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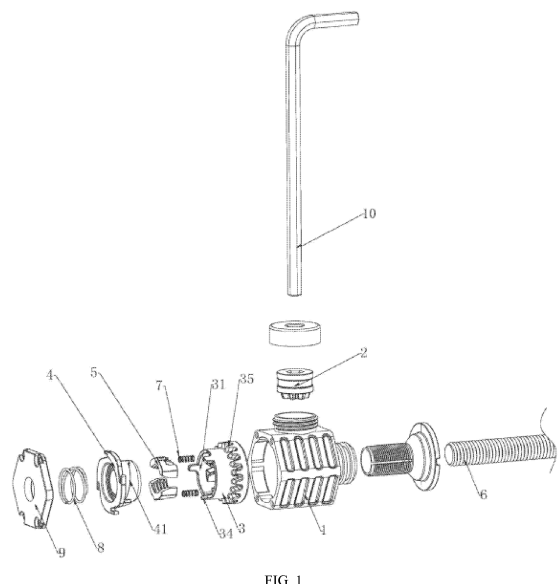
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(54) **QUICK MOUNTING STRUCTURE OF TOILET LOCKER**

(57) A quick mounting structure of a toilet locker, comprising a body (1). The body (1) is provided with a driving member (2) and a driven member (3), and is further provided with an abutting member (4) moveable towards to or away from the driven member (3); one of the driven member (3) and the abutting member (4) is provided with a split nut (5) switchable between two states of disengagement and engagement; the other one of the driven member (3) and the abutting member (4) is used for abutting against the split nut (5), and a screw hole in the middle of the split nut (5) is penetrable by a locking stud (6); and the driving member (2) cooperates with the driven member (3) to drive the abutting member (4) to move in a direction towards or away from the driven member (3), so that the split nut (5) is engaged with or disengaged from the locking stud (6). The split nut (5) matched with the locking stud (6) is placed in the body (1) for disengagement or engagement as required, so that the locking stud (6) extends into the nut and realizes locking at any position, thereby avoiding tedious operations such as due to different toilet thicknesses, measuring and adjusting the exposed length of the locking stud (6) to make a designated position located in the locker; and the driven member (3) cooperates with the driving member (2) to drive the split nut (5) to be engaged to

achieve a pre-tightening function, without holding the toilet by hand, allowing for mounting by one person, and reducing mounting difficulty.



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Description

TECHNICAL FIELD

[0001] The utility model relates to the technical field of bathroom products, and in particular, to a quick mounting structure of a toilet locker.

BACKGROUND

[0002] Existing wall-hung toilets are increasingly popular among consumers due to their ease of cleaning and small space occupation. Among them, fully enclosed toilets are the most widely used due to their round and attractive appearance.

SUMMARY

Technical problem

[0003] Most fully enclosed toilets are secured to the wall by a toilet locker. However, many existing toilet lockers involve complicated mounting steps, such as measuring the thickness of the toilet and adjusting the exposed length of a stud, which demand a high level of expertise from end users. It is necessary to accurately measure the thickness of the toilet, and then calculate and adjust the exposed length of the locking stud based on the actual conditions to complete mounting. Otherwise, it is very likely that the toilet will not be able to be securely fastened, resulting in installation failure.

Technical solution

[0004] To solve the above problems, the objective of the utility model is to provide a quick mounting structure of a toilet locker.

[0005] The utility model is implemented as follows: A quick mounting structure of a toilet locker includes a body, where the body is provided with a driving member and a driven member, and is further provided with an abutting member moveable towards to or away from the driven member; one of the driven member and the abutting member is provided with a split nut switchable between two states of disengagement and engagement; the other one of the driven member and the abutting member is used for abutting against the split nut, and a screw hole in the middle of the split nut is penetrable by a locking stud; and the driving member cooperates with the driven member to drive the abutting member to move in a direction towards or away from the driven member, so that the split nut is engaged with or disengaged from the locking stud.

[0006] Preferably, one of the abutting member and the driven member is provided with a guiding inclined surface, and the other one of the abutting member and the driven member is provided with a guide rib; and during the movement of the driven member, the guiding inclined surface cooperates with the guide rib to drive the abutting

member to move in the direction towards or away from the driven member.

[0007] Preferably, a movable chamber is provided in the driven member, and a guide portion is provided on an inner wall of the movable chamber; the abutting member is arranged to drive the split nut to move along the guide portion to guide the engagement or disengagement of the split nut; and the guide portion is an inclined guide surface and/or a dovetail groove.

[0008] Preferably, a first elastic member is provided between the split nut and the driven member, and the first elastic member is arranged to drive the split nut to reset; or there is a repulsive magnetic force between the split nut and the driven member, and the repulsive magnetic force is arranged to drive the split nut to reset; or there is an attractive magnetic force between the abutting member and the split nut, and the attractive magnetic force is arranged to drive the split nut to reset.

[0009] Preferably, a second elastic member is provided between the abutting member and an end cover, and the second elastic member is arranged to drive the abutting member to reset; or there is a repulsive magnetic force between the abutting member and the end cover, and the repulsive magnetic force is arranged to drive the abutting member to reset.

[0010] Preferably, the abutting member is provided with the guiding inclined surface, and one end of the guiding inclined surface is provided with a first limit portion; the driven member is provided with the guide rib; during forward rotation of the driving member, the abutting member moves towards the driven member to drive the split nut to engage with the locking stud; and when the guide rib abuts against the first limit portion for limiting, the abutting member moves together with the driven member to lock the split nut with the locking stud.

[0011] Preferably, the other end of the guiding inclined surface is provided with a second limit portion; during reverse rotation of the driving member, the abutting member moves away from the driven member to drive the split nut to disengage from the locking stud; and when the guide rib abuts against the second limit portion for limiting, the abutting member moves together with the driven member to disengage the split nut from the locking stud.

[0012] Preferably, elastic one-way teeth are provided on an outer circumferential surface of the abutting member, and a plurality of limit protrusions are provided on an inner circumferential surface of the body at positions opposite to the one-way teeth; and when the abutting member moves away from the driven member, the one-way teeth cooperate with the limit protrusions to increase damping against the abutting member during rotation.

[0013] Preferably, the body is shaped as a three-way pipe provided with a first opening, a second opening, and a third opening; the first opening and the second opening are arranged on both sides of the body; the abutting member and the driven member are located at the first opening and the second opening respectively; the lock-

ing stud is arranged to penetrate the first opening and the second opening; the third opening is arranged at an upper end of the body, and the driving member is arranged at the third opening.

[0014] Preferably, first engaging teeth are provided on an outer circumferential surface of the driven member, second engaging teeth are provided on an outer circumferential surface of the driving member, and the first engaging teeth engage with the second engaging teeth; and an upper end surface of the driving member is provided with a locking groove used for cooperating with a tool.

Beneficial effects

[0015] The beneficial effects of the utility model are as follows: The utility model provides a quick mounting structure of a toilet locker. Compared with the prior art, the utility model has at least the following technical effects: 1. The split nut matched with the locking stud is placed in the body for disengagement or engagement as required, so that the locking stud extends into the nut and realizes locking at any position, thereby avoiding tedious operations such as due to different toilet thicknesses, measuring and adjusting the exposed length of the locking stud to make a designated position located in the locker; and the driving member and the driven member cooperate with the abutting member to drive the split nut to be engaged to achieve a pre-tightening function, without holding the toilet by hand until the locker completely locks the toilet like existing lockers, allowing for mounting by one person, greatly reducing user's mounting difficulty, and improving mounting efficiency. 2. The one-way teeth provided on the abutting member cooperate with the limit protrusions of the body to increase resistance during reverse rotation, so that when the split nut is loosened by reverse rotation, the abutting member and the driven member preferentially slide relative to each other along the guiding inclined surface, and then the abutting member moves away from the driven member, ensuring that the split nut is completely disengaged from the locking stud and the toilet can be smoothly removed. 3. The second elastic member provided on the abutting member keeps the abutting member close to the driven member. When the driven member rotates forward and approaches under the action of the guiding inclined surface, the abutting member pushes against the split nut for engagement or semi-engagement, achieving a pre-locking function and facilitating subsequent tightening of the split nut with the locking stud.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016]

FIG. 1 is an exploded view of a quick mounting structure of a toilet locker according to the utility model.

