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(54) **DOOR CLOSING DEVICE APPLIED TO FOLDING DOOR, FOLDING DOOR AND SHOWER ROOM DOOR STRUCTURE**

(57) A door closing device applied to a folding door, wherein the door closing device is configured to be arranged at the junction of two door leaves of the folding door. The door closing device comprises a main body. The main body is configured to be arranged at the upper ends of the door leaves and is separately connected to the two door leaves. The main body is provided with a hook member. The upper end of the hook member is hook-shaped. The upper end of the hook member is configured to be able to be hung on a door frame in a closed state to prevent the two door leaves from drooping at the junction. A shower room door structure, comprising a folding door, a door frame and the door closing device, wherein the top end of the junction between the two door leaves of the folding door is provided with the door closing device, and in the closed state, the upper end of the hook is configured to be hung on the door frame.

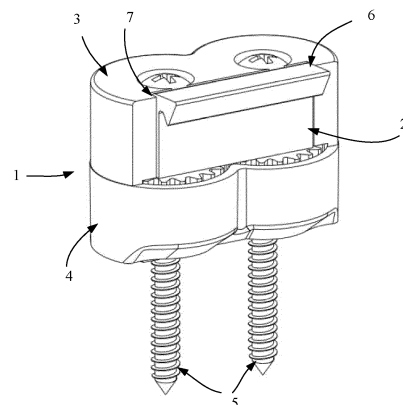


FIG. 1

Description

Technical Field

[0001] Embodiments of the present application relate to, but are not limited to, the field of sanitary ware, and more particularly relate to, but are not limited to, a door closing device applied to a folding door, a folding door and a shower room door structure.

Background

[0002] Folding doors are commonly used doors for shopping malls, office buildings, families and other places, which can be used as partitions, folding screens, and also as inner doors or outer doors, and can effectively play the roles of temperature insulation, dust prevention, noise reduction and sound insulation, shielding, etc. Moreover, they occupy a small space and are highly approved by users. Folding doors are often used in shower rooms.

[0003] After a folding door is used for a period of time, the junction of two door leaves of the folding door will sag under the action of its own gravity, which leads to the skewness of the door leaves, especially the skewness is particularly significant when the door is in a closed state, thus seriously affecting the user experience.

Summary

[0004] The following is a summary of the subject matters described in detail herein. This summary is not intended to limit the protection scope of the claims.

[0005] A door closing device applied to a folding door is provided. The door closing device is disposed at a junction of two door leaves of the folding door, the door closing device includes a main body configured to be disposed at upper ends of the door leaves and connected with the two door leaves respectively. A hook member is disposed on the main body, an upper end of the hook member is hook-shaped and is configured to be hung on a door frame in a door closed state to prevent the two door leaves from sagging at the junction.

[0006] A shower room door structure includes a folding door, a door frame and the door closing device described above. A top end of the junction of two door leaves of the folding door is provided with the door closing device, and the upper end of the hook member is configured to be hung on the door frame in the door closed state.

[0007] A folding door includes two door leaves and the door closing device described above. The top end of the junction of the two door leaves is provided with the door closing device, and the upper end of the hook member is configured to be hung on the door frame in the door closed state.

[0008] Other aspects will become apparent after reading and understanding the brief description of drawings and implementations of the embodiments of the present

application.

Brief Description of Drawings

[0009]

FIG. 1 is a schematic diagram of a door closing device according to an embodiment of the present application;

FIG. 2 is an exploded schematic diagram of the door closing device of FIG. 1;

FIG. 3 is a first cross-sectional schematic diagram of the door closing device of FIG. 1;

FIG. 4 is a second cross-sectional schematic diagram of the door closing device of FIG. 1;

FIG. 5 is a schematic diagram of a hook member in FIG. 2;

FIG. 6 is a schematic diagram of a fixing ring in FIG. 2;

FIG. 7 is a schematic diagram of a fixing seat in FIG. 2;

FIG. 8 is a schematic diagram of a guide post cover in FIG. 2;

FIG. 9 is a schematic diagram of a driving gear in FIG. 2;

FIG. 10 is a schematic diagram of a shower room door structure in a door opened state according to another embodiment of the present application;

FIG. 11 is a schematic diagram of the shower room door structure of FIG. 10 in a door closed state;

FIG. 12 is an enlarged schematic diagram of part A of FIG. 10; and

FIG. 13 is an enlarged schematic diagram of part B of FIG. 11.

[0010] Reference signs: 1-main body, 2-hook member, 3-guide post cover, 4-fixing seat, 5-self-tapping screw, 6-external connection end, 7-notch, 8-connection end, 9-fixing pin, 10-elastic member, 11-fixing ring, 12-driving gear, 13-driven gear, 14-fixing block, 15-sinking groove, 16-connection hole, 17-driving door leaf, 18-driven door leaf, 19-door frame, 20-guide rail, 21-mounting cavity, 22-guide post, 23-first through hole, 24-vertical plate, 25-arc-shaped groove, 26-insertion hole, 27-first recess, 28-second through hole, 29-second recess, 30-third recess.

Detailed Description

[0011] Hereinafter, embodiments of the present application will be described in detail with reference to the accompanying drawings. It is noted that the embodiments in the present application and the features in the embodiments may be combined with each other arbitrarily if there is no conflict.

[0012] Many embodiments are set forth in the following description to facilitate a full understanding of the embodiments of the present application, however, the embodiments of the present application may be implemented in other ways different from those described herein, and therefore the scope of protection of the embodiments of the present application is not limited by the implementations disclosed below.

