



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

(43) Date of publication:
30.09.2020 Bulletin 2020/40

(21) Application number: **18881229.1**

(22) Date of filing: **20.09.2018**

(51) Int Cl.:
B05B 1/18 (2006.01) B05B 1/12 (2006.01)
B05B 3/08 (2006.01)

(86) International application number:
PCT/CN2018/106639

(87) International publication number:
WO 2019/100833 (31.05.2019 Gazette 2019/22)

(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: **24.11.2017 CN 201711190009**
24.11.2017 CN 201721590648 U

(71) Applicant: **Xiamen Solex High-Tech Industries Co., Ltd.**
Xiamen, Fujian 361000 (CN)

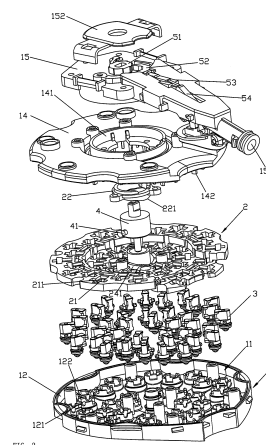
(72) Inventors:
• **LIN, Fengde**
Xiamen
Fujian 361000 (CN)
• **ZHANG, Mingfu**
Xiamen
Fujian 361000 (CN)
• **ZHUO, Zhiwei**
Xiamen
Fujian 361000 (CN)
• **CHEN, Wenxing**
Xiamen
Fujian 361000 (CN)

(74) Representative: **Hamel, Armin**
Iridium IP
Friedrich-König-Strasse 3-5
68167 Mannheim (DE)

(54) **AREA-ADJUSTABLE WATER OUTLET MECHANISM**

(57) The present disclosure discloses a water outlet mechanism with an adjustable water outlet area. The water outlet mechanism with an adjustable water outlet area a fixed portion (1), and a movable plate (2) disposed in the fixed portion (1). The fixed portion (1) comprises a water outlet cavity (11) and a water outlet cover (12), the water outlet cover (12) comprises a plurality of through holes (121) penetrating through a front surface to a back surface, the through holes (121) are disposed with one or more water outlet nozzles (3) and first ends of the one or more water outlet nozzles (3) are configured to be connected to the water outlet cavity (11), the one or more water outlet nozzles (3) are configured to be swingably connected to the water outlet cover (11), the one or more water outlet nozzle (3) are partially disposed in the through holes (121), the movable plate (2) is configured to be movably connected to an inner side of the fixed portion (1) in an up-and-down direction, the movable plate (2) is operatively connected to the one or more water outlet nozzles (3), the movable plate (2) moves in the up-and-down direction to drive the one or more water outlet nozzles (3) to swing to change water outlet angles

of the one or more water outlet nozzles (3) to adjust water outlet area. It can not only change a water outlet angle of the water outlet nozzle, but also adjust the water outlet area to meet different needs of shower scopes from different family members, and meet different needs of shower scopes in different shower scenarios.



Description

FIELD OF THE DISCLOSURE

[0001] The present disclosure relates to a water outlet mechanism, in particular relates to a water outlet mechanism with an adjustable water outlet area.

BACKGROUND OF THE DISCLOSURE

[0002] Existing water outlet mechanism comprises a fixed portion and a movable plate disposed in the fixed portion, the fixed portion comprises a water outlet cavity and a water outlet cover, the water outlet cover is disposed with a plurality of through holes penetrating a front surface and back surface, the through hole is disposed with a nozzle, and a first end of the nozzle is configured to be connected to the water outlet cavity. The water outlet nozzle is made of flexible material and fixedly connected to the movable plate. The water outlet nozzle passes through the through hole, and the movable plate moves to drive the water outlet nozzle to move to adjust an angle of water splash. For example, CN204646766U discloses a water outlet mechanism. Disadvantages of the water outlet mechanism are as follows. First, it can only change the angle of the water splash, but not water outlet area. Second, the water outlet nozzle is connected to the movable plate, the water outlet nozzle passes through the through hole, and the water outlet nozzle can only be made of flexible material, the water outlet nozzle moves due to deformation characteristics of the flexible material, the angle of the water splash changes, the use is limited, and the structure is complex.

BRIEF SUMMARY OF THE DISCLOSURE

[0003] The present disclosure provides a water outlet mechanism with an adjustable water outlet area, which overcomes the deficiencies of existing techniques.

[0004] In order to solve the aforementioned technical problems, a technical solution of the present disclosure is as follows.

[0005] A water outlet mechanism with an adjustable water outlet area, comprises a fixed portion and a movable plate disposed in the fixed portion. The fixed portion comprises a water outlet cavity and a water outlet cover. The water outlet cover comprises a plurality of through holes penetrating through a front surface to a back surface, and the through holes are disposed with one or more water outlet nozzles and first ends of the one or more water outlet nozzles are configured to be connected to the water outlet cavity. The one or more water outlet nozzles are configured to be swingably connected to the water outlet cover, and the one or more water outlet nozzles are partially disposed in the through holes. The movable plate is configured to be connected to an inner side of the fixed portion and to be movable in an up-and-down direction. The movable plate is operatively connected to

the one or more water outlet nozzles, and the movable plate moves in the up-and-down direction to drive the one or more water outlet nozzles to swing to change water outlet angles of the one or more water outlet nozzles to adjust water outlet area.

[0006] In a preferred embodiment, the water outlet cover comprises an middle portion, the plurality of through holes surrounds the middle portion, and ends of the one or more water outlet nozzles are close to or away from the middle portion to define swing directions of the one or more water outlet nozzles relative to the water outlet cover.

[0007] In a preferred embodiment, the middle portion is a center line of the water outlet cover.

[0008] In a preferred embodiment, a gap is disposed between each of outer walls of the one or more water outlet nozzle and a corresponding one of inner walls of the through holes to provide a space for a corresponding one of the one or more water outlet nozzles to swing, and the gap is disposed with an elastic seal ring.

[0009] In a preferred embodiment, each of the one or more water outlet nozzles comprises a nozzle and a connection portion fixedly disposed on the nozzle. Each of the one or more water outlet nozzles comprises a water hole passing through an end surface of the corresponding one of the connection portions and a bottom surface of the nozzle wherein the water hole is connected to the water outlet cavity. The connection portions each extends outward to define a swing shaft. The through holes of the water outlet cover swingably connected to the one or more water outlet nozzles are disposed with peripheral walls. A rear surface of the water outlet cover extends outward to define the peripheral walls. The peripheral walls each surrounds the corresponding one of the through holes. The swing shafts each is rotatably connected to a corresponding one of the peripheral walls, and the nozzles each is disposed in a corresponding one of the through holes.

[0010] In a preferred embodiment, the connection portions each extends outward to define a fitting portion. The movable plate comprises one or more fitting holes penetrating in the up-and-down direction. The connection portions each passes through a corresponding one of the one or more fitting holes in an upward direction, the fitting portions abut the movable plate, the movable plate moves in the up-and-down direction to drive the one or more water outlet nozzles to swing through the fitting portions.

[0011] In a preferred embodiment, the fitting portions of the connection portions each comprises an upper fitting portion and a lower fitting portion disposed at intervals in the up-and-down direction. The upper fitting portions are configured to cooperate with a top surface of the movable plate, and the lower fitting portions are configured to cooperate with a bottom surface of the movable plate.

[0012] In a preferred embodiment, hole walls of the one or more fitting holes are disposed with one or more

abutting steps. The upper fitting portions cooperate with top surfaces of a corresponding one of the one or more abutting steps, and the lower fitting portions cooperate with bottom surfaces of the one or more abutting steps.

[0013] In a preferred embodiment, both sides of the connection portion extend outward to define the fitting portion, and each of the one or more fitting holes comprises a cross structure.

[0014] In a preferred embodiment, each of the one or more fitting holes comprises an inner-outer hole disposed along an inner-outer direction and a left-right hole disposed along a left-right direction, and the inner-outer hole cooperate with the left-right hole to define the cross structure. The inner-outer hole comprise an inner hole portion, and a hole wall of the inner hole portion protrudes inward to define an abutting step. Top surfaces of the abutting steps (211) each cooperates to a corresponding one of the upper fitting portions (322), and bottom surfaces of the abutting steps (211) each cooperates to a corresponding one of the lower fitting portions (323).

[0015] In a preferred embodiment, the fixed portion is rotatably connected to a rotating shaft, the rotating shaft is operatively connected to the movable plate, and the rotating shaft rotates to drive the movable plate to move in the up-and-down direction.

[0016] In a preferred embodiment, the rotating shaft extends outward to define a convex shaft, an inner side of the fixed portion further comprises a guide block, the movable plate is relatively fixedly connected to the guide block, a track portion is defined between the movable plate and the guide block, and a height of a circumferential direction of the track portion changes, and the convex shaft cooperates with the track portion.

[0017] In a preferred embodiment, the height of the circumferential direction of the track portion changes gradually.

[0018] In a preferred embodiment, the track portion comprises at least two positioning steps, and a guide surface is connected to each two adjacent positioning steps.

[0019] In a preferred embodiment, the movable plate and the guide block surround an outside of the rotating shaft.

[0020] In a preferred embodiment, further comprises a driving mechanism. The driving mechanism comprises an operation member configured to move relative to the fixed portion and an intermittent motion mechanism connected to the fixed portion. The intermittent motion mechanism is operatively connected to the rotating shaft, and the operation member is operatively connected to the intermittent motion mechanism.

