application. It is obvious to those skilled in the art that the exemplary embodiments may be implemented in many different forms without the specific details, and hence none of them should be interpreted as limiting the scope of the present application. In some

exemplary embodiments, well-known methods, well-known device structures, and well-known technologies are not described in detail.

[0045] When an element or layer is referred to as being "located on", or "bonded", "connected" or "coupled" to another element or layer, the element or layer may be directly located on the other element or layer, or directly bonded, connected or coupled to the other element or layer, or there may be intermediate elements or layers. In contrast, when an element or layer is referred to as being "directly located on", "directly bonded with", "directly connected to" or "directly coupled to" another element or layer, there is no element or layer intervened therebetween. Other terms for describing relationships among the elements should be interpreted in a similar manner (for example, "between" and "directly between", "adjacent" and "directly adjacent", etc.). The term, "and/or", as used herein includes any and all combinations of one or more of the associated listed items.

[0046] Although the terms, "first", "second", "third" and the like, may be used herein to describe different elements, components, regions, layers and/or portions, these elements, components, regions, layers and/or portions should not be limited by these terms. These terms may only be used to distinguish one element, component, region, layer and/or portion from another region, layer and/or portion. Unless clearly stated by the context, the use of terms such as "first", "second", and other numerical terms herein does not imply a certain sequence or order. Therefore, the first element, component, region, layer or portion discussed below may also be referred to as second element, component, region, layer or portion without departing from the teachings of the exemplary embodiments.

[0047] The conventional technology has the following disadvantages in providing a sleeve structure between a wall-against profile and a transition profile during construction.

(1) The transition profile is in sleeved connection with the wall-against profile. If the fit is tight, a relative position adjustment of sliding between the two will scratch the surface, affecting the corrosion resistance of the profile and the appearance of the product. If the fit is loose, there will be a gap between the two, which will cause looseness and noise when the panel is rotated.

(2) The transition profile is in sleeved connection with the wall-against profile, and the relative position between the transition profile and the wall-against profile is fixed by screws. However, due to the thin wall thickness of the profile, the number of teeth connecting the screws to the profile wall is excessively small, so that the bearing capacity of the screws is limited and the screws are prone to failure, thereby reducing the strength of the revolving door.

[0048] In view of the above problems, a rotating shaft assembly for a shower door and a shower door including the same are provided according to embodiments of the present application. FIG. 1 is a schematic view showing a mounting position of the rotating shaft assembly.

[0049] The rotating shaft assembly includes a transition assembly, a shaft sleeve, a clamping device and an adjustment assembly. The transition assembly is configured to connect the shaft sleeve with the wall. Generally, the transition assembly and the shaft sleeve are arranged side by side, and two ends of the transition assembly are hinged to two ends of the shaft sleeve respectively, so that the shaft sleeve is rotatable around a rotating axis parallel to a central axis of the shaft sleeve.

[0050] According to an embodiment of the present application, a groove is defined on a side, away from the transition assembly, of the shaft sleeve, and is configured to accommodate the clamping device. The clamping device is located in the groove on the side of the shaft sleeve, and is configured to clamp a panel of the shower door. The rotating shaft assembly according to an embodiment of the present application further includes an adjustment assembly, and a length of the adjustment assembly is adjustable. One end of the adjustment assembly is connected with the shaft sleeve, and the other end of the adjustment assembly is connected with the clamping device. When the length of the adjustment assembly is adjusted, the clamping device moves back and forth in the groove in a direction perpendicular to the rotating axis of the shaft sleeve, thereby driving the panel of the shower door away from or close to the shaft sleeve, achieving an adjustable width of the shower door and eliminating the mounting error.

[0051] Referring to FIG. 1 to FIG. 5, an optional transition assembly is provided according to an embodiment of the present application, which includes a frame 10 and a base 11, and each of two ends of the frame 10 is provided with the base 11. Optionally, the frame 10 is a strip-shaped profile. (a) and (b) in FIG. 4 respectively show perspective views of an optional structure of the frame 10 viewed from different perspectives, and (c) in FIG. 4 shows a top view of the optional structure of the frame 10. As shown in (c) in FIG. 1, the frame 10 includes a bottom plate 101, side plates 102, surrounding plates 103 and bending plates 104.

[0052] Specifically, the bottom plate 101 is provided with fixing holes 1011 at positions close to two ends of the bottom plate 101. The fixing holes 1011 are configured to fix the bottom plate 1011 to the wall. For example, bolts are passed through the fixing holes 1011 at the two ends of the bottom plate 101, so as to press the bottom plate 101 against the wall. Each of two sides of the bottom plate 101 is provided with the side plate 102, and the side plates 102 and the bottom plate form a semi-enclosed structure in the shape of "⊏". Optionally, a side, away from the bottom plate 101, of each side plate 102 is connected with the bending plate 104. A cross section of the bending plate 104 is circular or major-arc-shaped.

Optionally, a through hole is formed in the base 11. A connector/fastener can be inserted into a hole formed by the bending plate 104 after passing through the base 11, so as to achieve the connection between the base 11 and the frame 10. Optionally, threads are formed at a position of an inner wall of the bending plate 104 close to the end, and are configured to threadedly connect the base 11 with the frame 10. Optionally, a side, away from the side plate 102, of each bending plate 104 is connected with the surrounding plate 103. The surrounding plate 103 is configured to cover a gap between the shaft sleeve and the bottom plate 101. According to an embodiment of the present application, as shown in FIG. 2 and FIG. 3, a sealing member 12 may be provided in the groove defined by the bottom plate 101, the side plates 102, the surrounding plates 103 and the bending plates 104, so as to enhance the sealing effect on the gap between the frame 10 and the shaft sleeve. The surrounding plates 103 and the sealing member 12 are configured to prevent dust and water from entering the gap between the shaft sleeve and the frame 10. Optionally, a width of the surrounding plate 103 is greater than a width of the side plate 102.

[0053] According to an embodiment of the present application, A and B in FIG. 5 show perspective views of the base 11 viewed from different perspectives. The base 11 is plate-shaped. A thickness direction of the base 11 is parallel to an extending direction of the frame 10. The shaft sleeve is mounted between the bases 11 at the two ends of the frame. A side surface, facing toward the midpoint of the frame 10, of the base 11 is provided with a first hinge member 111, which is configured to be hinged to the shaft sleeve. At least one though hole 113 is formed at a position of the base 11 connected with the frame 10, that is, on a surface 112 facing away from the frame 10, for fasteners to pass through. For example, it should be understood that the connection between the frame 10 and the base 11 can be fixed or detachable.

