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

(11) **EP 3 940 182 A1**

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

(43) Date of publication:
19.01.2022 Bulletin 2022/03

(21) Application number: **19918833.5**

(22) Date of filing: **12.08.2019**

(51) International Patent Classification (IPC):
E06B 3/36 *(2006.01)* ***E05D 7/081*** *(2006.01)*

(52) Cooperative Patent Classification (CPC):
E05D 7/081; E05D 15/02; E06B 3/36; E06B 7/28

(86) International application number:
PCT/CN2019/100128

(87) International publication number:
WO 2020/181714 (17.09.2020 Gazette 2020/38)

(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:
KH MA MD TN

(30) Priority: **12.03.2019 CN 201910184396**

(71) Applicant: **Fujian Xihe Sanitary Ware Technology Co., Ltd.**
QuanZhou, Fujian (CN)

(72) Inventors:
- **LIN, Xiaofa**
  Nan an City, Fujian 362304 (CN)
- **LIN, Xiaoshan**
  Nan'an City, Fujian 362304 (CN)
- **SHEN, Youchang**
  Nan'an City, Fujian 362304 (CN)
- **ZHENG, Pengxing**
  Nan'an City, Fujian 362304 (CN)
- **DENG, Xiaoqing**
  Nan'an City, Fujian 362304 (CN)

(74) Representative: **Argyma**
14 Boulevard de Strasbourg
31000 Toulouse (FR)

(54) HINGE APPARATUS AND ROTATING SHOWER ROOM DOOR

(57) A hinging apparatus and a rotary shower door are disclosed. The hinging apparatus comprises a hinge shaft, a first seat body and a second seat body. The first seat body is provided with a first axle hole and a first surface, and the first surface is provided with a first slot communicating with the first axle hole; through the first slot, the hinge shaft is driven to slide in the first axle hole along a hinge axis direction; and the second seat body is provided with a second axle hole for the hinge shaft to stretch in. The rotary shower door comprises a door head, a door leaf and the hinging apparatus. The first seat body is fixed to the door head and the second seat body is fixed to the door leaf. By adopting the technical scheme, the on-site installation of the hinging apparatus and the rotary shower door are simple and the construction period of the on-site installation is short.

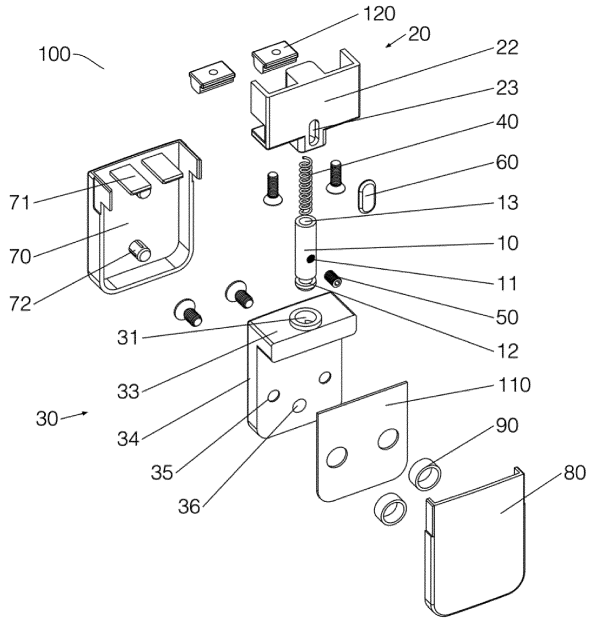

Fig. 2

EP 3 940 182 A1

Description

BACKGROUND

Technical Field

[0001] The disclosure relates to the field of shower doors, in particular to a hinging apparatus and a rotary shower door.

Description of Related Art

[0002] A hinging apparatus of an existing rotary shower door is generally a hinge, i.e., one sheet of the hinge is fixed to a wall while the other sheet of the hinge is fixed to the rotary door, such that rotary opening and closing are achieved. However, it is troublesome to mount the hinge type hinging apparatus and the construction period is long.

SUMMARY

[0003] The purpose of the disclosure is to overcome the above-mentioned defects or problems in the prior art by providing a hinging apparatus and a rotary shower door which is easy to mount and short in on-site construction period.

[0004] To accomplish the foregoing purposes, the following technical solutions are adopted by the disclosure:

[0005] According to a first technical scheme of the disclosure, the hinging apparatus includes a hinge shaft, a first seat body and a second seat body. The first seat body is provided with a first axle hole and a first surface, and the first surface is provided with a first slot communicating with the first axle hole; through the first slot, the hinge shaft is driven to slide in the first axle hole along a hinge axis direction; and the second seat body is provided with a second axle hole for the hinge shaft to stretch into.

[0006] According to a second technical scheme based on the first technical scheme, the hinging apparatus further includes an elastic element, wherein the elastic element is placed in the first axle hole and when the elastic element is released, the elastic element drives the hinge shaft to slide along a direction stretching out of the first axle hole.

[0007] According to a third technical scheme based on the first technical scheme, a first hole is formed in an outer edge surface of the hinge shaft, and a driving lever is inserted into the first hole after penetrating through the first slot.

[0008] According to a fourth technical scheme based on the first technical scheme, the hinging apparatus further includes a jackscrew, wherein a first threaded hole penetrating through the hinge shaft is formed in an outer edge surface of the hinge shaft; and the jackscrew is threadedly connected to the first threaded hole and abuts against a hole wall of the first axle hole after penetrating through the first slot.

[0009] According to a fifth technical scheme based on the first technical scheme, the hinging apparatus further includes a first cover body, for covering the first slot.

[0010] According to a sixth technical scheme based on the first technical scheme, the hinging apparatus further includes a second cover body, wherein a second slot vertical to the hinge axis is formed in the outer edge surface of the hinge shaft, and an insertion sheet is arranged on the second cover body and the insertion sheet is inserted into the second slot when the second cover body and the second seat body are fixedly connected.

[0011] According to a seventh technical scheme based on the sixth technical scheme, second slot is formed in two sides of the hinge shaft, wherein the two sides are the two sides of the hinge shaft when the hinge shaft faces the insertion sheet, and the insertion sheet is inserted into the second slot formed in two sides of the hinge shaft.

[0012] According to an eighth technical scheme based on the seventh technical scheme, the second slot is annular slot.

[0013] According to a ninth technical scheme based on the sixth technical scheme, the second seat body is provided with a second hole for the insertion sheet to insert into, wherein the second hole is vertical to and communicates with the second axle hole

[0014] A tenth technical scheme relates to a rotary shower door, including a door head and a door leaf and further including the hinging apparatus according to any one of technical scheme one to technical scheme nine, wherein the first seat body is fixedly connected to the door head and the second seat body is fixedly connected to the door leaf.

[0015] According to an eleventh technical scheme based on the tenth technical scheme, the second body includes a top plate and a backup plate connected integrally, wherein the top plate extends from one end of the backup plate along a direction vertical to the backup plate, an inner surface of the backup plate is used for being attached to the door leaf, and the second axle hole is formed in the top plate and the axis of the second axle hole is parallel to the backup plate.

[0016] According to a twelfth technical scheme based on the tenth technical scheme, the hinging apparatus further includes a third cover body, wherein a supporting column with a second threaded hole is arranged on the third cover body, the door leaf is provided with a mounting hole and the mounting hole is sleeved on the supporting column, the second seat body is provided with a through hole for a screw to penetrate through and further be in threaded connection to the second threaded hole of the supporting column.

