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HINGE FOR SHOWER DOOR AND SHOWER DOOR HAVING THE SAME

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ABSTRACT

The present application provides a hinge for a shower door and a shower door including the same, which belong to the technical field of shower doors. The hinge includes a first cover plate, a second cover plate, and a connecting member. The first cover plate includes a first hinge portion. The second cover plate includes a second hinge portion. The connecting member includes a third hinge portion and a fourth hinge portion. The first hinge portion is hinged to the third hinge portion, enabling the first cover plate and the connecting member to rotate relative to each other around a first axis. The second hinge portion is hinged to the fourth hinge portion, allowing the second cover plate and the connecting member to rotate relative to each other around a second axis. The first axis and the second axis are parallel to each other. An increase in the angle of opening and closing of the hinge is thereby achieved.

HINGE FOR SHOWER DOOR AND SHOWER DOOR HAVING THE SAME

FIELD

[0001] The present application relates to the technical field of shower doors, and in particular to a hinge for a shower door and the shower door.

BACKGROUND

[0002] Along with the development of the home decoration market, more and more users choose shower doors or shower rooms to achieve the separation of dry and wet areas in indoor spaces.

[0003] In related technologies, most shower doors are swing-type doors. That is, a fixed screen surface and a movable screen surface of the shower door are hinged to each other by means of hinges, which allows the movable screen surface to rotate horizontally around a hinge axis. In the related technologies, however, an opening and closing angle of the hinge can be up to 180 degrees, which limits a rotation angle of the movable screen surface of the shower door, and restricts the design and application of the shower door.

[0004] Therefore, there is an urgent need for a hinge with a larger opening and closing angle.

SUMMARY

[0005] In order to solve the technical problems that the opening and closing angle of the hinge for the shower door in the conventional technology is limited, a hinge for a shower door and a shower door including the same are provided according to the present application.

[0006] In a first aspect, a hinge for a shower door is provided according to the present application, including a first cover plate, a second cover plate and a connecting member;

the first cover plate includes a first hinge portion, the second cover plate includes a second hinge portion, and the connecting member includes a third hinge portion and a fourth hinge portion;

the first hinge portion is hinged to the third hinge portion, enabling the first cover plate and the connecting member to rotate relative to each other around a first axis;

the second hinge portion is hinged to the fourth hinge portion, allowing the second cover plate and the connecting member to rotate relative to each other around a second axis;

the first axis and the second axis are parallel to each other;

at least one of the third hinge portion and the fourth hinge portion further includes a first positioning structure, and at least one of the first hinge portion and the second hinge portion further includes a second positioning structure;

the first positioning structure and the second positioning structure are coaxially arranged along the first axis, the first positioning structure and the second positioning structure are configured to form a male-female fit, and contact surfaces of the first positioning structure and the second positioning structure are formed with guiding surfaces, which enable the first positioning structure and the second positioning structure to enter or exit the male-female fit under an action of a torsional moment around the first axis.

[0007] Optionally, the first positioning structure and the second positioning structure are configured as a one-way locking structure such that when the first positioning structure and the second positioning structure form the male-female fit, the male-female fit can be released by applying a first torque along a first direction around the first axis/second axis, and when the first positioning structure and the second positioning structure form the male-female fit, changing the direction of the first torque cannot release the male-female fit.

[0008] Optionally, the third hinge portion and/or the fourth hinge portion is a hinge hole, the first hinge portion is hinged to the third hinge portion through a pin shaft, and/or, the second hinge portion is hinged to the fourth hinge portion through a pin shaft.

[0009] Optionally, a first step and a second step are formed on the inner wall of the hinge hole, and the first step and the second step successively divide the hinge hole into a first accommodating cavity, a second accommodating cavity and a third accommodating cavity that are axially distributed along the hinge hole;

an inner diameter of the first accommodating cavity is larger than that of the second accommodating cavity, and an inner diameter of the second accommodating cavity is larger than that of the third accommodating cavity;

the first accommodating cavity is used to accommodate the first positioning structure;

the second accommodating cavity is used for a reset mechanism, which is used to apply

an axial force to the first positioning structure;

the third accommodating cavity is used to restrict the pin shaft, so as to prevent the pin shaft from swinging.

[0010] Optionally, the first positioning structure is of a cylindrical structure, and the first positioning structure is formed with a pin shaft hole that passes through both ends;

the first positioning structure is mounted in the first accommodating cavity in a non-rotatable manner, and the outer diameter of the first positioning structure matches the inner diameter of the first accommodating cavity;

at least one first limiting structure is formed on a first end surface of the first positioning structure, and the at least one first limiting structure is circumferentially distributed around a center of the first end surface.

[0011] Optionally, the hinge further includes a second positioning structure;

the second positioning structure is mounted to the first hinge portion in a non-rotatable manner, and at least one second limiting structure is formed on one end surface of the second positioning structure, the at least one second limiting structure matches the shape of the at least one first limiting structure and forms a male-female fit with the at least one first limiting structure, and the number and positions of the at least one second limiting structure correspond to those of the at least one first limiting structure one by one.

[0012] Optionally, each of the at least one first limiting structure includes a first guiding surface and a second guiding surface, and a bevel angle of the first guiding surface relative to the first end surface is smaller than a bevel angle of the second guiding surface relative to the first end surface;

each of the at least one second limiting structure includes a third guiding surface and a fourth guiding surface, a bevel angle of the third guiding surface is the same as that of the first guiding surface, and a bevel angle of the fourth guiding surface is the same as that of the second guiding surface.

[0013] Optionally, the reset mechanism comprises an elastic element;

the elastic element is located within the second accommodating cavity, and one end of the elastic element abuts against the second step, while the other end of the elastic element abuts

against the end of the first positioning structure away from the second positioning structure.

[0014] Optionally, in a direction perpendicular to the first cover plate, a size of a main body of the first cover plate is smaller than that of the first hinge portion, so as to avoid interference when the first cover plate rotates around the first axis;

and/or,

in a direction perpendicular to the second cover plate, a size of a main body of the second cover plate is smaller than that of the second hinge portion, so as to avoid interference when the second cover plate rotates around the second axis.

[0015] In a second aspect, a shower door is further provided by the present application, including the hinge according to any one of the above and a screen surface.

[0016] The hinge for a shower door and a shower door including the same provided in the embodiments of the present application have achieved at least the following beneficial effects.

[0017] In the hinge provided in the embodiments of the present application, the connecting member includes a third hinge portion and a fourth hinge portion. The first cover plate and the second cover plate are respectively hinged to the connecting member, so that the first cover plate rotates around the first axis and the second cover plate rotates around the second axis. In this way, the interference between the first cover plate and the second cover plate is avoided, and the opening and closing angle of the hinge is increased.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] The drawings to be used in the embodiments of the present application or the background art are described below in order to more clearly illustrate the technical solutions in the embodiments of the present application or the background art.

[0019] FIG. 1 is a schematic view showing an optional mounting position of a hinge provided according to an embodiment of the present application;

[0020] FIG. 2 is an optional exploded view of the hinge provided according to the embodiment of the present application;

[0021] FIG. 3 is an optional schematic structural view of a first cover plate of the hinge provided according to the embodiment of the present application;

[0022] FIG. 4 is an optional schematic structural view of a second cover plate of the hinge provided according to the embodiment of the present application;

[0023] FIG. 5 is an optional schematic structural view of a connecting member of the hinge provided according to the embodiment of the present application;

[0024] FIG. 6 is an optional schematic structural view of a first positioning structure of the hinge provided according to the embodiment of the present application;

[0025] FIG. 7 is an optional schematic structural view of a second positioning structure of the hinge provided according to the embodiment of the present application;

[0026] FIG. 8 is a schematic structural view showing optional working states of the hinge provided according to the embodiment of the present application;

[0027] FIG. 9 is an optional schematic structural view of the hinge provided according to the embodiment of the present application;

[0028] FIG. 10 is a schematic view of the hinge provided according to the embodiment of the present application being opened 360 degrees;

[0029] FIG. 11 is a schematic view of the hinge provided according to the embodiment of the present application being in a closed state;

[0030] FIG. 12 is a schematic view of the hinge provided according to the embodiment of the present application being opened 90 degrees.