[0054] In some optional embodiments, as shown in FIG. 2, FIG. 3 and FIG. 6, a shaft sleeve is provided according to the embodiments of the present application, which includes a rotating shaft 20 and end covers 30 arranged at two ends of the rotating shaft 20. A perspective view of the rotating shaft 20 is shown in the left figure of FIG. 6, and a top view of the rotating shaft 20 is shown in the right figure of FIG. 6. As shown in the FIG. 3 and the right figure of FIG. 6, the rotating shaft 20 has a cylindrical structure, and a sliding groove 201 is defined on a side, away from the frame 10, of the rotating shaft 20. Optionally, an end, close to a sliding groove bottom 203, of an outer wall of the sliding groove 201 is provided with a connecting hole 204. A contour of the connecting hole 204 may be circular or major-arc-shaped. Optionally, a first side wall 205 and a second side wall 206 of the sliding groove 201 exceed a rear end of a housing 202. A rear end of the first side wall 205 and a rear end of the second side wall 206 form a first blocking strip 208 and a second blocking strip 209 respectively. Along a direction toward the sliding groove bottom 203, a position-limiting protrusion 207 is formed on an inner wall of the first side wall 205.

[0055] Optionally, the rotating shaft 20 further includes a housing 202, the sliding groove bottom 203 of the sliding groove 201 is surrounded by the housing 202. Along a direction perpendicular to the rotating axis, a cross-sectional contour of the housing 202 is in a shape of major arc, and end points of the major arc are connected with the outer wall of the sliding groove 201.

[0056] According to an embodiment of the present application, as shown in FIG. 7 and FIG. 8, a contour of the end cover 30 matches a contour of the rotating shaft 20, and an end, close to the rotating shaft 20, of the end cover 30 is in sleeved connection with an end of the rotating shaft 20. The end, facing toward the rotating shaft 20, of the end cover 30 is provided with an accommodating groove 305. The accommodating groove 305 is configured to accommodate the adjustment assembly. As shown in FIG. 7, the end cover 30 includes an engagement section 302 and a limiting section 303. As shown in FIG. 2 and FIG. 3, the engagement section 302 is configured to engage with the end of the rotating shaft 20. A diameter of the limiting section 303 is different from a diameter of the engagement section 302, and the limiting section 303 and the engagement section 302 form a step. When the engagement section 302 engages with the rotating shaft 20, a surface of the step overlaps with an end face of the rotating shaft 20, thus preventing the end cover 30 from moving toward the center of the rotating shaft 20. Exemplarily, an outer diameter of the engagement section 302 is equal to an inner diameter of the housing 202, and an outer diameter of the limiting section 303 is greater than an outer diameter of the engagement section 302. Exemplarily, an inner diameter of the engagement section 302 is equal to an outer diameter of the housing 202, and an inner diameter of the limiting section 303 is smaller than an outer diameter of the housing 202. It should be understood that a groove body of the accommodating groove 305 protrudes from a surface of the limiting section 303.

[0057] Further, a positioning groove 306 is formed in an inner wall of a side, corresponding to the sliding groove bottom 203 of the rotating shaft 20, of the accommodating groove 305, which is configured to fix the adjustment assembly. Furthermore, a first avoidance groove 304 is defined on a side, corresponding to the sliding groove bottom 203, of the limiting section 303, and a second avoidance groove 310 is defined at the bottom of a side, corresponding to an opening of the sliding groove 201, of the accommodating groove 305. The first avoidance groove 304 and the second avoidance groove 310 are configured to facilitate the entry of the adjustment tool into the end cover 30, so as to realize the adjustment of the length of the adjustment assembly. Optionally, a side wall of the accommodating groove 305 may exceed beyond a bounding surface between the limiting section 303 and the engagement section 302. When the engagement section 302 engages with the rotating shaft 20, the accommodating groove 305 engages with the side wall of the sliding groove 201, so as to prevent the end cover 30 from rotating around the central axis of the housing 202.

[0058] Optionally, as shown in FIG. 7, a first contact surface 307, away from the rotating shaft 20, of the end cover 30 is a

flat surface, and a second hinge member 301 is formed on the flat surface. The second hinge member 301 is hinged to the first hinge member 111, so as to realize the rotation of the rotating shaft 20. It should be noted that, one of the second hinge member 301 and the first hinge member 111 may be a pin, and the other one of the first hinge member 111 and the second hinge member 301 may be a hole. It should be noted that the pin may be rigid or elastic. At least one positioning hole 308 is formed on the first contact surface 307, and a position of the positioning hole 308 corresponds to a position of the connecting hole 204, which allows the end cover 30 to be connected with the rotating shaft 20 by a connector or a fastener (such as a buckle, a pin or a screw).

[0059] In still other optional embodiments, as shown in FIG. 8, a second contact portion 309 is formed on a surface of the first contact surface 307. Correspondingly, a first contact portion 114 is formed on a side, facing toward the center of the frame 10, of the base 11. The first contact portion 114 and the second contact portion 309 form a protrusion-recess fit, to realize the angle positioning and obstacle avoidance during the rotation of the rotating shaft 20. Optionally, surface contours of the first contact portion 114 and the second contact portion 309 have guiding surfaces.

[0060] According to an embodiment of the present application, the clamping device includes at least one clamper 40. As shown in FIG. 3 and FIG. 9, in some exemplary embodiment, the clamper 40 is a rod-shaped profile provided with a clamping groove 401 extending through two ends. Each side inner wall of the clamping groove 401 is provided with a first position-limiting strip 405 and a second position-limiting strip 406 along a clamping groove bottom 402 to a groove opening. A via hole 404 is provided at a position, close to an end of the clamper, of the clamping groove bottom 402. An end of the adjustment assembly is embedded in the clamping groove 401, and a main body of the adjustment assembly passes through the via hole 404. The first position-limiting strip 401 and the second position-limiting strip 406 are configured to limit the end of the adjustment assembly, so that the clamper 40 moves axially along the main body of the adjustment assembly with the movement of the end of the adjustment assembly when the length of the adjustment assembly is adjusted. It is not difficult to understand that the clamping device may also be two independent clampers 40, which are respectively clamped at two same-side corners of the panel of the shower door.

[0061] According to an embodiment of the application, the adjustment assembly is of a length-adjustable structure in a broad sense. It may have an integral and non-detachable structure, such as a segmented telescopic structure similar to an antenna or a telescopic rack structure and its variation structure. The adjustment assembly may also have a split and detachable structure, such as a worm-slider structure, a rail-slider structure, or a screw-slider structure and the like. Although the total length of this kind of structure and its variation is unchanged, a distance between the slider and the end of the rail or bar is adjustable, which is referred to as a length-adjustable structure in the present application. Optionally, the adjustment assembly includes a first adjustment member 50 and a second adjustment member 60. Preferably, the adjustment assembly has a locking mechanism.

[0062] Exemplarily, the first adjustment member 50 is block-shaped, and a main body of the first adjustment member 50 is provided with a threaded hole 502. Correspondingly, the second adjustment member 60 is a worm or a screw, and the first adjustment member 50 and the second adjustment member 60 form a worm-slider fit or a screw-slider fit. For another example, one of the first adjustment member 50 and the second adjustment member 60 has a dovetail structure or a fishbone structure, and the other one of the first adjustment member 50 and the second adjustment member 60 is provided with a dovetail groove or fishbone groove.