[0013] Referring to FIGS. 1-9, a door closing device according to an embodiment of the present application is provided. The door closing device can be applied to a folding door, and the door closing device can be fixed at the junction of two door leaves. As shown in FIGS. 1-9 and FIG. 11, the door closing device includes a main body 1, which may be disposed on upper ends of the door leaves and connected with two door leaves respectively. The main body 1 is provided with a hook member 2, and an upper end of the hook member 2 is hook-shaped, so that the door leaves can be hung on a door frame to prevent the two door leaves from sagging at the junction thereof. Therefore, the door closing device makes use of the hook member 2 to enable the two door leaves to connect with the door frame at the junction of the two door leaves in a door closed state, which can avoid sag under the long-term use and improve the user experience.

[0014] As shown in FIGS. 2-4, the main body 1 may include a fixing seat 4 and a guide post cover 3 which are separate. The guide post cover 3 may be disposed at the upper end of the fixing seat 4, and the fixing seat 4 and the guide post cover 3 may enclose and form a mounting cavity 21. One end of the hook member 2 may extend into the mounting cavity 21, and the other end of the hook member 2 may extend out of the mounting cavity 21. The guide post cover 3 may be provided with a notch 7 for the hook member 2 to extend out (see FIGS. 1 and 8). As shown in FIG. 7, the fixing seat 4 may be gourd-shaped, and an upper end of the fixing seat 4 may be provided with a first recess 27. As shown in FIG. 8, the guide post cover 3 may be matched with an external outline of the fixing seat 4. As shown in FIG. 4, the guide post cover 3 may be provided with a third recess 30 with a downward opening, and openings of the first recess 27 and the third recess 30 may be aligned to form the above-mentioned mounting cavity 21.

[0015] As shown in FIGS. 2-6, the hook member 2 may include a connection end 8 and an external connection end 6. The connection end 8 may be flat and a contour of the connection end 8 may be matched with the mounting cavity 21, so that a wall of the mounting cavity 21 may

also guide the connection end 8 to move up and down. The external connection end 6 may be connected to the connection end 8 by a vertical plate 24, an upper end of the vertical plate may be connected to the external connection end 6, the external connection end 6 may be hook-shaped, and a lower end of the vertical plate 24 may be connected to the connection end 8. The lower end of the guide post cover 3 may be provided with two vertical guide posts 22, and the connection end 8 may be provided with two connection holes 16. The guide posts 22 may be inserted into the connection holes 16, so that the connection end 8 may slide on the guide posts 22. The guide posts 22 may provide guidance for the up and down movement of the hook member 2. An elastic member 10 may be disposed between the connection end 8 and the top wall of the mounting cavity 21. The elastic member 10 may be a spring, and two springs may be sleeved on two guide posts 22 respectively. In addition, the vertical plate 24 may be provided with an arc-shaped groove 25 corresponding to the elastic member 10 to give way to the spring. Thus, the hook member 2 may be moved up and down, and the adjustment of the position of the hook member 2 in the up and down direction can be ensured under the action of the elastic member 10. In addition, one detachable fixing ring 11 may be disposed at a lower end of each guide post 22. The fixing ring 11 may be sleeved on the guide post 22, and the fixing ring 11 and the guide post 22 may be correspondingly provided with insertion holes 26. A fixing pin 9 may be inserted into the insertion holes 26 to relatively fix the guide post 22 and the fixing ring 11, thus preventing the connection end 8 and the spring from falling out of the guide post 22, and forming an integrated structure, which is convenient for installation.

[0016] As also shown in FIGS. 2, 3, 4 and 9, the main body 1 may be provided with a gear assembly, which may include a driving gear 12 and a driven gear 13 which are meshed. The driving gear 12 and the driven gear 13 may be respectively connected with the rotating shafts of the two door leaves, and the door leaves may rotate about respective rotating shafts during the opening and closing. The two guide posts 22 may be arranged corresponding to the axes of the driving gear 12 and the driven gear 13, respectively (i.e., the axes of the two guide posts 22 may be collinear with the axes of the driving gear 12 and the driven gear 13, respectively). The driving gear 12 and the driven gear 13 may be mounted in the first recess 27, and the bottom of the first recess 27 of the fixing seat 4 may be provided with two first through holes 23 corresponding to the driving gear 12 and the driven gear 13. Lower ends of the driving gear 12 and the driven gear 13 may be inserted into the two first through holes 23, respectively, so that the driving gear 12 and the driven gear 13 may rotate about centers of the two first through holes 23, respectively. Moreover, the lower end of each of the driving gear 12 and the driven gear 13 may be provided with a fixing block 14. The fixing block 14 may be inserted into a recess (not shown in the drawings) of

the door leaf, so that the driving gear 12 may rotate together with the door leaf connected thereto, and the driving gear 12 drives the driven gear 13 to rotate, and the rotation of the driven gear 13 can further drive the door leaf connected thereto to rotate together, the two door leaves can rotate synchronously. In addition, the upper end of each of the driving gear 12 and the driven gear 13 may be provided with a second recess 29. The guide post 22 and the fixing ring 11 may be inserted into the second recess 29, and the fixing ring 11 may also limit the upward movement of the gear assembly.

[0017] The main body 1 may be limited on the door leaves by two self-tapping screws 5. The guide post 22, the driving gear 12 and the driven gear 13 may all be provided with a second through hole 28 for the self-tapping screw 5 to penetrate through. The self-tapping screws 5 may penetrate through the guide posts 22 and the gear assembly sequentially to penetrate through the main body 1 up and down and penetrate through the mounting cavity 21. An upper end of the guide post cover 3 may be provided with sinking grooves 15 corresponding to the guide posts 22, and nuts of the self-tapping screws 5 may be disposed in the sinking grooves 15. Lower ends of the self-tapping screws 5 may be screwed into the rotating shafts of the two door leaves, the door leaf fixed by the self-tapping screw 5 penetrating through the driving gear 12 may be a driving door leaf 17, and the door leaf fixed by the self-tapping screw 5 penetrating through the driven gear 13 may be a driven door leaf 18.