[0031] Reference numerals in the drawings are listed as follows:

[0032] 10 first cover plate, 20 second cover plate, 30 connecting member, 40 first positioning structure, 50 second positioning structure, 60 elastic element, 70 pin shaft;

[0033] 101 main body of the first cover plate, 102 first contact surface, 103 first non-contact surface, 104 first clamping member, 105 first hinge portion, 1051 first upper hinge portion, 1052 first lower hinge portion, 106 first opening, 107 top surface of the first lower hinge portion, 108 first upper hinge hole, 109 limiting element, 1010 first threaded hole;

[0034] 201 main body of second cover plate, 202 second contact surface, 203 second non-contact surface, 204 second clamping member, 205 second hinge portion, 2051 second upper hinge portion, 2052 second lower hinge portion, 206 second opening, 207 top surface of second lower hinge portion, 208 second upper hinge hole, 209 limiting element, 2010 second threaded

hole;

[0035] 301 third hinge portion, 302 fourth hinge portion, 303 third hinge hole, 304 fourth hinge hole, 305 third accommodating cavity, 306 second accommodating cavity, 307 first accommodating cavity, 308 limiting element;

[0036] 401 first plane, 402 first guiding surface, 403 second guiding surface, 404 first end surface, 405 limiting element, 406 first countersunk hole, 407 first through hole;

[0037] 501 second plane, 502 fourth guiding surface, 503 third guiding surface, 504 second end surface, 505 limiting element, 506 second countersunk hole, 507 second through hole.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0038] In order to facilitate understanding of the present application, hereinafter the present application is described in detail in conjunction with the drawings. The drawings show preferable embodiments of the present application. The present application may be implemented in various forms and is not limited to the embodiments described herein. The embodiments described herein are intended for clarifying and elucidating contents of the present application.

[0039] It should be noted that, an element being "connected" to another element may indicate that the element is directly connected to the other element and is integrated with the other element or there is an intermediate element. The terms "mount", "one end", "the other end" and the like used in the present application are for illustrative purposes only.

[0040] Unless otherwise defined, all technical and scientific terms used herein have the same meanings as commonly understood by those skilled in the art. The terms are merely intended for describing specific embodiments, rather than limiting the present application. A term "and/or" used herein includes all arbitrary combinations of one or multiple relevant items listed.

[0041] In order to solve the technical problems that the opening and closing angle of the hinge in the related technology is limited, a hinge for a shower door is provided according to a first aspect of an embodiment of the present application. A mounting position of the hinge is shown in FIG. 1.

[0042] Referring to FIG. 2, the hinge includes a first cover plate 10, a second cover plate 20, and a connecting member 30. The first cover plate 10 includes a first hinge portion 105, the

second cover plate 20 includes a second hinge portion 205, and the connecting member 30 includes a third hinge portion 301 and a fourth hinge portion 302. Moreover, the first hinge portion 105 is hinged to the third hinge portion 301, enabling the first cover plate 10 and the connecting member 30 to rotate relative to each other around a first axis. The second hinge portion 205 is hinged to the fourth hinge portion 302, allowing the second cover plate 20 and the connecting member 30 to rotate relative to each other around a second axis. Moreover, the first axis and the second axis are parallel to each other. Furthermore, at least one of the third hinge portion 301 and the fourth hinge portion 302 further includes a first positioning structure 40, and one of the first hinge portion 105 and the second hinge portion 205 further include a second positioning structure 50. Here, the first positioning structure 40 and the second positioning structure 50 are combined in pairs. Each pair of the first positioning structure 40 and the second positioning structure 50 is coaxially arranged along the first axis or the second axis and forms a male-female fit. Also, contact surfaces of the first positioning structure 40 and the second positioning structure 50 are guiding surfaces, which enable the first positioning structure 40 and the second positioning structure 50 to enter or exit the male-female fit under an action of the torsional moment around the first/second axis. It should be noted that the first and second positioning structures may be directly machined in the first to fourth hinge portions, or they may be separately machined and then mounted in the first to fourth hinge portions. The first and second positioning structures are non-rotatable when assembled in the first to fourth hinge portions, so as to transmit the moment received by the first/second cover plate to the connecting member 30, causing the connecting member 30 to rotate along with the rotation of the first/second cover plate. Moreover, it is not difficult to understand that the height relationship between the first positioning structure and the second positioning structure does not affect their normal operation.

[0043] Optionally, a distance between the first axis and the second axis is greater than or equal to half of a sum of the thicknesses of the first cover plate 10 and the second cover plate 20. It should be understood that the structures of the first to fourth hinge portions provided in the present application are not particularly limited, as long as the first cover plate is hinged to the connecting member and the second cover plate is hinged to the connecting member. Optionally, the first/second hinge portion includes a hinge shaft or a hinge hole. Alternatively, the third/fourth hinge portion includes a hinge shaft or a hinge hole.

[0044] In some optional embodiments, referring to FIG. 2, the first cover plate 10 and the

second cover plate 20 are respectively connected to the connecting member 30 by a pin shaft. Exemplarily, the third hinge portion 301 and/or the fourth hinge portion 302 includes a hinge hole; the first hinge portion 105 is hinged to the third hinge portion 301 through a pin shaft; and/or, the second hinge portion 205 is hinged to the fourth hinge portion 302 through a pin shaft.

[0045] In some optional embodiments, referring to FIG. 3, one end of a main body 101 of the first cover plate is provided with a first hinge portion 105. The first hinge portion 105 includes an upper hinge portion 1051 and a lower hinge portion 1052. A first opening 106 is formed between the upper hinge portion 1051 and the lower hinge portion 1052. When the first hinge portion 105 is hinged to the connecting member 30, one end of the connecting member 30 close to the third hinge portion 301 is embedded in the first opening 106.

[0046] According to some optional embodiments, as shown in FIG. 3, the first hinge portion 105 includes a first upper hinge portion 1051 and a first lower hinge portion 1052. Optionally, the first upper hinge portion 1051 includes a first upper hinge hole 108, and the first lower hinge portion 1052 includes a first threaded hole 1010 extending downward from a top surface 107 of the first lower hinge portion. As shown in FIG. 5, the third hinge portion 301 includes a third hinge hole 303. Referring to FIG. 1, when the first cover plate 10 is hinged to the connecting member 30, one end of the connecting member 30 close to the third hinge portion 301 is embedded in the first opening 106, and the first upper hinge hole 108, the third hinge hole 303 and the first threaded hole 1010 are aligned. The pin shaft 70 passes through the first upper hinge hole 108 and the third hinge hole 303 in sequence, and an end of the pin shaft 70 is threadedly connected to the connecting member 30 through the first threaded hole 1010.

[0047] A side of the main body of the first cover plate facing the shower door screen surface is called a first contact surface 102. The surface on the side facing away from the first contact surface 102 is called a first non-contact surface 103. Optionally, a first clamping member 104 is provided on the first contact surface 102 for clamping the screen surface of the shower door. In a direction from the first contact surface to the first non-contact surface, the size of the first hinge portion is larger than the size (i.e., thickness) of the main body of the first cover plate, so that the first hinge portion is higher than the first contact surface in this direction. The first cover plate is only rotatable in clockwise direction (the clockwise direction is the same as that in FIG. 9). If the first cover plate rotates in counterclockwise direction (the counterclockwise direction

is the same as that in FIG. 9), the extrusion force generated by the interference between the first hinge portion and the connecting member prevents it from rotating.