[0063] Referring to FIG. 10, an optional first adjustment member 50 is provided according to an embodiment of the present application. The first adjustment member 50 is cubic. As shown in FIG. 2 and FIG. 3, an embedded end 501 of the first adjustment member 50 is embedded in the clamping groove 401. Each of two sides of the embedded end 501 is provided with a positioning groove 503. When the embedded end 501 is embedded in the clamping groove 401, the first position-limiting strip 405 on the inner wall of the clamping groove 401 enters the positioning groove 503, and forms a protrusion-recess fit with the positioning groove 503, so that the clamper 40 moves with the movement of the first adjustment member 50. As shown in FIG. 10, a blocking sheet 504 is formed on a side surface, facing away from the embedded end 501, of the first adjustment member 50, and the blocking sheet 504 is configured to prevent the first adjustment member from moving toward the center of the clamping groove. Alternatively, the second adjustment member 60 is a screw.

[0064] As shown in FIG. 2, when the end cover 30 engages with the end of the rotating shaft 20, the second adjustment member 60 passes through the second avoidance groove 310, the via hole 404 and the threaded hole 502 in a listed sequence. One end of the second adjustment member 60 is limited by the positioning groove 306, and the other end points a direction away from the sliding groove bottom 203. The embedded end 501 of the first adjustment member 50 is embedded in the clamping groove 401, and one end of the clamper 40 is located in the accommodating groove 305, so that the first adjustment member 50 can reciprocate in the accommodating groove 305. FIG. 2 shows an example in which the first hinge member 111 is a hole and the second hinge member 301 is a pin.

[0065] In an optional embodiment, the first adjustment member 50 is a screw, and the second adjustment member 60 is a slider. Referring to FIG. 2 and FIG. 3, a mounting process of the rotating shaft assembly according to an embodiment of the present application is shown below. The frame 10 is fixed against the wall, and the two bases 11 are arranged at two ends of the frame 10, opposing each other. The panel 70 is inserted into the clamping groove 401 of the clamper 40, then the two

first adjustment members 50 are inserted into the two ends of the clamping groove 401 respectively, and the threaded holes 502 are aligned with the via holes 404, and then the second adjustment members 60 are screwed into the threaded holes 202 after passing through the via holes 404. After the position of the first adjustment member 50 in the second adjustment member 60 is adjusted according to the required dimension for field mounting, the clamper 40 is fitted into the sliding groove 201 of the rotating shaft 20, so that an end, away from the first adjustment member 50, of the second adjustment member 60 is overlapped with the sliding groove bottom 203. Then, the end covers 30 are inserted into the two ends of the rotating shaft 20, so that the first adjustment member 50 and the second adjustment member 60 are located in the accommodating groove 305, and the end, away from the first adjustment member 50, of the second adjustment member 60 is embedded in the positioning groove 306. Finally, the rotating shaft 20 with the end covers 30 mounted at the two ends is hinged to the first hinge member 111 of the base 11 by means of the second hinge member 301. Optionally, before the rotating shaft 20 is hinged to the base 11, a sealing member 12 may be mounted on a side, facing away from the wall, of the frame 10.

[0066] According to another aspect, a shower door is provided according to an embodiment of the present application, which includes the rotating shaft assembly according to any preceding embodiments and a panel 70. Sides of the panel 70 are located in the clamping groove 401.

[0067] In summary, in the rotating shaft assembly for the shower door and the shower door including the same according to the embodiments of the present application, the bases are arranged at the two ends of the frame, the rotating shaft is hinged to the bases by using the end covers, the sliding groove is defined on the side of the rotating shaft, and the clamper is arranged in the sliding groove. The embedded end of the first adjustment member is connected with the end of the clamper, the first end of the second adjustment member is connected with the end cover, and the second end of the second adjustment member faces away from the sliding groove bottom. The main body of the second adjustment member is detachably connected with the main body of the first adjustment member, and the axial position of the first adjustment member along the second adjustment member is adjustable, so that the position of the clamper in the sliding groove is adjustable. Therefore, the relative position of the frame and the panel of the shower door can be adjusted, and the mounting error can be eliminated. With the above structure, the problems of scratch, looseness and noise caused by the sleeved connection between the transition profile and the wall-against profile are avoided, the axial position of the first adjustment member along the second adjustment member is adjustable and the position of the clamper is adjustable by the detachable connection between the main body of the first adjustment member and the main body of the second adjustment member. In addition, the connection between the main body of the first adjustment member and the main body of the second adjustment member avoids the problem of insufficient strength of the shower door caused by insufficient number of connected teeth of the screws when the profile is directly fixed by screws.

[0068] Although some embodiments and variations of the present application have been described in detail, it should be understood by those skilled in the art that the present application is not limited to the embodiments and variations described above but may include other various possible conjunctions and combinations. Other variations and modifications can be implemented by those skilled in the art without departing from the essence and scope of the present application. All these modifications and variations fall within the scope of the present application. Moreover, all the members described herein can be replaced by other technically equivalent members.

Claims

1. A rotating shaft assembly for a shower door, wherein the rotating shaft assembly comprises a transition assembly, a shaft sleeve, a clamping device and an adjustment assembly; wherein,

   the transition assembly and the shaft sleeve are arranged side by side, and two ends of the transition assembly are hinged to two ends of the shaft sleeve respectively,
   a groove is defined on a side, away from the transition assembly, of the shaft sleeve;
   the clamping device is located in the groove, and is configured to clamp a panel of the shower door; and
   one end of the adjustment assembly is connected with the shaft sleeve, and the other end of the adjustment assembly is connected with a clamper; and a length of the adjustment assembly in a direction perpendicular to a rotating axis of the shaft sleeve is adjustable, so that a distance between the clamping device and the shaft sleeve is adjustable.

2. The rotating shaft assembly according to claim 1, wherein the transition assembly comprises a frame (10) and a base (11); the shaft sleeve comprises a rotating shaft (20) and an end cover (30); the clamping device comprises at least one clamper (40); the adjustment assembly comprises a first adjustment member (50) and a second adjustment member (60); wherein

each of two ends of the frame (10) is provided with the base (11); each of two ends of the rotating shaft (20) is hinged to the base (11) by means of the end cover (30);
a sliding groove (201) extending through two end surfaces of the rotating shaft (20) is defined on a side, away from the frame (10), of the rotating shaft (20); and a sliding groove bottom (203) of the sliding groove (201) is parallel to a rotating axis of the rotating shaft (20);
the clamper (40) is fitted in the sliding groove (201) and is slidable in a direction perpendicular to the sliding groove bottom (203), and the clamper (40) has a clamping groove (401);
the first adjustment member (50) is block-shaped, and an embedded end (501) of the first adjustment member (50) is connected with an end of the clamper (40);
the second adjustment member (60) is strip-shaped, a first end of the second adjustment member (60) is connected with the end cover (30), and a second end of the second adjustment member (60) is away from the sliding groove bottom (203);
a main body of the second adjustment member (60) is detachably connected with a main body of the first adjustment member (50), and an axial position of the first adjustment member (50) along the second adjustment member (60) is adjustable;
a side surface, facing toward the rotating shaft (20), of the base (11) is provided with a first hinge member (111); a side surface, away from the rotating shaft (20), of the end cover (30) is provided with a second hinge member (301); the first hinge member (111) is hinged to the second hinge member (301), and a hinge rotating axis is parallel to the rotating axis of the rotating shaft (20); and
one of the first hinge member (111) and the second hinge member (301) is a pin, and the other is a hole.

