(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 312 373 A1

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
25.04.2018 Bulletin 2018/17

(21) Application number: **16892931.3**

(22) Date of filing: **08.09.2016**

(51) Int Cl.:
E05D 15/06 *(2006.01)* ***A47K 3/34*** *(2006.01)*

(86) International application number:
PCT/CN2016/098413

(87) International publication number:
WO 2018/045527 (15.03.2018 Gazette 2018/11)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(71) Applicant: **Ideal Sanitary Ware Co., Ltd.**
Foshan, Guangdong 528225 (CN)

(72) Inventor: **WEI, Wuxiang**
Foshan, Guangdong 528225 (CN)

(74) Representative: **Morris, Jonathan Paul**
Urquhart-Dykes & Lord LLP
Altius House
1 North Fourth Street
Milton Keynes MK9 1NE (GB)

(54) **EASY-TO-CLEAN LOWER SLIDE DEVICE FOR SHOWER DOOR**

(57) The present invention discloses an easy-to-clean shower door lower sliding device, comprising a pulley holder (10), a pulley support (20) and a pulley (30) mounted on the pulley support, and a disengageable connection is formed between the pulley holder (10) and the pulley support (20), a control cover (50) reciprocally movable relative to the pulley holder is provided on the pulley holder (10), and a reset member is provided between the control cover (50) and the pulley holder (10); the pulley support (20) has a cavity for receiving the pulley holder (10), wherein the pulley holder (10) comprises a holder body and elastic latches (102,103) provided on both sides thereof, the pulley holder (10) is engaged with the pulley support (20) via the elastic latches, and the pulley holder (10) is disengageable from the pulley support (20) by compressing the elastic latches (102,103) by the control cover (50).

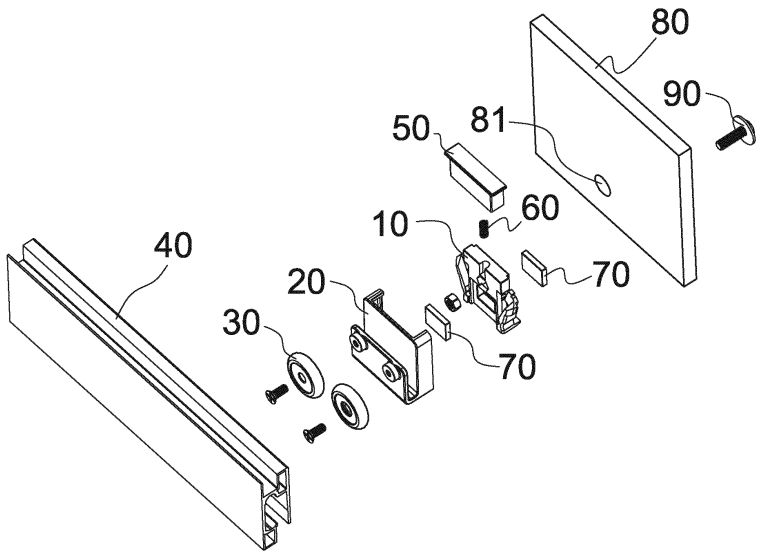

FIG.3

EP 3 312 373 A1

Description

Technical Field

[0001] The present invention relates to the technical field of shower doors, and more particularly to a lower sliding device in a shower door.

Background Technology

[0002] The existing sliding shower doors are usually provided with upper and lower tracks and movable door sheets, wherein a sliding groove is provided on one side of the lower track, and upper and lower pulleys are mounted on the movable door sheets, and the pulleys can slide on the lower track, there is a certain distance between the movable door sheets and the lower track during sliding along the lower track. On one hand, since the sliding groove is located on the side of the lower track, when the user looks outward from the shower door, it is possible to see the sliding groove of the lower track and the sliding wheels, which has an influence on the aesthetics; On the other hand, the shower door needs to be cleaned in a timely manner, and in the existing shower door structure, since it is troublesome to separate the lower track from the movable door sheets, it is more difficult to clean the fouling dirt between the lower track and the movable door sheets.

Summary of the Invention

[0003] The technical problem to be solved by the present invention is to provide an easy-to-clean shower door lower sliding device in regarding to the above-mentioned drawbacks of the prior art.

[0004] In order to solve the above-mentioned technical problems, the present invention adopts the following technical solution: provided is an easy-to-clean shower door lower sliding device, comprising a pulley holder, a pulley support and a pulley mounted on the pulley support, and a disengageable connection is formed between the pulley holder and the pulley support, a control cover reciprocally movable relative to the pulley holder is provided on the pulley holder, and a reset member is provided between the control cover and the pulley holder; the pulley support has a cavity for receiving the pulley holder, wherein the pulley holder comprises a holder body and elastic latches provided on both sides thereof, the pulley holder is engaged with the pulley support via the elastic latches, and the pulley holder is disengageable from the pulley support by compressing the elastic latches by the control cover.

[0005] In a further technical solution, the elastic latches have roots connected to the holder body, and the bodies of the elastic latches are angled with respect to the holder body, and guide surfaces on which the control cover is slidable are formed at outsides of the elastic latches.

[0006] In a further technical solution, tops of the elastic latches are provided with positioning bosses, and positioning grooves which cooperate with the positioning bosses are provided on the holder body; the elastic latches produce outward elastic force when the positioning bosses are pressed into the positioning grooves while compression clearances are formed between the elastic latches and the holder body.

[0007] In a further technical solution, the control cover has a top plate, a first side wall, a second side wall and a third side wall extending out from one side of the top plate, and a semi-enclosed cavity is formed among the three side walls; the side edges of the first side wall and the third side wall far away from the second side wall are respectively formed with oppositely convex flanges; the control cover is placed over the top of the pulley holder and is above the elastic latches and is slidable up and down relative to the pulley holder, when the control cover slides down, the elastic latches are compressed inwardly toward the holder body under the action of the control cover, when the control cover slides up, the elastic latches are ejected outwardly away from the holder body; the flanges are provided thereon with limit teeth which cooperate with bosses at the top of the holder body to prevent the control cover from being disengaged from the pulley holder.