[0018] When mounting the door closing device, the springs and the hook member 2 may be sleeved on the guide posts 22 first, and then the fixing rings 11 are mounted, so that the guide post cover 3, the springs and the hook member 2 form an integrated structure. Subsequently, the gear assembly may be fitted into the fixing seat 4 and the fixing seat 4 may be positioned at the junction of the driving door leaf 17 and the driven door leaf 18. Then, the guide post cover 3 may be covered on the fixing seat 4 to cover the gear assembly and the like, and the connection between the door closing device and the door leaves can be formed after the self-tapping screws 5 are screwed. The door closing device is connected with the driving door leaf 17 and the driven door leaf 18. When the door is opened or closed, the user needs to push the driving door leaf 17 to rotate, so that the driven door leaf 18 can rotate synchronously under the action of the gear assembly to realize the unfolding and folding of the folding door.

[0019] As shown in FIGS. 10-13, the door closing device, the folding door and the door frame 19 constitute a shower room door structure. The folding door may include the driving door leaf 17 and the driven door leaf 18, the door frame 19 may include a guide rail 20 at the top thereof, and the main body 1 may be provided at the upper end of the junction of the driving door leaf 17 and the driven door leaf 18. In the door closed state, the upper end of the hook member 2 can be hung on the door frame 19, such as the guide rail 20 of the door frame 19, and it

can ensure that the junction of the two door leaves will not sag when used for a long time. In the process of closing the door, an end of the external connection end of the hook member 2 can first contact the guide rail 20, and the hook member 2 can move up under the action of the springs, and can be hung on the guide rail 20 after continuing to move, thus completing automatic hooking. In the process of opening the door, the hook member 2 can be disengaged from the guide rail 20 in the same way, thus realizing automatic disengagement.

[0020] In combination with the embodiments above, the door closing device according to the embodiments of the present application makes use of the hook member to enable the two door leaves to connect with the door frame at the junction of the two door leaves in the door closed state, thereby avoiding sag under long-term use and improving the user experience. The hook member of the door closing device according to the embodiments of the present application can be lifted up and down, and by way of the self-elasticity and the action of the elastic member, the automatic unhooking and automatic hooking can be realized respectively when opening and closing the door. The door closing device according to the embodiments of the present application is provided with a gear assembly, which can drive two door leaves to rotate synchronously. The door closing device according to the embodiments of the application realizes a modular design, which has a simple structure, convenient manufacture, low cost, convenient mounting, high universality and is suitable for various types of rooms.

[0021] In the description of the embodiments of the present application, it should be noted that the orientation or position relationships indicated by the terms "upper", "lower", "one side", "the other side", "one end", "the other end", "side", "relative", "four corners", "periphery", "square structure" and the like are based on the orientation or position relationships shown in the drawings, which are only for convenience of describing the embodiments of the present application and simplifying the description, rather than indicating or implying that the structure referred has the specific orientation, or is constructed and operated in the specific orientation, and thus cannot be interpreted as a limitation on the embodiments of the present application.

[0022] In the description of the embodiments of the present application, unless otherwise explicitly specified and limited, the terms "connection", "direct connection", "indirect connection", "fixed connection", "mounting" and "assembly" should be understood in a broad sense, for example, they may be fixed connection, detachable connection or integrated connection; and the terms "mounting", "connection" and "fixed connection" may be direct connection, or indirect connection through an intermediary, or may be an internal communication between two elements. For those of ordinary skills in the art, the specific meanings of the above terms in the embodiments of the present application can be understood according to specific situations.

[0023] Although implementations disclosed in the embodiments of the present application are described above, the described contents are only implementations adopted for facilitating the understanding of the embodiments of the present application, and are not intended to limit the embodiments of the present application. Without departing from the spirit and scope disclosed in the embodiments of the present application, any person skilled in the art to which the embodiments of the present application pertains may make any modifications and changes in the form and details of implementation, but the scope of patent protection of the embodiments of the present application shall still be defined by the appended claims.

Claims

1. A door closing device applied to a folding door, the door closing device being configured to be disposed at a junction of two door leaves of the folding door, wherein the door closing device comprises a main body configured to be disposed at upper ends of the door leaves and connected with the two door leaves respectively, a hook member is disposed on the main body, an upper end of the hook member is hook-shaped and is configured to be able to hang on a door frame in a door closed state to prevent the two door leaves from sagging at the junction.
2. The door closing device applied to a folding door according to claim 1, wherein a mounting cavity is provided in the main body, the hook member comprises a connection end extending into the mounting cavity and a hook-shaped external connection end, the connection end is configured to be able to slide up and down in the mounting cavity, the external connection end extends out of the mounting cavity, an elastic member is disposed between the connection end and a top wall of the mounting cavity, and the external connection end is configured to be hung on the door frame or disengaged from the door frame.
3. The door closing device applied to a folding door according to claim 2, wherein the main body is provided with a gear assembly, the gear assembly comprises a driving gear and a driven gear which are meshed, the driving gear and the driven gear are configured to be connected with rotating shafts of the two door leaves, respectively.
4. The door closing device applied to a folding door according to claim 3, wherein the main body comprises a fixing seat and a guide post cover which are separated, the guide post cover is disposed at an upper end of the fixing seat, the fixing seat and the guide post cover enclose and form the mounting cavity, and the guide post cover is provided with a notch for the hook member to extend out.
5. The door closing device applied to a folding door according to claim 4, wherein the main body is provided with a vertical guide post, the connection end is sleeved on the guide post and configured to be able to slide on the guide post, and the elastic member is provided as a spring, and the spring is sleeved on the guide post.
6. The door closing device applied to a folding door according to claim 5, wherein the guide post cover is provided with the guide post extending downward, and a lower end of the guide post is provided with a detachable fixing ring for preventing the connection end and the spring from disengaging from the guide post.
7. The door closing device applied to a folding door according to claim 5, wherein the guide post cover is provided with two guide posts, and the two guide posts are respectively disposed corresponding to axes of the driving gear and the driven gear.
8. The door closing device applied to a folding door according to claim 7, wherein the main body is configured to be limited on the door leaves by two self-tapping screws, the guide posts, the driving gear and the driven gear are all provided with through holes for the self-tapping screws to penetrate through, and the self-tapping screws penetrate through the mounting cavity and are configured to be screwed into the door leaves.
9. The door closing device applied to a folding door according to claim 6, wherein the door closing device further comprises a fixing pin, the fixing ring is sleeved on the guide post, and the fixing ring and the guide post are each correspondingly provided with an insertion hole, and the fixing pin is inserted into the insertion holes to relatively fix the guide post and the fixing ring.
10. A shower room door structure, comprising a folding door and a door frame, wherein the shower room door structure further comprises the door closing device according to any one of claims 1-9, the door closing device is disposed at a top end of the junction of the two door leaves of the folding door, and an upper end of the hook member is configured to be hung on the door frame in the door closed state.
11. The shower room door structure according to claim 10, wherein the door frame is provided with a guide rail, and the upper end of the hook member is configured to be hung on the guide rail of the door frame in the door closed state.