3. The rotating shaft assembly according to claim 2, wherein a threaded hole (502) is defined in the main body of the first adjustment member (50), the second adjustment member (60) is a worm or screw, and the first adjustment member (50) and the second adjustment member (60) form a worm-slider fit or a screw-slider fit; or
one of the first adjustment member (50) and the second adjustment member (60) has a dovetail structure or a fishbone structure, and the other one of the first adjustment member (50) and the second adjustment member (60) is provided with a dovetail groove or fishbone groove.

4. The rotating shaft assembly according to claim 2 or 3, wherein the rotating shaft (20) is a profile, a contour of the end cover (30) matches a contour of the rotating shaft (20), and an end, close to the rotating shaft (20), of the end cover (30) is in sleeved connection with an end of the rotating shaft (20); and
the end, facing toward the rotating shaft (20), of the end cover (30) is provided with an accommodating groove (305); and the accommodating groove (305) is configured to accommodate the first adjustment member (50) and the second adjustment member (60).

5. The rotating shaft assembly according to claim 2, wherein the frame (10) comprises a bottom plate (101), side plates (102), surrounding plates (103) and bending plates (104);

the bottom plate (101) is provided with fixing holes (1011) close to two ends of the bottom plate, and the fixing holes (1011) are configured to fix the bottom plate (101);
each of two sides of the bottom plate (101) is provided with the side plate (101), and the side plates (102) and the bottom plate (101) form a semi-enclosed structure in the shape of "⊏";
a side, away from the bottom plate (101), of each side plate (102) is connected with the surrounding plate (103) by means of the bending plate (104); a threaded hole is formed in an inner wall of the bending plate (104); and
a width of the surrounding plate (103) is greater than a width of the side plate (102).

6. The rotating shaft assembly according to claim 2 or 3, wherein the rotating shaft (20) further comprises a housing (202), a cross-sectional contour of the housing (202) in a direction perpendicular to the rotating axis of the rotating shaft (20) is in a shape of major arc; end points of the major arc are connected with an outer wall of the sliding groove (201);

an end, close to the sliding groove bottom (203), of the outer wall of the sliding groove (201) is provided with a connecting hole (204);
a first side wall (205) and a second side wall (206) of the sliding groove (201) exceed a rear end of the housing (202); a rear end of the first side wall (205) and a rear end of the second side wall (206) are provided with a first blocking strip (208) and a second blocking strip (209) respectively; and
a position-limiting protrusion (207) is formed, along a direction toward the sliding groove bottom (203), on an inner wall of the first side wall (205).

7. The rotating shaft assembly according to claim 2, wherein each side inner wall of the clamping groove (401) is provided with a first position-limiting strip (405) and a second position-limiting strip (406) along a clamping groove bottom (402) to a groove opening; and
a via hole (404) is provided at a position, close to the first adjustment member (50), of the clamping groove bottom (402).

8. The rotating shaft assembly according to claim 2, wherein the rotating shaft assembly further comprises a sealing member (12); and
the sealing member (12) is arranged between the frame (10) and the rotating shaft (20), to prevent dust and water from entering a gap between the frame (10) and the rotating shaft (20).

9. The rotating shaft assembly according to claim 1, wherein a first contact surface (307), facing toward the base (11), of the end cover (30) is provided with a first contact portion (309); a second contact surface, facing toward a surface of the end cover (30), of the base (11) is provided with a second contact portion; and
the first contact portion (309) and the second contact portion form a protrusion-recess fit, to realize locking and positioning during rotation.

10. A shower door, comprising the rotating shaft assembly according to any one of claims 1 to 9 and a panel (70); and one side or either side of the panel (70) is located in the clamping groove (40).