[0008] In a further technical solution, the pulley support has a main support plate, a front side of the main support plate is provided with a bending plate extending forwardly from the bottom of the main support plate and bending to extend upwardly, and the pulley is mounted on an upper portion of the bending plate; two side plates extend from both sides of the main support plate away from the bending plate, a cavity is formed between the two side plates and the main support plate, and two guide baffles extend from the ends of the two side plates toward a middle of the main support plate to define the slots respectively.

[0009] In a further technical solution, further comprised is a lower track for sliding the pulley support thereon, and the lower track is provided with a pulley groove for rolling the pulley along the same, one side of the pulley groove is provided with a baffle, and a notch for extending the bending plate of the pulley support into the pulley groove is provided between the lower portion of the baffle and the pulley groove.

[0010] In a further technical solution, a reset member receiving groove for mounting the reset member is provided in an upper intermediate position of the holder body, and an inner surface of the top plate of the control cover is provided with a reset member positioning post. The reset member is preferably a spring.

[0011] In a further technical solution, a lower portion of the holder body is provided with a first magnetic member mounting position, and a second magnetic member mounting position is provided at a central portion of the inner surface of the main support plate toward the cavity, and magnetic members for attracting the pulley holder to the pulley support are mounted in the magnetic mem-

ber mounting positions respectively.

[0012] In a further technical solution, further comprised is a movable door sheet fixed on the pulley holder, and the movable door sheet is provided with a through hole, and the pulley holder is provided with a screw through hole, and the pulley holder is fixedly connected with the movable door sheet through a screw passing through the through hole and the screw through hole.

[0013] According to the above technical solution, it can be seen that the shower door lower sliding device of the present invention fixes the pulley support to the pulley holder through the elastic latches. When the cleaning is required, the control cover moves downwardly relative to the pulley holder as long as it is pressed downwardly; the control cover slides along the guide surfaces of the elastic latches of the pulley holder so that the elastic latches are compressed inwardly, thus the contact of the elastic latches with the two side plates of the pulley support disappears and the pulley holder is separated from the pulley support so as to separate the movable door sheet from the lower track. After the cleaning is completed, the external force is removed, under the gravity of the movable door sheet, the pulley holder gets close to the pulley support, and the pulley holder enters the cavity of the pulley support. The elastic latches on both sides of the pulley holder are in contact with the two guide baffles of the pulley support, so that the elastic latches are compressed inwardly and then enter the slots, the elastic latches are ejected outwardly to be in contact with the two side plates and the guide baffles to prevent the pulley support from being disengaged from the pulley holder so as to achieve fixation again. The operation is simple and convenient, and the sliding groove of the track and the pulley can be hidden, therefore, the appearance will be more attractive.

Brief Description of the Drawings

[0014]

Fig. 1 is a schematic view of an application position of a shower door lower sliding device in a shower door according to the present invention.

Fig. 2 is a schematic view of an assembly structure between a shower door lower sliding device and a lower track and a movable door sheet according to an embodiment of the present invention.

Fig. 3 is an exploded view of the assembly structure as shown in Fig. 2.

Figs. 4a to 4c are various schematic views from different angles of the pulley holder of the shower door lower sliding device as shown in Fig. 2.

Figs. 4d to 4e are various schematic views from different angles of the pulley holder of the shower door lower sliding device as shown in Fig. 2 in the pre-compressed state.

Figs. 5a to 5c are various schematic views from different angles of the pulley support of the shower door lower sliding device as shown in Fig. 2.

Figs. 6a and 6b are various schematic views from different angles of the control cover of the shower door lower sliding device as shown in Fig. 2.

Figs. 7a and 7b are various schematic views from different angles of the pulley holder and the control cover assembly of the shower door lower sliding device as shown in Fig. 2.

Figs. 7c and 7d are various schematic views from different angles of the assembly as shown in Fig. 7a when the control cover is in the compressed state.

Fig. 8 is a top view of the shower door lower sliding device as shown in Fig. 2.

Fig. 9 is a schematic view of the lower track of the assembly structure as shown in Fig. 2.

Description of the Preferred Embodiments

[0015] Various embodiments of the invention will be described in detail below, in which embodiments will be described in conjunction with the accompanying drawings and described in the following description, and the other elements which do not affect the scope of protection of the claims of the present application are omitted in the drawings. It is to be noted that while the present invention will be described in conjunction with exemplary embodiments, it is to be understood that the invention is not limited to these exemplary embodiments. In contrast, the present invention not only includes these embodiments, but also various modifications and improvements.

[0016] Referring to Fig. 1, an embodiment of the present invention is applied at a position in the shower door, such as positions A, B, C and D.

[0017] Referring to Figs. 2 and 3, there is shown a main component of a shower door lower sliding device according to an embodiment of the present invention. As shown in the Figures, the shower door lower sliding device includes a pulley holder 10, a control cover 50 placed over the pulley holder 10, a spring 60, a magnetic member 70, a pulley support 20, a pulley support 30 and a lower track 40 and the like.

[0018] The pulley 30 is mounted on the pulley support 20 and is slidable along the lower track 40. The pulley holder 10 is mounted on the movable door sheet 80 and the pulley support 20 and the pulley holder 10 employ elastic latches 102 and 103 on both sides of the pulley holder 10 for fixation.

[0019] Referring to Figs. 4a to 4e, a screw through hole

101 is provided on the pulley holder 10, and the pulley holder 10 can be mounted on the movable door sheet 80 by using the screw 90 through the through hole 81 and the screw through hole 101 in the movable door sheet 80. The elastic latches 102 and 103, above which a control cover 50 is provided, are provided on both sides of the pulley holder 10, and the spring 60 is provided between the control cover 50 and the pulley holder 10.