[0021] In a preferred embodiment, the fixed portion further comprises a connecting base, the connecting base is fixedly connected to the water outlet cover to define the water outlet cavity or a part of the water outlet cavity. The movable plate is disposed in the water outlet cavity.

[0022] Compared with existing techniques, the technical solution of the present disclosure has the following

advantages.

[0023] The water outlet nozzle can be swingably connected to the water outlet cover and the water outlet nozzle partially extends into the through hole, the movable plate can be movably connected to the inner side of the fixed portion in the up-and-down direction, and the movable plate is operatively connected to the water outlet nozzle, and the movable plate moves in the up-and-down direction to drive the water outlet nozzle to swing. First, it can not only change a water outlet angle of the water outlet nozzle, but also adjust the water outlet area to meet different needs of shower scopes from different family members, and meet different needs of shower scopes in different shower scenarios. Second, the water outlet nozzle is directly swingably connected to the water outlet cover, it is easy to assemble, and control precision of a movement of the water outlet nozzle relative to the through hole is high. Third, the water outlet nozzle is operatively connected to the movable plate, the structure is compact, and the assembly is convenient.

[0024] The connection portion extends outward to define a swinging shaft, the swinging shaft is rotatably connected to the peripheral wall, the nozzle extends into the through hole, the structure is compact, and the assembly is convenient.

[0025] The connection portion passes through the fitting hole in the upward direction and the fitting portion abuts on the movable plate. The movable plate moves in the up-and-down direction to drive the water outlet nozzle to swing through the fitting portion, and the structure is simple.

[0026] The fitting portion of the connection portion comprises an upper fitting portion and a lower fitting portion disposed at intervals in the up-and-down direction, the upper fitting portion cooperates with a top surface of the movable plate, and the lower fitting portion cooperates a bottom surface of the movable plate, and the structure is simple.

[0027] The hole wall of the fitting hole comprises an abutting step, the upper fitting portion cooperates with the top surface of the abutting step, and the lower fitting portion cooperates with the bottom surface of the abutting step. The structure is simple and compact.

[0028] The rotating shaft extends outward to define a convex shaft, the movable plate is relatively fixedly connected to the guide block, and a track portion is defined between the two, a height of the track portion changes along the circumferential direction, and the convex shaft cooperates with and is connected to the track portion. The structure is simple and compact.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029] The present disclosure will be further described below with reference to the drawings and embodiments.

FIG. 1 illustrates a perspective view of a shower of a specific embodiment.

FIG. 2 illustrates an exploded perspective view of a portion of the shower of a specific embodiment.

FIG. 3 illustrates an assembly view of a water outlet cover and a water outlet nozzle of the shower of a specific embodiment.

FIG. 4 illustrates a schematic view of the assembly of a movable plate and a guide block of the shower of a specific embodiment.

FIG. 5-1 illustrates an enlarged view of a region A of FIG. 4.

FIG. 5-2 illustrates an enlarged view of a region B of FIG. 4.

FIG. 6 illustrates a perspective view of a rotating shaft of the shower of a specific embodiment.

FIG. 7 illustrates a perspective view of the water outlet nozzle of the shower of a specific embodiment.

FIG. 8 illustrates a cross-sectional view of a portion of the shower of a specific embodiment when a water outlet area of the shower is a middle state.

FIG. 9 illustrates a cross-sectional view of the portion of the shower head of a specific embodiment when the water outlet area of the shower is a large state.

FIG. 10 illustrates a cross-sectional view of the portion of the shower of a specific embodiment when the water outlet area of the shower is a small state.

FIG. 11 illustrates a cross-sectional view of the shower of a specific embodiment.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0030] Referring to FIGS. 1-11, a water outlet mechanism with an adjustable water outlet area comprises a fixed portion 1 and a movable plate 2 disposed in the fixed portion 1. The fixed portion 1 comprises a water outlet cavity 11 and a water outlet cover 12, the water outlet cover 12 comprises a plurality of through holes 121 penetrating a front surface to a back surface. The through holes 121 are disposed with one or more water outlet nozzles 3 and first ends of the one or more nozzles are configured to be connected to the water outlet cavity 11. Each of the through holes is disposed with a water outlet nozzle 3, or each of a part of the through holes is disposed with a water outlet nozzle 3. The one or more water outlet nozzles 3 are swingably connected to the water outlet cover 12 and the one or more water outlet nozzles 3 partially extend into the through holes 121, the movable plate 2 is movably connected to an inner side of the water outlet cavity 11 of the fixed portion 1 and to be movable in an up-and-down direction, and the movable plate 2 is operatively connected to the one or more water outlet nozzles 3, the movable plate 2 moves in the up-and-down direction to drive the one or more water outlet nozzles 3 to swing to change water outlet angles of the one or more water outlet nozzles 3 to adjust water outlet area.

[0031] In this embodiment, the water outlet cover 12 comprises a middle portion, and the middle portion is a center line of the water outlet cover 12. When the water outlet cover 12 is a disc structure, the center line is an

axis, the plurality of through holes 121 surround the middle portion. As required, an arrangement of the through holes 121 disposed with the one or more water outlet nozzles 3 is as follows. The through holes are disposed along a circle in a circumferential direction of the middle portion at intervals, or the through holes are disposed along concentric circles at intervals in the circumferential direction of the middle portion, an axis of the concentric circles is the middle portion. Swinging directions of the one or more water outlet nozzles 3 relative to the water outlet cover 12 is as follows. For example, referring to FIG. 8, FIG. 9, and FIG. 10, ends of the one or more water outlet nozzles 3 are close to or away from the middle portion. In FIG. 8, the one or more water outlet nozzles 3 face downward, and the water outlet area is in a middle state. In FIG. 9, the one or more water outlet nozzles 3 swing outward and face obliquely outward, and the water outlet area is in a large water state. In FIG. 10, and the one or more water outlet nozzles 3 swing inward and face obliquely inward, and the water output area is in a small water state. Among them, the water outlet area of the middle water state is between the water outlet area of the large water state and the water outlet area of the small water state. For example, a width of the water outlet area of the large water state is the same as a width of a shoulder, and is used for body showering (or, suitable for tall person, suitable for having a body shower, and getting wet quickly). A width of the water outlet area of the middle water state is the same as a width of a head, and is used for shampooing. A diameter of the water outlet area of the small water state is the same as a diameter of an arm, and is used for accurate showering (such as arm washing, leg washing, etc.).

[0032] A gap is disposed between an outer wall of each of the one or more water outlet nozzles 3 and an inner wall of a corresponding one of the through holes 121 to provide a space for a corresponding one of the one or more water outlet nozzles 3 to swing. An elastic seal ring 13 is disposed in the gap. The seal ring 13 plays a sealing role and prevents from water leakage. And, the seal ring is an elastic member, and elastic deformation of the elastic member provides the space for the corresponding one of the one or more water outlet nozzles to swing.

[0033] In this embodiment, the one or more water outlet nozzles 3 each comprises a nozzle portion 31 and a connection portion 32 fixedly disposed on the nozzle portion 31. The nozzle portions 31 each comprises a water hole 33 passing through an end surface of a corresponding one of the connection portions 32 and a bottom of a corresponding one of the nozzle portions 31 and being connected to the water outlet cavity 11. The connection portions 32 each extends outward to define two swing shafts 34 symmetrically disposed. The plurality of through holes 121 of the water outlet cover 12 swingably connected to the one or more water outlet nozzles 3 are disposed with peripheral walls 122, and a rear surface of the water outlet cover 12 extends outward to define the peripheral walls. The peripheral walls 122 each surrounds the correspond-

ing one of the through holes 121, the swing shafts 34 are rotatably connected to a corresponding one of the peripheral walls 122, and the nozzle portions 31 each is disposed in a corresponding one of the through holes 121. In this embodiment, the nozzle portion 31 comprises a cylindrical structure, and an end of the cylindrical structure comprises a tapered structure. The connection portions 32 each comprises a disc body 321 and a fixed portion fixedly disposed on the disc body 321, the disc bodies 321 each comprises a round disk and a protrusion extending outward from a rear portion of the round disk, an axis of each of the cylindrical structures of the nozzle portions 31 and an axis of a corresponding one of the round disks is coaxial, and a diameter of each of the round disks is larger than a diameter the corresponding one of the cylindrical structures. The swing shafts extend outward from an outer peripheral wall of the corresponding one of the round disks and are symmetrically disposed in a radial direction. In some embodiments, a rear portion of each of the peripheral walls 122 comprises an opening, and the protrusions each is disposed in a corresponding one of the openings, and swing accuracy of the one or more water outlet nozzle increase due to this structure.