[0048] Similarly, in some optional embodiments, as shown in FIG. 4, the second hinge portion 205 includes a second upper hinge portion 2051 and a second lower hinge portion 2052. Optionally, the second upper hinge portion 2051 includes a second upper hinge hole 208, and the second lower hinge portion 2052 includes a second threaded hole 2010 extending downward from the top surface 207 of the second lower hinge portion. As shown in FIG. 5, the fourth hinge portion 302 includes a fourth hinge hole 304. Referring to FIG. 1, when the second cover plate 20 is hinged to the connecting member 30, one end of the connecting member 30 close to the fourth hinge portion 302 is embedded in the second opening 206, and the second upper hinge hole 208, the fourth hinge hole 304 and the second threaded hole 2010 are aligned. The pin shaft 70 passes through the second upper hinge hole 208 and the fourth hinge hole 304 in sequence, and the end of the pin shaft 70 is threadedly connected to the connecting member 30 through the second threaded hole 2010.

[0049] The side of the main body of the second cover plate facing the shower door screen surface is called the second contact surface 202. The surface on the side facing away from the second contact surface 202 is called the second non-contact surface 203. Optionally, a second clamping member 204 is provided on the second contact surface 202 for clamping the screen surface of the shower door. In the direction from the second non-contact surface to the second contact surface, the size of the second hinge portion is larger than the size (i.e., thickness) of the main body of the second cover plate, so that the second hinge portion is higher than the second contact surface. The second cover plate is only rotatable in counter-clockwise direction (the counter-clockwise direction is the same as that in FIG. 9). If the first cover plate rotates in the counter-clockwise direction (the counter-clockwise direction is the same as that in FIG. 9), the extrusion force generated by the interference between the first hinge portion and the connecting member prevents it from rotating.

[0050] Optionally, the first positioning structure is arranged on the third and/or fourth hinge portion, and the second positioning structure is arranged on the first and/or second hinge portion. Exemplarily, a center of the second positioning structure has a through-hole that allows the pin shaft to pass through, and the first upper hinge hole 108 and/or the second upper hinge hole 208 may accommodate the second positioning structure. The center of the first positioning structure

has a through-hole that allows the pin shaft to pass through, and the third and/or fourth hinge hole may accommodate the first positioning structure. It should be noted that the second positioning structure is non-rotatably mounted in the first and/or second upper hinge hole, and the first positioning structure is non-rotatably mounted in the third and/or fourth hinge hole.

[0051] FIG. 5 shows a cross-sectional view of an optional structure of the connecting member. As shown in FIG. 5, optionally, a first step and a second step are formed on the inner wall of the third and/or fourth hinge hole. The first step and the second step successively divide the third and/or fourth hinge hole into a first accommodating cavity 307, a second accommodating cavity 306, and a third accommodating cavity 305 that are axially distributed along the third and/or fourth hinge hole.

[0052] The inner diameter of the first accommodating cavity 307 is larger than that of the second accommodating cavity 306. The inner diameter of the second accommodating cavity 306 is larger than that of the third accommodating cavity 305. The first accommodating cavity 307 is used to accommodate the first positioning structure 40. The second accommodating cavity 306 is for the reset mechanism, which is used to apply an axial force onto the first positioning structure 40. The third accommodating cavity 305 is used to restrict the pin shaft, so as to prevent the pin shaft from swinging.

[0053] It should be understood that the first positioning structure and the second positioning structure rotate relative to each other. When they enter or exit the male-female fit, extrusion occurs. The axial component of the extrusion force is opposite to the direction of the axial force applied by the reset mechanism. Optionally, during the process in which the male and female structures of the male-female fit between the first positioning structure and the second positioning structure are gradually aligned (i.e., entering the self-locking state), the axial force applied by the reset element pushes the male structure into the female structure. Alternatively, before or during the process in which the male and female structures of the male-female fit between the first positioning structure and the second positioning structure gradually move away from each other (i.e., before or during the process of unlocking), the thrust of the reset element is overcome to make the male structure withdraw from the female structure. Optionally, the reset mechanism includes an elastic element 60, which is located in the second accommodating cavity 306. One end of the elastic element 60 abuts against the second step, and the other end of the elastic element 60 abuts against the end of the first positioning structure

40 away from the second positioning structure 50.

[0054] In order to solve the problem that when the connecting member 30 rotates with one of the first cover plate 10 or the second cover plate 20, the other one rotates with the connecting member 30, resulting in unstable operation of the hinge, the first positioning structure 40 and the second positioning structure 50 provided in the present application are configured as a one-way locking structure. That is, when the first positioning structure 40 and the second positioning structure 50 form the male-female fit, applying a first torque along a first direction around the first axis/second axis can release the male-female fit, and when the first positioning structure 40 and the second positioning structure 50 form male-female fit, changing the direction of the first torque cannot release the male-female fit.

[0055] Exemplarily, as shown in FIGS. 6 and 7, positioning teeth are formed on the end surface of the first positioning structure 40 facing the second positioning structure 50. Positioning grooves that match the shape of the positioning teeth are formed on the end surface of the second positioning structure 50 facing the first positioning structure 40. The top of the positioning tooth is flat, and the two sides of the positioning tooth are slopes. Moreover, the angle (i.e., bevel angle) between one of the slopes and the end surface is smaller than the bevel angle of the other slope. When the positioning tooth is in the positioning groove, the first positioning structure 40 and the second positioning structure 50 form the male-female fit. Assume that the first positioning structure 40 is on the top, the second positioning structure 50 is at the bottom, and they are co-axially arranged and form the male-female fit. At this time, when a first torque in the first direction is applied to the first positioning structure 40, the first positioning structure and the second positioning structure are extruded. Guided by the slope with a smaller bevel angle of the positioning tooth, the component of the extrusion force along the rotation axis is greater than the resultant force of the thrust of the reset element and the pressure transmitted to the first and second positioning structures by the gravity of the shower door through the first cover plate or the second cover plate. This makes the positioning tooth of the first positioning structure 40 slide out of the positioning groove under the guidance of the slope with a smaller bevel angle, and the male-female fit between the first positioning structure 40 and the second positioning structure 50 is released. When the direction of the first torque is changed, due to the different bevel angles of the two slopes of the positioning tooth, the component of the extrusion force between the first positioning structure and the second positioning structure in the direction of the rotation axis is less than or equal to the resultant

force of the thrust of the reset element and the gravity of the shower door, so that the positioning tooth cannot move out of the positioning groove along the slope with a larger bevel angle. In this way, the following technical effects are achieved: when the first cover plate rotates in clockwise direction around the first axis (the same clockwise direction as in FIG. 9), the first positioning structure and the second positioning structure on the first axis can release the male-female fit, while the first positioning structure and the second positioning structure on the second axis cannot release the male-female fit, and when the first cover plate rotates in counter-clockwise direction around the first axis (the same counter-clockwise direction as in FIG. 9), the first positioning structure and the second positioning structure on the first axis cannot release the male-female fit, and the first positioning structure and the second positioning structure on the second axis can release the male-female fit. In other words, when the first cover plate is subjected to a torque that makes it rotate clockwise, the first cover plate rotates clockwise around the first axis. When the first cover plate is subjected to a torque that makes it rotate counterclockwise, the first cover plate and the connecting member are locked to each other and rotate together around the second axis. In other words, when the hinge is operating, due to the abovementioned configuration of the first positioning structure and the second positioning structure, the connecting member is always locked to one of the first cover plate or the second cover plate, so that the hinge rotates only around one of the first axis or the second axis each time it operates, thereby improving the stability of the hinge operation.