[0017] According to a thirteenth technical scheme based on the twelfth technical scheme, the hinging apparatus further includes a gasket arranged between the mounting hole and the supporting column.

[0018] According to a fourteenth technical scheme based on the tenth technical scheme, the hinging appa-

ratus further includes a connecting element, wherein the door head is provided with a track, a third slot being formed in the bottom of the track for the hinge shaft to stretch out; and the connecting element and the first seat body clamp the bottoms of the tracks on two sides of the third slot and are fastened by screws.

[0019] It can be known from above description of the disclosure, compared with the prior art, the disclosure has the following beneficial effects:

1. In the first technical scheme, the first seat body and the second seat body are connected with prefabricated members of a shower room respectively in a processing plant. During the on-site installation, as the hinge shaft can be driven to slide through the first slot, it can be very convenient for the hinge shaft to retract back to the first axle hole first and then drive the hinge shaft to stretch into the second axle hole after the second axle hole in the second seat body is aligned with the first axle hole, thereby achieving hinged connection. To complete the hinged connection, the on-site installation is convenient and the construction period of the on-site installation is short.

2. In the second technical scheme, by arranging the elastic element, the hinge shaft can extend out of the first axle hole reliably when the hinge shaft is not being driven, such that the hinging apparatus can be mounted favorably under a circumstance that the extension direction of the hinge shaft is opposite to the dead-weight direction of the hinge shaft, for example, under a circumstance that the first seat body is fixedly connected to a ground or a door sill, and the second seat body is fixedly connected to a door leaf.

3. In the third technical scheme, the first hole is formed in the outer edge surface of the hinge shaft, and a driving lever is inserted into the first hole after penetrating through the first slot, such that the hinge shaft is driven conveniently by the driving lever to slide in the first axle hole.

4. In the fourth technical scheme, by arranging the jackscrew, the position of the hinge shaft in the first axle hole can be fixed, and since the inner hexagonal hole of the jackscrew is matched with the wrench, the hinge shaft is easily driven to slide along the first axle hole.

5. In the fifth technical scheme, by arranging the first cover body which covers the first slot, dust accumulation or rusting in the first axle hole can be prevented, and aesthetic appearance of the hinging apparatus is improved.

6. In the sixth technical scheme, by inserting the insertion sheet of the second cover body into the second slot of the hinge shaft, the hinge shaft can reliably extend into the second axle hole and cannot escape the second axle hole. A situation that the door leaf collapses as the hinge shaft escapes the second axle hole caused by various reasons such as collision, deformation or structural looseness can be prevented.

7. In the seventh technical scheme, the insertion sheet is inserted into the second slot in two sides of the hinge shaft, such that the insertion sheets can more reliably limit the position of the hinge shaft and bending deformation of the hinge shaft caused by external force further can be prevented, and meanwhile, stress to a screw is shared, the screw is not easily fractured even when the force applied to the screw is quite large, failed connection caused by the fracture of the screw thus can be prevented.

8. In the eighth technical scheme, the second slot is annular slot which is more easily processed.

9. In the ninth technical scheme, the second seat body is provided with the second hole for the insertion sheet to insert into, such that stress to the insertion sheet can be transferred to the second seat body and stress to the insertion sheet is further shared, such that the connection is more stable.

10. In the tenth technical scheme, the first seat body is fixedly connected to the door head and the second seat body is fixedly connected to the door leaf, thus achieving the hinged connection of the rotary shower door.

11. In the eleventh technical scheme, the second seat body is configured in an L shape, such that the hinge shaft and the door leaf are located in a same vertical plane, and the hinge shaft is prevented from suffering from a shear force in a front-back direction of the door.

12. In the twelfth technical scheme, after the mounting hole in the door leaf is sleeved on the supporting column on the third cover body, the supporting column on the third cover body is connected to the second seat body through a screw, such that the second seat body and the door leaf are fixedly connected.

13. In the thirteenth technical scheme, by arranging the gasket, the glass door leaf is not easily damaged.

14. In the fourth technical scheme, as the first seat body and the connecting part clamp the bottom of the tracks and are fastened by the screw, the first seat body and the door head are fixedly connected.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] For clearer description of the technical solutions of the embodiments of the present disclosure, the accompanying drawings for describing the embodiments are introduced briefly hereinafter. Obviously, the accompanying drawings in the following description are some embodiments of the present disclosure, and persons of ordinary skill in the art may derive other drawings from these accompanying drawings without creative efforts.

Fig. 1 is a three-dimensional view of the hinging apparatus in the embodiment of the present disclosure;

Fig. 2 is an exploded three-dimensional view of the hinging apparatus in the embodiment of the present disclosure;

Fig. 3 is a structural schematic view of the hinging apparatus in the embodiment of the present disclosure;

Fig. 4 is a three-dimensional view of the rotary shower door in the embodiment of the present disclosure;

Fig. 5 is one mounting schematic view of the rotary shower door in the embodiment of the present disclosure;

Fig. 6 is another mounting schematic view of the rotary shower door in the embodiment of the present disclosure;;

Fig. 7 is a section view of Fig. 6 along A-A direction.

Description of Main Reference Numerals:

[0021] Hinging apparatus 100, hinge shaft 10, first threaded hole 11, second slot 12, spring mounting hole 13, first seat body 20, first axle hole 21, first surface 22, first slot 23, second seat body 30, second axle hole 31, second hole 32, top plate 33, backup plate 34, through hole 35, third cover body mounting hole 36, elastic element 40, jackscrew 50, first cover body 60, second cover body 70, insertion sheet 71, insertion column 72, third cover body 80, supporting column 82, gasket 90, spacer 110, connecting element 120, door head 200, third slot 201, door leaf 300, wrench 400.

DESCRIPTION OF THE EMBODIMENTS

[0022] The accompanying drawings in the embodiments of the disclosure are included to provide a clear and complete description of the technical solutions provided in the embodiments of the disclosure. Obviously, the described embodiments are preferred embodiments of the disclosure, and should not be regarded as exclusion of other embodiments. Based on the embodiments of the disclosure, all other embodiments obtained by a person of ordinary skill in the art without making any inventive effort fall within the scope that the disclosure seeks to protect.

[0023] Unless otherwise clearly defined in the claims, specification, and the above-mentioned drawings of the disclosure, the terms "first", "second", or "third" and so on are used to distinguish different objects, not used to describe a specific order.

[0024] Unless otherwise clearly defined in the claims, specification, and the above-mentioned drawings of the disclosure, for location words, such as the use of the terms "center", "transverse", "perpendicular", "horizontal", "vertical", "top", "bottom", "inner", "outer", "upper", "lower", "front", "rear", "left", "right", "clockwise", "counterclockwise", and other indication orientations or positional relationships are based on the orientations and positional relationships shown in the drawings, are provided to facilitate the description of the disclosure and simplify the description, and are not intended to indicate or imply that the indicated device or element must have a specific orientation or be constructed and operated in a specific orientation, so cannot be understood as limiting the specific protection scope of the disclosure.

[0025] In the claims, the description and the drawings of the present invention, unless otherwise explicitly defined, if the term "fixed connection" or "fixedly connected" is used, it should be understood in a broad sense, that is, any connection method without displacement relationship and relative rotation relationship between the two, that is, including non-removable fixed connection, removably fixed connection, connected as a whole, and fixed connection through other devices or components.