FIG. 2 is an exploded view of a driven member and a split nut in the quick mounting structure of the toilet locker according to the utility model.

FIG. 3 is a schematic view of a state where an abutting member is mounted on a body in the quick mounting structure of the toilet locker according to the utility model.

FIG. 4 is a schematic view of a cross-sectional state where a split nut in the quick mounting structure of the toilet locker is engaged or semi-engaged according to the utility model.

FIG. 5 is a schematic view of a movement state of a driven member and the abutting member when a driving member of the quick mounting structure of the toilet locker rotates clockwise according to the utility model.

FIG. 6 is a schematic view of a cross-sectional state where the split nut in the quick mounting structure of the toilet locker is disengaged according to the utility model.

FIG. 7 is a schematic view of a movement state of the driven member and the abutting member when the driving member of the quick mounting structure of the toilet locker rotates counterclockwise according to the utility model.

FIG. 8 is a schematic view of a state where the split nut is engaged or semi-engaged before a stud is mounted in the quick mounting structure of the toilet locker according to the utility model.

FIG. 9 is a schematic view of a state where the split nut is pushed by the stud to disengage along an inclined guide surface and a dovetail groove when the stud is mounted in the quick mounting structure of the toilet locker according to the utility model.

FIG. 10 is a schematic view of a state where the split nut is gradually engaged along the inclined surface and dovetail groove on the driven member under an elastic force of the abutting member when the stud is mounted in place in the quick mounting structure of the toilet locker according to the utility model.

[0017] Explanation of reference numerals: 1 - body, 11 - limit protrusion, 2 - driving member, 21 - second engaging tooth, 3 - driven member, 31 - movable chamber, 32 - inclined guide surface, 33 - dovetail groove, 34 - guide rib, 35 - first engaging tooth; 4 - abutting member, 41 - guiding inclined surface, 42 - one-way tooth, 43 - first limit portion, 44 - second limit portion, 5 - split nut, 6 - locking stud, 7 - first elastic member, 8 - second elastic member, 9 - end cover, 10 - tool.

DETAILED DESCRIPTION

[0018] Further explanation of the present application will be provided below in conjunction with the accompanying drawings and specific embodiments.

[0019] As shown in FIG. 1 to FIG. 10, a quick mounting structure of a toilet locker includes a body 1, where the

body 1 is provided with a driving member 2 and a driven member 3, and is further provided with an abutting member 4 moveable towards to or away from the driven member 3; one of the driven member 3 and the abutting member 4 is provided with a split nut 5 switchable between two states of disengagement and engagement; the other one of the driven member 3 and the abutting member 4 is used for abutting against the split nut 5, and a screw hole in the middle of the split nut 5 is penetrable by a locking stud 6; and the driving member 2 cooperates with the driven member 3 to drive the abutting member 4 to move in a direction towards or away from the driven member 3, so that the split nut 5 is engaged with or disengaged from the locking stud 6. The split nut 5 matched with the locking stud 6 is placed in the body 1 for disengagement or engagement as required, so that the locking stud 6 extends into the nut and realizes locking at any position, thereby avoiding tedious operations such as due to different toilet thicknesses, measuring and adjusting the exposed length of the locking stud 6 to make a designated position located in the locker; and the driven member 3 cooperates with the driving member 2 to drive the split nut 5 to be engaged to achieve a pre-tightening function, without holding the toilet by hand until the locker completely locks the toilet like existing lockers, allowing for mounting by one person, greatly reducing user's mounting difficulty, and improving mounting efficiency.

[0020] As shown in FIGs. 1, 2, 5, and 7, preferably, one of the abutting member 4 and the driven member 3 is provided with a guiding inclined surface 41, and the other one of the abutting member 4 and the driven member 3 is provided with a guide rib 34; and during the movement of the driven member 3, the guiding inclined surface 41 cooperates with the guide rib 34 to drive the abutting member 4 to move in the direction of towards or away from the driven member 3. Therefore, the driven member 3 and the abutting member 4 can be guided to move towards or away from each other.

[0021] As shown in FIG. 1 and FIG. 2, preferably, a movable chamber 31 is provided in the driven member 3, and a guide portion is provided on an inner wall of the movable chamber 31; the abutting member 4 is arranged to drive the split nut 5 to move along the guide portion to guide the engagement or disengagement of the split nut 5; and the guide portion is an inclined guide surface 32 and/or a dovetail groove 33.

[0022] As shown in FIGs. 1, 2, and 4, preferably, a first elastic member 7 is provided between the split nut 5 and the driven member 3, and the first elastic member 7 is arranged to drive the split nut 5 to reset; or there is a repulsive magnetic force between the split nut 5 and the driven member 3, and the repulsive magnetic force is arranged to drive the split nut 5 to reset; or there is an attractive magnetic force between the abutting member 4 and the split nut 5, and the attractive magnetic force is arranged to drive the split nut 5 to reset. When the abutting member 4 and the driven member 3 rotate relative to each other and move towards each other,

the split nut 5 is gradually engaged. When the abutting member 4 and the driven member 3 rotate relative to each other and move away from each other, the split nut 5 is gradually disengaged under the drive of the first elastic member 7 or the repulsive magnetic force or the attractive magnetic force. Preferably, the first elastic member 7 may be a spring or other components with elastic deformation, and is not limited to this.

[0023] As shown in FIGs. 1, 2, and 4, preferably, an inclined guide surface 32 is provided on an inner wall of the movable chamber 31; the inclined guide surface 32 gradually approaches an axis of the movable chamber 31 from a side close to the abutting member 4 to a side away from the abutting member 4, and is used for guiding the engagement or disengagement of the split nut 5; and the first elastic member 7 is arranged to drive the split nut 5 to move toward the abutting member 4 to reset and allowing an outer circumferential surface of the split nut 5 to abut against the inclined guide surface 32 during the movement. The abutting member 4 moves away from the driven member 3 under the action of the guiding inclined surface 41, and under the action of the first elastic member 7, the split nut 5 is driven to move along the guide portion towards the abutting member 4 and gradually moves away from the axis of the movable chamber 31, to achieve the disengagement of the split nut 5. On the contrary, the abutting member 4 moves towards the driven member 3 and gradually presses the split nut 5 to gradually engage.

[0024] As shown in FIGs. 1, 2, and 8, preferably, a dovetail groove 33 is provided on the inner wall of the movable chamber 31 at a position that avoids the inclined guide surface 32, and is used for cooperating with the inclined guide surface 32 to guide the movement of the split nut 5. Consequently, the split nut 5 will not rotate relative to the driven member 3.

[0025] As shown in FIGs. 1, 4, 6, 8 to 10, preferably, a second elastic member 8 is provided between the abutting member 4 and an end cover 9, and the second elastic member 8 is arranged to drive the abutting member 4 to reset; or there is a repulsive magnetic force between the abutting member 4 and the end cover 9, and the repulsive magnetic force is arranged to drive the abutting member 4 to reset. The second elastic member 8 or the repulsive magnetic force keeps the abutting member 4 close to the driven member 3. When the driven member 3 rotates forward and approaches under the action of the guiding inclined surface 41, the abutting member 4 pushes against the split nut 5 for engagement or semi-engagement, achieving a pre-locking function and facilitating subsequent tightening of the split nut 5 with the locking stud 6. The restoring force of the second elastic member 8 is greater than that of the first elastic member 7. Preferably, the second elastic member 8 may be a spring or other components with elastic deformation, and is not limited to this.

[0026] As shown in FIG. 4 to FIG. 7, preferably, the abutting member 4 is provided with the guiding inclined

surface 41, and one end of the guiding inclined surface 41 is provided with a first limit portion 43; the driven member 3 is provided with the guide rib 34; during forward rotation of the driving member 2, the abutting member 4 moves towards the driven member 3 to drive the split nut 5 to engage with the locking stud 6; and when the guide rib 34 abuts against the first limit portion 43 for limiting, the abutting member 4 moves together with the driven member 3 to lock the split nut 5 with the locking stud 6.