[0056] In some optional embodiments, as shown in FIG. 6, the first positioning structure 40 is of a cylindrical structure, and the first positioning structure 40 is formed with a pin shaft hole that penetrates through both ends. The first positioning structure 40 is mounted in the first accommodating cavity 307 in a non-rotatable manner, and the outer diameter of the first positioning structure 40 matches the inner diameter of the first accommodating cavity 307. Moreover, at least one first limiting structure is formed on the first end surface 404 of the first positioning structure 40, and at least one first limiting structure is circumferentially distributed around the center of the first end surface 404.

[0057] In some other optional embodiments, as shown in FIG. 7, the second positioning structure 50 is of a cylindrical structure. The second positioning structure 50 is mounted in the first hinge portion in a non-rotatable manner. At least one second limiting structure is formed on one end surface of the second positioning structure 50, and at least one second limiting structure matches the shape of the at least one first limiting structure and forms a male-female

fit with the at least one first limiting structure. Moreover, the number and positions of the at least one second limiting structure and the at least one first limiting structure correspond to each other one by one.

[0058] It should be understood that the first positioning structure and the second positioning structure are mounted in the first to fourth hinge holes in a non-rotatable manner through the limiting elements 109, 209, 405, 505. Exemplarily, a limiting element 405 (column or groove) is formed on the side wall of the first positioning structure 40, and correspondingly, a limiting element (groove or column) is formed on the inner wall of the first accommodating cavity 307 of the third/fourth hinge hole.

[0059] Each of the at least one first limiting structure includes a first guiding surface 402 and a second guiding surface 403. The bevel angle of the first guiding surface 402 relative to the first end surface 404 is smaller than the bevel angle of the second guiding surface 403 relative to the first end surface 404. Each of the at least one second limiting structure includes a third guiding surface 503 and a fourth guiding surface 502. The bevel angle of the third guiding surface 503 is the same as that of the first guiding surface 402, and the bevel angle of the fourth guiding surface 502 is the same as that of the second guiding surface 403. In this way, when the first positioning structure and the second positioning structure rotate relative to each other, the contact surfaces of the two generate extrusion, and under the action of the extrusion force, the first limiting structure and the second limiting structure can enter or disengage from the male-female fit. Optionally, the bevel angle of the first guiding surface is smaller than that of the second guiding surface, so that the axial component of the extrusion force acting on the first guiding surface is greater than the axial component of the extrusion force acting on the second guiding surface. In this way, when the rotation direction of the second positioning structure relative to the first positioning structure changes, the torques required to enter or achieve self-locking are different. Therefore, the stability of the hinge in the horizontal direction is improved.

[0060] Optionally, as shown in FIGS. 6 and 7, the first limiting structure is a toothed structure, and the second limiting structure is a groove-shaped structure that matches the shape of the toothed structure. FIG. 8 shows the opening and closing state of the hinge provided in the present application. FIGS. 8(a) to 8(e) respectively correspond to the states where the hinge is opened by 360 degrees, 270 degrees, 180 degrees, 90 degrees and 0 degree.

[0061] FIG. 9(a) shows the opening and closing direction of the hinge. FIGS. 9(b) and 9(c)

show, in a partial sectional view, the fitting relationship between the first positioning structure 40 and the second positioning structure 50 when the hinge is assembled. FIG. 10 shows, in a partial sectional view, the fitting relationship between the first positioning structure 40 and the second positioning structure 50 when the hinge is opened by 360 degrees. FIG. 11 shows, in a partial sectional view, the fitting relationship between the first positioning structure 40 and the second positioning structure 50 when the hinge is opened by 0 degree. FIG. 12 shows, in a partial sectional view, the fitting relationship between the first positioning structure 40 and the second positioning structure 50 when the hinge is opened by 90 degrees.

[0062] Exemplarily, as shown in FIGS. 9 to 10, when the hinge provided by the present application is in an initial position (opened by 180 degrees), in the first hinge portion and the third hinge portion, the first inclined surface of the first positioning structure is in contact with the third inclined surface of the second positioning structure. Since the bevel angles of the first inclined surface and the third inclined surface are smaller than those of the second inclined surface and the fourth inclined surface, the axial force applied to the second positioning structure by the shower door screen surface under the action of gravity cannot overcome the elastic force of the elastic element, so that the positioning structure maintains its current position. Similarly, in the second hinge portion and the third hinge portion, the axial force applied to the second positioning structure by the shower door screen surface under the action of gravity cannot overcome the elastic force of the elastic element, so that the second positioning structure maintains its current position.

[0063] A shower door is provided according to a second aspect of the embodiments of the present application. As shown in FIG. 1, the shower door includes the hinge provided in any of the above embodiments and a screen surface.

[0064] In summary, for the hinge provided according to the embodiments of the present application, the connecting member includes a third hinge portion and a fourth hinge portion. The first cover plate and the second cover plate are respectively hinged to the connecting member, enabling the first cover plate to rotate around the first axis and the second cover plate to rotate around the second axis. In this way, the interference between the first cover plate and the second cover plate is avoided, and the opening and closing angle of the hinge is increased. When the hinge provided by the present application is in the initial position (opened by 180 degrees), the fixed panel and the movable panel of the shower door are on the same screen

surface. When rotating clockwise, the second cover plate interferes with the connecting member and cannot rotate, while the first cover plate can rotate clockwise. When rotating counterclockwise, the first cover plate interferes with the connecting member and cannot rotate, while the second cover plate can rotate counterclockwise. Thus, the first cover plate can rotate 180 degrees clockwise from the initial position, and the second cover plate can rotate 180 degrees counterclockwise from the initial position. When the movable panel rotates counterclockwise, the hinge around the second axis is triggered, and when the movable panel rotates clockwise, the hinge around the first axis is triggered, so that the movable panel can rotate 360 degrees, that is, it can rotate from one side surface of the fixed panel to the another side surface. By setting the first hinge portion higher than the first contact surface of the first cover plate and the second hinge portion higher than the second contact surface of the second cover plate, the second hinge is self-locked when the first hinge is triggered, and the first hinge is self-locked when the second hinge is triggered. In other words, the shape of the cover plate enables only one of the first cover plate and the second cover plate in the hinge to rotate at a time, avoiding the situation that when the movable panel of the shower door rotates around one of the first axis or the second axis, the connecting member of the hinge rotates around the other axis, which improves the stability of the hinge. Through the first positioning structure and the second positioning structure, the self-locking of the hinge at the preset opening angle is realized, and the stability of the hinge in the horizontal direction is improved. By configuring the part where the first positioning structure and the second positioning structure form an male-female fit as a one-way locking structure, the connecting member always rotates only around one of the first axis or the second axis during the operation of the hinge, which improves the stability of the hinge operation. By applying an axial force to the first positioning structure through the elastic element, the axial force (i.e., the extrusion force) applied to the second positioning structure by the screen surface of the shower door under the action of gravity is overcome, and the stability of the self-locking is improved.

[0065] The foregoing descriptions are only preferred embodiments of the present application, which does not limit the patent scope of the present application. Any modifications or replacements that those skilled in the art can easily obtained within the technology scope of the present application should be within the protection scope of the present application. Therefore, the protection scope of the present application shall be in accordance with the protection scope of the claims.