12. The shower room door structure according to claim 10, wherein the upper end of the hook member is configured to be disengaged from the door frame in a door opened state.

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13. A folding door, comprising two door leaves, wherein the folding door further comprises the door closing device according to any one of claims 1-9, the door closing device is disposed at a top end of the junction of the two door leaves, and the upper end of the hook member is configured to be hung on the door frame in the door closed state.

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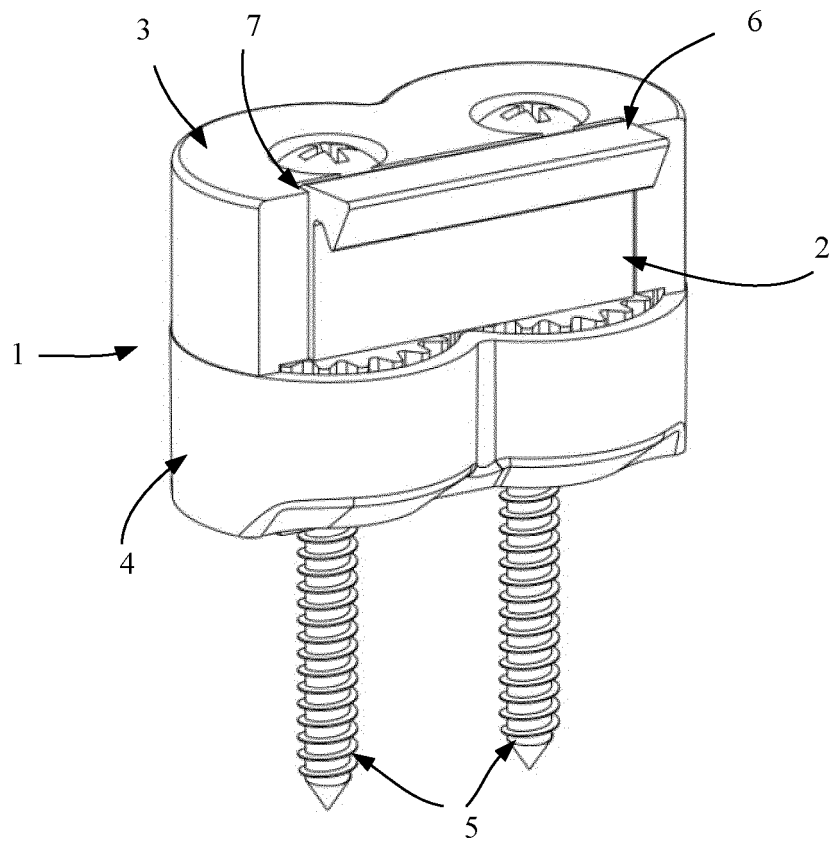