[0027] As shown in FIG. 4 to FIG. 7, preferably, the other end of the guiding inclined surface 41 is provided with a second limit portion 44; during reverse rotation of the driving member 2, the abutting member 4 moves away from the driven member 3 to drive the split nut 5 to disengage from the locking stud 6; and when the guide rib 34 abuts against the second limit portion 44 for limiting, the abutting member 4 moves together with the driven member 3 to disengage the split nut 5 from the locking stud 6. The first limit portion 43 and the second limit portion 44 cooperate with a guide rib 34 to limit a relative rotation angle between the driven member 3 and the abutting member 4. The length of the guide rib 34 is equal to an axial distance between two ends of the guiding inclined surface 41 plus a size of the second limit portion 44, enabling the driven member 3 to interact with the guiding inclined surface 41 on the abutting member 4 when rotating and to move away from or towards the abutting member, to ensure that the split nut 5 can be smoothly engaged or disengaged.

[0028] As shown in FIG. 1 to FIG. 10, preferably, elastic one-way teeth 42 are provided on an outer circumferential surface of the abutting member 4, and a plurality of limit protrusions 11 are provided on an inner circumferential surface of the body 1 at positions opposite to the one-way teeth 42; and when the abutting member 4 moves away from the driven member 3, the one-way teeth cooperate with the limit protrusions 11 to increase damping against the abutting member 4 during rotation. The one-way teeth 42 provided on the abutting member 4 cooperate with the limit protrusions 11 of the body 1 to increase resistance during counterclockwise rotation (the resistance can better ensure that the abutting member 4 first moves away from the driven member 3 (to disengage the split nut 5), and then rotates together with the driven member 3 after being in place), so that when the split nut 5 is loosened by reverse rotation, the abutting member 4 and the driven member 3 preferentially slide relative to each other along the guiding inclined surface 41, and then the abutting member 4 moves away from the driven member 3, ensuring that the split nut 5 is completely disengaged from the stud 6 and the toilet can be smoothly removed.

[0029] As shown in FIGs. 1, 4, 6, and 8 to 10, preferably, the body 1 is shaped as a three-way pipe provided with a first opening, a second opening, and a third opening; the first opening and the second opening are arranged on both sides of the body; the abutting member 4 and the driven member 3 are located at the first opening

and the second opening respectively; the locking stud 6 is arranged to penetrate the first opening and the second opening; and the third opening is arranged at an upper end of the body 1, and the driving member 2 is arranged at the third opening. One end of the body 1 near the abutting member 4 is covered by the end cover 9.

[0030] As shown in FIGs. 1, 2, 5, and 7, preferably, first engaging teeth 35 are provided on an outer circumferential surface of the driven member 3, second engaging teeth 21 are provided on an outer circumferential surface of the driving member 2, and the first engaging teeth 35 are arranged to engage with the second engaging teeth 21; and an upper end surface of the driving member 2 is provided with a locking groove used for cooperating with a tool. The locking groove may be a cross groove, a plum blossom groove, a straight groove, a hexagonal groove, etc., and is not limited to these. The locking groove facilitates the use of the tool 10 to drive the driving member 2 to rotate, thereby driving the driven member 3 to rotate.

[0031] The utility model has the following working principle:

Before mounting, the driving member 2 is first rotated clockwise to ensure that the split nut 5 is in an engaged or semi-engaged state, as shown in FIG. 8. When the toilet and the locker are mounted together with the locking stud 6, the split nut 5 is disengaged along the inclined guide surface 32 (dovetail groove 33) on the driven member 3 under a pushing force of the locking stud 6 penetrating into the body from a side with the limit portion, and is smoothly mounted, as shown in FIG. 9. After the toilet is mounted in place, the split nut 5 is gradually engaged along the inclined guide surface 32 and the dovetail groove 33 on the driven member 3 under an elastic force of the abutting member 4. At this time, the toilet can be loosened by hand, the split nut 5 is engaged with the locking stud 6 and tightened under the gravity of the toilet, and the toilet will not fall. Then, the driving member 2 continues to be rotated clockwise, and the split nut 5 rotates forward with the driven member 3, finally locking the toilet to the wall, as shown in FIG. 10.

[0032] When loosening, the driving member 2 is rotated counterclockwise, and the split nut 5 rotates reversely with the driven member 3 and gradually disengages from the locking stud 6. At the same time, the abutting member 4 also gradually moves away from the driven member 3 under the action of the guiding inclined surface 41. Then, the split nut 5 can be completely disengaged under the action of the first elastic member and the inclined guide surface 32 (dovetail groove 33) on the driven member 3. Finally, threads on the split nut 5 are completely disengaged from threads on the locking stud 6, and the toilet can be removed from the locking stud 6.

[0033] The following points should be noted: Firstly, in the description of the present application, it should be noted that unless otherwise specified and limited, the terms "mount", "connected", and "connection" should be broadly understood, for example, the term "connection"

may be mechanical connection, electrical connection, internal communication between two elements, or direct connection; the terms "upper", "lower", "left", "right", etc. are merely used for representing relative positional relationships; and when the absolute position of a described object changes, the relative positional relationship may change.

[0034] Secondly, in the accompanying drawings of the disclosed embodiments of the utility model, only the structures related to the disclosed embodiments are mentioned, and other structures can refer to the usual design; and the same embodiment and different embodiments of the utility model can be combined with each other on a non-conflict basis.

[0035] Finally, described above are merely preferred implementations of the utility model, the scope of protection of the utility model is not limited to the above embodiments, and any technical solution under the concept of the utility model falls within the scope of protection of the utility model.

[0036] It should be pointed out that, for those of ordinary skill in the art, many improvements and modifications can be made without departing from the principle of the utility model, and these improvements and modifications should also be considered within the scope of protection of the utility model.

Claims

1. A quick mounting structure of a toilet locker, comprising a body, wherein the body is provided with a driving member and a driven member, and is further provided with an abutting member moveable towards to or away from the driven member; one of the driven member and the abutting member is provided with a split nut switchable between two states of disengagement and engagement; the other one of the driven member and the abutting member is used for abutting against the split nut, and a screw hole in the middle of the split nut is penetrable by a locking stud; and the driving member cooperates with the driven member to drive the abutting member to move in a direction towards or away from the driven member, so that the split nut is engaged with or disengaged from the locking stud.
2. The quick mounting structure of the toilet locker according to claim 1, wherein one of the abutting member and the driven member is provided with a guiding inclined surface, and the other one of the abutting member and the driven member is provided with a guide rib; and wherein during the movement of the driven member, the guiding inclined surface cooperates with the guide rib to drive the abutting member to move in the direction towards or away from the driven member.
3. The quick mounting structure of the toilet locker according to claim 1, wherein a movable chamber is provided in the driven member, and a guide portion is provided on an inner wall of the movable chamber; the abutting member is arranged to drive the split nut to move along the guide portion to guide the engagement or disengagement of the split nut; and the guide portion is an inclined guide surface and/or a dovetail groove.
4. The quick mounting structure of the toilet locker according to claim 3, wherein a first elastic member is provided between the split nut and the driven member, and the first elastic member is arranged to drive the split nut to reset; or there is a repulsive magnetic force between the split nut and the driven member, and the repulsive magnetic force is arranged to drive the split nut to reset; or there is an attractive magnetic force between the abutting member and the split nut, and the attractive magnetic force is arranged to drive the split nut to reset.
5. The quick mounting structure of the toilet locker according to claim 2, wherein a second elastic member is provided between the abutting member and an end cover, and the second elastic member is arranged to drive the abutting member to reset; or there is a repulsive magnetic force between the abutting member and the end cover, and the repulsive magnetic force is arranged to drive the abutting member to reset.
6. The quick mounting structure of the toilet locker according to claim 2, wherein the abutting member is provided with the guiding inclined surface, and one end of the guiding inclined surface is provided with a first limit portion; the driven member is provided with the guide rib; during forward rotation of the driving member, the abutting member moves towards the driven member to drive the split nut to engage with the locking stud; and when the guide rib abuts against the first limit portion for limiting, the abutting member moves together with the driven member to lock the split nut with the locking stud.
7. The quick mounting structure of the toilet locker according to claim 6, wherein the other end of the guiding inclined surface is provided with a second limit portion; during reverse rotation of the driving member, the abutting member moves away from the driven member to drive the split nut to disengage from the locking stud; and when the guide rib abuts against the second limit portion for limiting, the abutting member moves together with the driven member to disengage the split nut from the locking stud.
8. The quick mounting structure of the toilet locker according to claim 7, wherein elastic one-way teeth

are provided on an outer circumferential surface of the abutting member, and a plurality of limit protrusions are provided on an inner circumferential surface of the body at positions opposite to the one-way teeth; and when the abutting member moves away from the driven member, the one-way teeth cooperate with the limit protrusions to increase damping against the abutting member during rotation. 5