CLAIMS

1. A hinge for a shower door, comprising a first cover plate (10), a second cover plate (20) and a connecting member (30), wherein

the first cover plate (10) comprises a first hinge portion (105), the second cover plate (20) comprises a second hinge portion (205), and the connecting member (30) comprises a third hinge portion (301) and a fourth hinge portion (302); and

the first hinge portion (105) is hinged to the third hinge portion (301), which allows the first cover plate (10) and the connecting member (30) to rotate relative to each other around a first axis;

the second hinge portion (205) is hinged to the fourth hinge portion (302), which allows the second cover plate (20) and the connecting member (30) to rotate relative to each other around a second axis; and

the first axis and the second axis are parallel to each other;

at least one of the third hinge portion and the fourth hinge portion further comprises a first positioning structure (40), and at least one of the first hinge portion and the second hinge portion further comprises a second positioning structure (50);

the first positioning structure (40) and the second positioning structure (50) are coaxially arranged along the first axis or second axis, the first positioning structure (40) and the second positioning structure (50) are configured to form a male-female fit, and contact surfaces of the first positioning structure (40) and the second positioning structure (50) are formed with guiding surfaces, which allow the first positioning structure (40) and the second positioning structure (50) to enter or exit the male-female fit under an action of a torsional moment around the first axis/the second axis.

2. The hinge according to claim 1, wherein the first positioning structure (40) and the second positioning structure (50) are configured as a one-way locking structure such that when the first positioning structure (40) and the second positioning structure (50) come into the male-female fit, the male-female fit is releasable by applying a first torque along a first direction

around the first axis or second axis, and when the first positioning structure (40) and the second positioning structure (50) come into the male-female fit, changing the direction of the first torque does not release the male-female fit.

3. The hinge according to claim 1, wherein the third hinge portion (301) and/or the fourth hinge portion (302) comprises a third and/or fourth hinge hole, the first hinge portion (105) is hinged to the third hinge portion (301) through a pin shaft, and/or, the second hinge portion (205) is hinged to the fourth hinge portion (302) through a pin shaft.

4. The hinge according to claim 2 or 3, wherein a first step and a second step are formed on an inner wall of the third hinge hole and/or the fourth hinge hole, and the first step and the second step successively divide the hinge hole into a first accommodating cavity (307), a second accommodating cavity (306) and a third accommodating cavity (305) that are axially distributed along the hinge hole;

wherein an inner diameter of the first accommodating cavity (307) is larger than an inner diameter of the second accommodating cavity (306), and an inner diameter of the second accommodating cavity (306) is larger than an inner diameter of the third accommodating cavity (305);

the first accommodating cavity (307) is used to accommodate the first positioning structure (40);

the second accommodating cavity (306) is used for a reset mechanism, which is used to apply an axial force onto the first positioning structure (40); and

the third accommodating cavity (305) is used to restrict the pin shaft, so as to prevent the pin shaft from swinging.

5. The hinge according to claim 4, wherein the first positioning structure (40) is of a cylindrical structure, and the first positioning structure (40) has a pin shaft hole that passes through both ends;

the first positioning structure (40) is mounted in the first accommodating cavity (307) in a

non-rotatable manner, and an outer diameter of the first positioning structure (40) matches the inner diameter of the first accommodating cavity (307); and

at least one first limiting structure is formed on a first end surface (404) of the first positioning structure (40), and the at least one first limiting structure is circumferentially distributed around a center of the first end surface.

6. The hinge according to claim 5, wherein the second positioning structure (50) is of a cylindrical structure,

the second positioning structure (50) is mounted to the first hinge portion in a non-rotatable manner, and

at least one second limiting structure is formed on one end surface of the second positioning structure (50), wherein the at least one second limiting structure matches the shape of the at least one first limiting structure and forms a male-female fit with the at least one limiting structure, and the number and positions of the at least one second limiting structure correspond to the number and positions of the at least one first limiting structure one by one.

7. The hinge according to claim 5, wherein each of the at least one first limiting structure comprises a first guiding surface (402) and a second guiding surface (403), and a bevel angle of the first guiding surface (402) relative to the first end surface (404) is smaller than a bevel angle of the second guiding surface (403) relative to the first end surface (404), and

each of the at least one second limiting structure comprises a third guiding surface (503) and a fourth guiding surface (502), a bevel angle of the third guiding surface (503) is the same as the bevel angle of the first guiding surface (402), and a bevel angle of the fourth guiding surface (502) is the same as the bevel angle of the second guiding surface (403).

8. The hinge according to claim 4, wherein the reset mechanism comprises an elastic element (60);

wherein the elastic element (60) is located within the second accommodating cavity (306), and one end of the elastic element (60) abuts against the second step, while the other end of the

elastic element (60) abuts against the end of the first positioning structure (40) away from the second positioning structure (50).

9. The hinge according to claim 1, wherein in a direction perpendicular to the first cover plate (10), a size of a main body of the first cover plate (10) is smaller than a size of the first hinge portion, so as to avoid interference when the first cover plate (10) rotates around the first axis; and/or,

in a direction perpendicular to the second cover plate (20), a size of a main body of the second cover plate (20) is smaller than a size of the second hinge portion, so as to avoid interference when the second cover plate (20) rotates around the second axis.