[0026] In the claims, the description and the drawings of the present invention, the terms "including", "having" and their variations are intended to be "including but not limited to".

[0027] With reference to Fig .1 to Fig. 3, a hinging apparatus 100 in the embodiment is shown. As shown in Fig. 2, the hinging apparatus 100 includes a hinge shaft 10, a first seat body 20, a second seat body 30, an elastic element 40, a jackscrew 50, a first cover body 60, a second cover body 70, a third cover body 80, a gasket 90, a spacer 110 and a connecting element 120.

[0028] An upper end surface of the hinge shaft 10 is provided with a spring mounting hole 13, an outer edge surface of the hinge shaft 10 is provided with a first threaded hole 11 penetrating through the hinge shaft 10, and the outer edge surface under the first threaded hole 11 is further provided with a second slot 12 vertical to the hinge axis, and the second slot 12 is annular slot. It should be understood that the second slot 12 may not be annular slot, for example, transverse slots symmetrically formed in two sides of the outer edge surface of the hinge shaft 10 or transverse slot formed in one side of the outer edge surface of the hinge shaft 10 are also applicable. And annular slot is easier to process and form.

[0029] A lower end surface of the first seat body 20 is

provided with a first axle hole 21 (the first axle hole 21 is shown in Fig. 7), the first axle hole 21 is a blind hole in the embodiment, as shown in Fig. 2, the first seat body 20 is provided with a first surface 22 vertical to the lower end surface of the first seat body 20, that is, the front end surface in the embodiment, the first surface 22 is provided with a first slot 23 communicating with the first axle hole 21, and generally, as shown in the embodiment, the first slot 23 is rounded rectangle, and the length direction of the first slot 23 is parallel to the axis direction of the first axle hole 21. Via the first slot 23, mounting staff can drive the hinge shaft 10 to slide up and down in the first axle hole 21 along the hinge axis.

[0030] The second seat body 30 includes a top plate 33 and a backup plate 34 connected integrally, and the top plate 33 extends from the upper end of the backup plate 34 along a direction vertical to the backup plate 34 to form an L shape with the backup plate 34. The inner surface of the backup plate 34, that is, the surface of the backup plate 34 facing the extension direction of the top plate 33 for attaching a thin door leaf, for example, the door leaf 300 in the embodiment, is described in detail hereafter. The top plate 33 is provided with a second axle hole 31 parallel to the backup plate 34, and in the embodiment, the second axle hole 31 also is a blind hole (not shown in the figure). As shown in Fig. 3, a surface, opposite to the extension direction of the top plate 33, of the backup plate 34 is further provided with two second holes 32, and the second holes 32 are connected to the second axle hole 31 and are vertical to the axis of the second axle hole 31.The backup plate 34 is further provided with two through holes 35 and two third cover body mounting holes 36.

[0031] The elastic element 40 is a spring in the embodiment. In the embodiment, one end of the elastic element 40 urges against a bottom of the first axle hole 21 (blind hole) while the other end of the elastic element 40 is placed in the spring mounting hole 13 of the hinge shaft 10. The mounting position of the elastic element 40 has decided that when the hinge shaft 10 stretches into the first axle hole 21, the elastic element 40 is compressed, and when the elastic element 40 is released, the hinge shaft 10 is driven to slide along a direction extending out of the first axle hole 21.

[0032] The jackscrew 50 penetrates through the first slot 23 and is threadedly connected to the first threaded hole 11 and fixes positions of the hinge shaft 10 and the first axle hole 21 along the hinge axis by urging against a hole wall of the first axle hole 21.

[0033] The first cover body 60 is covered on the first slot 23 to cover the first slot 23.

[0034] The second cover body 70 is provided with two insertion sheets 71 and two insertion columns 72.The two insertion sheets 71 are inserted into the two second holes 32 of the second seat body 30 and are inserted into the second slot 12 of the hinge shaft when the second cover body 70 and the second seat body 30 are fixed by means of inserting-connection fit between the insertion columns 72 and the third cover body mounting holes 36. In the embodiment, the insertion sheets 71 are matched with the second hole 32 in width.

[0035] The third cover body 80 is provided with two supporting columns 82 of second threaded holes.

[0036] The gasket 90, the spacer 110 and the connecting element 120 are used for connecting a door head 200 and the door leaf 300, which is described in detail below.

[0037] With reference to Fig .4 to Fig. 7, the rotary shower door in the embodiment is shown. With reference to Fig. 4 to Fig. 7, the rotary shower door includes the door head 200, the door leaf 300, the door sill (not shown) and two hinging apparatuses 100 which are an upper hinging apparatus and a lower hinging apparatus respectively.

[0038] With reference to Fig. 5 to Fig. 7, the door head 200 is provided with a track, and a third slot 201 is formed in the bottom of the track.

[0039] The door leaf 300 is the glass door leaf which is provided with the mounting hole (not shown in the figures).

[0040] The door sill is fixedly connected to the ground and is also provided with a track, and an upper portion of the track is provided with the third slot 201.

[0041] The connecting element 120 in the upper hinging apparatus, as shown in Fig. 5, is embedded into the tracks on two sides of the third slot 201 of the door head 200 and clamps, together with the first seat body 20, the bottoms of the tracks on two sides of the third slot 201, and then is fastened by screws.

[0042] The gasket 90 in the upper hinging apparatus is sleeved on the supporting column 82, and the spacer 110 is sleeved on the gasket 90 and is attached to the body of the third cover body 80. The door leaf 300 is combined to the third cover body 80 by way of sleeving the mounting hole onto the gasket 90. By arranging the gasket, the door leaf 300 is not easily damaged. The backup plate 34 of the second seat body 30 abuts the door leaf 300 and the top plate 33 is located on the top of the door leaf 300. Then the screw penetrates through the through holes 35 in the second seat body 30 and is threadedly connected to the second threaded holes of the supporting column 82 on the third cover body 80, such that the door leaf 300 is tightly clamped between the spacer 110 and the backup plate 34 of the second seat body 30. In the embodiment, when the second seat body 30 is fixedly connected to the door leaf 300, the second axle hole 31 is located above the door leaf 300.

[0043] A connecting mode of the lower hinging apparatus to the door sill and the door leaf is as same as the above-mentioned connecting mode, and when the first seat body 20 of the lower hinging apparatus, the connecting element 120 and the door sill are connected fixedly, the opening of the first axle hole 21 of the first seat body 20 faces upward.