[0034] In this embodiment, the connection portions 32 each comprises two fitting portions extending outward, the two fitting portions are axially symmetrically disposed in a left-and-right direction, and each of the two fitting portions comprises an upper fitting portion 322 and a lower fitting portion 323 disposed at intervals in an up-and-down direction. The movable plate 2 comprises one or more fitting holes 21 penetrating in the up-and-down direction. The one or more fitting holes 21 each comprises a cross structure. The one or more fitting holes 21 each comprises an inner-outer hole disposed in an inner-and-outer direction and a left-right hole disposed in a left-and-right direction. The inner-outer holes each cooperates with the corresponding one of the left-right holes to define the cross structure. The inner-outer holes each comprises an inner hole portion, a wall of each of the inner hole portions protrudes in an inward direction to define an abutting step 211. The connection portions 32 each passes through the corresponding one of the one or more fitting holes 21 in an upward direction. The upper fitting portions 322 each cooperates to a top surface of the corresponding one of the abutting steps 211, the lower fitting portions 323 each cooperates to a bottom surface of the corresponding one of the abutting step 211, enabling the movable plate 2 moving in the up-and-down direction to drive the one or more water outlet nozzles 3 to swing through the fitting portions. The connection portions 32 each easily passes through and is connected to the corresponding one of the one or more fitting holes 21 in the upward direction due to the cross structure at a fitting position. In some embodiments, both sides of an upper portion of each of the fixed portion extends outward to define the corresponding one of the upper fitting portion 322, the protrusions each comprises the corresponding

one of the lower fitting portion 323. Further, bottom surfaces of the upper fitting portions 322 and top surfaces of the lower fitting portions 323 both comprise smooth curved surfaces configured to play a guiding role to enable the one or more water outlet nozzles 3 to swing smoothly.

[0035] In this embodiment, the fixed portion 1 is rotatably connected to a rotating shaft 4, an inner side of the fixed portion 1 is disposed with a guide block 22. The rotating shaft 4 radially symmetrically extends outward to define two convex shafts 41, for example, the convex shafts are cylindrical shafts. The movable plate 2 is relatively fixedly connected to the guide block 22, a track portion 23 is defined between the movable plate 2 and the guide block 22, and a height of a circumferential direction of the track portion 23 changes. The movable plate 2 and the guide block 22 both surround an outer side of the rotating shaft 4. The convex shafts 41 cooperate and are connected to the track portion 23. Therefore, when the rotating shaft 4 rotates, the movable plate 2 and the guide block 22 move as a whole in the up-and-down direction through a cooperation of the convex shafts 41 and the track portion 23. The track portion 23 comprises at least two positioning steps 231. In this embodiment, comprises three positioning steps 231, and each two adjacent positioning steps 231 comprises a guide surface. The guide surface is a spiral surface. The positioning steps 231 respectively correspond to the water outlet area of the middle water state, the water outlet area of the large water state, and the water outlet area of the small water state of FIG. 8, FIG. 9, and FIG. 10. However, it is not limited to this, as required, the track portion 23 can comprise no positioning step. The height of the circumferential direction of the track portion gradually changes to achieve a stepless change of the water outlet area similar to a stepless change of speed. The movable plate 2 comprises a first sleeve hole configured to surround an outer side of the rotating shaft 4, and an inner wall of the first sleeve hole defines a first sleeve hole wall 241. The guide block 22 comprises a second sleeve hole configured to surround the rotating shaft 4, an inner wall of the second sleeve hole defines a second sleeve hole wall 221, a top end surface of the first sleeve hole wall 241 comprises a first track surface, a bottom end surface of the second sleeve hole wall 221 comprises a second track surface, the first track surface is parallel to the second track surface and the movable plate relatively fixedly corresponds to the guide block to define the track portion 23.

[0036] In some embodiments, the fixed portion further comprises a connecting base 14 and a fixed base 15, and the connecting base 14 is fixedly connected to the water outlet cover 12. The connecting base 14 comprises a penetrating hole 141 penetrating in the up-and-down direction. The fixed base 15 is fixedly connected to and covers an upper side of the connecting base 14. The water outlet cover 12, the connecting base 14, and the fixed base 15 define the water outlet cavity 11, which

comprises a cavity between the water outlet cover 12 and the connecting base 14, the penetrating hole 141, and a cavity between the connecting base and the fixed base. The movable plate is disposed in the cavity between the water outlet cover 12 and the connecting base 14, a hole wall of the penetrating hole 141 surrounds the guide block 22, the guide block is configured to move in the penetrating hole, the cavity between the connecting base and the fixed base. The upper end of the rotating shaft 4 extends out of an upper side of the fixed base 15. The fixed base 15 defines a water inlet passage 151 configured to introduce water into the water outlet cavity 11. In some embodiments, the fixed portion further comprises the connecting base 14, a bottom surface of the connecting base 14 extends outward to define pairs of abutting protrusions 142, the pairs of abutting protrusions 142 correspond to the one or more fitting holes 21 one to one, each pair of the pairs of abutting protrusions 142 respectively pass through the left-right holes of the one or more fitting holes 21 to abut the corresponding one of the swing shafts 34 to prevent the swing shafts from separating.

[0037] In this embodiment: it also comprises a drive mechanism, the drive mechanism comprises an operation member 5 configured to move relative to the fixed portion and an intermittent motion mechanism connected to the fixed portion. The intermittent motion mechanism is operatively connected to the rotating shaft 4 to drive the rotating shaft to rotate, and the operation member 5 is operatively connected to the intermittent motion mechanism. The intermittent motion mechanism comprises a ratchet wheel-ratchet pawl mechanism. In some embodiments, the ratchet wheel-ratchet pawl mechanism comprises a ratchet wheel 51 fixedly disposed on an extended portion of the rotating shaft extending out of the upper side of the fixed portion, a ratchet pawl 52, and a sliding base 53. An end of the ratchet pawl 52 is rotatably connected to the fixed portion 1, such as a top surface of the fixed base 1. A tail end of the pawl 52 is configured to abut ratchet teeth of the ratchet wheel 51. The sliding base 53 is configured to slide relative to the fixed portion 1, for example, the sliding base 53 is slidably connected to the fixed base. A head end of the sliding base 53 abuts a middle portion of the ratchet pawl to enable the ratchet pawl to move, and the tail end of the ratchet pawl abuts the ratchet teeth of the ratchet wheel 51 to drive the ratchet wheel 51 to rotate forward to a predetermined angle. The operation member 5 is swingably connected to the fixed base (as required, the operation member 5 is slidably connected to the fixed base). The operation member 5 is operatively connected to the sliding base 53 to drive the sliding base to slide. As required, further comprises a buckle cover 152. The buckle cover is configured to be disposed on the fixed portion, such as the fixed base. A cover plate of the buckle cover is disposed above the ratchet wheel to prevent the ratchet wheel, the ratchet pawl, etc. separating from the fixed portion. The operation member is, for example, a dial, a button, etc. As required, further comprises a swing base 54 swingably

connected to the fixed base. A first end of the swing base 54 abuts the operation member, a second end abuts the sliding base. An elastic body is disposed between the sliding base and the fixed base to reset the sliding base.

[0038] This embodiment is an application of the water outlet mechanism with the adjustable water outlet area of a hand shower, the shower further comprises a rear cover 16, the rear cover 16 is fixedly connected to or defines a hand-held portion 161, the rear cover 16 is fixedly connected to the water outlet cover 12. The connecting base, the fixed base, and the like are disposed between the rear cover and the water outlet cover. A water inlet joint 162 is disposed in the hand-held portion. The water inlet joint 162 is in communication with the water outlet passage 151, and the operation member 5 is disposed between the water outlet cover and the hand-held portion.

[0039] The operation member 5 is pressed to drive the swing base 54 to swing, then drive the sliding base 53 to slide, then abut the ratchet pawl 52 to move, the ratchet pawl 52 abuts the ratchet wheel 51 to enable the ratchet wheel 51 to rotate at a predetermined angle, then drive the rotating shaft 4 to rotate, and the convex shaft 41 of the rotating shaft 4 drives the movable plate 2 and the guide block 22 to move as a whole in the up-and-down direction. A cooperation of the steps and the fitting portions drive the one or more water outlet nozzle 3 to swing relative to the water outlet cover, and angles of the one or more water outlet nozzles changes to change water outlet angle and water outlet area. When is released, the swing base, the sliding base, and the operation member is reset.

[0040] In embodiment 2, embodiment differs from embodiment 1 in that: further comprises a stop claw, a first end of the stop claw is rotatably connected to the fixed base, and a second end is configured to abut the ratchet teeth of the ratchet wheel to keep the ratchet wheel in a position when the ratchet wheel is rotated to the position.

[0041] In embodiment 3, embodiment 3 differs from embodiment 2 in that: the ratchet pawl is fixedly connected to the sliding base, and the ratchet pawl is configured to abut the ratchet teeth of the ratchet wheel. The button is pressed to drive the ratchet pawl to move to a left direction (when the ratchet pawl moves in the left direction, resulting upward deformation). The ratchet pawl drives the ratchet wheel to rotate in a counterclockwise direction, and the rotating block is fixedly connected to the ratchet wheel. Therefore, the rotating block also rotates in the counterclockwise direction to achieve functional switching. The pawl ratchet is reset under a force of a reset spring (when the ratchet pawl moves in the left direction, resulting the upward deformation), and the ratchet wheel does not move due to an action of the stop claw to achieve an intermittent rotation the ratchet wheel.

[0042] In embodiment 4, embodiment 4 differs from embodiment 1 in that: the intermittent motion mechanism comprises a rack, a first rotating disk, and a second rotating disk. A peripheral wall of the first rotating disk de-

finer gear teeth, the rack is engaged with the first rotating disk. An end surface of the first rotating disk is disposed with first ratchet teeth, an end surface of the second rotating disk is disposed with second ratchet teeth, the first ratchet teeth are engaged with the second ratchet teeth to define a clutch (an engaged state and a disengaged state). For example, the rack is fixedly disposed on the sliding base, the rack rotates forward to drive the first rotating disk to move in the counterclockwise direction, the clutch is in the engaged state, the second rotating disk is driven to move in the counterclockwise direction. After releasing the hand, under an elastic force of a second elastic body, the rack moves in a reverse direction to be reset, to drive the first rotating disk to move in a clockwise direction, the clutch is inactive, and the first rotating disk is idling.