[0020] The material of the pulley holder 10 may be a plastic having elasticity, such as nylon. The elastic latches 102 and 103 provided on both sides of the pulley holder 10 have roots connected to the body of the pulley holder 10, and the bodies of the elastic latches 102 and 103 are angled with respect to the body of the pulley holder 10, tops of the elastic latches 102 and 103 are provided with positioning bosses 104, the body of the pulley holder 10 is provided with a positioning groove 105, and the positioning bosses 104 of the elastic latches 102 and 103 are pressed into the positioning groove 105 through external force, the roots of the elastic latches will produce outward resilience due to deformation while the elastic latches 102, 103 and the body of the pulley holder 10 still have certain compression clearances 107 therebetween which allow further inward deformation of the elastic latches 102 and 103. One side of each of the latches 102, 103 has a guide surface 109. The lower portion of the body of the pulley holder 10 is provided with a square hole 1011 for mounting the magnetic member 70.

[0021] Referring to Figs. 5a to 5c, the pulley support 20 has a main support plate 203, a bending plate 201 is provided on the front side of the main support plate 203, and screw holes 202 of the mounting pulley 30 are provided at an upper portion of the bending plate 201; the bending plate 201 extends forwardly from the bottom of the main support plate 203 and is bent to extend upwardly and two side plates 204 and 205 extend out from both sides of the main support plate 203 away from the bending plate 201, and a cavity 2011 is formed between the two side plates 204 and 205 and the main support plates 203, and two guide baffles 206 and 207 extend from the ends of the side plates 204 and 205 toward the middle of the main support plate and thereby defining the slots 208 and 209. The main support plate 203 is provided with a square groove 2010 for mounting the magnetic member 70 at the central portion of the inner surface thereof toward the cavity 2011.

[0022] When the pulley holder 10 gets close to the pulley support 20, and the pulley holder 10 enters the cavity of the pulley support 20, the elastic latches 102 and 103 on both sides of the pulley holder 10 are in contact with the two guide baffles 206 and 207 of the pulley support 20, so that the elastic latches 102 and 103 are compressed inwardly and then enter the slots 208 and 209, the elastic latches 102 and 103 are ejected outwardly to be in contact with the two side plates 204 and 205 and the guide baffles 206 and 207 to prevent the pulley support 20 from being disengaged from the pulley holder 10.

[0023] The square hole 1011 of the pulley holder 10 and the square groove 2010 of the pulley support 20 are respectively provided with a magnetic member 70, both of which allow the pulley holder 10 and the pulley holder 20 to be attracted together so as to reduce the noises resulted from the clearances.

[0024] As shown in Fig. 9, the lower track 40 is provided with a pulley groove 401, and a baffle 402 is provided on one side of the pulley groove 401, and a notch 403 is provided between the lower portion of the baffle 402 and the pulley groove 401. The bending plate 201 of the pulley support 20 can be stretched into the pulley groove 401 through the notch 403 of the lower track 40, and the pulley 30 comes into contact with the pulley groove 401 so that the pulley support 20 is pre-mounted on the lower track 40.

[0025] Referring to Figs. 6a and 6b, the control cover 50 has a top plate 501, a first side wall 502, a second side wall 503 and a third side wall 504 extending from a side of the top plate 501 form a semi-enclosed cavity 505. The oppositely convex flanges 506, 507 are respectively formed on the side edges of the first side wall 502 and the third side wall 504 away from the second side wall 503. The control cover 50 may be placed over the top of the pulley holder 10 and may slide up and down relative to the pulley holder 10. The flanges 506, 507 are provided with limiting teeth 508 which cooperate with the bosses 108 at the top of the body of the pulley holder 10 to prevent the control cover 50 from being disengaged from the pulley holder 10.

[0026] A spring groove 1010 for mounting the spring 60 is provided at an upper middle position of the body of the pulley holder 10, the inner surface of the top plate 501 of the control cover 50 is provided with a spring positioning post 509 for fixing the end of the spring 60.

[0027] Referring to Figs. 7a to 7d, when the control cover 50 is pressed downwardly, the control cover 50 moves downwardly relative to the pulley holder 10, and the first side wall 502 and the third side wall 504 of the control cover 50 moves along the guide surfaces 109 of the elastic latches 102 and 103 of the pulley holder 10, such that the elastic latches 102 and 103 are compressed inwardly so that the contact of the elastic latches 102, 103 with the two side plates 204, 205 of the pulley support 20 disappears, and the pulley holder 10 is disengaged from the pulley support 20; after removal of the external force, the control cover 50 is reset under the action of the spring 60, and the elastic latches 102, 103 are ejected outwardly.

[0028] The foregoing is only a preferred embodiment of the present invention and it should be noted that it will be appreciated that various changes and modifications easily contemplated by those skilled in the art may be made to the invention as described herein without departing form the spirit and scope thereof.

Industrial Applicability

[0029] The shower door lower sliding device of the

present invention can be industrially manufactured and used, and thus has industrial applicability.

Claims

1. An easy-to-clean shower door lower sliding device, comprising a pulley holder, a pulley support and a pulley mounted on the pulley support, and a disengageable connection is formed between the pulley holder and the pulley support, wherein a control cover reciprocally movable relative to the pulley holder is provided on the pulley holder, and a reset member is provided between the control cover and the pulley holder; wherein the pulley support has a cavity for receiving the pulley holder, the pulley holder comprises a holder body and elastic latches provided on both sides thereof, the pulley holder is engaged with the pulley support via the elastic latches, and the pulley holder is disengageable from the pulley support by compressing the elastic latches with the control cover.

2. The shower door lower sliding device according to claim 1, wherein the elastic latches have roots connected to the holder body, bodies of the elastic latches are angled with respect to the holder body, and guide surfaces on which the control cover is slidable are formed at outsides of the elastic latches.

3. The shower door lower sliding device according to claim 2, wherein tops of the elastic latches are provided with positioning bosses, and positioning grooves cooperating with the positioning bosses are provided on the holder body; wherein the elastic latches produce outward elastic force when the positioning bosses are pressed into the positioning grooves while compression clearances are formed between the elastic latches and the holder body.