9. The quick mounting structure of the toilet locker according to claim 1, wherein the body is shaped as a three-way pipe provided with a first opening, a second opening, and a third opening; the first opening and the second opening are arranged on both sides of the body; the abutting member and the driven member are located at the first opening and the second opening respectively; the locking stud is arranged to penetrate the first opening and the second opening; the third opening is arranged at an upper end of the body, and the driving member is arranged at the third opening. 10 15 20

10. The quick mounting structure of the toilet locker according to claim 1, wherein first engaging teeth are provided on an outer circumferential surface of the driven member, second engaging teeth are provided on an outer circumferential surface of the driving member, and the first engaging teeth are arranged to engage with the second engaging teeth; and an upper end surface of the driving member is provided with a locking groove used for cooperating with a tool. 25 30

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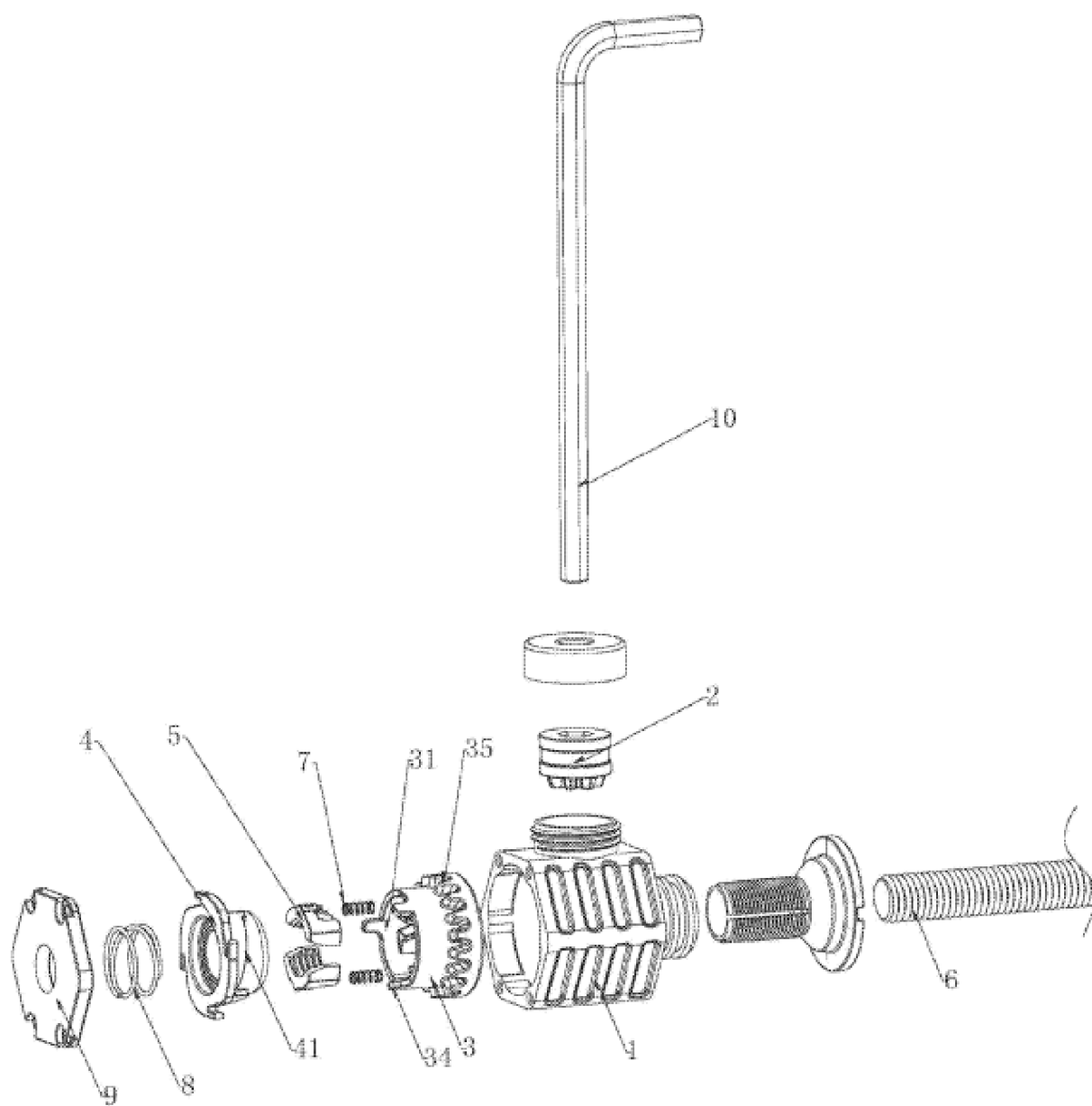