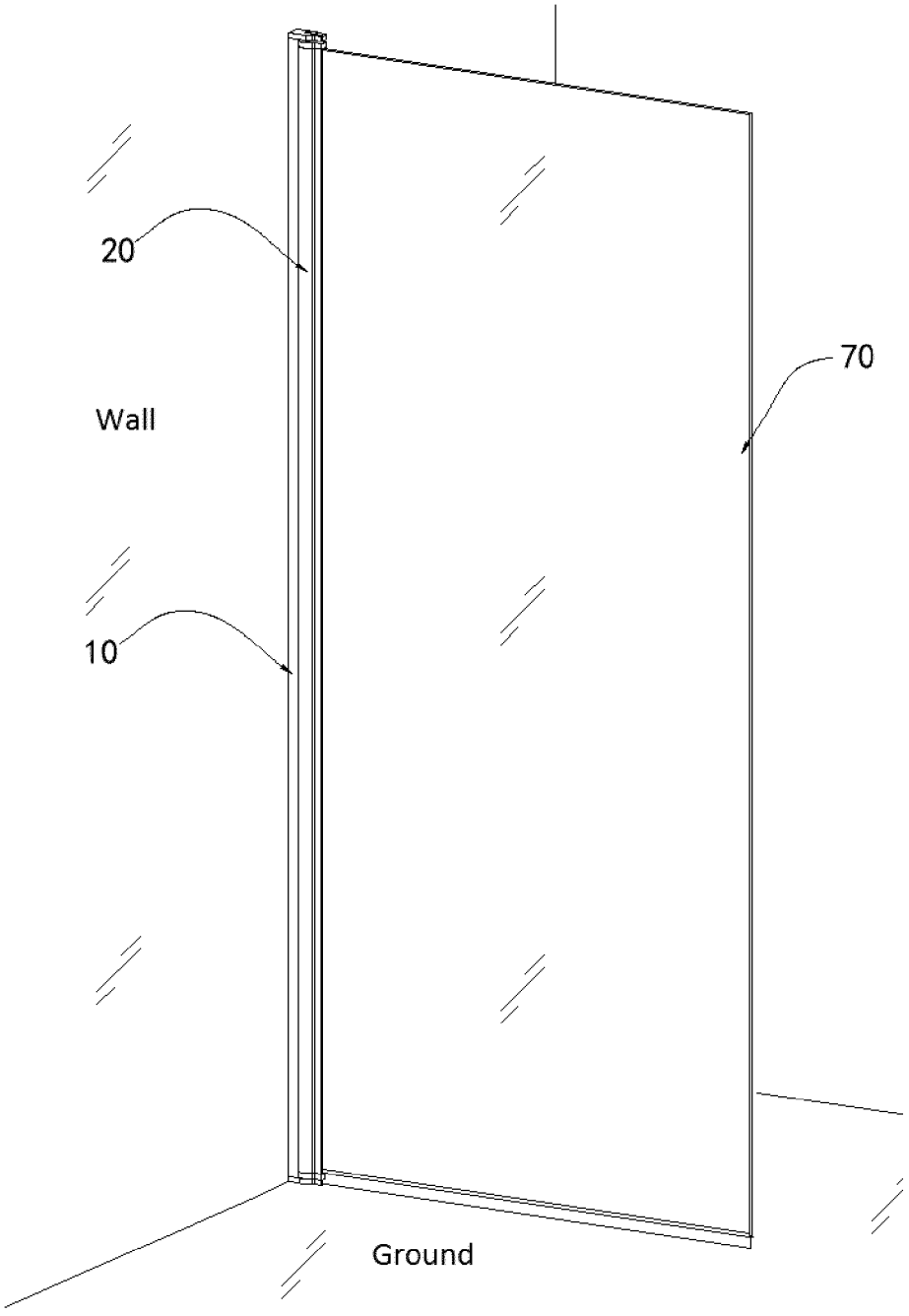


FIG. 1

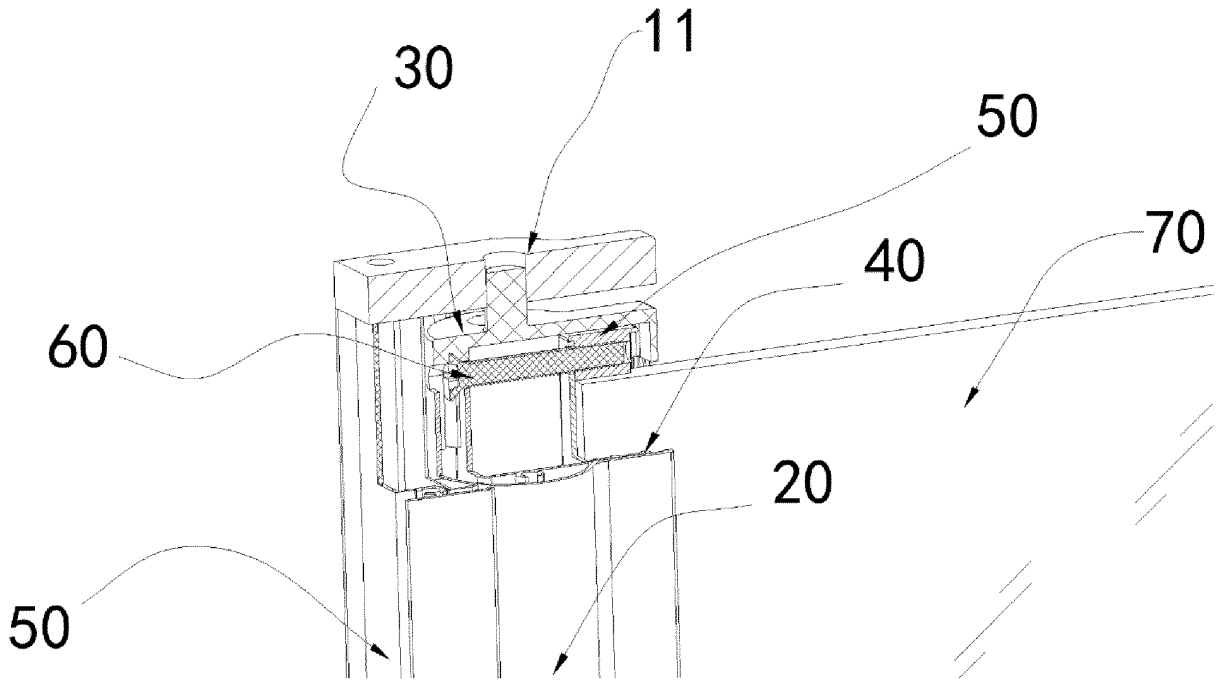