4. The shower door lower sliding device according to claim 2, wherein the control cover has a top plate, a first side wall, a second side wall and a third side wall extending out from one side of the top plate, and a semi-enclosed cavity is formed among the three side walls; the side edges of the first side wall and the third side wall far away from the second side wall are respectively formed with oppositely convex flanges; wherein the control cover is placed over a top of the pulley holder and is above the elastic latches and is slidable up and down relative to the pulley holder; and when the control cover slides down, the elastic latches are compressed inwardly toward the holder body under the action of the control cover; when the control cover slides up, the elastic latches are ejected outwardly away from the holder body; the flanges are provided thereon with limit teeth which cooperate with bosses at the top of the holder body to prevent the control cover from being disengaged from the pulley holder.

5. The shower door lower sliding device according to claim 1, wherein the pulley support has a main support plate, a front side of the main support plate is provided with a bending plate extending forwardly from a bottom of the main support plate and bending to extend upwardly, and the pulley is mounted on an upper portion of the bending plate; two side plates extend from both sides of the main support plate away from the bending plate, a cavity is formed between the two side plates and the main support plate, and two guide baffles extend from the ends of the two side plates toward a middle of the main support plate to define slots respectively.

6. The shower door lower sliding device according to claim 1, further comprising a lower track for sliding the pulley support thereon, wherein the lower track is provided with a pulley groove for rolling the pulley along the same, one side of the pulley groove is provided with a baffle, and a notch for extending the bending plate of the pulley support into the pulley groove is provided between a lower portion of the baffle and the pulley groove.

7. The shower door lower sliding device according to claim 1, wherein a reset member receiving groove for mounting the reset member is provided in an upper intermediate position of the holder body, and an inner surface of the top plate of the control cover is provided with a reset member positioning post.

8. The shower door lower sliding device according to claim 7, wherein the reset member is a spring.

9. The shower door lower sliding device according to claim 1, wherein a lower portion of the holder body is provided with a first magnetic member mounting position, and a second magnetic member mounting position is provided at a central portion of the inner surface of the main support plate toward the cavity, and magnetic members for attracting the pulley holder to the pulley support are mounted in the magnetic member mounting positions respectively.

10. The shower door lower sliding device according to claim 1, further comprising a movable door sheet fixed on the pulley holder, wherein the movable door sheet is provided with a through hole, and the pulley holder is provided with a screw through hole, and the pulley holder is fixedly connected with the movable door sheet through a screw passing through the through hole and the screw through hole.