[0043] In embodiment 5, embodiment 5 differs from embodiment 4 in that: the intermittent motion mechanism comprises a pushing rod, a first rotating disk, and a second rotating disk. The pushing rod cooperates the first rotating disk to drive the first rotating disk to rotate through the pushing rod. An end face of the first rotating disk is disposed with first ratchet teeth, an end face of the second rotating disk is disposed with second ratchet teeth, the first ratchet teeth are engaged with the second ratchet teeth. In this embodiment, a first end of the pushing rod is rotatably connected to the sliding base, and a second end is rotatably connected to the first rotating disk. The sliding base moves to drive the first rotating disk to rotate in the counterclockwise direction through the pushing rod, to drive the second rotating disk to rotate in the counterclockwise direction. When the pushing rod is reset, the first rotating disk is idling.

[0044] The water outlet mechanism with the adjustable water outlet area of the present disclosure can be used as a hand shower, a top shower, a kitchen shower, and other water outlet devices.

[0045] It will be apparent to those skilled in the art that various modifications and variations can be made in the present disclosure without departing from the spirit or scope of the disclosure. Thus, it is intended that the present disclosure cover the modifications and variations of this disclosure provided they come within the scope of the appended claims and their equivalents.

INDUSTRIAL APPLICABILITY

[0046] The present disclosure discloses a water outlet mechanism with an adjustable water outlet area. The movable plate is configured to be movably connected to an inner side of the fixed portion in an up-and-down direction. The movable plate is operatively connected to the one or more water outlet nozzles, and the movable plate moves in the up-and-down direction to drive the one or more water outlet nozzles to swing to change water outlet angles of the one or more water outlet nozzles to adjust water outlet area. It can not only change a water outlet angle of the water outlet nozzle, but also adjust the

water outlet area to meet different needs of shower scopes from different family members, and meet different needs of shower scopes in different shower scenarios. The application range is wide. The industrial applicability is good.

Claims

1. A water outlet mechanism with an adjustable water outlet area, comprising:

a fixed portion (1) and
a movable plate (2) disposed in the fixed portion (1), **characterized in that**

the fixed portion (1) comprises a water outlet cavity (11) and a water outlet cover (12), the water outlet cover (12) comprises a plurality of through holes (121) penetrating through a front surface to a back surface, the through holes (121) are disposed with one or more water outlet nozzles (3) and first ends of the one or more water outlet nozzles (3) are configured to be connected to the water outlet cavity (11), the one or more water outlet nozzles (3) are configured to be swingably connected to the water outlet cover (12), the one or more water outlet nozzles (3) are partially disposed in the through holes (121), the movable plate (2) is configured to be connected to an inner side of the fixed portion (1) and wherein the movable plate (2) is configured to be movable in an up-and-down direction, the movable plate (2) is operatively connected to the one or more water outlet nozzles (3), the movable plate (2) moves in the up-and-down direction to drive the one or more water outlet nozzles (3) to swing to change water outlet angles of the one or more water outlet nozzles (3) to adjust water outlet area.

2. The water outlet mechanism with the adjustable water outlet area according to claim 1, **characterized in that**

the water outlet cover (12) comprises a middle portion, the plurality of through holes (121) surrounds the middle portion, and ends of the one or more water outlet nozzles are close to or away from the middle portion to define swing directions of the one or more water outlet nozzles (3) relative to the water outlet cover (12).

3. The water outlet mechanism with the adjustable water outlet area according to claim 2, **characterized in that** the middle portion is a center line of the water outlet cover (12).
4. The water outlet mechanism with the adjustable water outlet area according to claim 1, **characterized in that** a gap is disposed between each of outer walls of the one or more water outlet nozzle (3) and a corresponding one of inner walls of the through holes to provide space for a corresponding one of the one or more water outlet nozzles (3) to swing, and the gap is disposed with an elastic seal ring (13).
5. The water outlet mechanism with the adjustable water outlet area according to claim 1, **characterized in that** each of the one or more water outlet nozzles (3) comprises a nozzle (31) and a connection portion (32) fixedly disposed on the nozzle (31), each of the one or more water outlet nozzles (3) comprises a water hole passing through an end surface of the corresponding one of the connection portions (32) and a bottom surface of the nozzle (31) and wherein the water hole is connected to the water outlet cavity (11), the connection portions (32) each extends outward to define a swing shaft (34), the through holes (3) of the water outlet cover (12) swingably connected to the one or more water outlet nozzles are disposed with peripheral walls (122). a rear surface of the water outlet cover extends outward to define the peripheral walls (122), each of the peripheral walls (122) surrounds the corresponding one of the through holes (3), the swing shafts (34) each is rotatably connected to a corresponding one of the peripheral walls (122), and the nozzles (31) each is disposed in a corresponding one of the plurality of through holes (121).
6. The water outlet mechanism with the adjustable water outlet area according to claim 5, **characterized in that** the connection portions (32) each extends outward to define a fitting portion, the movable plate (2) comprises one or more fitting holes (21) penetrating in the up-and-down direction, the connection portions (32) each passes through a corresponding one of the one or more fitting holes (21) in an upward direction, the fitting portions about the movable plate (2), and the movable plate (2) moves in the up-and-down direction to drive the one or more water outlet nozzles (3) to swing through the fitting portions.
7. The water outlet mechanism with the adjustable water outlet area according to claim 6, **characterized in that** the fitting portions of the connection portions (32) each comprises an upper fitting portion (322) and a lower fitting portion (323) disposed at intervals in the up-and-down direction, the upper fitting portions (322) are configured to cooperate with a top surface of the movable plate (2), and the lower fitting portions (323) are configured to cooperate with a bottom surface of the movable plate (2).
8. The water outlet mechanism with the adjustable water outlet area according to claim 7, **characterized in that** hole walls of the one or more fitting holes (21) are disposed with one or more abutting steps (211), the upper fitting portions (322) cooperate with top surfaces of the one or more abutting steps (211), and the lower fitting portions (323) cooperate with bottom surfaces of the one or more abutting steps (211).
9. The water outlet mechanism with the adjustable water outlet area according to claim 6, **characterized in that** both sides of the connection portion (32) extend outward to define the fitting portion, and each of the one or more fitting holes (21) comprises a cross structure.
10. The water outlet mechanism with the adjustable water outlet area according to claim 9, **characterized in that** each of the one or more fitting holes (21) comprises an inner-outer hole disposed along an inner-outer direction and a left-right hole disposed along a left-right direction, the inner-outer hole cooperate with the left-right hole to define the cross structure, the inner-outer hole comprise an inner hole portion, a hole wall of the inner hole portion protrudes inward to define an abutting step (211), top surfaces of the abutting steps (211) each cooperates to a corresponding one of the upper fitting portions (322), and bottom surfaces of the abutting steps (211) each cooperates to a corresponding one of the lower fitting portions (323).
11. The water outlet mechanism with the adjustable water outlet area according to any one of claims 1 to 10, **characterized in that** the fixed portion (1) is rotatably connected to a rotating shaft (4), the rotating shaft (4) is operatively connected to the movable plate (2), and the rotating shaft (4) rotates to drive the movable

plate (2) to move in the up-and-down direction.

12. The water outlet mechanism with the adjustable water outlet area according to claim 11, **characterized in that**
 - the rotating shaft (4) extends outward to define a convex shaft (41),
 - an inner side of the fixed portion (1) further comprises a guide block (22),
 - the movable plate (2) is relatively fixedly connected to the guide block (22),
 - a track portion (23) is defined between the movable plate (2) and the guide block (22),
 - a height of a circumferential direction of the track portion (23) changes, and
 - the convex shaft (41) cooperates with the track portion (23).
13. The water outlet mechanism with the adjustable water outlet area according to claim 12, **characterized in that** the height of the circumferential direction of the track portion (23) changes gradually.
14. The water outlet mechanism with the adjustable water outlet area according to claim 12, **characterized in that**
 - the track portion (23) comprises at least two positioning steps (231), and
 - a guide surface is connected to each two adjacent positioning steps (231).
15. The water outlet mechanism with the adjustable water outlet area according to claim 12, **characterized in that** the movable plate (2) and the guide block (22) surround an outside of the rotating shaft (4).
16. The water outlet mechanism with the adjustable water outlet area according to claim 11, further comprising:
 - a driving mechanism,
 - the driving mechanism comprises an operation member (5) configured to move relative to the fixed portion (1) and an intermittent motion mechanism connected to the fixed portion (1),
 - the intermittent motion mechanism is operatively connected to the rotating shaft (4), and
 - the operation member (5) is operatively connected to the intermittent motion mechanism.
17. The water outlet mechanism with the adjustable water outlet area according to any one of claims 1 to 10, **characterized in that**
 - the fixed portion (1) further comprises a connecting base (14),
 - the connecting base (14) is fixedly connected to the water outlet cover (12) to define the water outlet cavity (11) or a part of the water outlet cavity, and

the movable plate (2) is disposed in the water outlet cavity (11).

18. The water outlet mechanism with the adjustable water outlet area according to claim 17, **characterized in that** the water outlet mechanism with the adjustable water outlet area is a hand shower, a top shower, or a kitchen shower.