FIG. 2

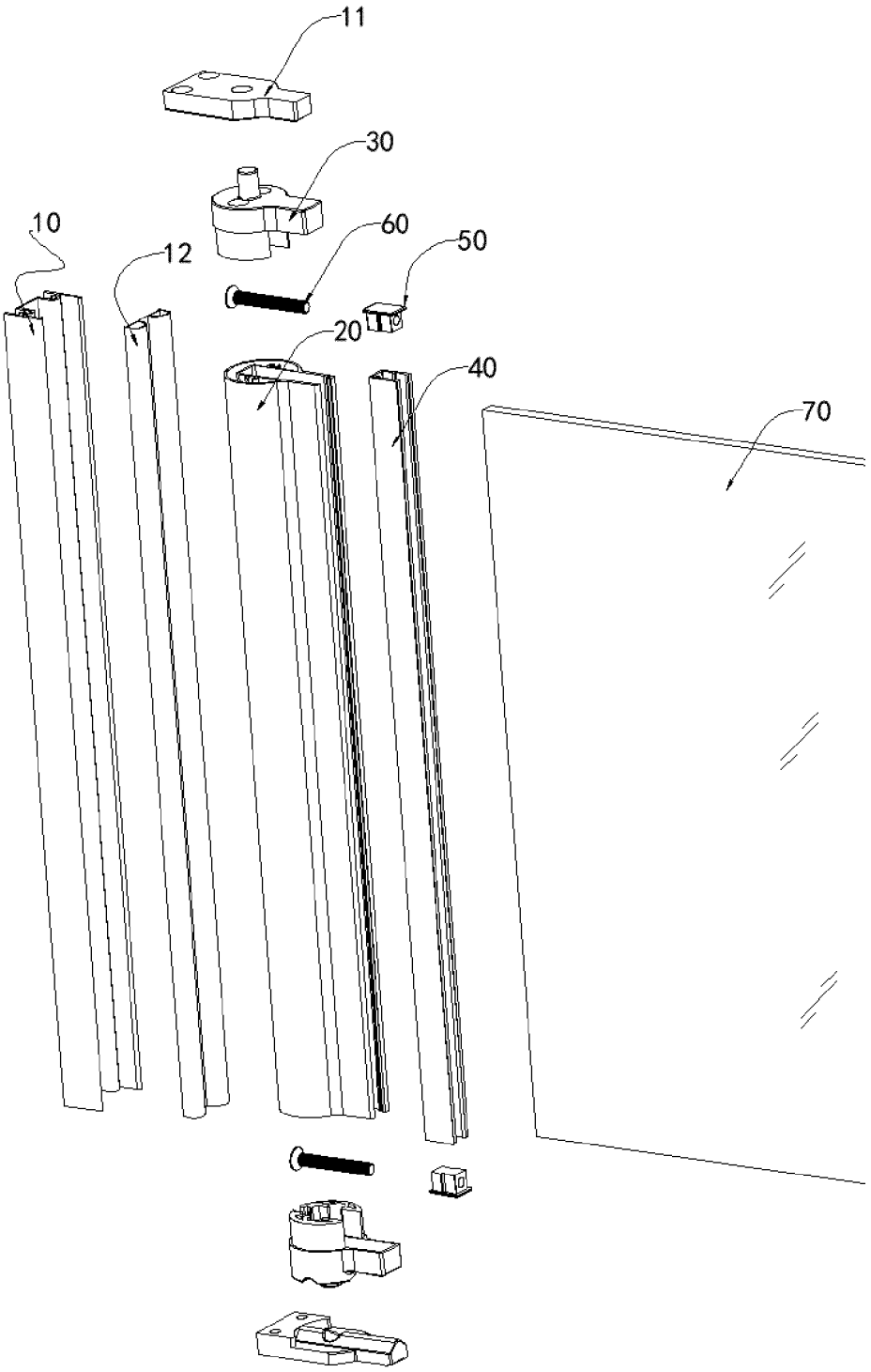


FIG. 3

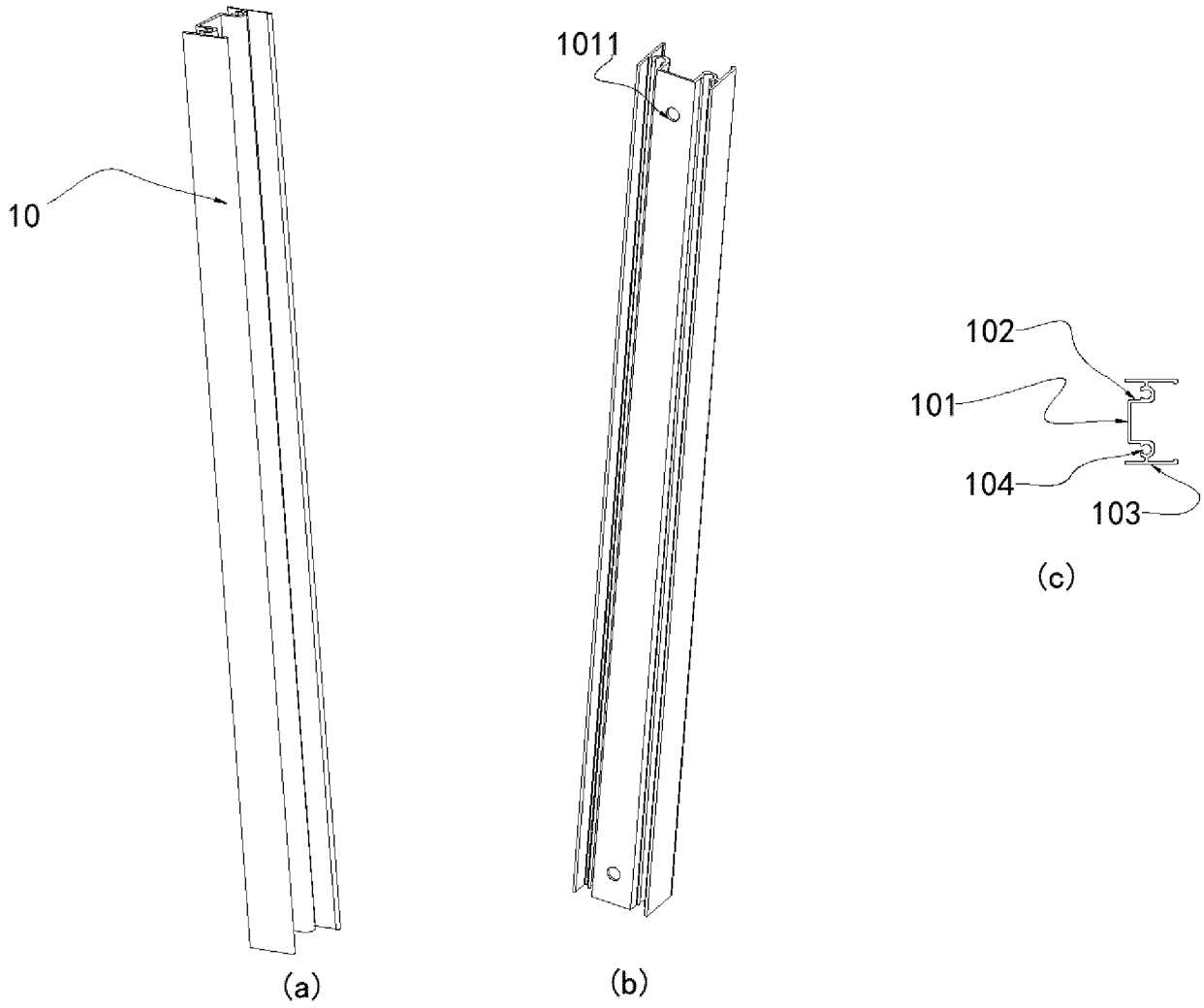