FIG. 1

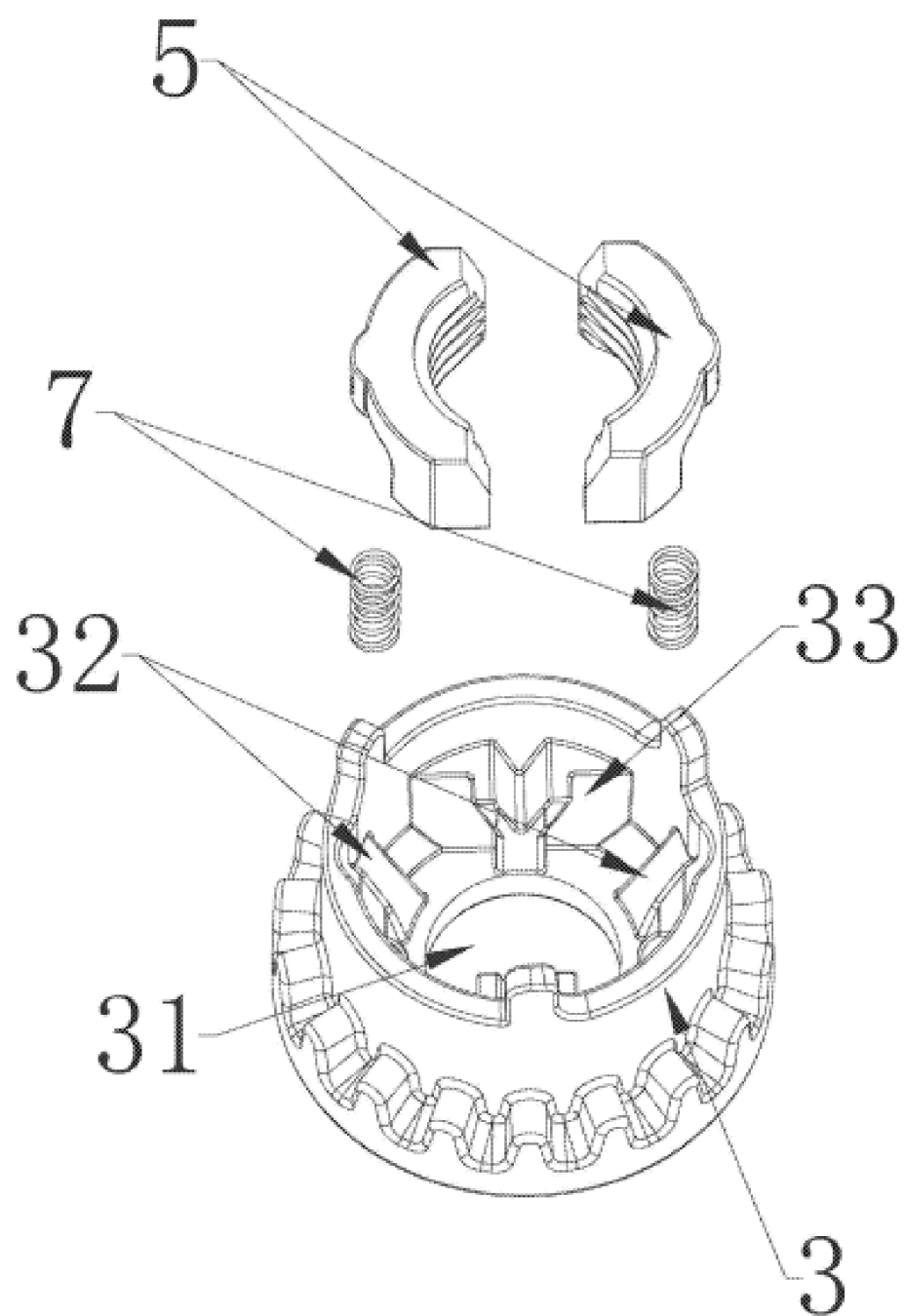


FIG. 2

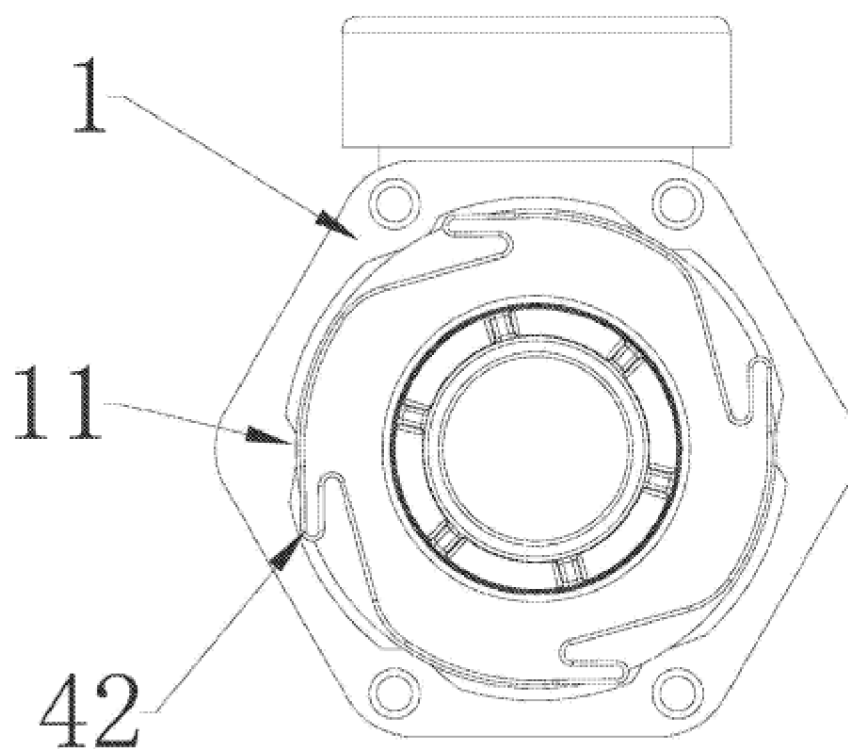


FIG. 3

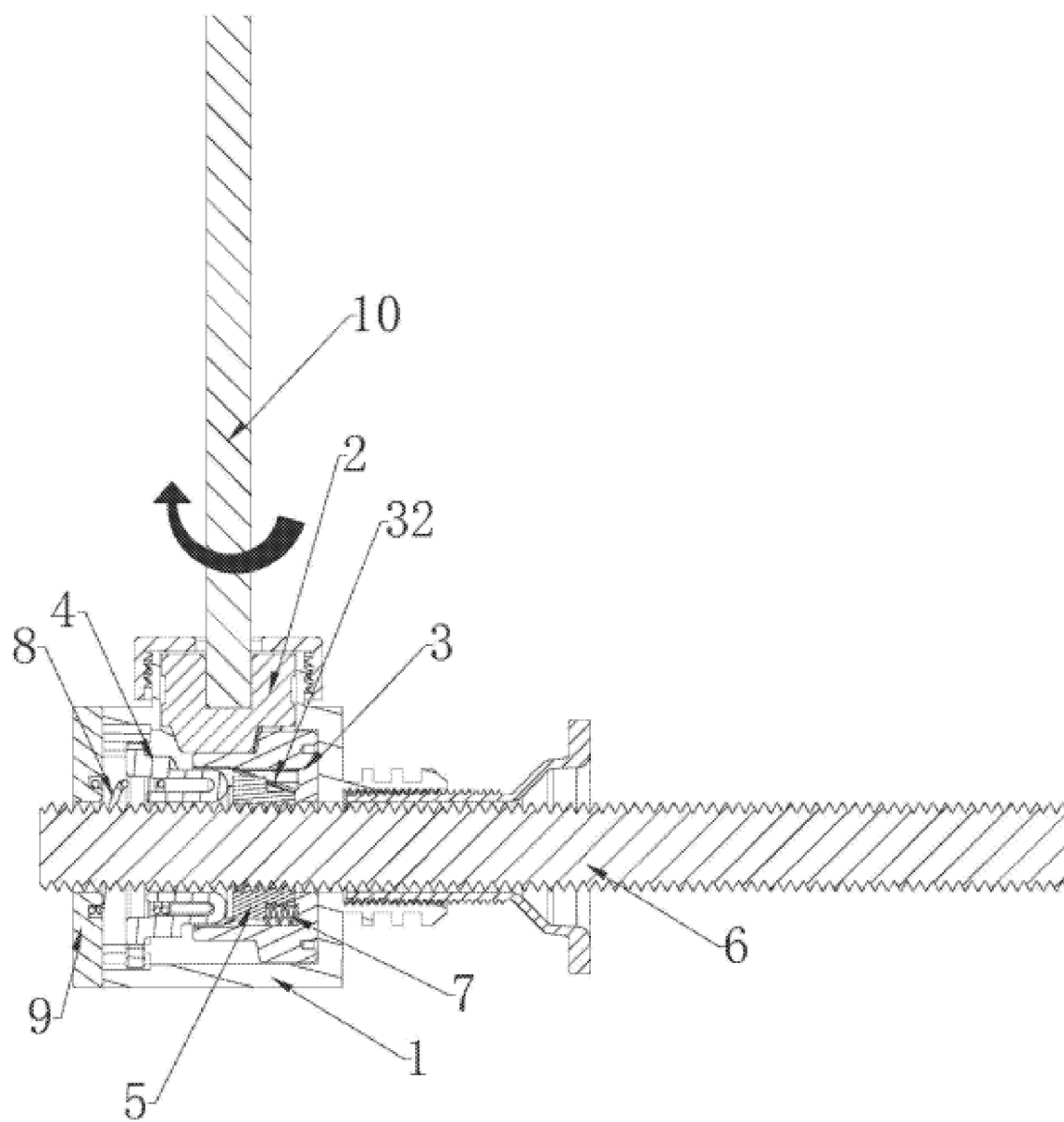


FIG. 4

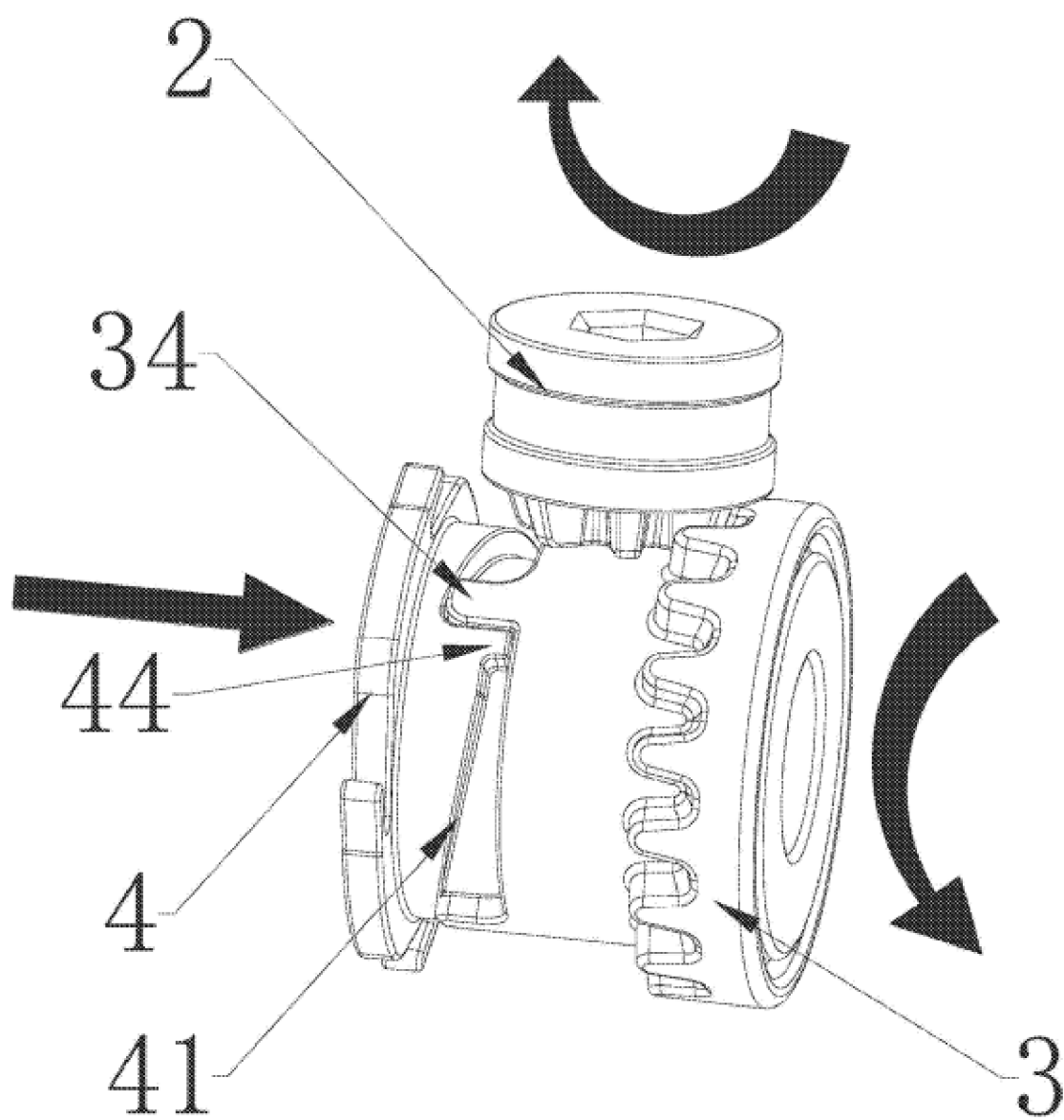


FIG. 5

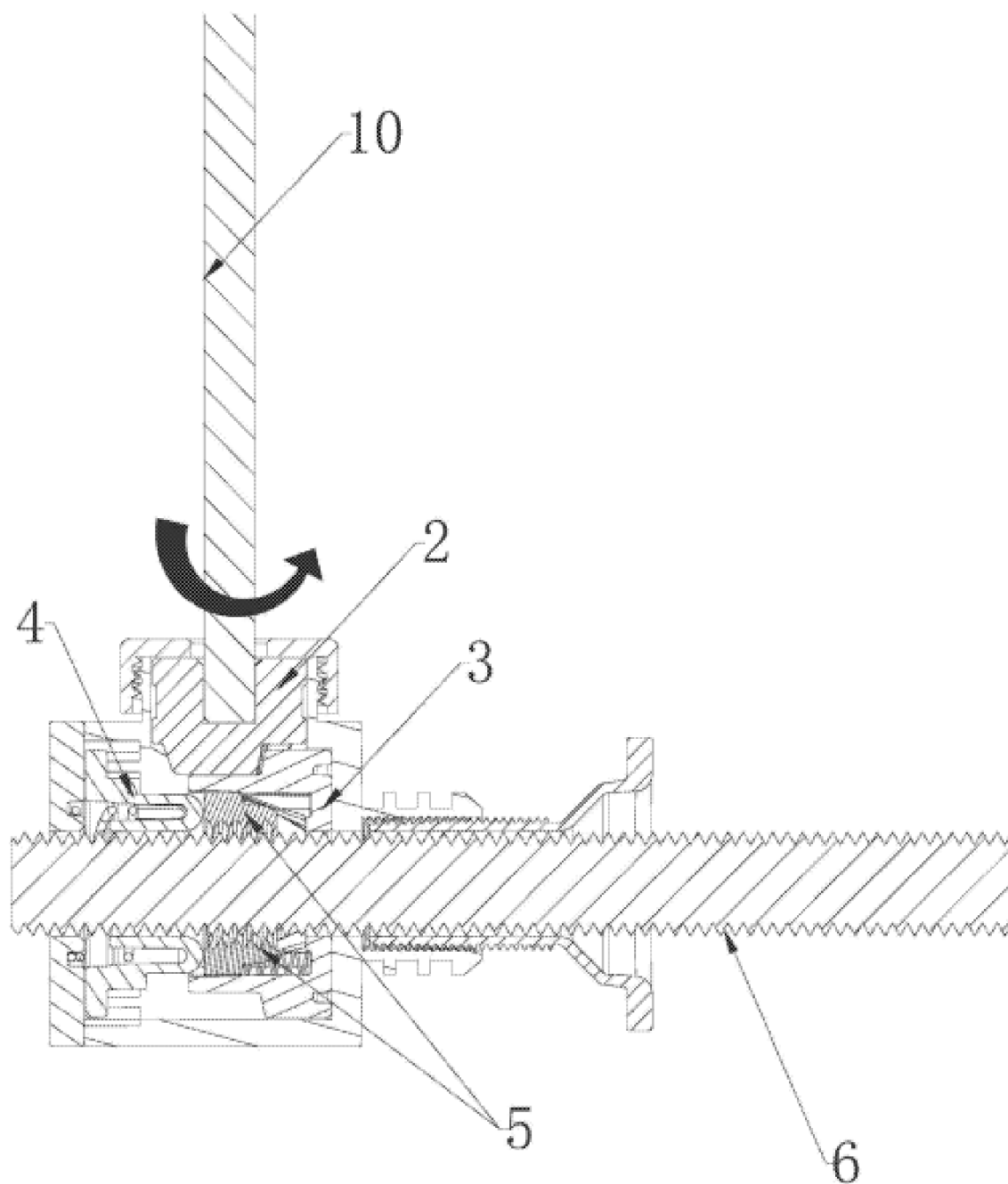


FIG. 6

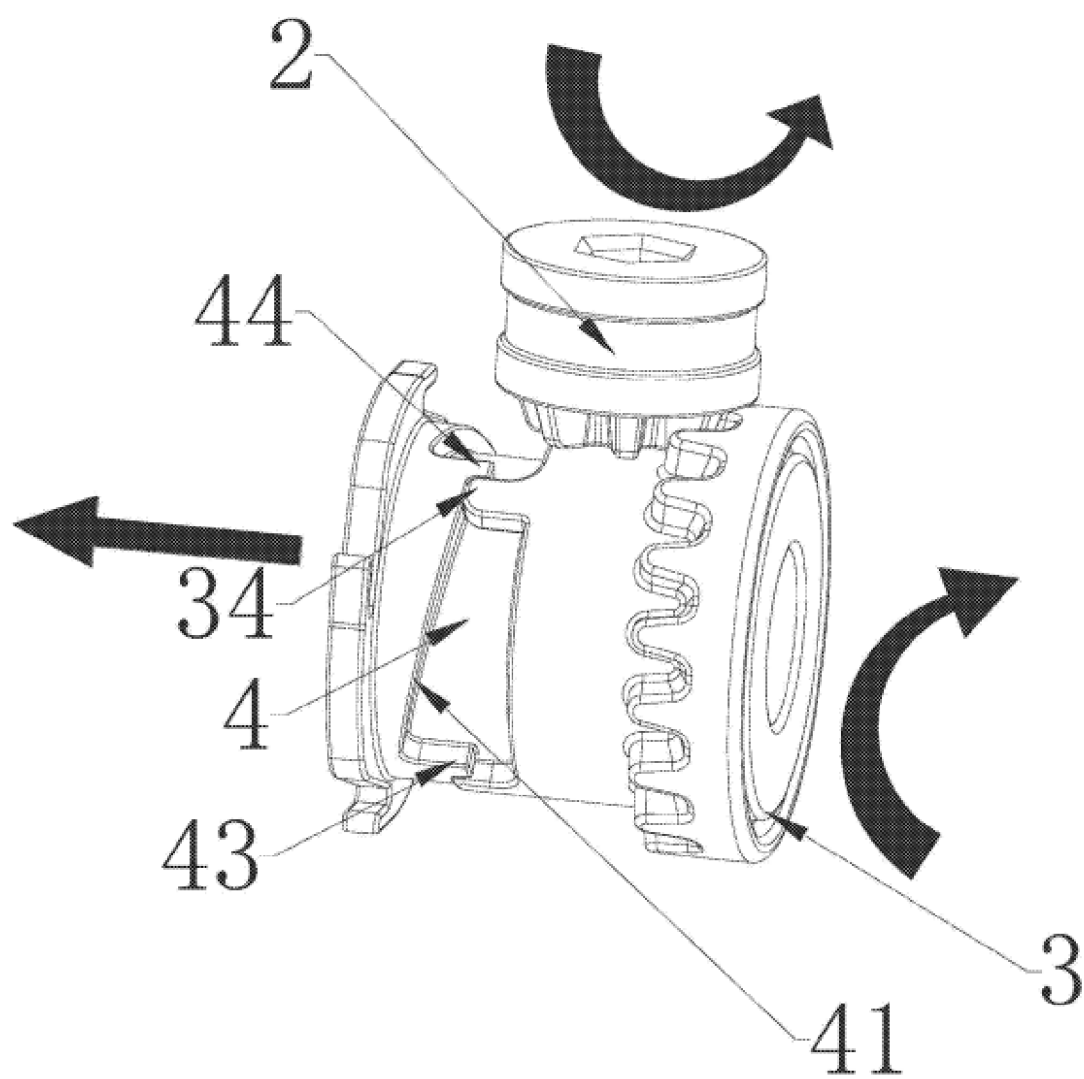


FIG. 7

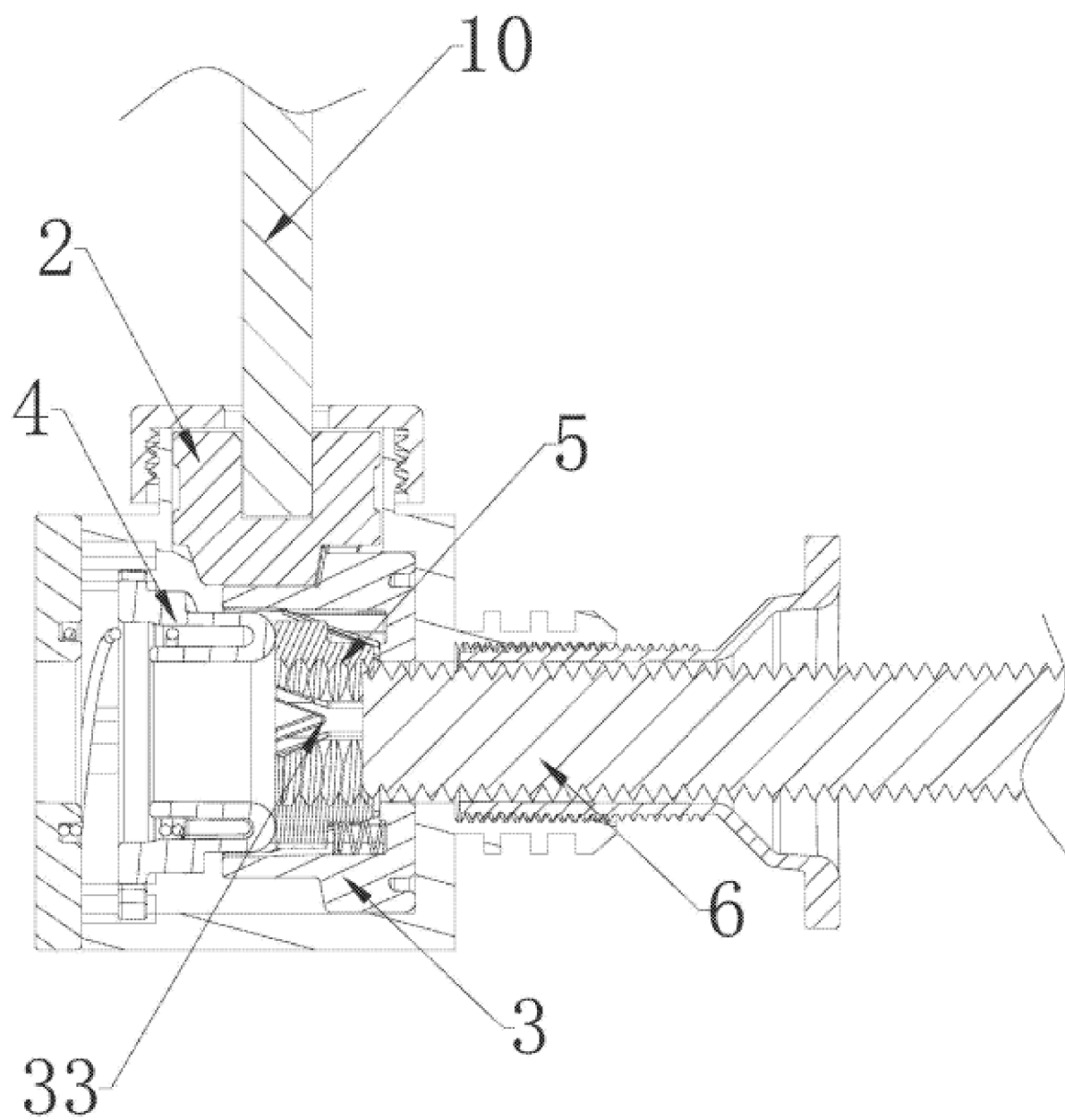


FIG. 8

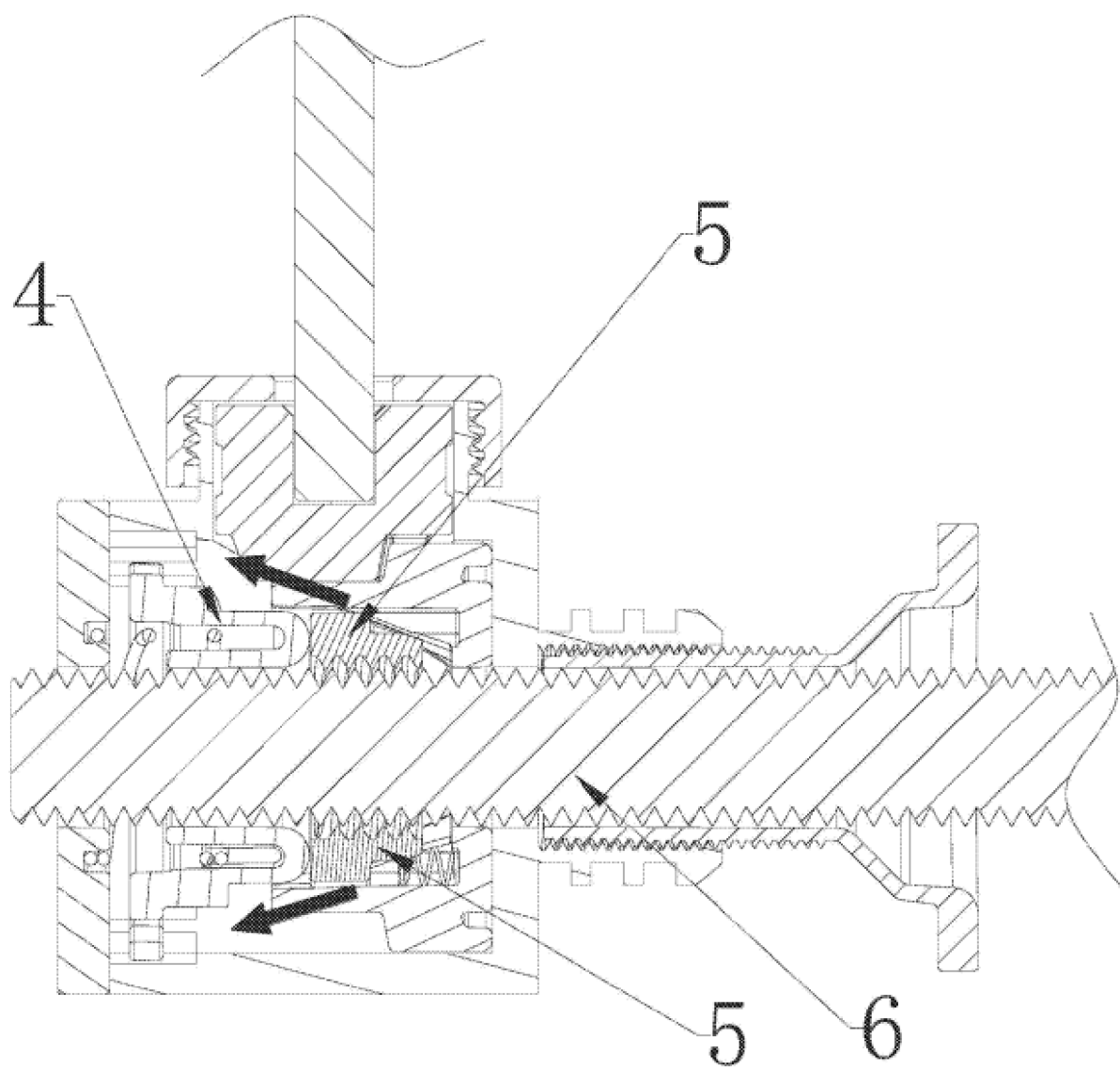


FIG. 9

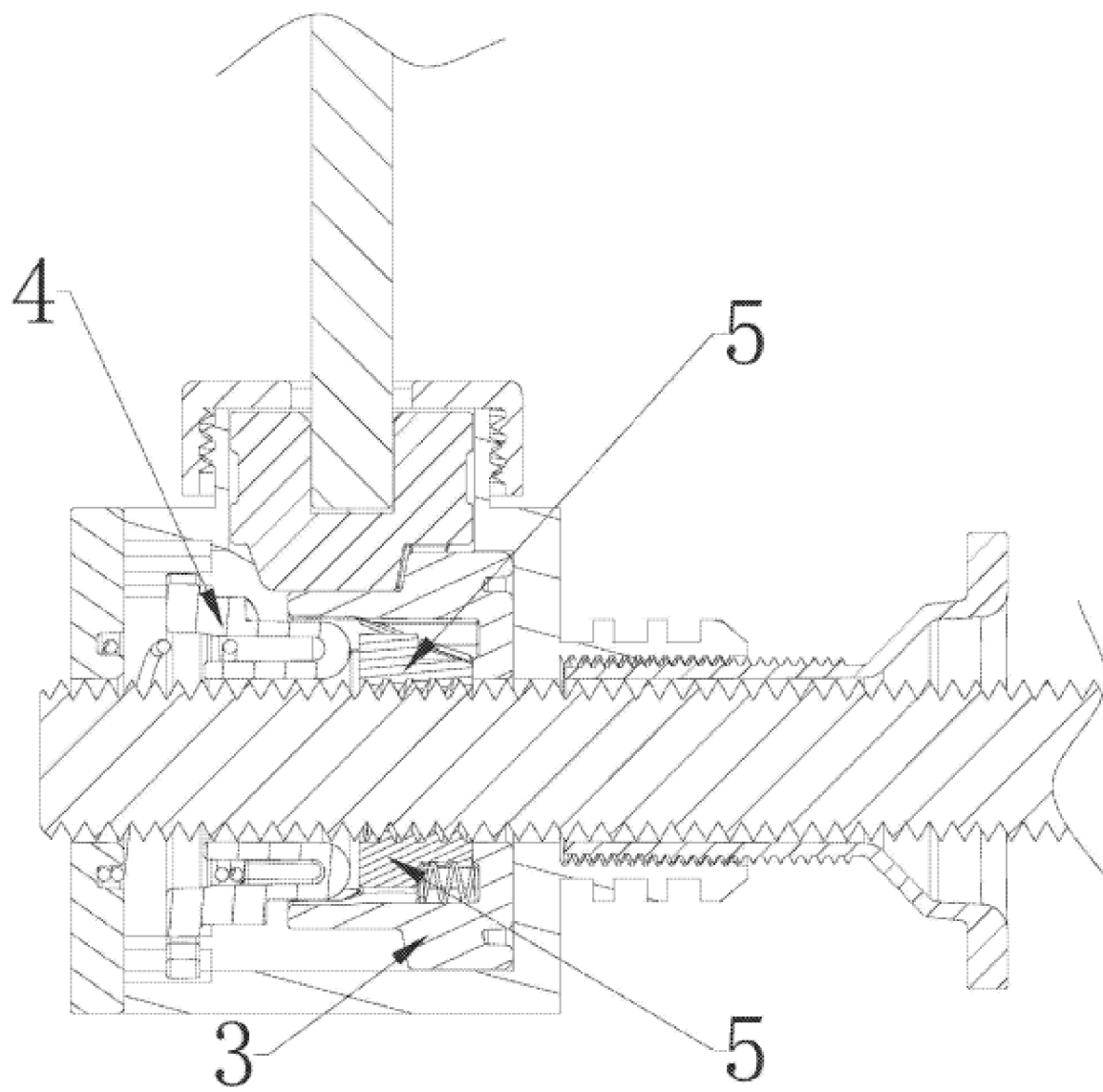


FIG. 10

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2023/140940

A. CLASSIFICATION OF SUBJECT MATTER

E03D11/14(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)

E03D

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)

CNXTX, CNABS, WPABSC, ENTXTC, WPABS, ENTXT, DWPI, VEN, 中国期刊网全文数据库, China Journal Network Full-text Database (CJFD): 厦门瑞尔特卫浴科技股份有限公司, 冯杨斌, 张荣誉, 王兴东, 马桶, 锁紧, 锁固, 墙, 开合螺母, 螺母, 螺杆, 螺柱, 齿轮, 啮合, 导向, 引导, 弹性, 弹簧, 转, 驱动, 