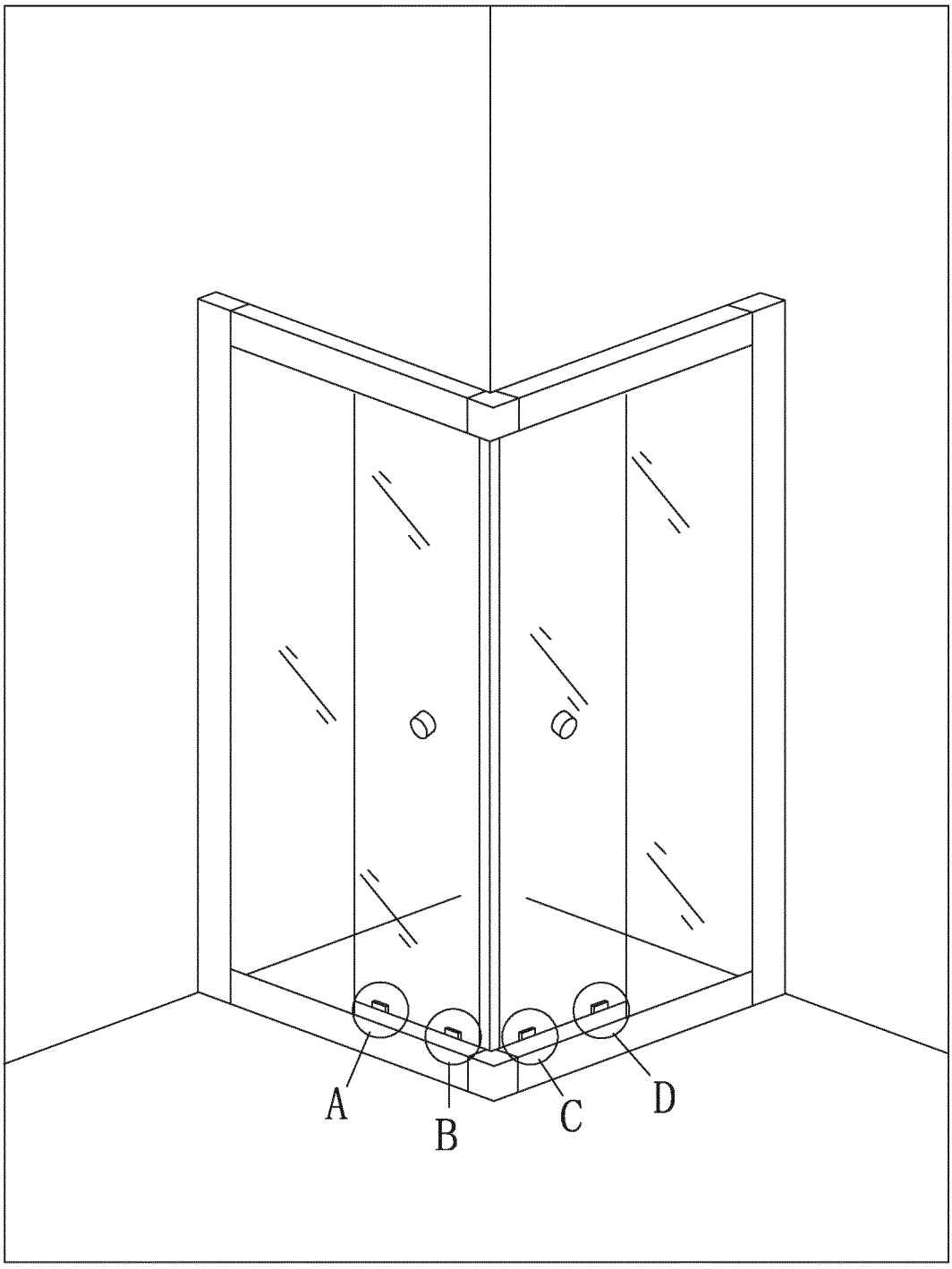

FIG.1

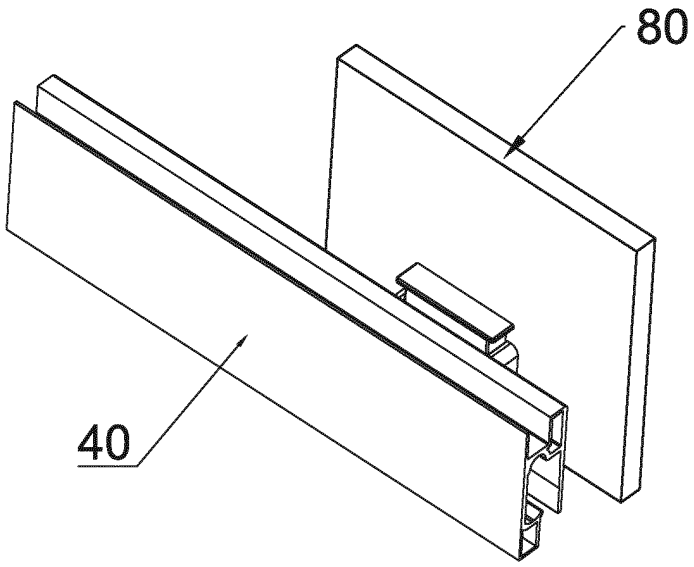

FIG.2

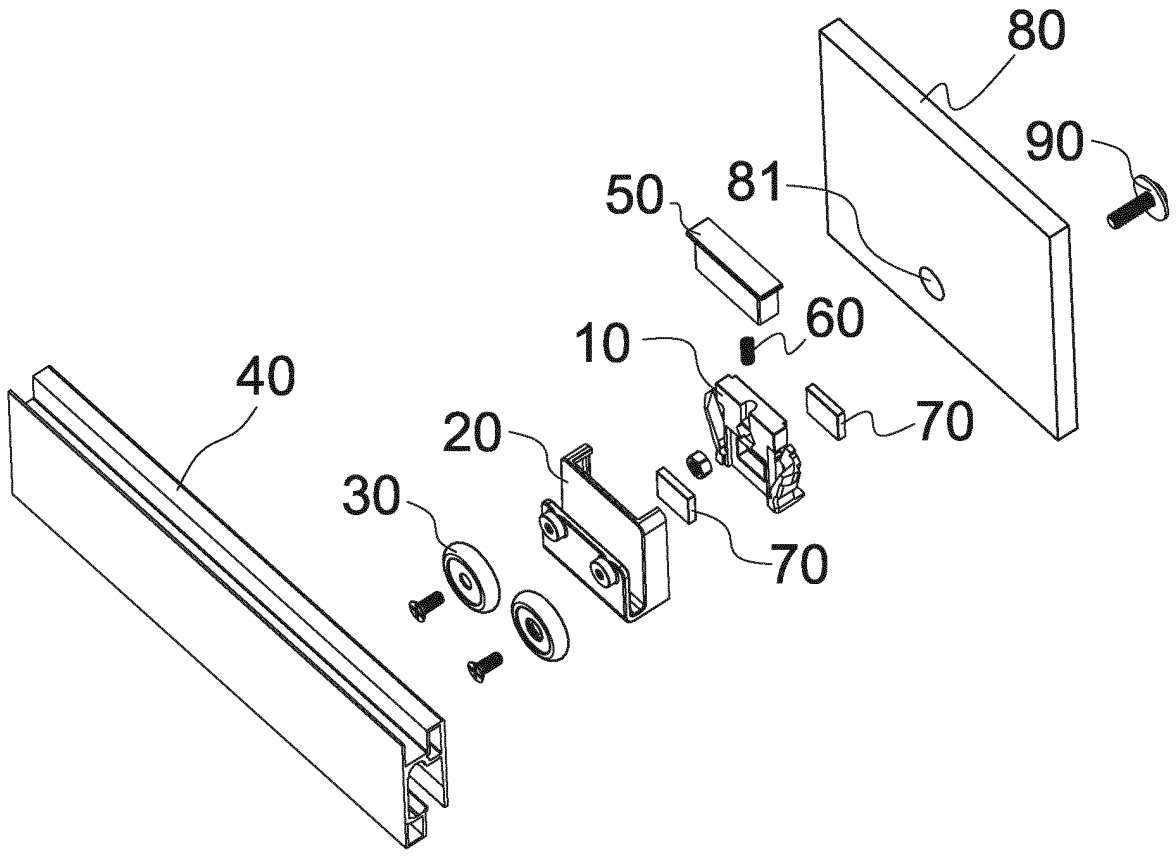

FIG.3

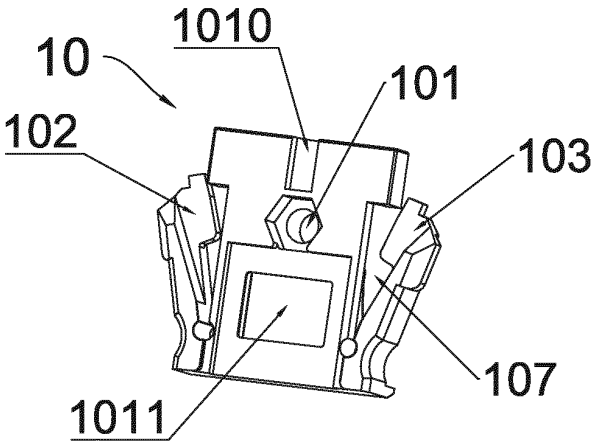

FIG.4a

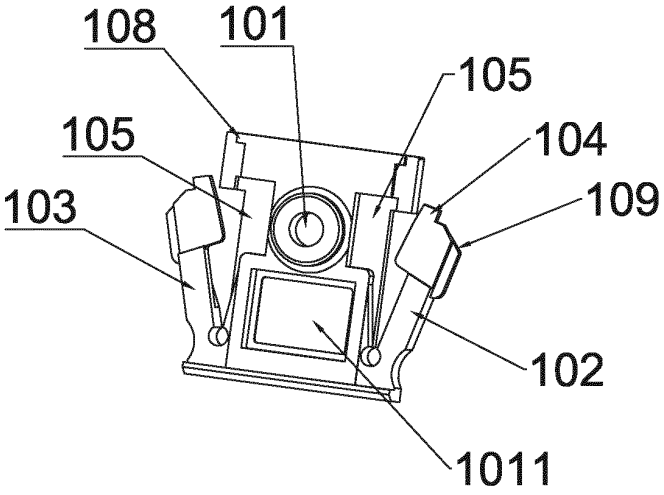

FIG.4b

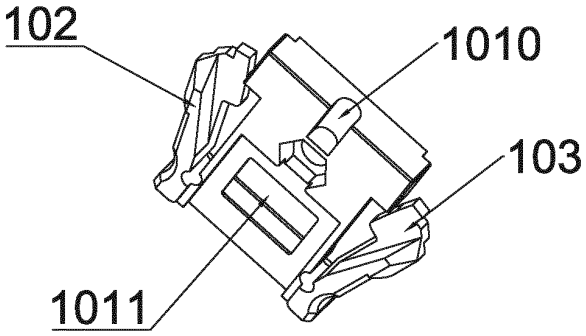

FIG.4c

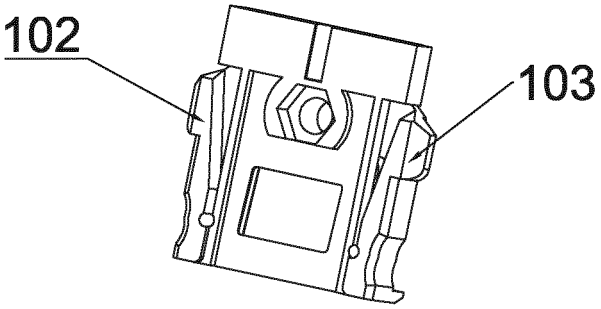

FIG.4d

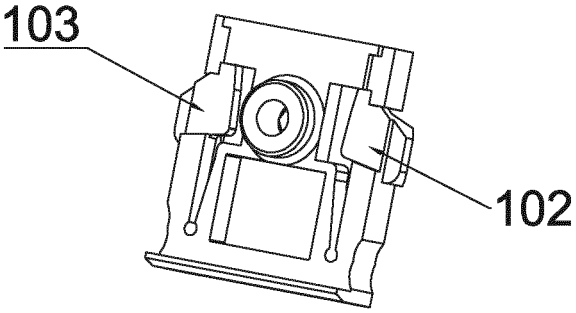

FIG.4e

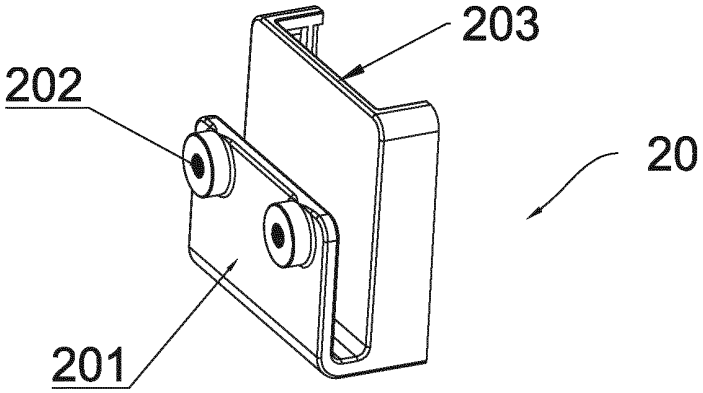

FIG.5a

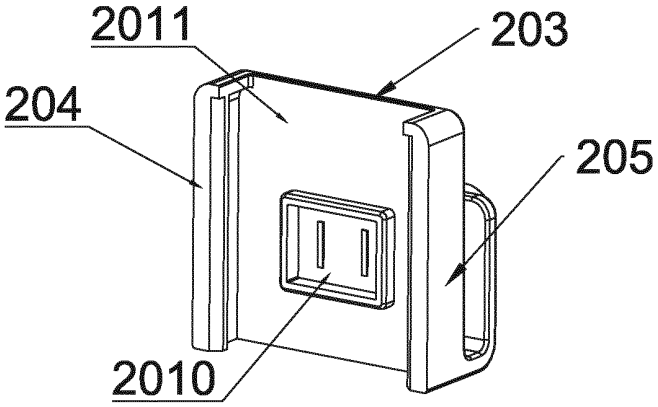

FIG.5b

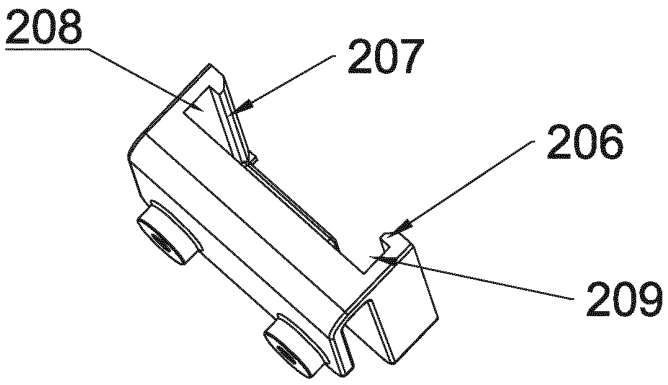

FIG.5c

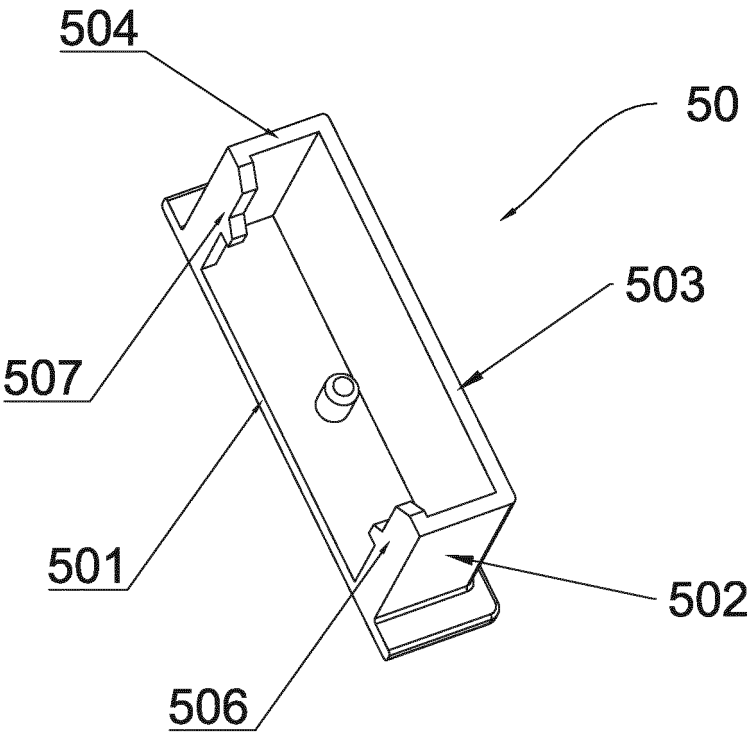

FIG.6a

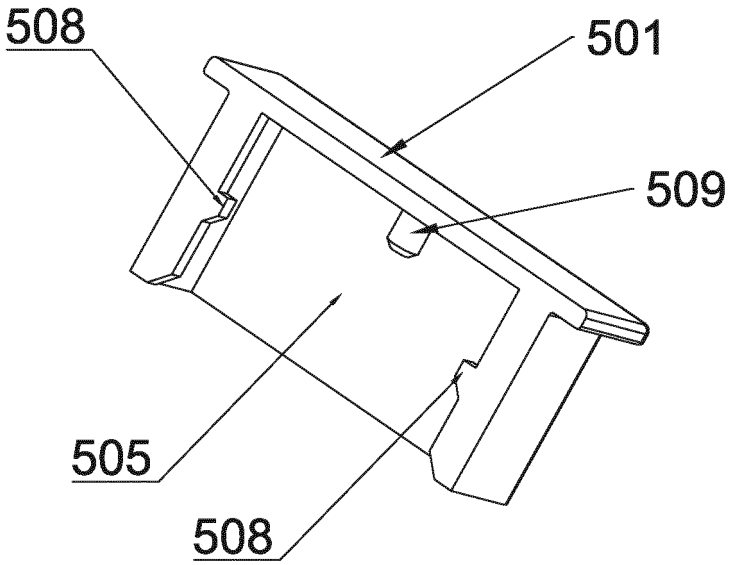

FIG.6b

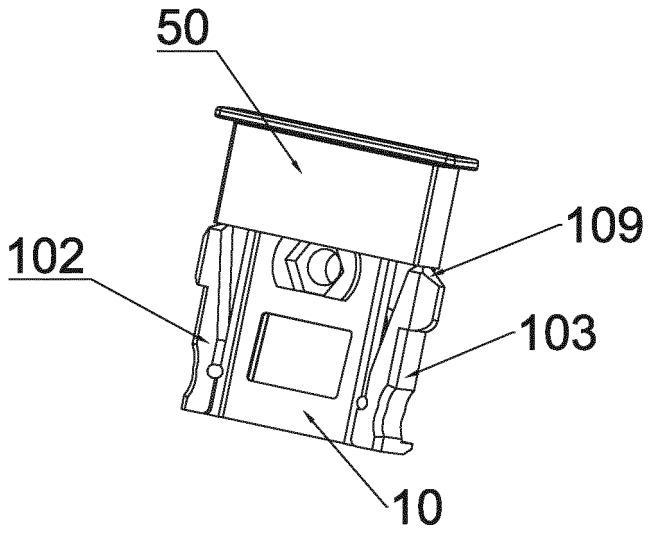

FIG.7a

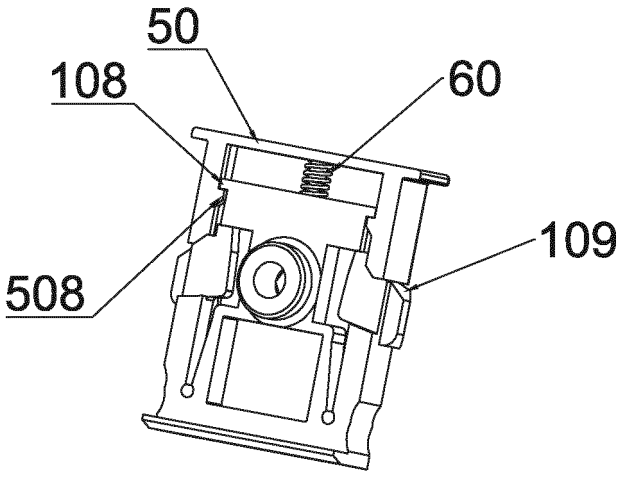

FIG.7b