FIG. 1

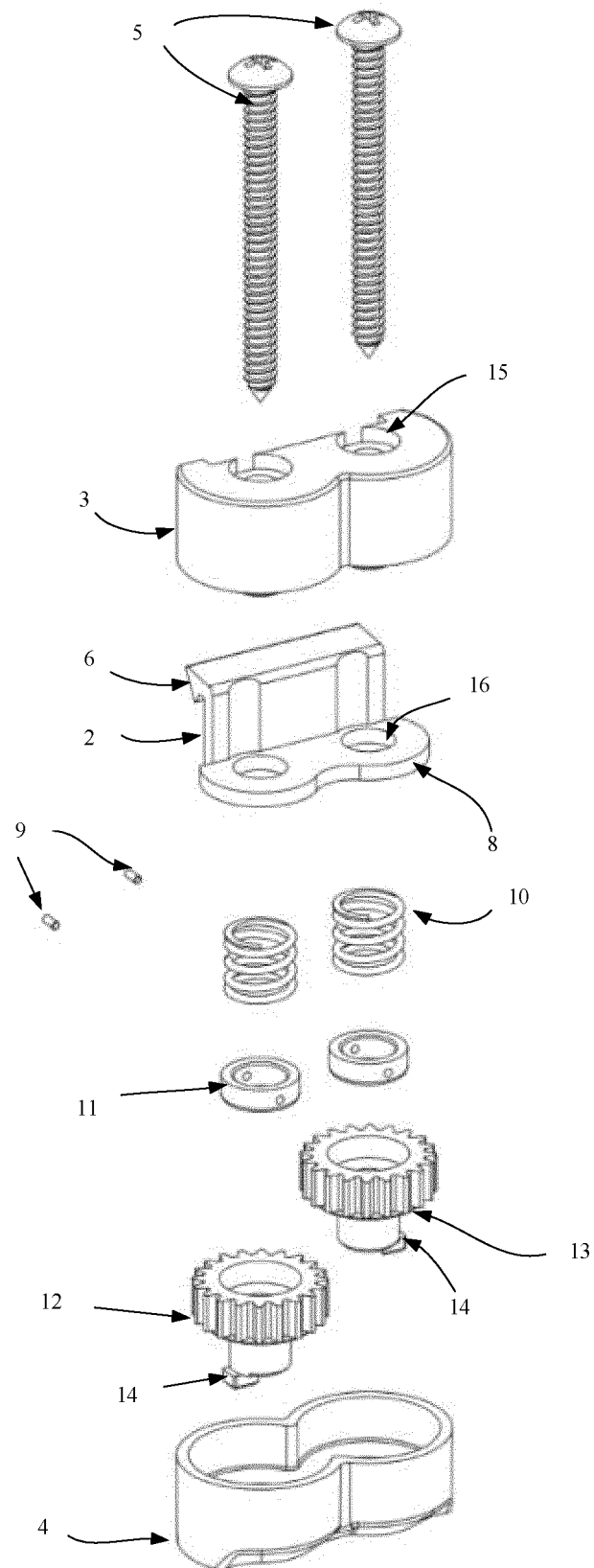


FIG. 2

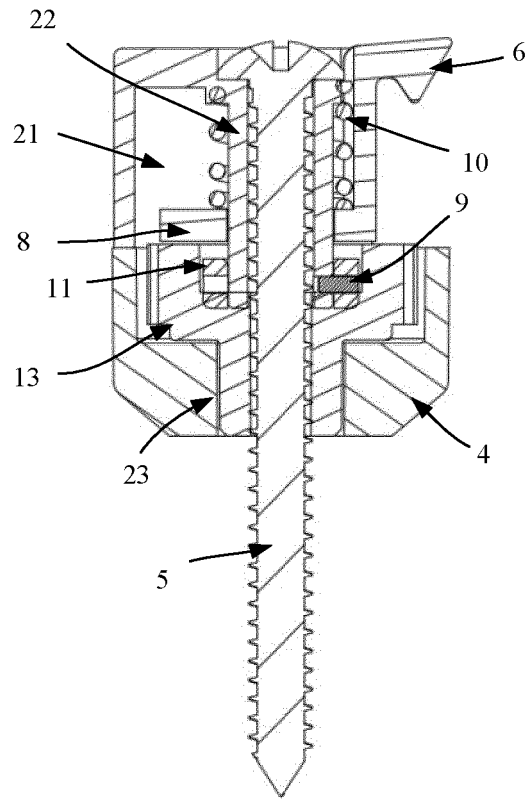


FIG. 3

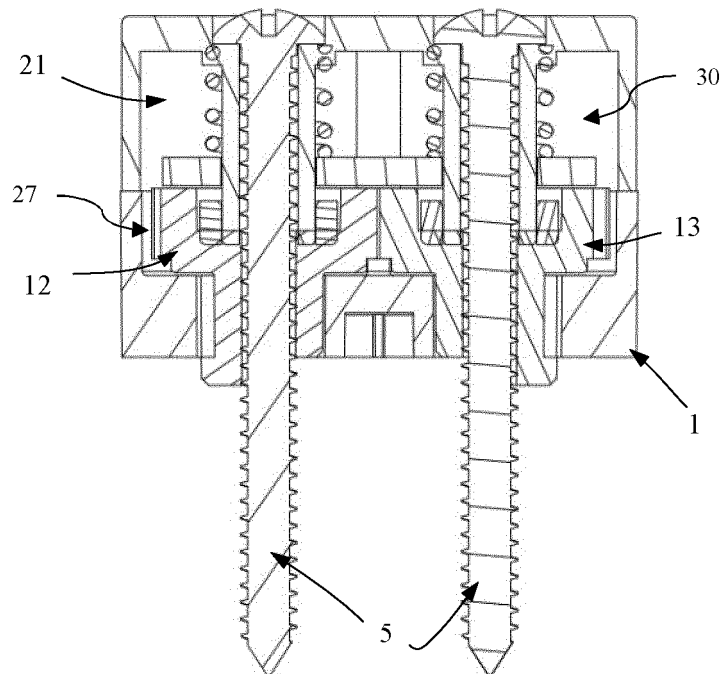


FIG. 4

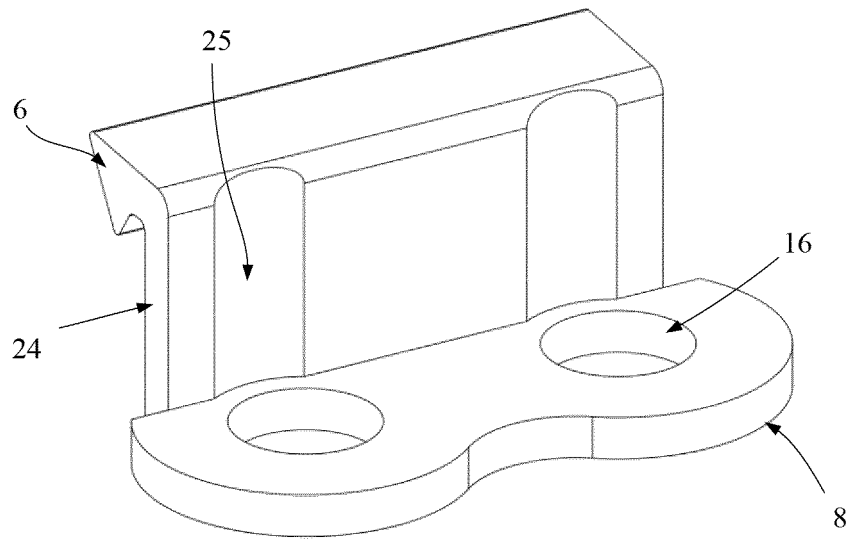


FIG. 5

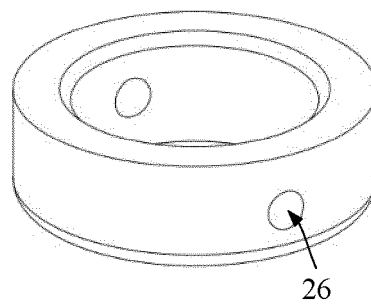


FIG. 6

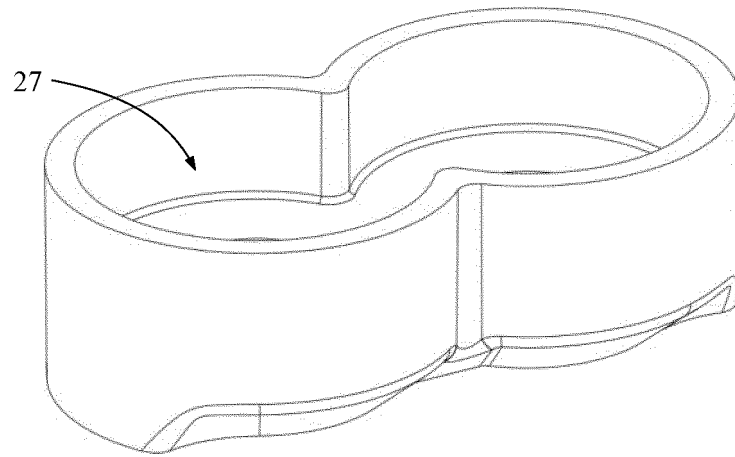


FIG. 7

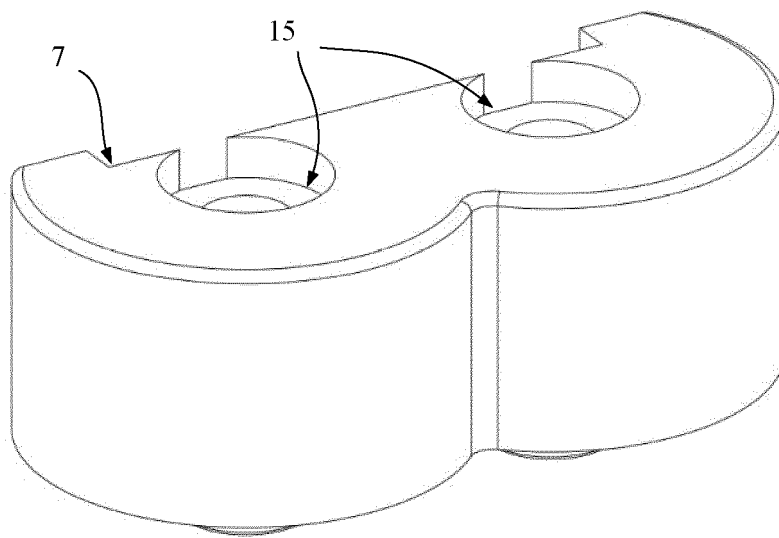


FIG. 8

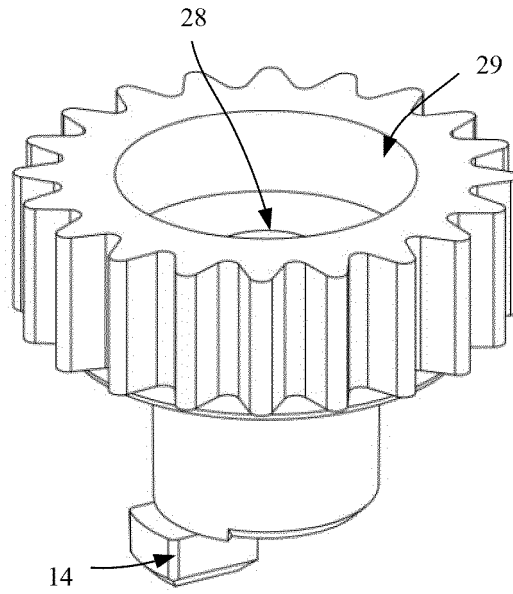


FIG. 9

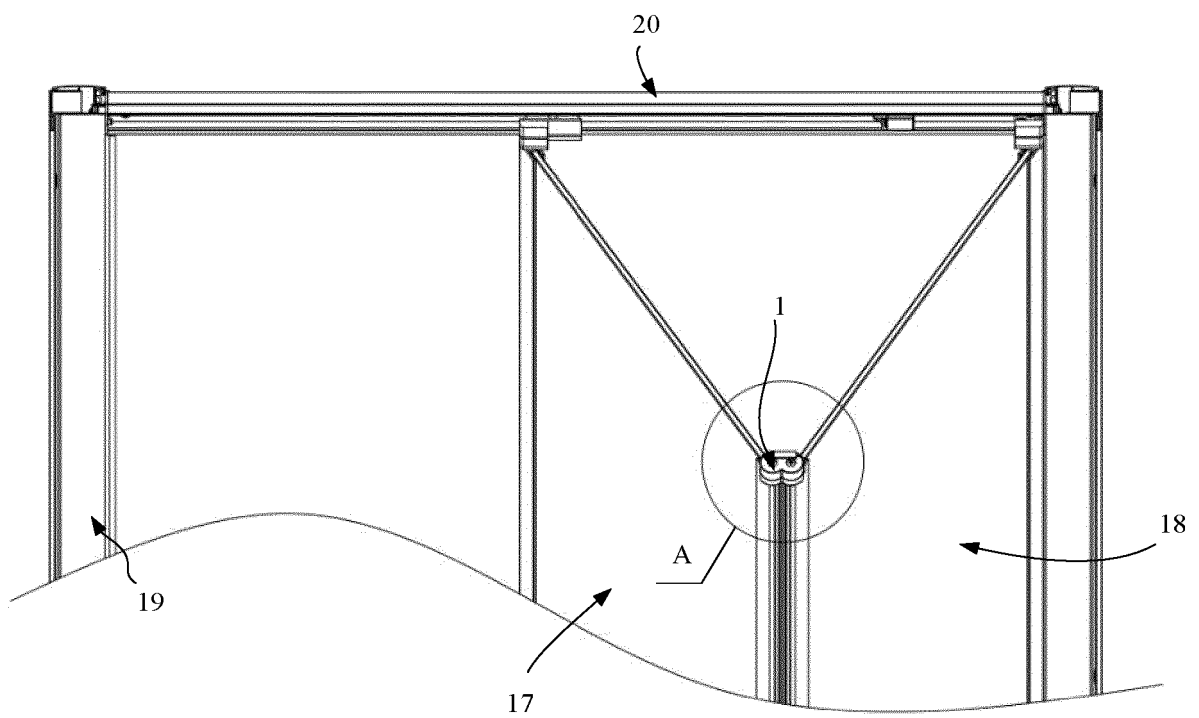


FIG. 10

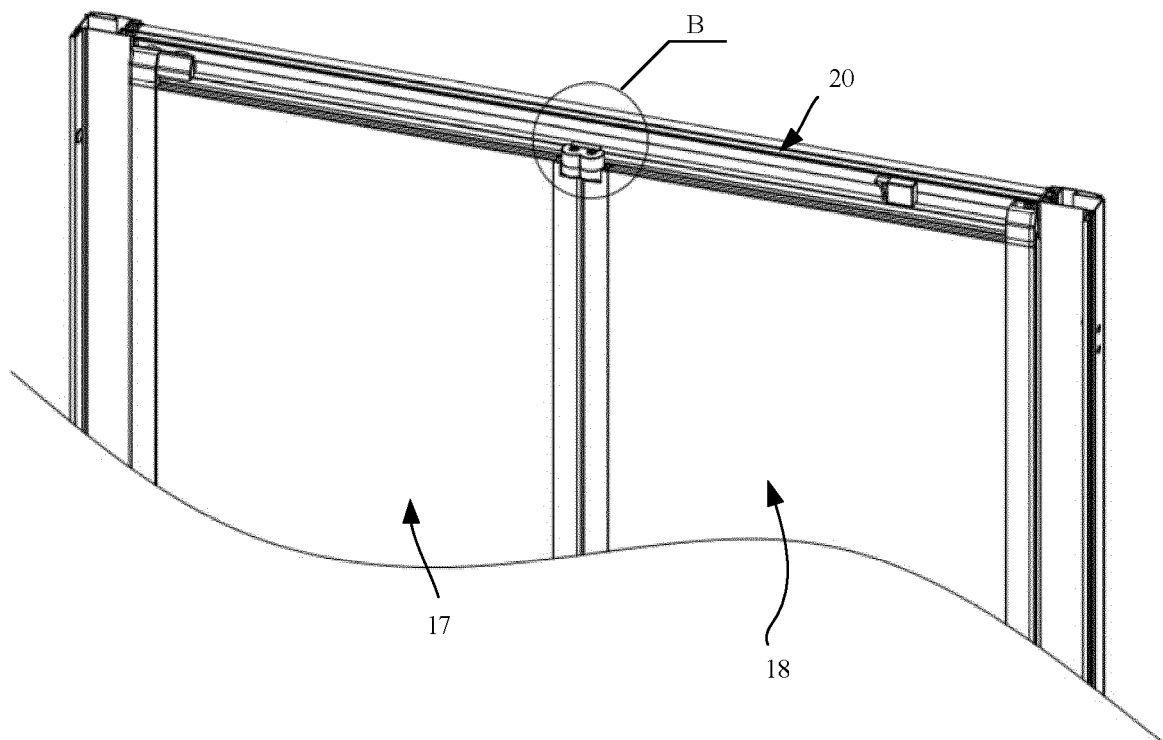


FIG. 11

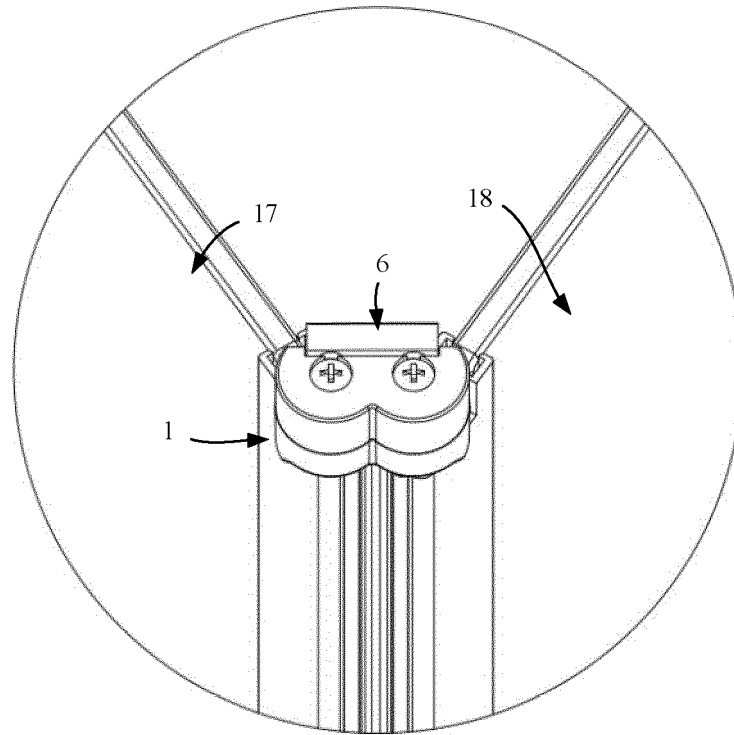


FIG. 12

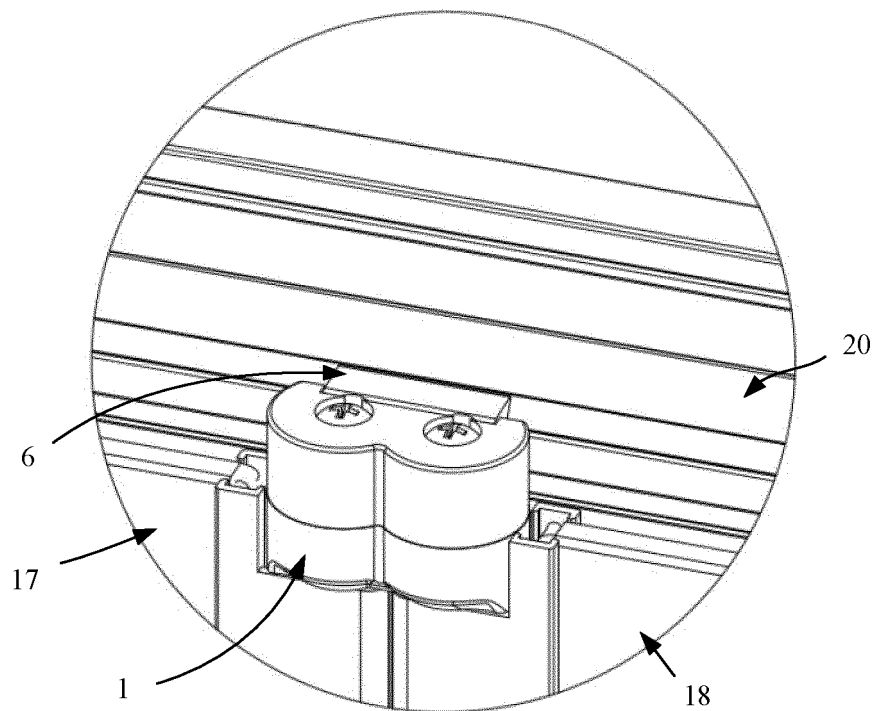


FIG. 13

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2020/132784

A. CLASSIFICATION OF SUBJECT MATTER E05D 15/26(2006.01)i; E06B 3/48(2006.01)i; A47K 3/36(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) E06B3,E05D15,A47K3,E05C21 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched																					