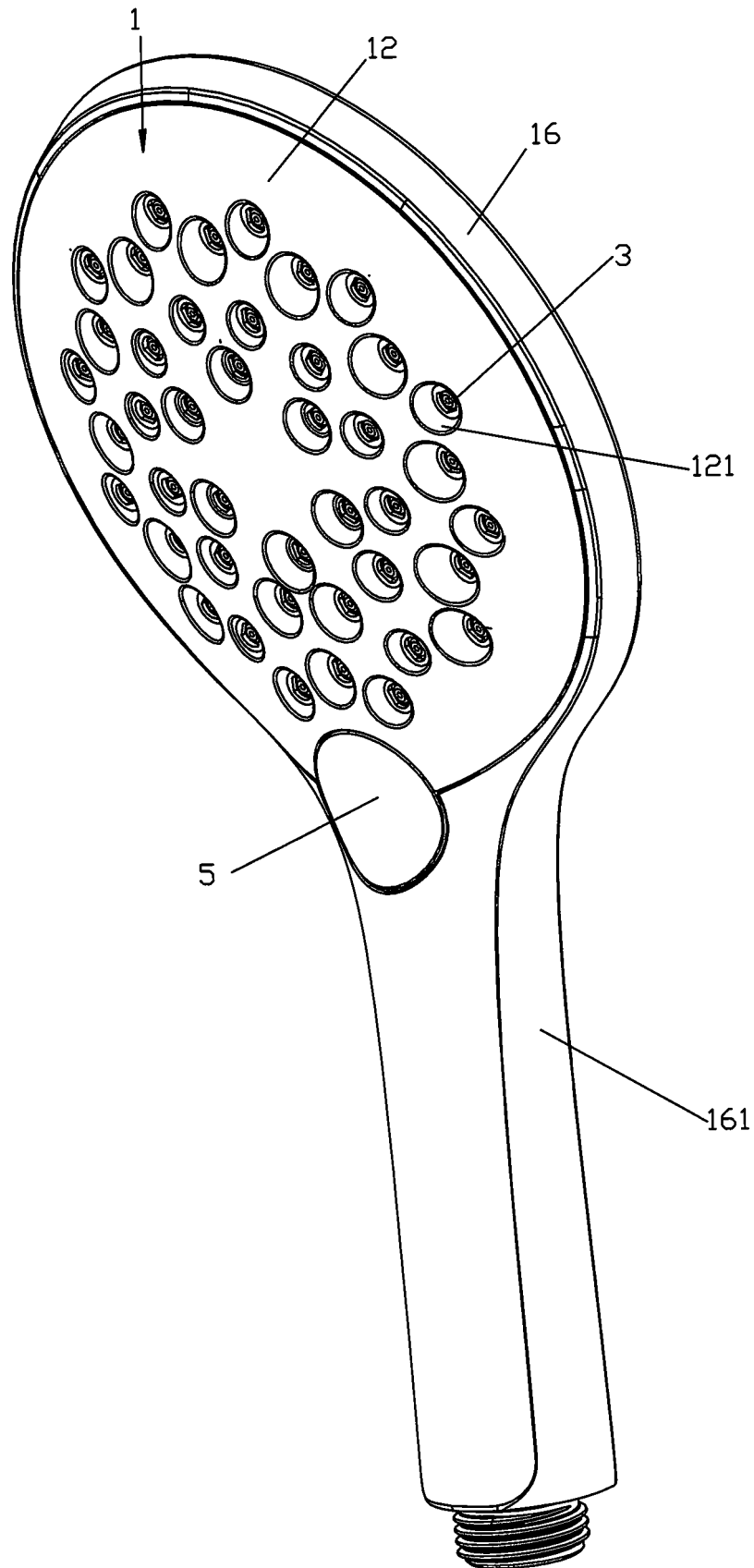


FIG. 1

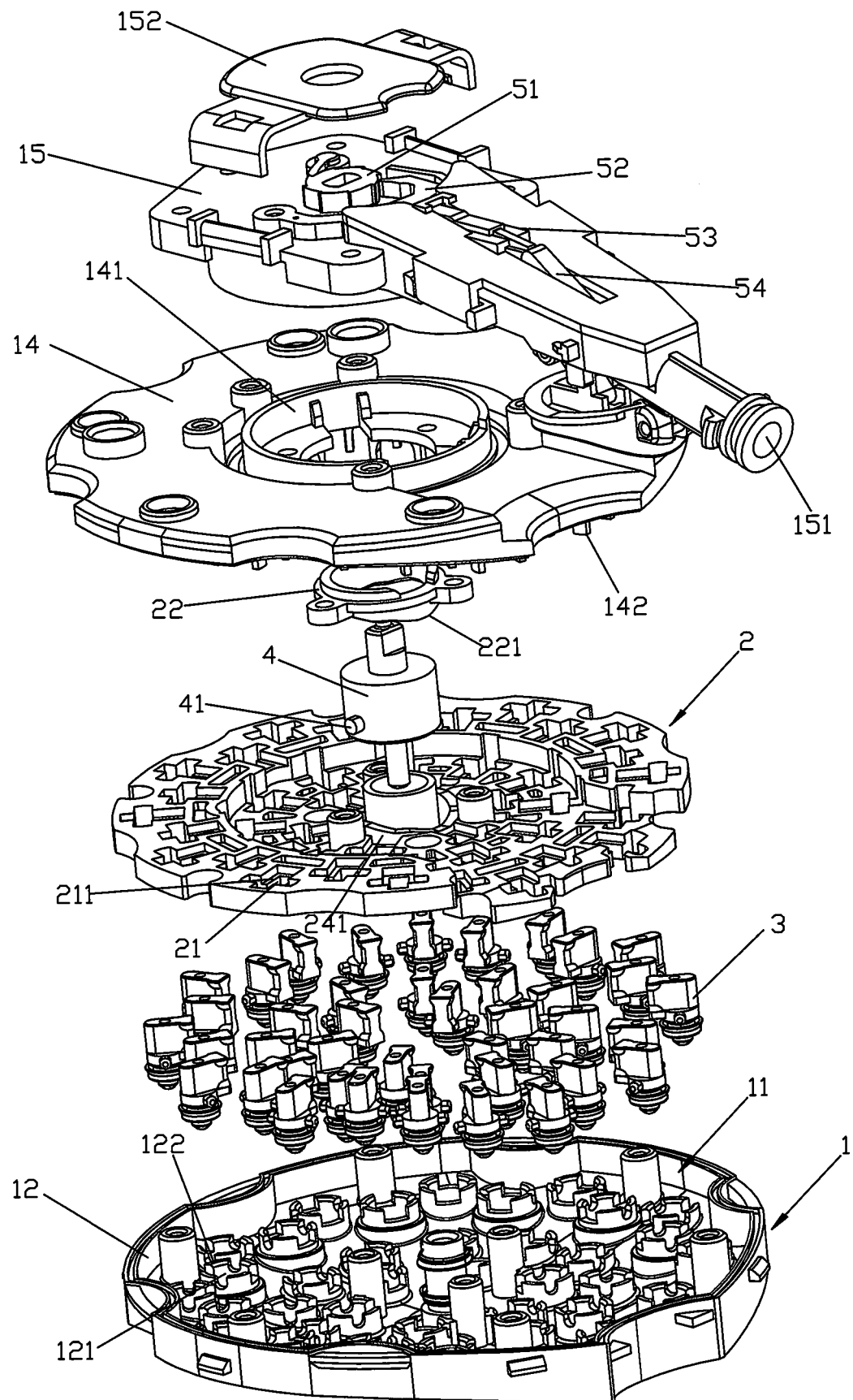


FIG. 2