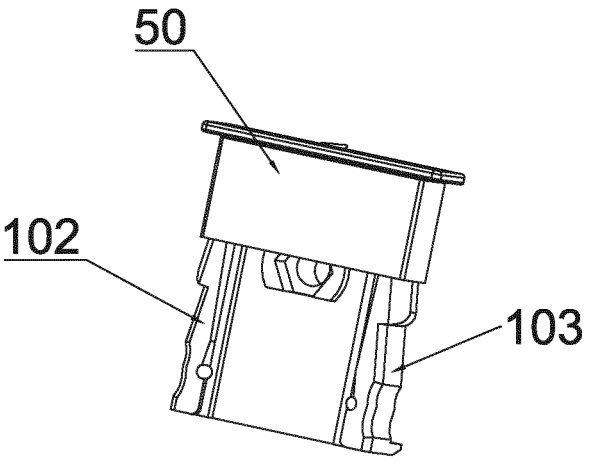

FIG.7c

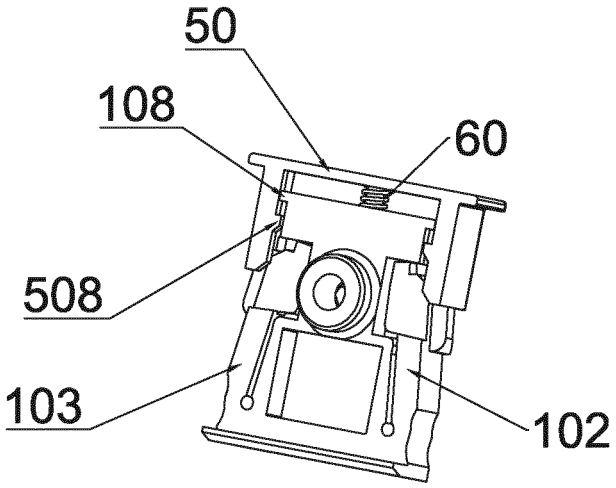

FIG.7d

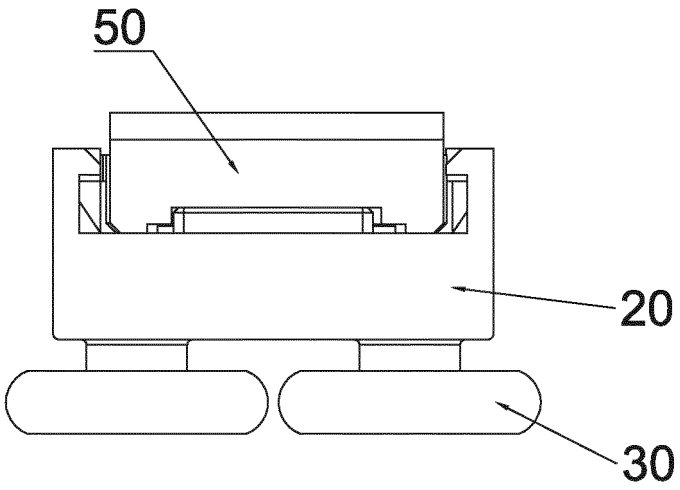

FIG.8

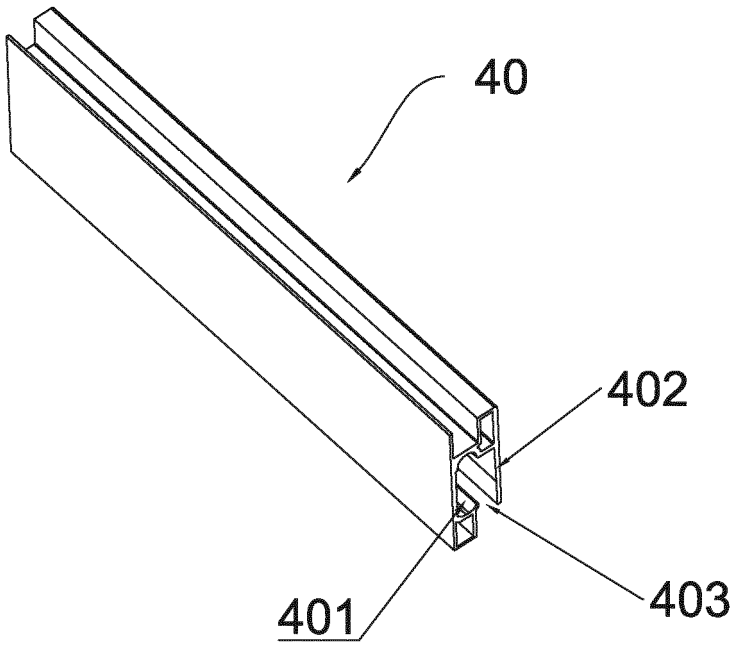

FIG.9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2016/098413

A. CLASSIFICATION OF SUBJECT MATTER

E05D 15/06 (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)

E05D, E06B

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, CNKI, VEN: pulley, clamp, door?, shower, bath, slid+, rail, track, bracket, bearer, cover+, lock+, elastic?, tooth, teeth, clean+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 105683470 A (IDEAL SANITARY WARE CO., LTD.), 15 June 2016 (15.06.2016), description, paragraphs [0027]-[0030], and figures 1 and 2	1-10