FIG. 4

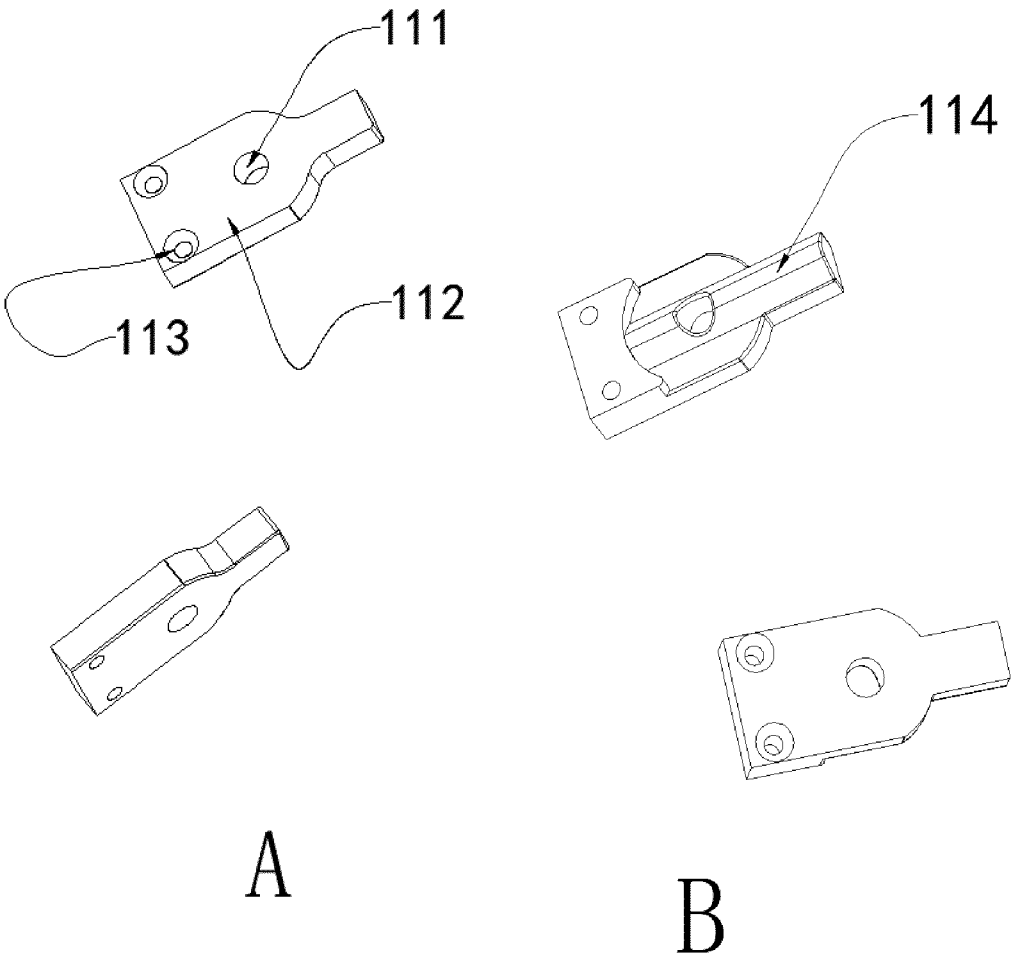
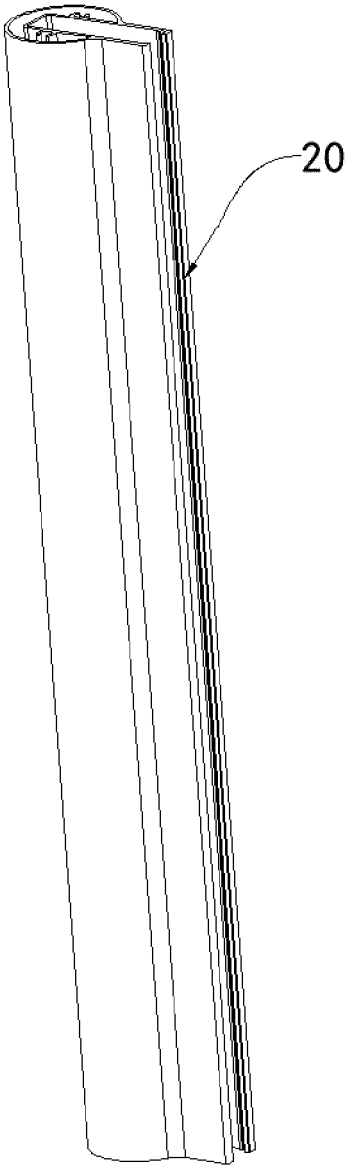