磁, lock+, toilet, closetool, wall, nut?, screw, bolt, gear, slid +, spring?, driv+, magnet+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 115962203 A (FOSHAN GAOMING ANHUA CERAMIC SANITARY WARE CO., LTD. et al.) 14 April 2023 (2023-04-14) description, paragraphs 0043-0059 and figures 1-7	1-10
A	CN 110670693 A (XIAMEN R&T PLUMBING TECHNOLOGY CO., LTD.) 10 January 2020 (2020-01-10) entire document	1-10
A	CN 212001466 U (XIAMEN R&T PLUMBING TECHNOLOGY CO., LTD.) 24 November 2020 (2020-11-24) entire document	1-10
A	CN 217128422 U (BESTTER (XIAMEN) TECHNOLOGY INC.) 05 August 2022 (2022-08-05) entire document	1-10
A	CN 217299190 U (CHEN GUIZHONG) 26 August 2022 (2022-08-26) entire document	1-10

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

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"D" document cited by the applicant in the international application	"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
"E" earlier application or patent but published on or after the international filing date	"&" document member of the same patent family
"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	

Date of the actual completion of the international search

23 May 2024

Date of mailing of the international search report

30 May 2024

Name and mailing address of the ISA/CN

China National Intellectual Property Administration (ISA/
CN)
China No. 6, Xitucheng Road, Jimenqiao, Haidian District,
Beijing 100088

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2023/140940

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 219450955 U (XIAMEN HAOCHENG WATER PURIFYING TECHNOLOGY CO., LTD.) 01 August 2023 (2023-08-01) entire document	1-10
A	CN 219527850 U (XIAMEN RONGJI PRECISION TECHNOLOGY CO., LTD.) 15 August 2023 (2023-08-15) entire document	1-10
A	EP 3361017 A1 (GEBERIT INTERNATIONAL AG) 15 August 2018 (2018-08-15) entire document	1-10
A	KR 20200016156 A (IB KOREA CO., LTD.) 14 February 2020 (2020-02-14) entire document	1-10

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2023/140940

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Patent document cited in search report			Publication date (day/month/year)		Patent family member(s)			Publication date (day/month/year)	
CN	115962203	A	14 April 2023		None				
CN	110670693	A	10 January 2020		EP	4023828	A1	06 July 2022	
					EP	4023828	A4	09 November 2022	
					WO	2021077820	A1	29 April 2021	
					CN	211816743	U	30 October 2020	
CN	212001466	U	24 November 2020		None				
CN	217128422	U	05 August 2022		CN	114703929	A	05 July 2022	
					CN	114703929	B	30 May 2023	
CN	217299190	U	26 August 2022		None				
CN	219450955	U	01 August 2023		CN	116241785	A	09 June 2023	
CN	219527850	U	15 August 2023		None				
EP	3361017	A1	15 August 2018		EP	3361017	B1	19 January 2022	
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