A	CN 202755779 U (ZHONGSHAN FRAE SHOWER EQUIPMENT CO., LTD.), 27 February 2013 (27.02.2013), the whole document	1-10
A	CN 201236563 Y (ZENG, Wen), 13 May 2009 (13.05.2009), the whole document	1-10
A	CN 203271399 U (FOSHAN DABBL SANITARY WARE CO., LTD.), 06 November 2013 (06.11.2013), the whole document	1-10
A	CN 202970229 U (FOSHAN IDEAL CO., LTD.), 05 June 2013 (05.06.2013), the whole document	1-10
A	EP 0538181 A1 (M I FLAIR LIMITED), 21 April 1993 (21.04.1993), the whole document	1-10
E	CN 106460428 A (IDEAL SANITARY WARE CO., LTD.), 22 February 2017 (22.02.2017), claims 1-10	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

"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
26 May 2017 (26.05.2017)	**13 June 2017 (13.06.2017)**
Name and mailing address of the ISA/CN: State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No.: (86-10) 62019451	Authorized officer **REN, Qihua** Telephone No.: (86-10) **62084966**

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2016/098413

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 105683470 A	15 June 2016	None	
CN 202755779 U	27 February 2013	None	
CN 201236563 Y	13 May 2009	None	
CN 203271399 U	06 November 2013	None	
CN 202970229 U	05 June 2013	CA 2808823 C	26 January 2016
		AU 2013201352 B2	07 May 2015
		EP 2728095 A2	07 May 2014
		US 2014115969 A1	01 May 2014
		AU 2013201352 A1	15 May 2014
		CA 2808823 A1	01 May 2014
EP 0538181 A1	21 April 1993	IE 913549 A1	21 April 1993
CN 106460428 A	22 February 2017	None	

Form PCT/ISA/210 (patent family annex) (July 2009)