[0044] A specific installation procedure of the rotary shower room is described in detail as follows:

S1, connecting the second seat body 30, the third cover body 80, the gasket 90, the spacer 110 and the door leaf 300 of the upper and lower hinging apparatuses through the above-mentioned manner;

S2, connecting the first seat body 20, the connecting element 120 of the lower hinging apparatus and the door sill through the above-mentioned manner;

S3, connecting the first seat body 20 of the upper hinging apparatus, the connecting element 120 of the upper hinging apparatus and the door head in the above-mentioned manner;

S4, placing the elastic element 40 of the lower hinging apparatus in the spring mounting hole 13 of the hinge shaft 10;

S5, placing the hinge shaft 10 and the elastic element 40 of the lower hinging apparatus in the first axle hole 21 (the opening the first axle hole 21 is upward at the moment) of the first seat body 20 in a way that the opening of the spring mounting hole 13 faces downward;

S6, placing the elastic element 40 of the upper hinging apparatus in the spring mounting hole 13 of the hinge shaft 10;

S7, placing the hinge shaft 10 and the elastics part 40 of the upper hinging apparatus in the first axle hole 21 (the opening of the first axle hole 21 is downward at the moment) of the first seat body 20 in a way that the opening of the spring mounting hole 13 faces upnward, and the jackscrew 50 penetrates through the first slot 23 and is threadedly connected to the first threaded hole 11 of the hinge shaft 10, and as shown in Fig .6 and Fig. 7, inserting the wrench 400 into the inner hexagonal hole of the jackscrew 50 and wrenching the hinge shaft 10 to compress the elastic element 40 till the hinge shaft 10 is no longer exposed out of the first axle hole 21 or is just exposed little, and then fastening the jackscrew 50 with the wrench 400 till the hinge shaft 10 is fixed to the hole wall of the first axle hole 21;

S8, mounting the door leaf, inserting the hinge shaft 10 of the lower hinging apparatus into the second axle hole 31 of the lower hinging apparatus and then aligning the second axle hole 31 of the upper hinging apparatus with the hinge shaft 10 of the upper hinging apparatus; and loosening the jackscrew 50 of the upper hinging apparatus with the wrench 400, wherein the hinge shaft 10 of the upper hinging apparatus is driven by a resilience of the elastic element 40 to be inserted into the second axle hole 31 of the upper hinging apparatus;

S9, mounting the second cover boy 70 of the upper hinging apparatus when the hinge shaft 10 of the upper hinging apparatus reliably abuts against the bottom of the second axle hole 31(the blind hole), wherein the insertion sheets 71 are inserted into the second holes 32 in the second seat body 30 and are further inserted into the second slot 12 of the hinge shaft 10, and at the moment, the insertion columns 72 of the second cover body 70 are inserted into the third cover body mounting holes 36 of the second seat body 30 to achieve fixed connection between the second cover body 70 and the second seat body 30;

S10, similar to S9, carrying out the fixed connection between the second cover body 70 and the second seat body 30 in the lower hinging apparatus; and

S11, covering first slots 23 of the upper and lower hinging apparatuses by the first cover bodies 60 respectively to complete all connections.

[0045] The first, second and third steps can be completed in the processing plant. During on-site installation, the rotary shower door can be mounted only by completing the steps after the first, second and third steps. In the mounting process, except the wrench 400, other tools are not needed, such that the on-site installation of the rotary shower door is convenient and the on-site construction period is short.

[0046] In the above-mentioned technical scheme, by arranging the elastic element 40, the hinge shaft 10 can extend out of the first axle hole 21 reliably when the hinge shaft 10 is not being driven, such that the lower hinging apparatus can be mounted favorably under a circumstance that the extension direction of the hinge shaft 10 is opposite to the dead-weight direction of the hinge shaft 10.

[0047] In the above-mentioned technical scheme, by arranging the jackscrew 50, the position of the hinge shaft 10 in the first axle hole 21 can be fixed, and since the inner hexagonal hole of the jackscrew 50 is matched with the wrench 400, the hinge shaft 10 is easily driven to slide along the first axle hole 21.

[0048] Since the first cover body 60 is covered on the first slot 12, dust accumulation or rusting in the first axle hole 21 can be prevented, and aesthetic appearance of the hinging apparatus is improved.

[0049] By inserting the insertion sheets 71 of the second cover body 70 into the second slots 12 of the hinge shaft 10, the hinge shaft 10 can reliably extend into the second axle hole 31 and cannot escape the second axle hole 31. A situation that the door leaf collapses as the hinge shaft 10 escapes the second axle hole 31 caused by various reasons such as collision, deformation or structural looseness can be prevented.

[0050] The second slot 12 is annular slot, such that the insertion sheets 71 can more reliably limit the position of

the hinge shaft 10 and bending deformation of the hinge shaft 10 caused by external force further can be prevented, and meanwhile, stress to a screw is shared, the screw is not easily fractured even when the force applied to the screw is quite large, failed connection caused by the fracture of the screw thus can be prevented..

[0051] The insertion sheets 71 are inserted into the second holes 32 of the second seat body 30 and are matched with the second holes 32, such that stress to the insertion sheets 71 can be transferred to the second seat body 30 and stress to the insertion sheets 71 is further shared.

[0052] The descriptions of the above specification and embodiments are intended to explain the protection scope of the present disclosure, but should not be construed as limitations on the scope of the disclosure.. Through inspiration provided by the disclosure or the embodiments, modifications, equivalents, or other improvements of the embodiments or part of the technical features of the disclosure obtained by people having ordinary skill in the art by combining general knowledge and common technical knowledge in the art and/or existing art through logical analyses, reasoning, or limited tests fall within the protection scope of the disclosure.

Claims

1. A hinging apparatus, **characterized by** comprising:

   a hinge shaft;
   a first seat body, wherein the first seat body is provided with a first axle hole and a first surface, and the first surface is provided with a first slot communicating with the first axle hole; through the first slot, the hinge shaft is driven to slide in the first axle hole along a hinge axis direction; and
   a second seat body, wherein the second seat body is provided with a second axle hole for the hinge shaft to stretch in.

2. The hinging apparatus according to claim 1, **characterized by** further comprising an elastic element, wherein the elastic element is placed in the first axle hole and when the elastic element is released, the elastic element drives the hinge shaft to slide along a direction stretching out of the first axle hole.

3. The hinging apparatus according to claim 1, **characterized in that** a first hole is formed in an outer edge surface of the hinge shaft, and a driving lever is inserted into the first hole after penetrating through the first slot.

4. The hinging apparatus according to claim 1, **characterized by** further comprising a jackscrew, wherein a first threaded hole penetrating through the hinge shaft is formed in an outer edge surface of the hinge shaft; the jackscrew is threadedly connected to the first threaded hole and abuts against a hole wall of the first axle hole after penetrating through the first slot.

5. The hinging apparatus according to claim 1, **characterized by** further comprising a first cover body for covering the first slot.

6. The hinging apparatus according to claim 1, **characterized by** further comprising a second cover body, wherein a second slot vertical to the hinge axis is formed in the outer edge surface of the hinge shaft, and an insertion sheet is arranged on the second cover body and the insertion sheet is inserted into the second slot when the second cover body and the second seat body are fixedly connected.

7. The hinging apparatus according to claim 6, **characterized in that** second slot is formed in two sides of the hinge shaft, wherein the two sides are the two sides of the hinge shaft when the hinge shaft faces the insertion sheet, and the insertion sheet is inserted into the second slot formed in two sides of the hinge shaft.

8. The hinging apparatus according to claim 7, **characterized in that** the second slot is annular slot.

9. The hinging apparatus according to claim 6, **characterized in that** the second seat body is provided with a second hole for the insertion sheet to insert into, wherein the second hole is vertical to and communicates with the second axle hole.

10. A rotary shower door, comprising a door head and a door leaf and **characterized by** further comprising the hinging apparatus according to any one of claim 1 to claim 9, wherein the first seat body is fixedly connected to the door head and the second seat body is fixedly connected to the door leaf.