FIG. 5



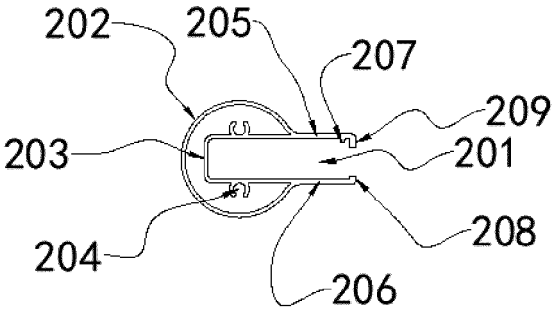


FIG. 6

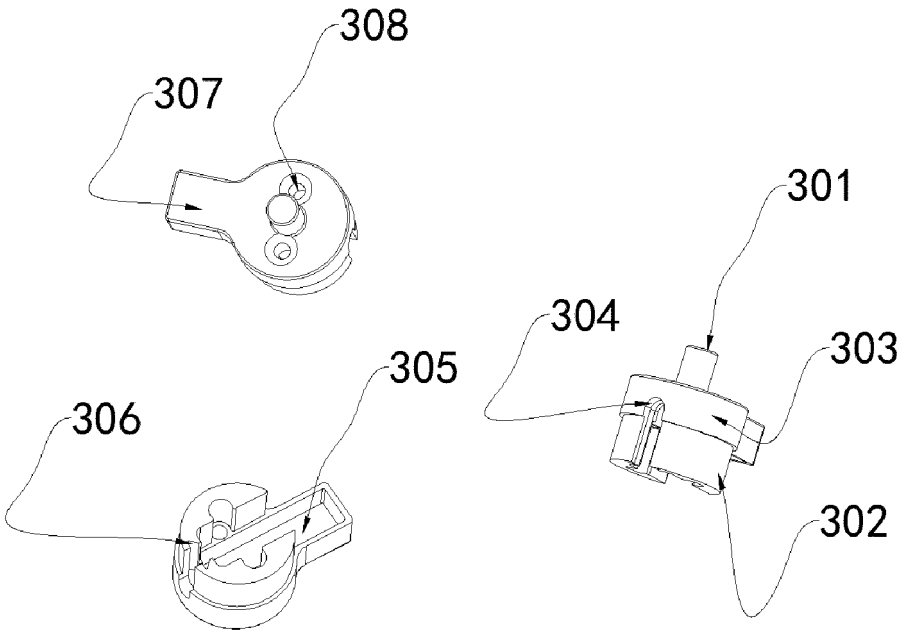


FIG. 7

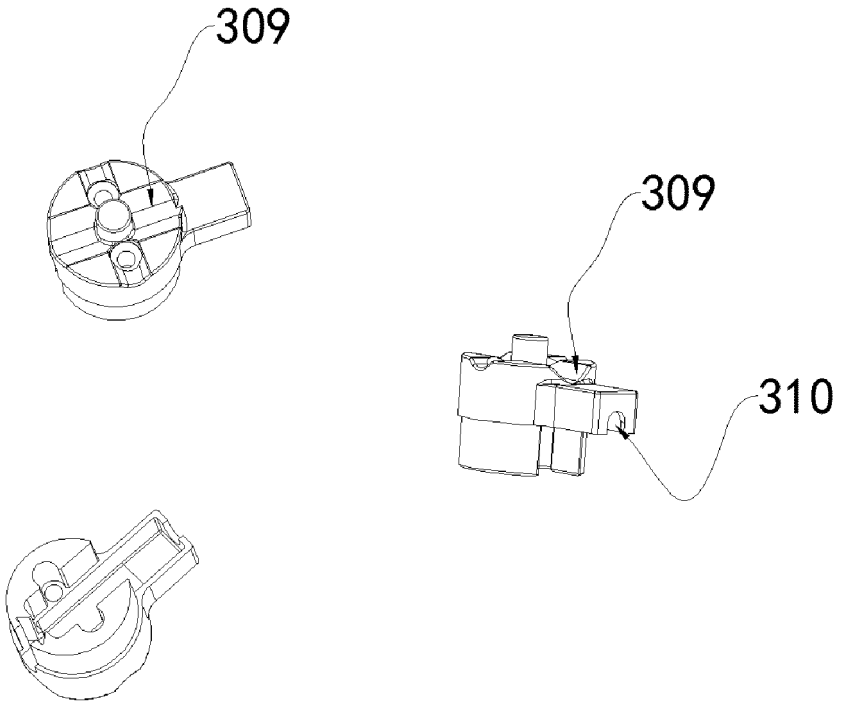


FIG. 8

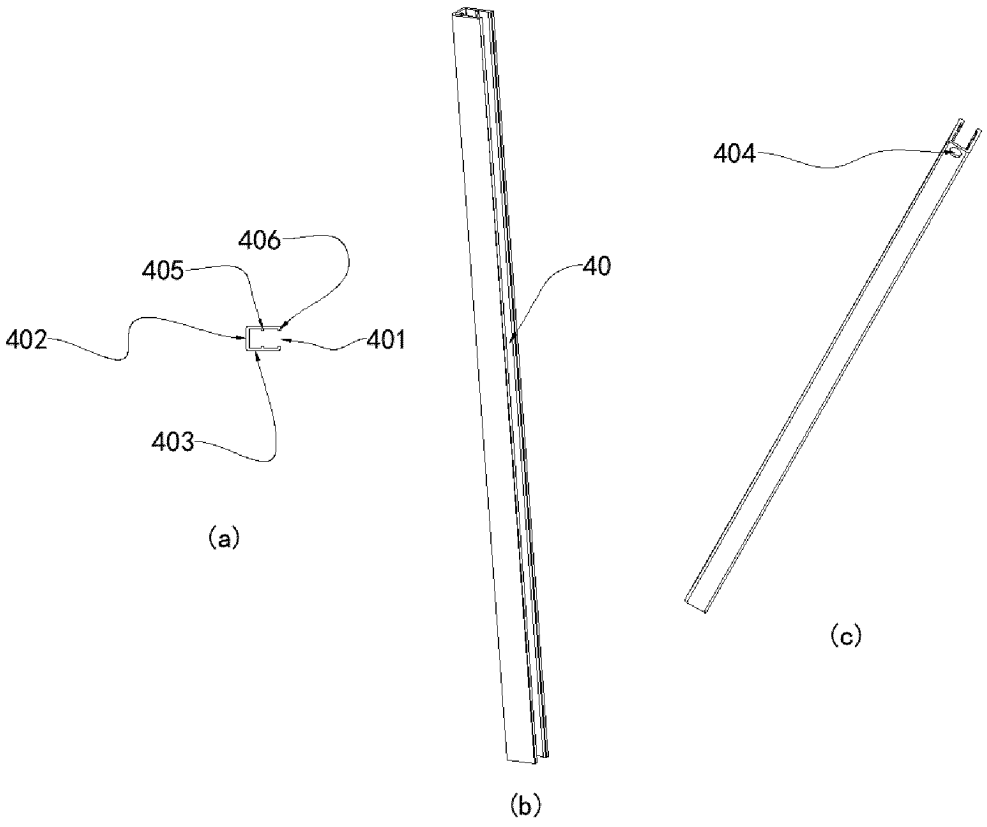


FIG. 9

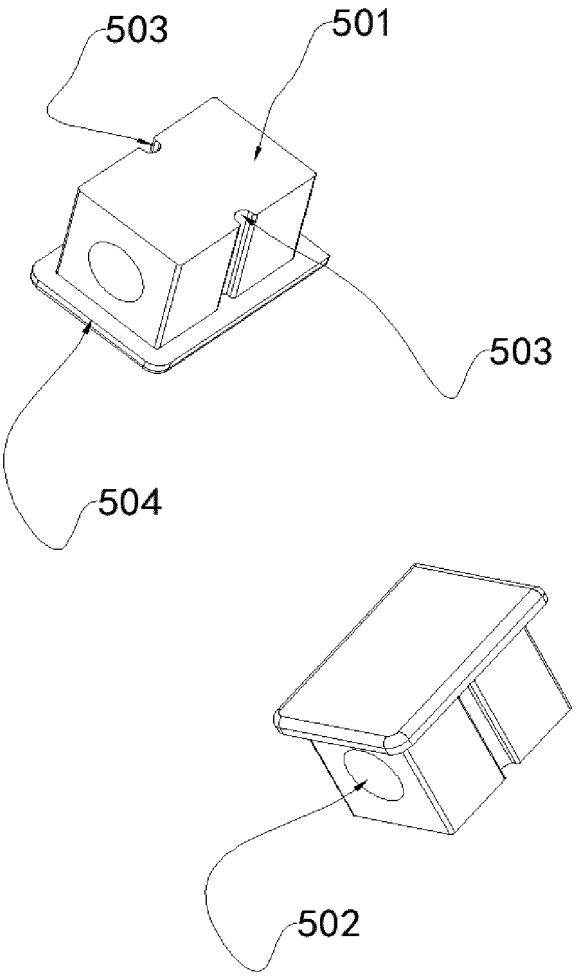


FIG. 10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2023/087529

A. CLASSIFICATION OF SUBJECT MATTER

E05D 7/083 (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)

IPC: E05D,E06B,A47K

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)

CNABS, CNTXT, CNTXTC, VEN, CNKI: 淋浴, 浴室, 玻璃, 门, 调节, 调整, 可调, 轴, 螺纹, 螺钉, shower+, bath+, glass+, adjust+, regulat+, shaft?, screw+, bolt?

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 29504881 U1 (ROTH WERKE GMBH) 01 June 1995 (1995-06-01) claims 1-5, description, pages 4-5, and figures 1-4	1, 10
Y	DE 29504881 U1 (ROTH WERKE GMBH) 01 June 1995 (1995-06-01) claims 1-5, description, pages 4-5, and figures 1-4	2-9
Y	CN 111852256 A (FUJIAN XIHE SANITARY WARE TECHNOLOGY CO., LTD.) 30 October 2020 (2020-10-30) description, specific embodiments, and figures 1-17	2-9
A	CN 209315678 U (NINGBO OBETTER SANITARY WARE CO., LTD.) 30 August 2019 (2019-08-30) entire document	1-10
A	DE 8902211 U1 (KORALLE SANITAERPRODUKTE GMBH) 08 June 1989 (1989-06-08) entire document	1-10
A	EP 3251569 A1 (ROTH WERKE GMBH) 06 December 2017 (2017-12-06) entire document	1-10

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"D" document cited by the applicant in the international application
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
04 January 2024	**05 January 2024**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **China No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088**	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 2022)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2023/087529

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
DE 29504881 U1	01 June 1995	None	
CN 111852256 A	30 October 2020	None	
CN 209315678 U	30 August 2019	None	
DE 8902211 U1	08 June 1989	None	
EP 3251569 A1	06 December 2017	PL 3251569 T3	31 December 2018
		EP 3251569 B1	20 June 2018

Form PCT/ISA/210 (patent family annex) (July 2022)