10. A shower door, comprising the hinge according to any one of claims 1 to 10 and a screen surface.

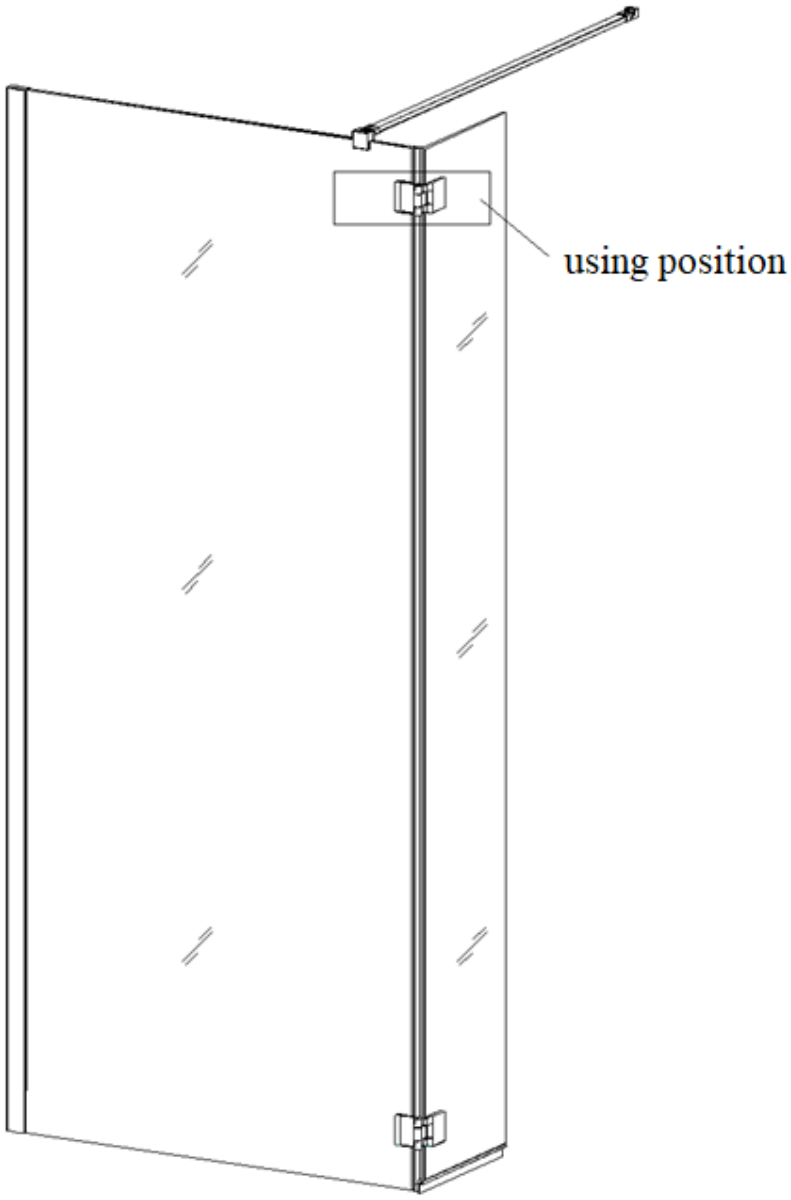

FIG. 1

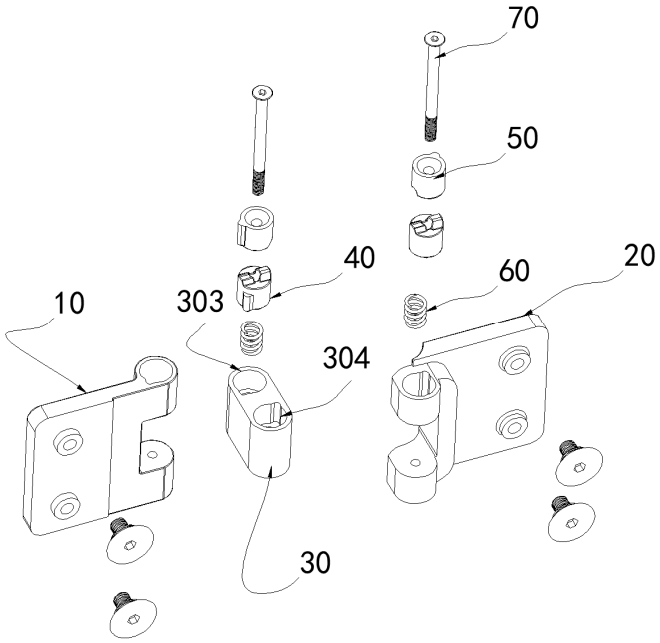
70
50
40
60
20
10
303
304
30

FIG. 2

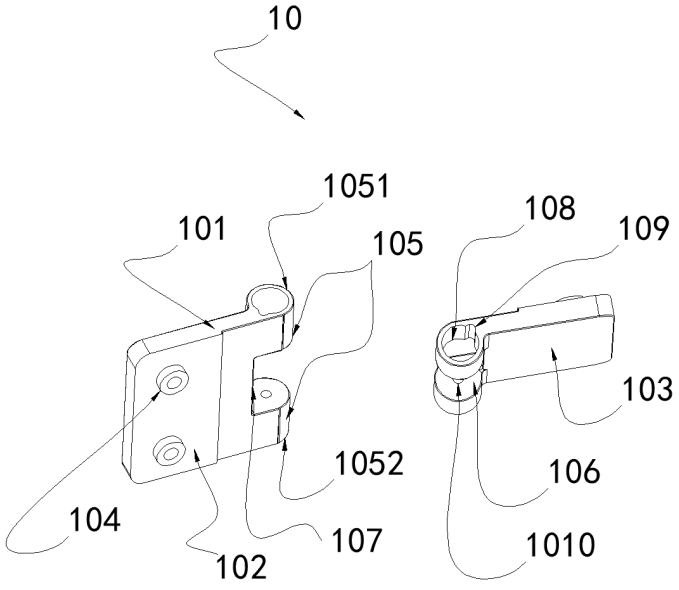
10
1051
101
105
108
109
103
1052
106
104
107
1010
102

FIG. 3

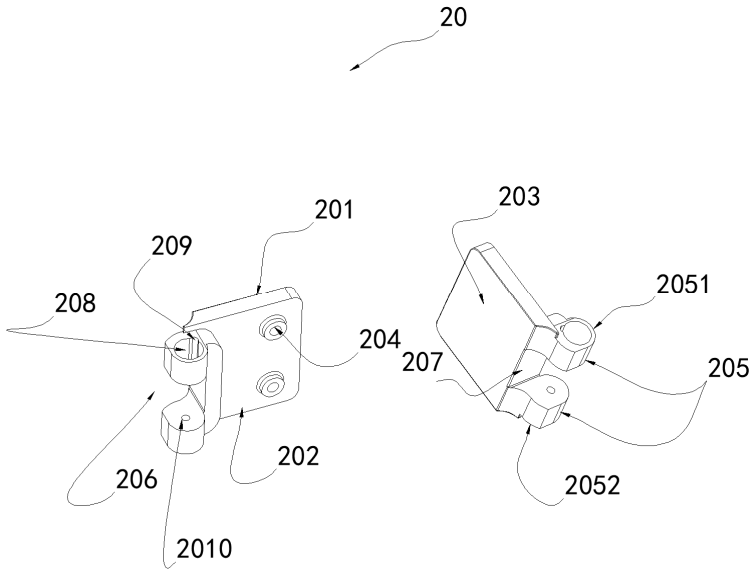
20
201
209
208
204
206
202
2010
203
2051
207
205
2052