11. The rotary shower door according to claim 10, **characterized in that** the second seat body comprises a top plate and a backup plate connected integrally, wherein the top plate extends from one end of the backup plate along a direction vertical to the backup plate, an inner surface of the backup plate is used for being attached to the door leaf, and the second axle hole is formed in the top plate and the axis of the second axle hole is parallel to the backup plate.

12. The rotary shower door according to claim 10, **characterized in that** the hinging apparatus further comprises a third cover body, wherein a supporting column with a second threaded hole is arranged on the third cover body, the door leaf is provided with a

mounting hole and the mounting hole is sleeved on the supporting column, the second seat body is provided with a through hole for a screw to penetrate through and further be in threaded connection to the second threaded hole of the supporting column.

13. The rotary shower door according to claim 12, **characterized in that** the hinging apparatus further comprises a gasket arranged between the mounting hole and the supporting column.

14. The rotary shower door according to claim 10, **characterized in that** the hinging apparatus further comprises a connecting element, wherein the door head is provided with a track, a third slot being formed in the bottom of the track for the hinge shaft to stretch out; and the connecting element and the first seat body clamp the bottoms of the tracks on two sides of the third slot and are fastened by screws.

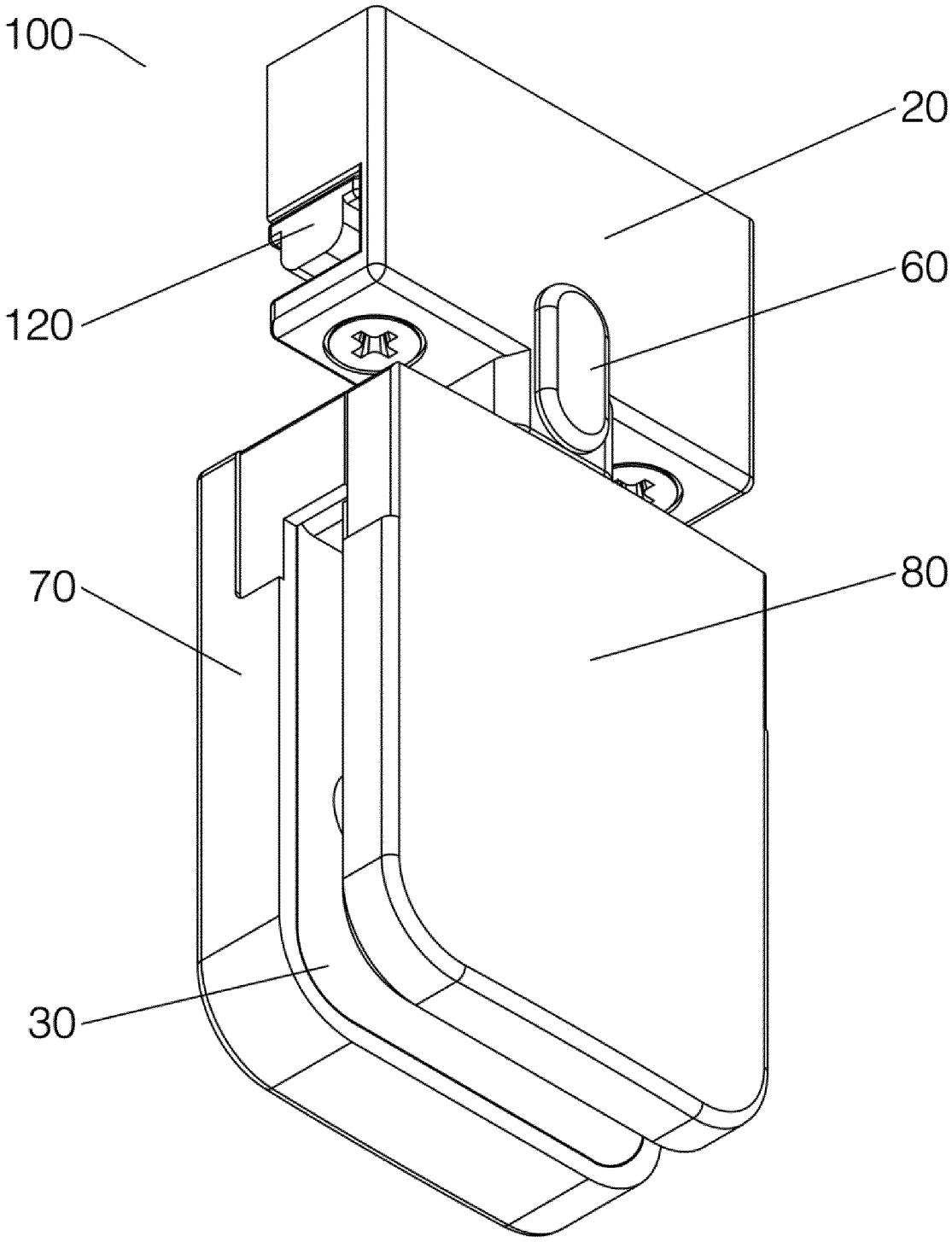

Fig. 1

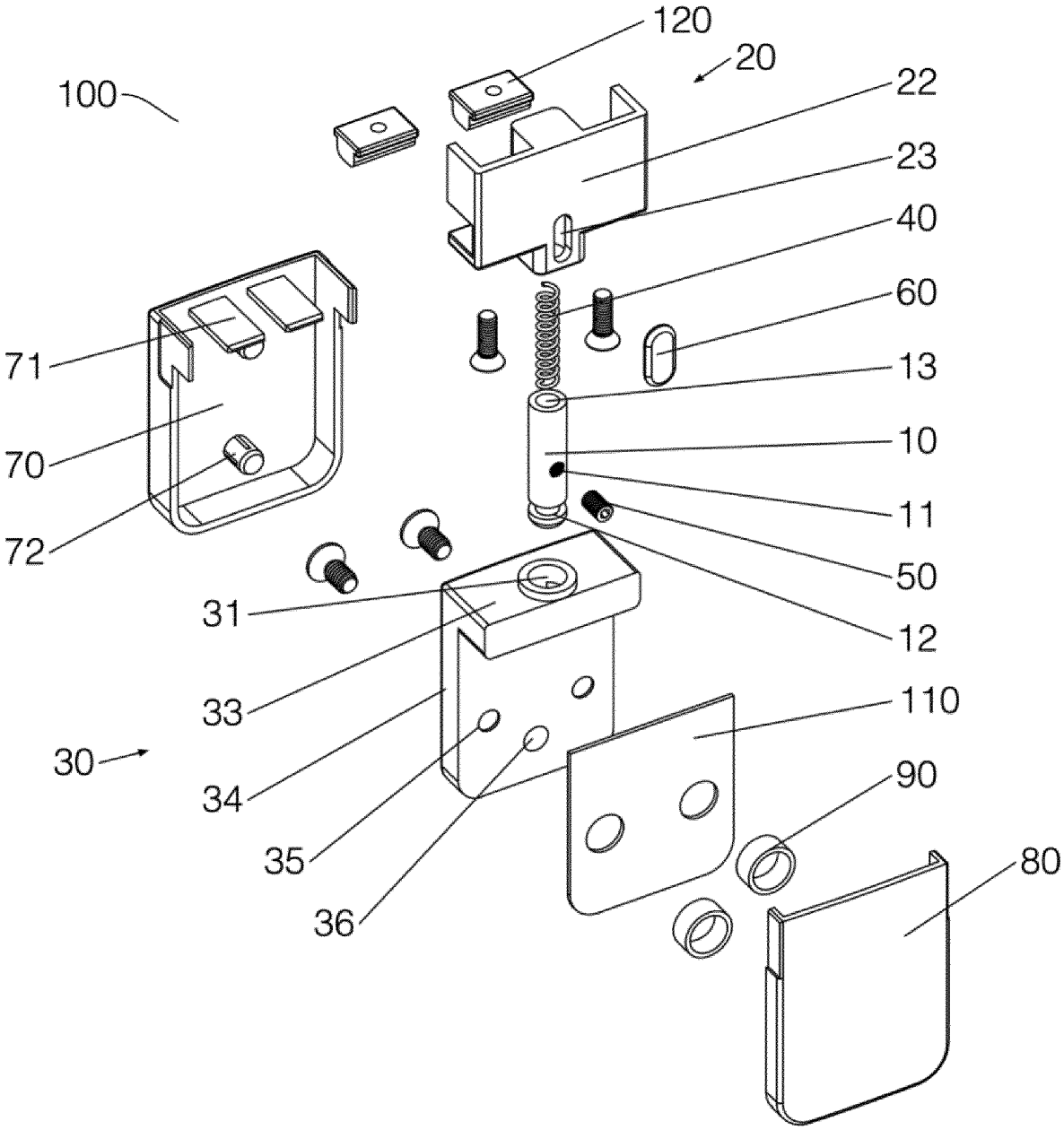
120
20
100
22
23
40
60
71
13
70
10
11
72
50
31
12
33
110
30
90
34
80
35
36