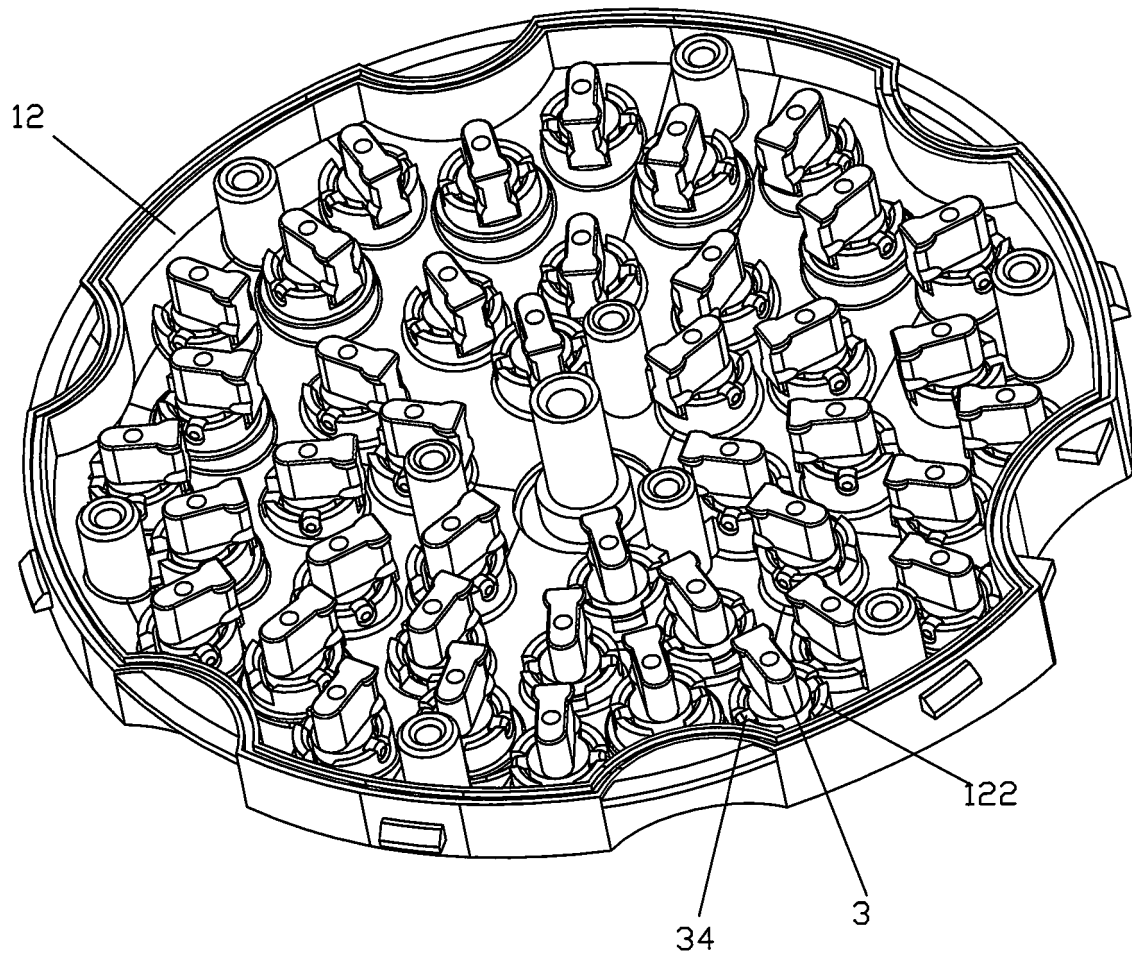
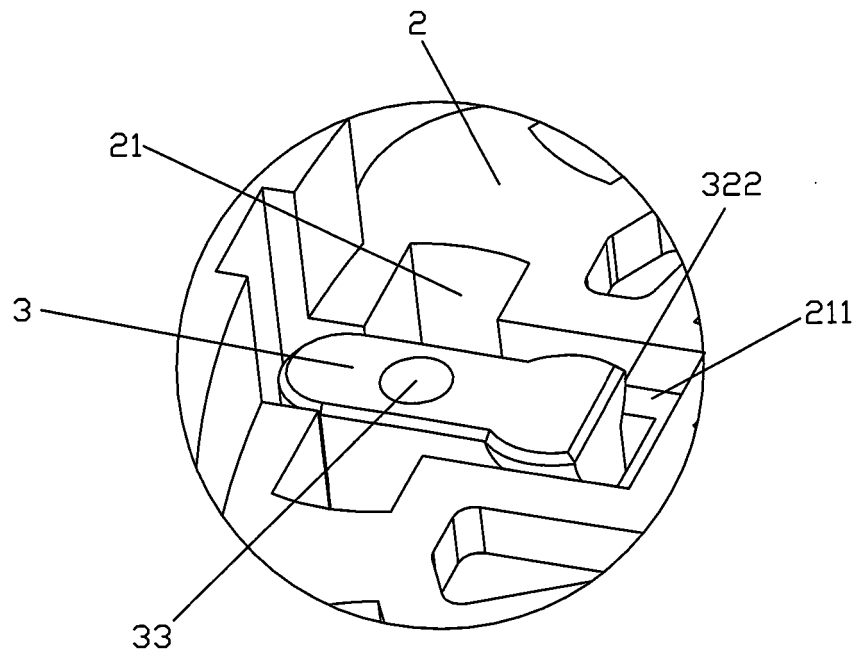
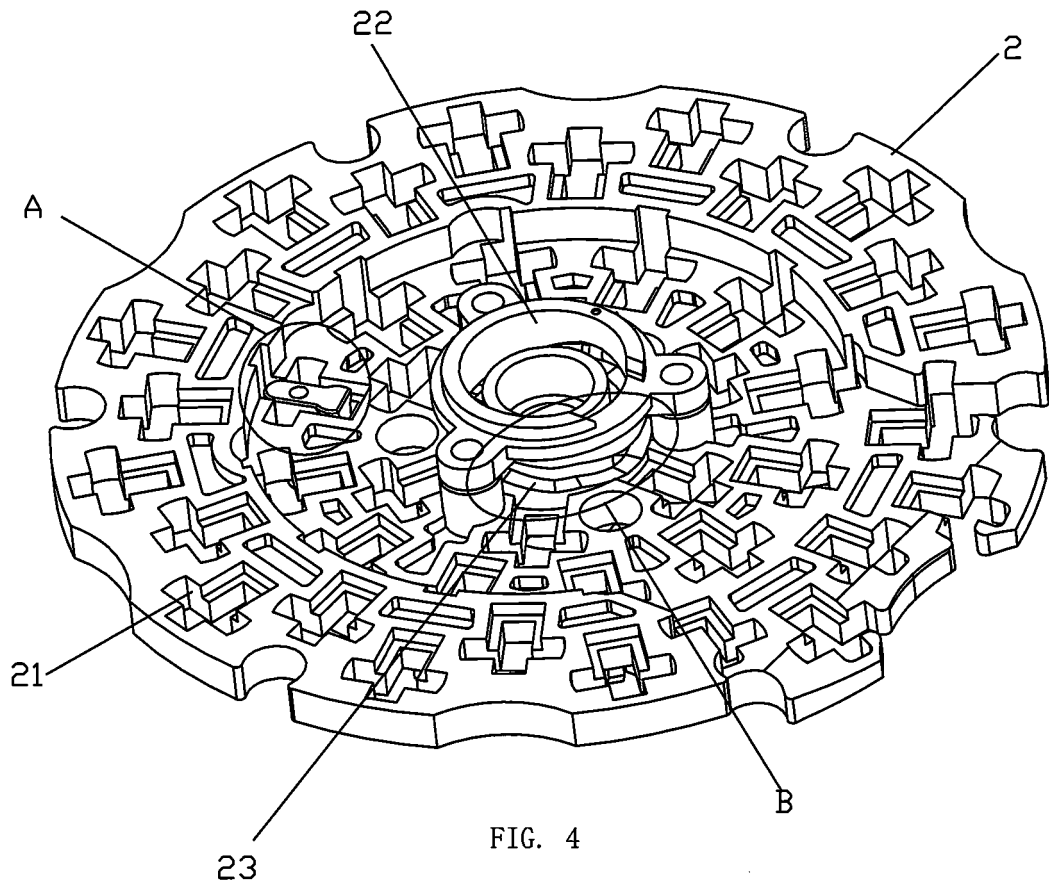