FIG. 4

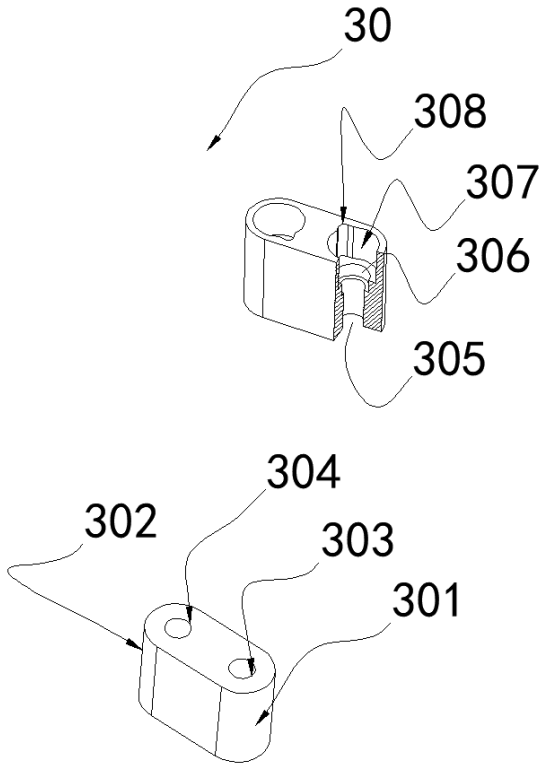
30
308
307
306
305
304
302
303
301

FIG. 5

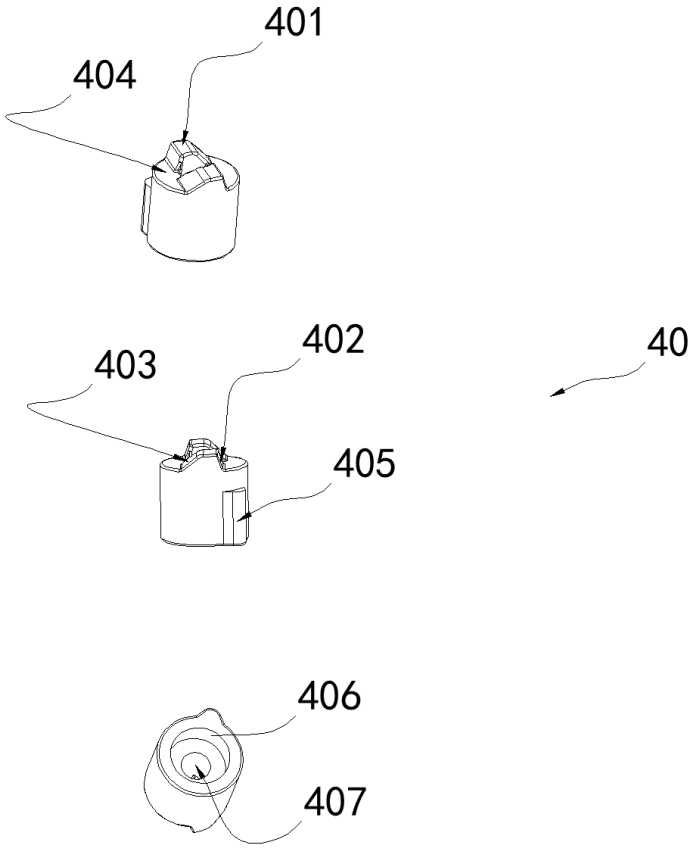

FIG. 6

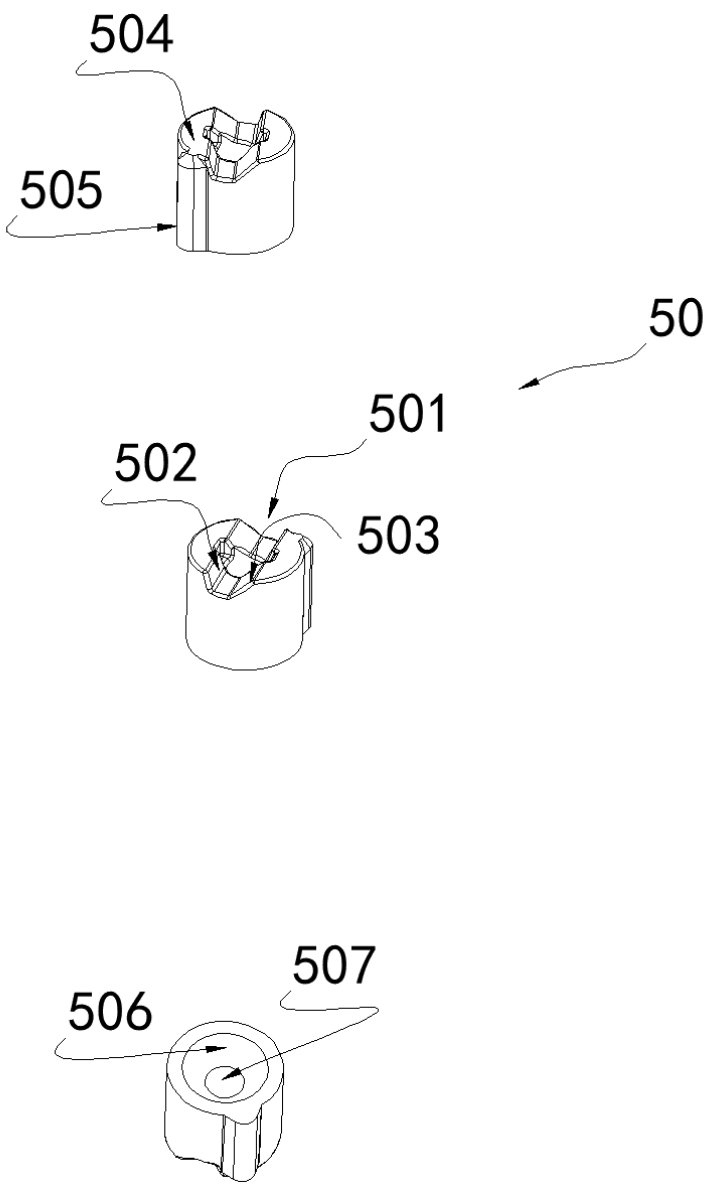

FIG. 7

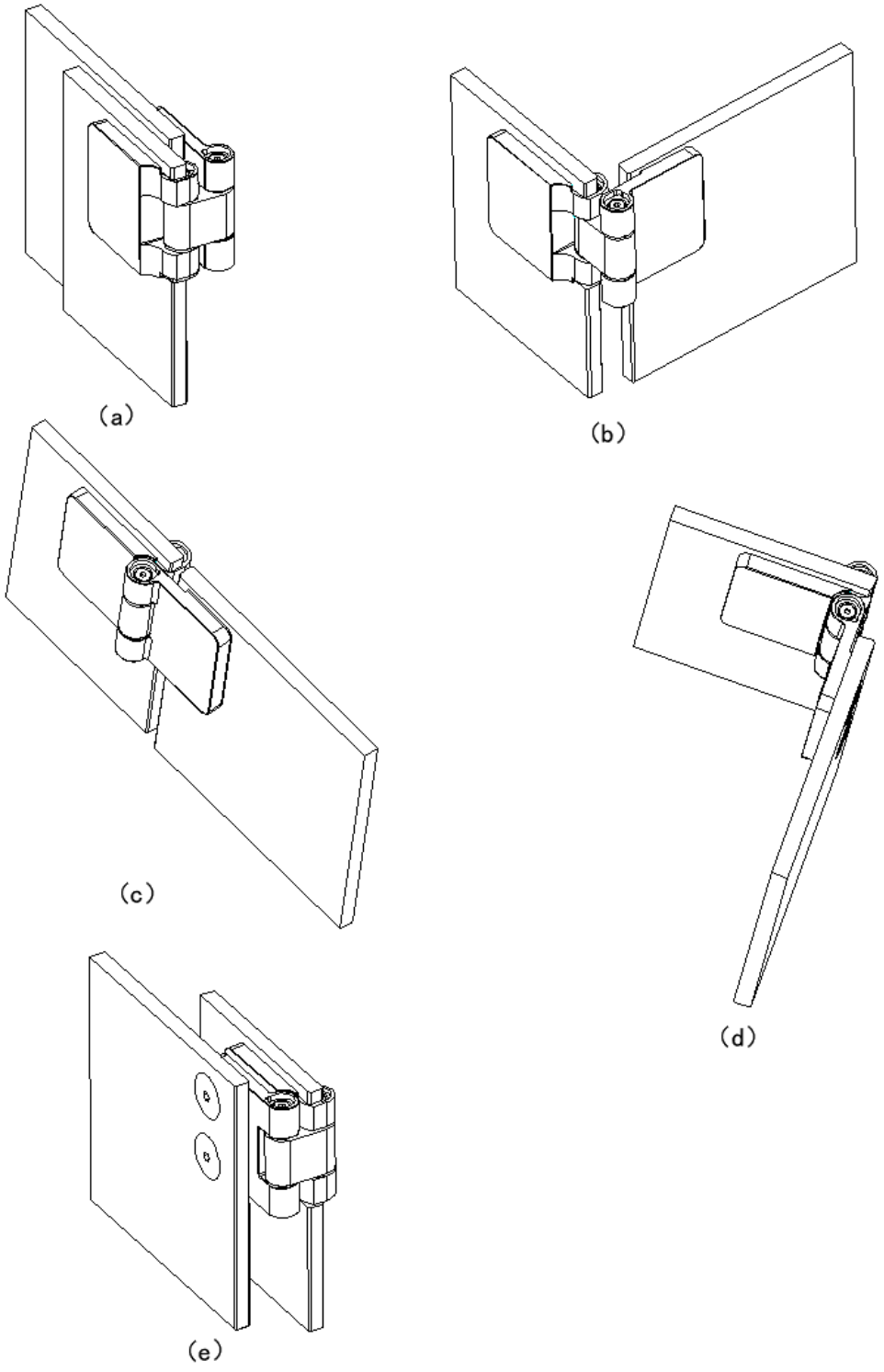

FIG. 8