Fig. 2

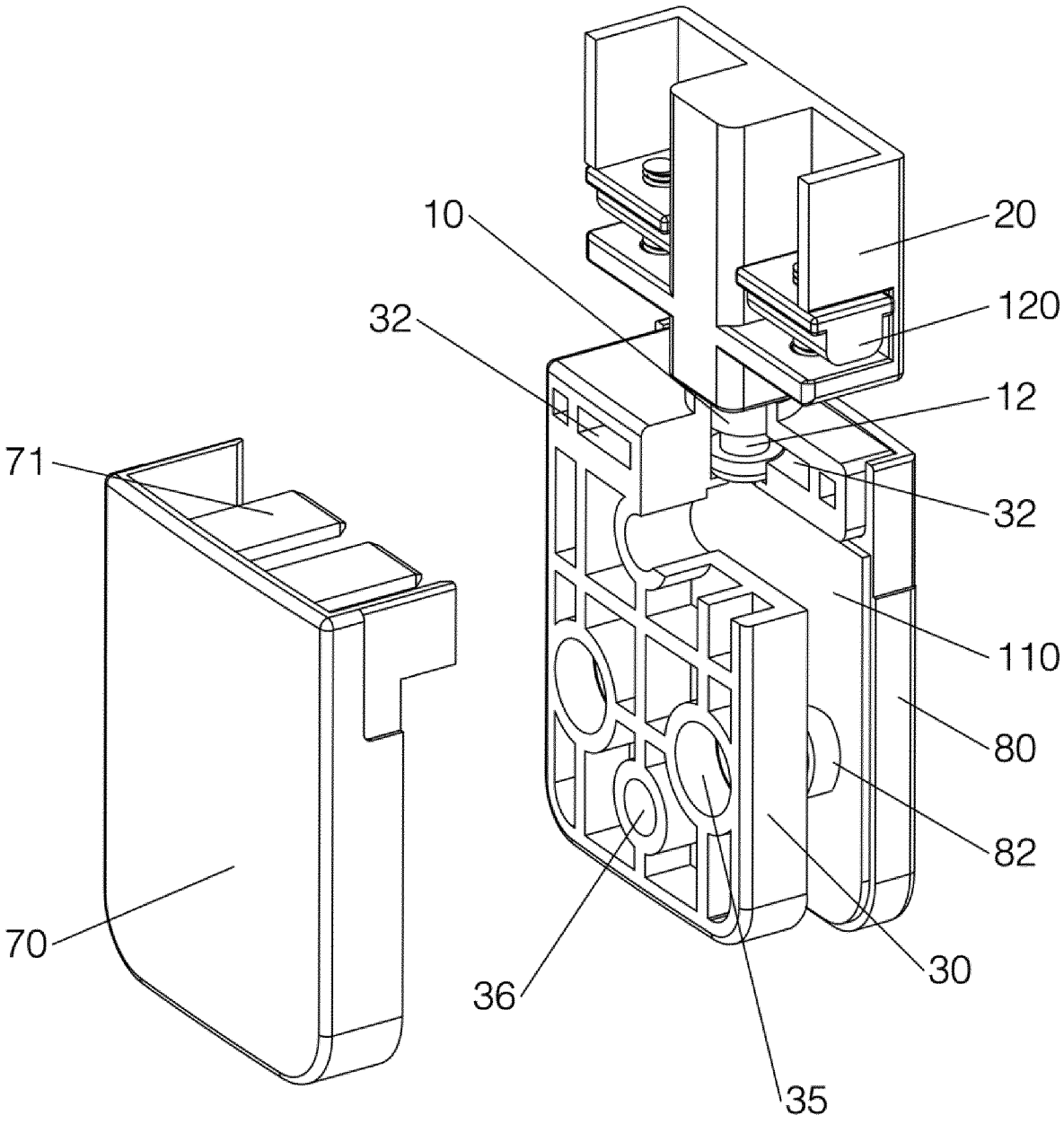

Fig. 3

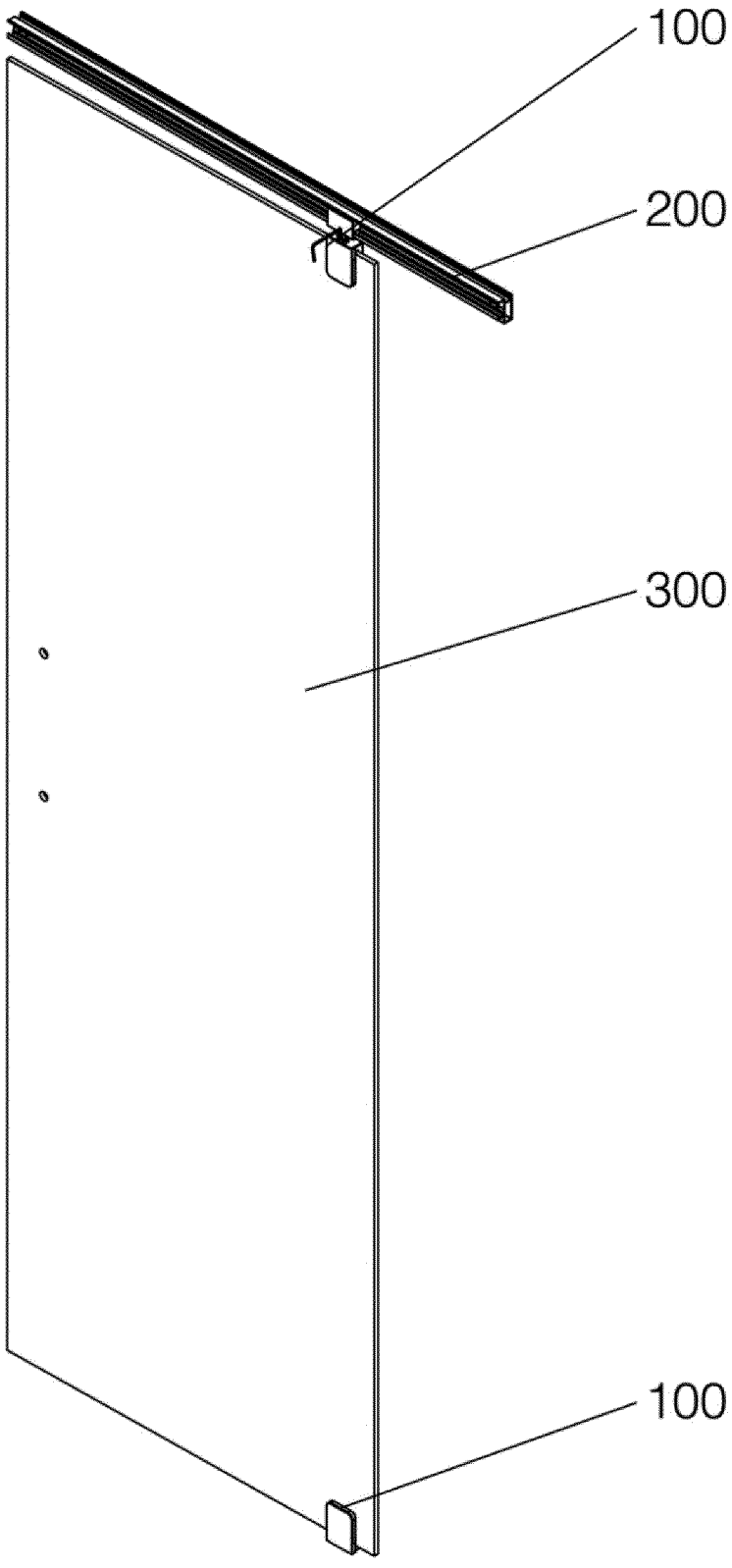

Fig. 4

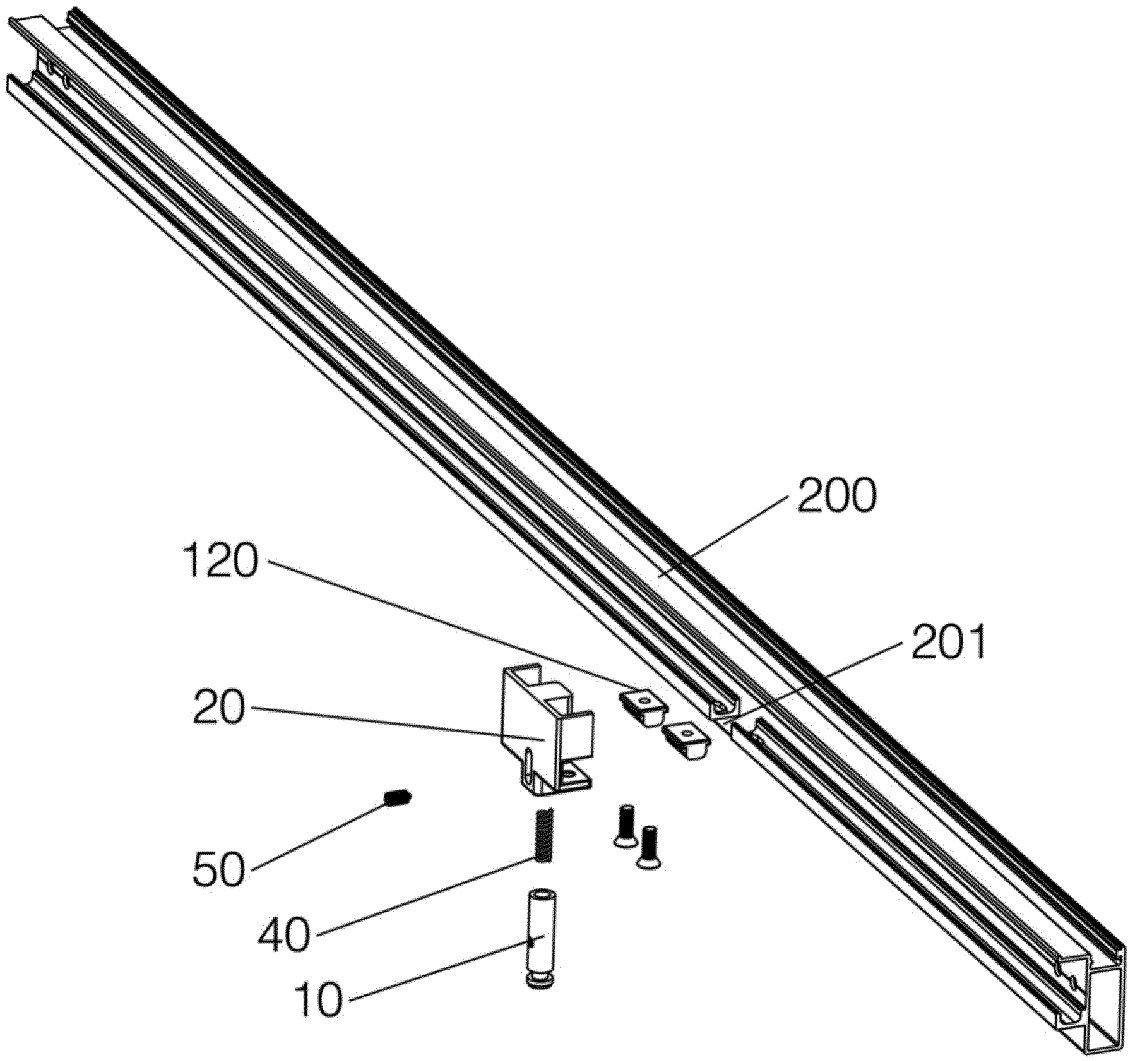

Fig. 5

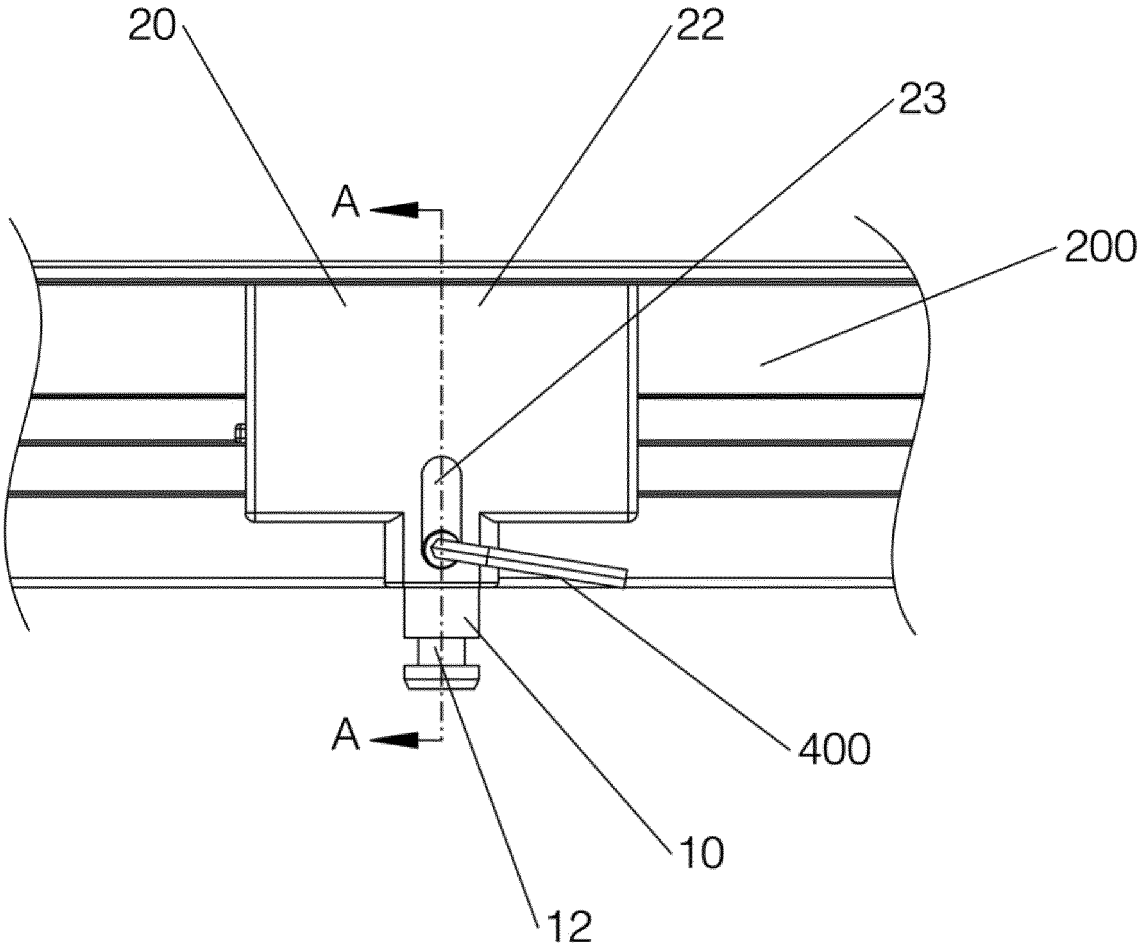

Fig. 6

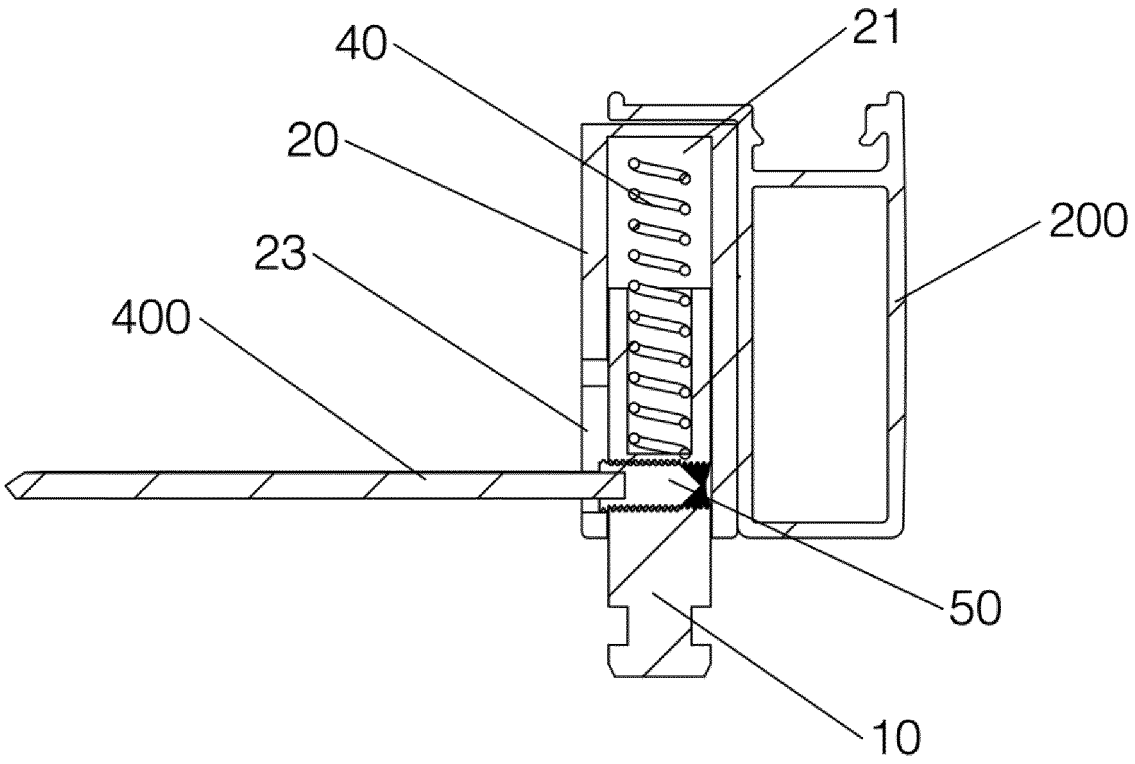

Fig. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2019/100128

A. CLASSIFICATION OF SUBJECT MATTER

E06B 3/36(2006.01)i; E05D 7/081(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)

E06B/-, E05D/-

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, DWPI, SIPOABS, TWABS, EPTXT, USTXT, WOTXT, 中国期刊网全文数据库, CNKI: 铰链, 销轴, 门, 弹簧, 弹性, 槽, 悬挂, 浴, hinge+, bathroom, door, spring, mov+, hole

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 7-331948 A (KURIKI SEISAKUSHO K.K.) 19 December 1995 (1995-12-19) description, paragraphs 0012-0029, and figures 1-5	1-14