FIG. 3



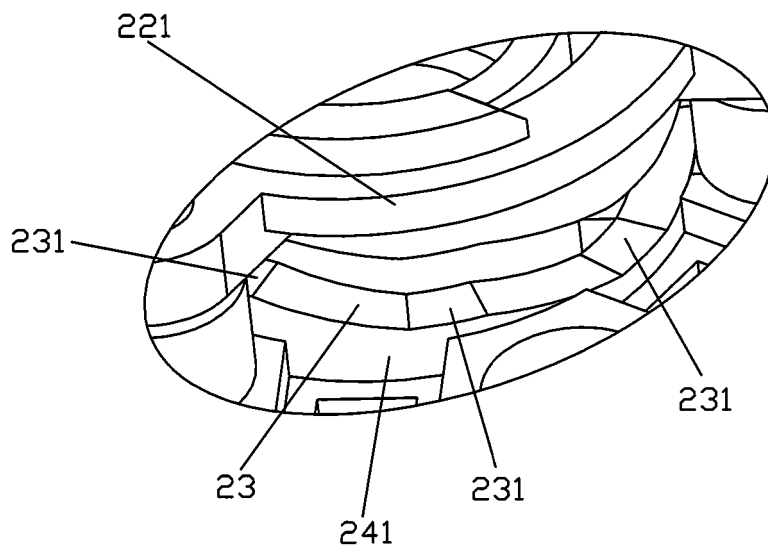


FIG. 5-2

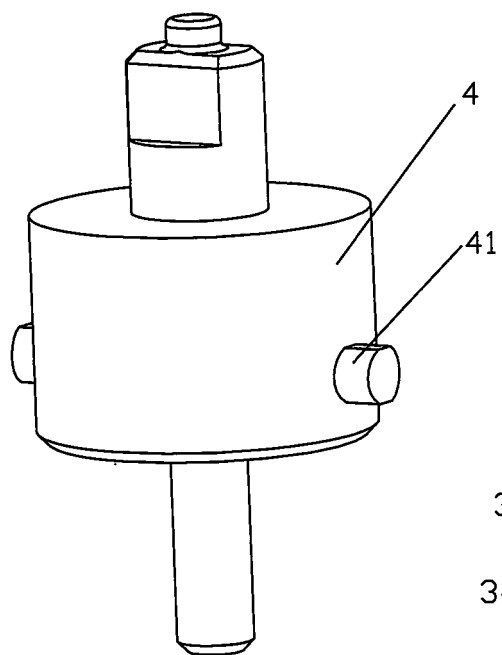


FIG. 6

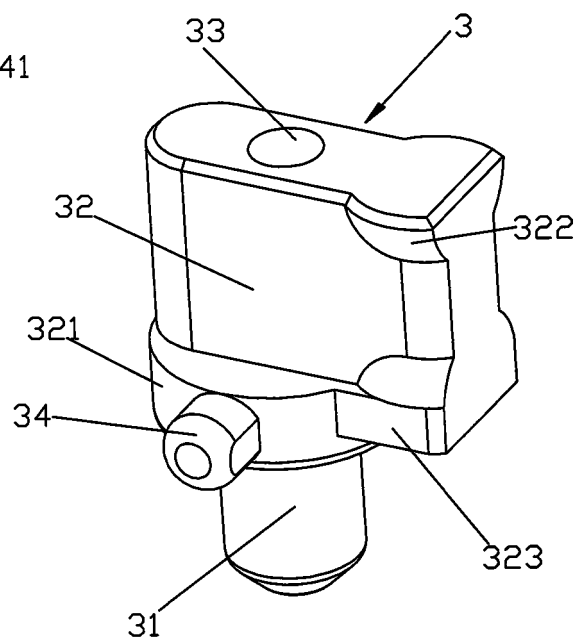


FIG. 7

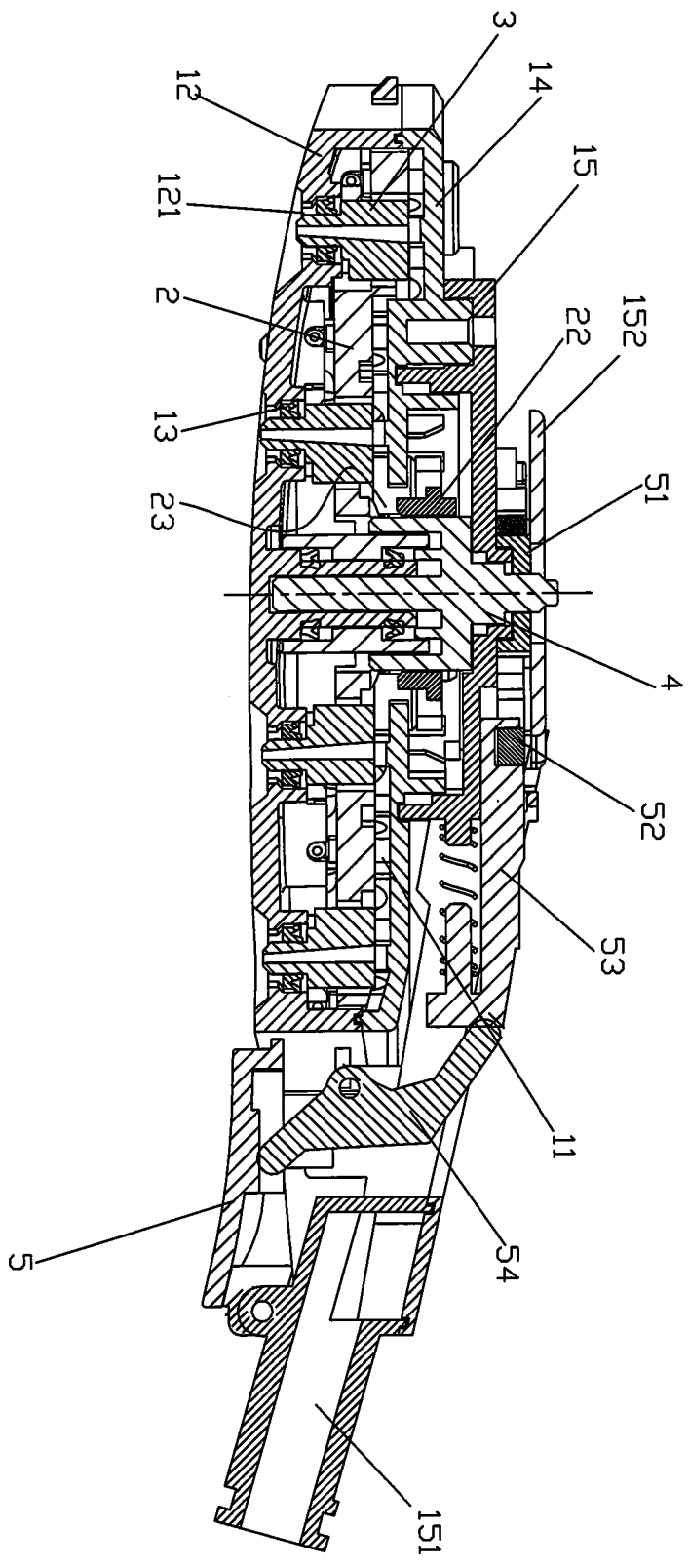


FIG. 8

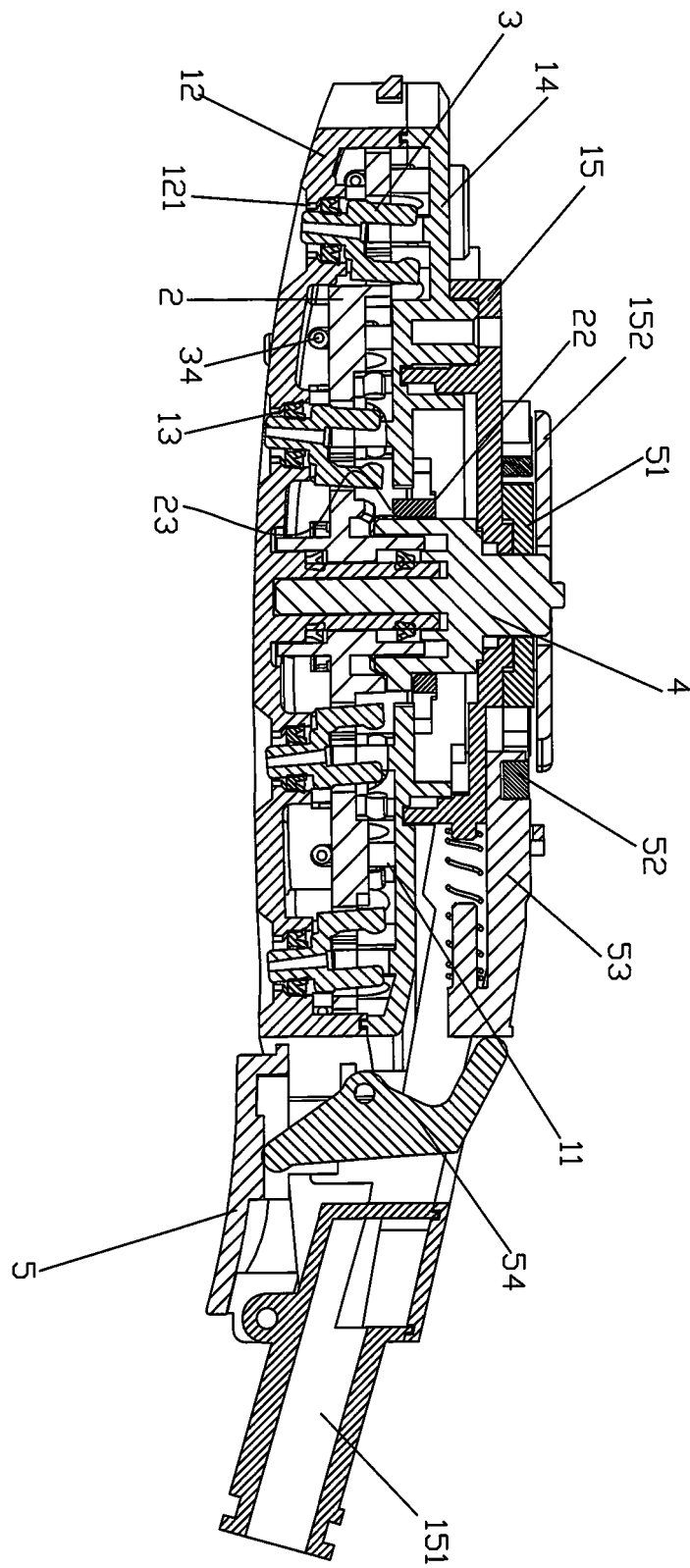


FIG. 9

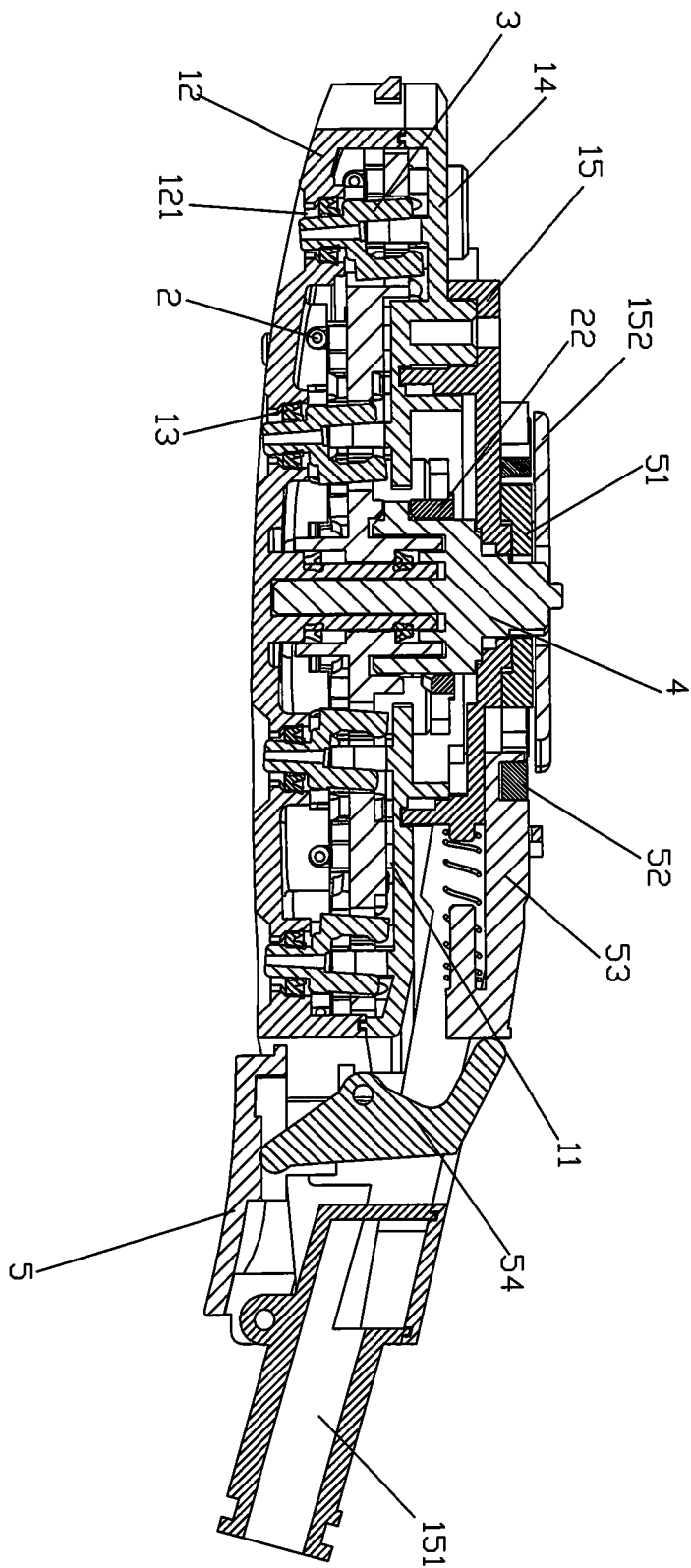


FIG. 10

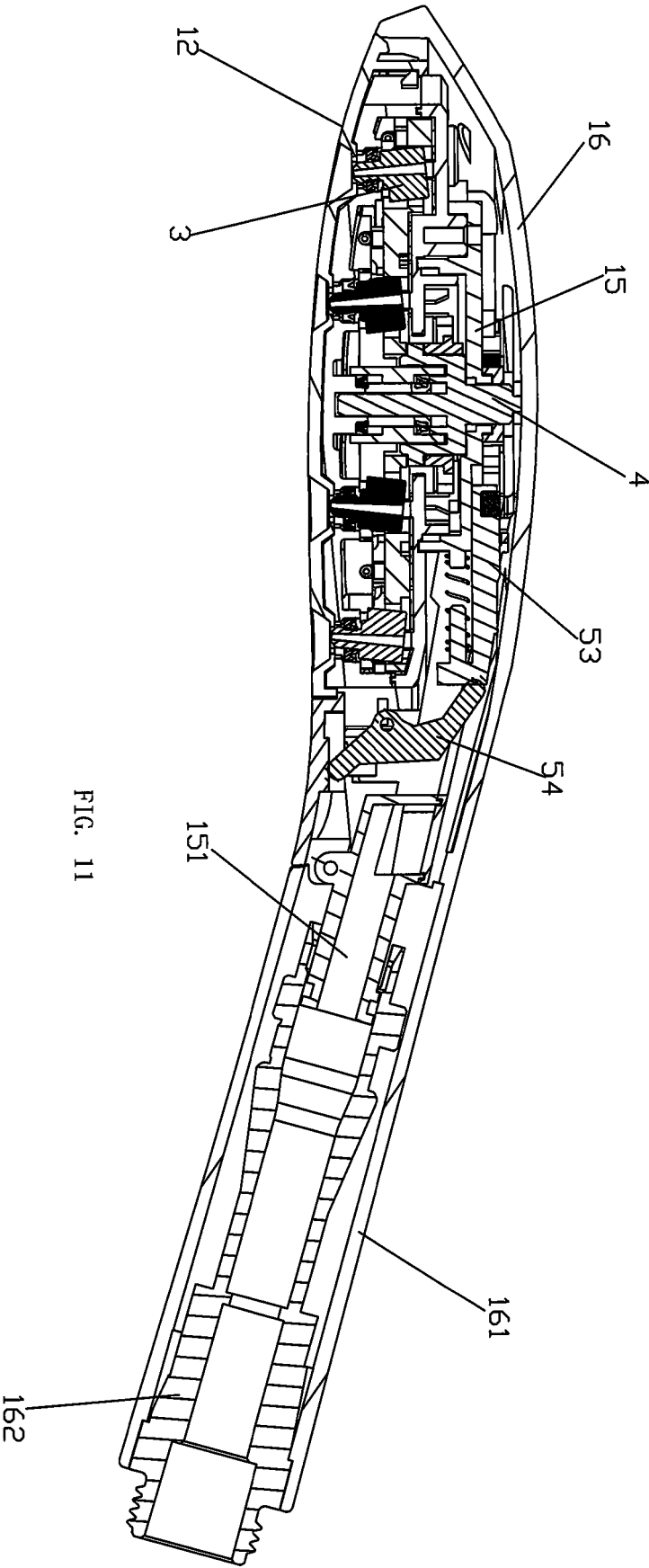


FIG. 11

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2018/106639

A. CLASSIFICATION OF SUBJECT MATTER B05B 1/18(2006.01)i; B05B 1/12(2006.01)i; B05B 3/08(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) B05B 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) CNKI; VEN; CNABS: 面积, 喷嘴, 喷头, 水嘴, 摆动, 角度, swing+, sway+, reciprocate+, angle																					
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>PX</td> <td>CN 207857158 U (XIAMEN SOLEX HIGH-TECH INDUSTRIES CO., LTD.) 14 September 2018 (2018-09-14) claims 1-17, description, paragraphs [0042]-[0055], and figures 1-11</td> <td>1-18</td> </tr> <tr> <td>A</td> <td>CN 106607194 A (XINCHANG COUNTY SHUANGCAI TOWNSHIP HEHONG HARDWARE FACTORY) 03 May 2017 (2017-05-03) description, paragraphs [0041]-[0050], and figures 6-1 and 7-1</td> <td>1-18</td> </tr> <tr> <td>A</td> <td>CN 201949945 U (QUANZHOU JOMOO SANITARY WARE CO., LTD.) 31 August 2011 (2011-08-31) entire document</td> <td>1-18</td> </tr> <tr> <td>A</td> <td>CN 106378270 A (XIAMEN RUNNER INDUSTRIAL CORPORATION) 08 February 2017 (2017-02-08) entire document</td> <td>1-18</td> </tr> <tr> <td>A</td> <td>CN 205731687 U (XIAMEN EASO CO., LTD.) 30 November 2016 (2016-11-30) entire document</td> <td>1-18</td> </tr> <tr> <td>A</td> <td>US 8985483 B2 (PETROVIC JOHN E) 24 March 2015 (2015-03-24) entire document</td> <td>1-18</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	PX	CN 207857158 U (XIAMEN SOLEX HIGH-TECH INDUSTRIES CO., LTD.) 14 September 2018 (2018-09-14) claims 1-17, description, paragraphs [0042]-[0055], and figures 1-11	1-18	A	CN 106607194 A (XINCHANG COUNTY SHUANGCAI TOWNSHIP HEHONG HARDWARE FACTORY) 03 May 2017 (2017-05-03) description, paragraphs [0041]-[0050], and figures 6-1 and 7-1	1-18	A	CN 201949945 U (QUANZHOU JOMOO SANITARY WARE CO., LTD.) 31 August 2011 (2011-08-31) entire document	1-18	A	CN 106378270 A (XIAMEN RUNNER INDUSTRIAL CORPORATION) 08 February 2017 (2017-02-08) entire document	1-18	A	CN 205731687 U (XIAMEN EASO CO., LTD.) 30 November 2016 (2016-11-30) entire document	1-18	A	US 8985483 B2 (PETROVIC JOHN E) 24 March 2015 (2015-03-24) entire document	1-18
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.																			
PX	CN 207857158 U (XIAMEN SOLEX HIGH-TECH INDUSTRIES CO., LTD.) 14 September 2018 (2018-09-14) claims 1-17, description, paragraphs [0042]-[0055], and figures 1-11	1-18																			
A	CN 106607194 A (XINCHANG COUNTY SHUANGCAI TOWNSHIP HEHONG HARDWARE FACTORY) 03 May 2017 (2017-05-03) description, paragraphs [0041]-[0050], and figures 6-1 and 7-1	1-18																			
A	CN 201949945 U (QUANZHOU JOMOO SANITARY WARE CO., LTD.) 31 August 2011 (2011-08-31) entire document	1-18																			
A	CN 106378270 A (XIAMEN RUNNER INDUSTRIAL CORPORATION) 08 February 2017 (2017-02-08) entire document	1-18																			
A	CN 205731687 U (XIAMEN EASO CO., LTD.) 30 November 2016 (2016-11-30) entire document	1-18																			
A	US 8985483 B2 (PETROVIC JOHN E) 24 March 2015 (2015-03-24) entire document	1-18																			
☐ 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 16 November 2018	Date of mailing of the international search report 12 December 2018																				
Name and mailing address of the ISA/CN State Intellectual Property Office of the P. R. China (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/CN2018/106639

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 207857158 U	14 September 2018	None	
CN 106607194 A	03 May 2017	None	
CN 201949945 U	31 August 2011	None	
CN 106378270 A	08 February 2017	None	
CN 205731687 U	30 November 2016	None	
US 8985483 B2	24 March 2015	US 2013186972 A1	25 July 2013

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

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- CN 204646766 U [0002]