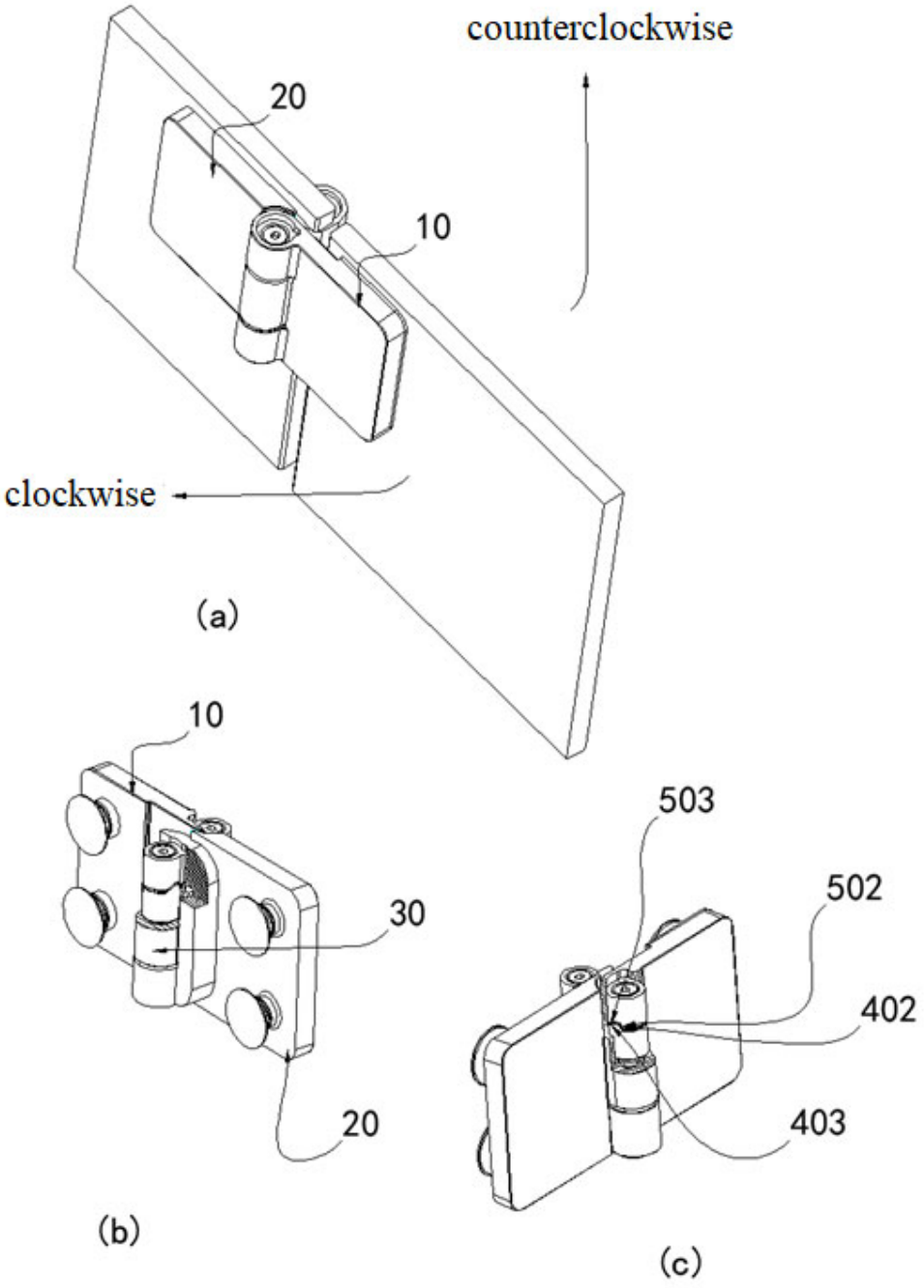
counterclockwise
20
10
clockwise
(a)
10
30
20
(b)
503
502
402
403
(c)

FIG. 9

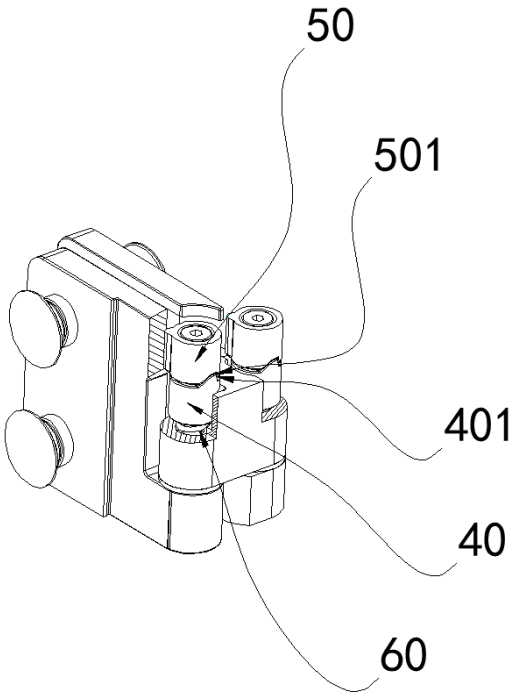

FIG. 10

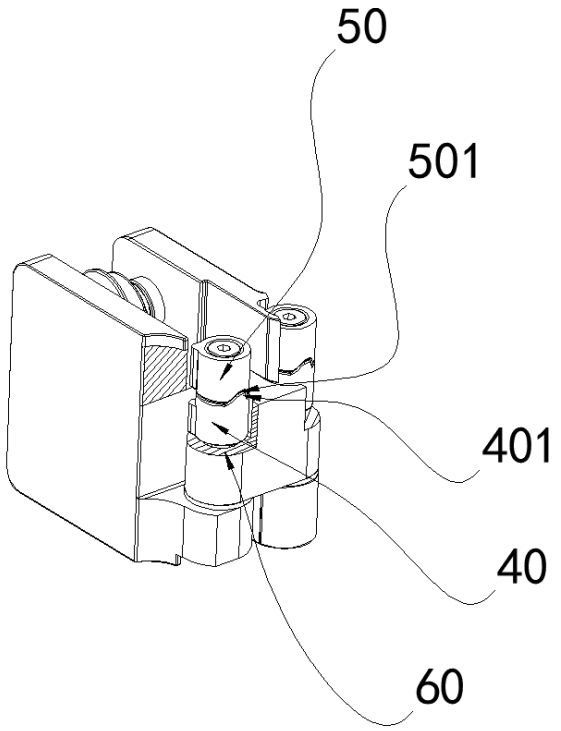

FIG. 11

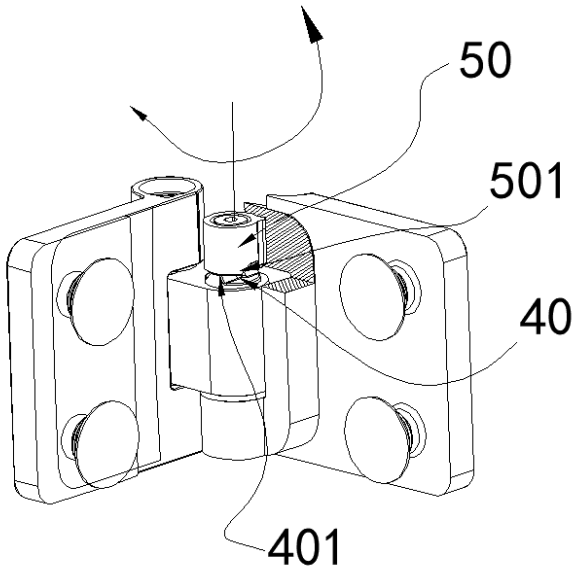

FIG. 12