X	JP H08-100575 A (HITACHI CHEMICAL CO., LTD. et al.) 16 April 1996 (1996-04-16) description, paragraphs 0014-0043, and figures 1-6	1-14
PX	CN 109779457 A (FUJIAN XIHE SANITARY WARE TECHNOLOGY CO., LTD.) 21 May 2019 (2019-05-21) claims 1-14	1-14
A	DE 102008006522 B3 (PALME SANITAER VERTRIEBSGES.M.B.H.) 18 June 2009 (2009-06-18) entire document	1-14
A	JP H09-209638 A (KG PARTEK K.K.) 12 August 1997 (1997-08-12) entire document	1-14
A	JP 2002-357043 A (TSUCHIKAWA, Zenji) 13 December 2002 (2002-12-13) entire document	1-14
A	CN 108064319 A (FOSHAN IDEAL CO., LTD.) 22 May 2018 (2018-05-22) entire document	1-14

☐ 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
19 November 2019	**05 December 2019**

Name and mailing address of the ISA/CN
China National Intellectual Property Administration (ISA/CN)
No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088
China

Facsimile No. **(86-10)62019451**

Authorized officer

Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2019/100128

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
JP 特开平7-331948 A	19 December 1995	None	
JP 特开平8-100575 A	16 April 1996	JP 2876184 B2	31 March 1999
CN 109779457 A	21 May 2019	None	
DE 102008006522 B3	18 June 2009	AT 506374 A1	15 August 2009
		AT 506374 B1	15 June 2012
JP 特开平9-209638 A	12 August 1997	None	
JP 特开2002-357043 A	13 December 2002	None	
CN 108064319 A	22 May 2018	WO 2019024009 A1	07 February 2019

Form PCT/ISA/210 (patent family annex) (January 2015)