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C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>JP 0610574 A (SWAN SHOJI KK) 18 January 1994 (1994-01-18) description, specific embodiments, and figures 1-9</td> <td>1, 10-13</td> </tr> <tr> <td>Y</td> <td>JP 0610574 A (SWAN SHOJI KK) 18 January 1994 (1994-01-18) description, specific embodiments, and figures 1-9</td> <td>2-4</td> </tr> <tr> <td>A</td> <td>JP 0610574 A (SWAN SHOJI KK) 18 January 1994 (1994-01-18) description, specific embodiments, figures 1-9</td> <td>5-9</td> </tr> <tr> <td>Y</td> <td>CN 208640551 U (ZHONGSHAN NEPTUM SANITARY WARE CO., LTD.) 26 March 2019 (2019-03-26) description, specific embodiments, and figures 1-12</td> <td>2-4</td> </tr> <tr> <td>A</td> <td>CN 211500334 U (FOSHAN SHUNDE YIHUA TOILET AND BATHROOM EQUIPMENT CO., LTD.) 15 September 2020 (2020-09-15) entire document</td> <td>1-13</td> </tr> <tr> <td>A</td> <td>CN 109730563 A (FUJIAN XIHE SANITARY WARE TECHNOLOGY CO., LTD.) 10 May 2019 (2019-05-10) entire document</td> <td>1-13</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	JP 0610574 A (SWAN SHOJI KK) 18 January 1994 (1994-01-18) description, specific embodiments, and figures 1-9	1, 10-13	Y	JP 0610574 A (SWAN SHOJI KK) 18 January 1994 (1994-01-18) description, specific embodiments, and figures 1-9	2-4	A	JP 0610574 A (SWAN SHOJI KK) 18 January 1994 (1994-01-18) description, specific embodiments, figures 1-9	5-9	Y	CN 208640551 U (ZHONGSHAN NEPTUM SANITARY WARE CO., LTD.) 26 March 2019 (2019-03-26) description, specific embodiments, and figures 1-12	2-4	A	CN 211500334 U (FOSHAN SHUNDE YIHUA TOILET AND BATHROOM EQUIPMENT CO., LTD.) 15 September 2020 (2020-09-15) entire document	1-13	A	CN 109730563 A (FUJIAN XIHE SANITARY WARE TECHNOLOGY CO., LTD.) 10 May 2019 (2019-05-10) entire document	1-13
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A	JP 0610574 A (SWAN SHOJI KK) 18 January 1994 (1994-01-18) description, specific embodiments, figures 1-9	5-9																			
Y	CN 208640551 U (ZHONGSHAN NEPTUM SANITARY WARE CO., LTD.) 26 March 2019 (2019-03-26) description, specific embodiments, and figures 1-12	2-4																			
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Date of the actual completion of the international search 21 July 2021	Date of mailing of the international search report 02 August 2021																				
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