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(54) SHOWER WHICH CAN PRODUCE DIFFERENT SPRAYS FROM SAME WATER OUTFLOW PORT

(57) The invention discloses a shower which can produce different sprays from same water outflow port, comprising a fixing assembly with a water outlet chamber, a movable part, an operating member and a driving mechanism, the fixing assembly is provided with a cover assembly which is provided with a plurality of water outflow ports that can fluidly connect the water outlet chamber. The operating member is connected to the movable part in a transmission way and the operating member can drive the movable part to switch among at least three control positions, when the movable part is located in different control positions, different spray patterns will be produced. The same water outflow port of the shower can deliver at least three sprays, and the same water outflow port can deliver different particle sprays, which can meet the needs of different populations for particle sprays.

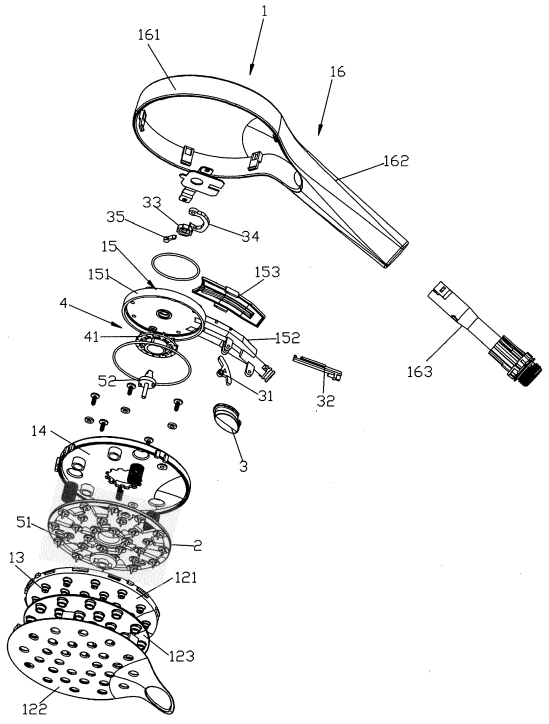

FIG. 2

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Description

Technical field

[0001] The invention relates to a shower, in particular to a shower which can produce different sprays from same water outflow port.

Background Art

[0002] Traditional shower, comprises a fixing assembly, the fixing assembly is provided with a water outlet chamber and a plurality of water-separation chambers, a switching mechanism is provided between the plurality of water-separation chambers and the water outlet chamber; the fixing assembly is provided with a cover assembly, the cover assembly is provided with a plurality of water outflow ports that can fluidly connect the water outlet chamber, all water outflow ports are divided into a plurality of regions, which correspond one by one to the plurality of water-separation chambers. Generally, different water outlet chambers produce different spray patterns. The different water-separation chambers are fluidly connected to the water outlet chamber by switching the switching mechanism, and the water outflow ports of the corresponding regions of the water-separation chamber deliver water to realize the switching of the effluent function. It has the following shortcomings: firstly, a water outlet chamber, a plurality of water-separation chambers and a switching mechanism are provided, which results in a complex internal structure; secondly, different spray patterns come out from the water outflow ports corresponding to different regions; only the water outflow ports of the corresponding region deliver water, while the water outflow ports in other regions does not deliver water, the area of delivering water is small.

Summary of the invention

[0003] The present invention provides a shower which can produce different sprays from same water outflow port, which overcomes the shortcomings of the shower in background art.

[0004] The first technical scheme adopted by the invention to solve the technical problems is:

A shower which can produce different sprays from same water outflow port, comprises a fixing assembly with a water outlet chamber, the fixing assembly is provided with a cover assembly, the cover assembly is provided with a plurality of water outflow ports that can fluidly connect the water outlet chamber; the shower further comprises a movable part, an operating member and a driving mechanism; the movable part is movably disposed in the fixing assembly and comprises a movable plate , and the movable plate is provided with a plurality of convex parts protruding from the movable plate, the driving mechanism is connected to the movable part and drives the movable part to do cyclic repetitive motion; the operating member is connected to the movable part in a transmission way and the operating member can drive the movable part to switch among at least three control positions, the distance between the movable part in different control positions and the cover assembly are difference, and when the movable part move to at least one of three control positions, the convex parts are inserted into the water outflow ports; when the movable part is in different control positions, different spray patterns will be produced.

[0005] A plurality of surrounding walls are disposed fixedly on the bottom surface of the movable part, and the surrounding walls surround the convex parts, and the surrounding walls are provided with a plurality of inclined openings penetrating the inside and outside of the surrounding walls; there are three control positions: high control, middle control and low control, the distance between the movable part and the cover assembly is the largest when the movable part is located in the high control position, the distance between the movable part and the cover assembly is the smallest when the movable part is located in the low control position, the surrounding walls of low control position abut against the rear of cover assembly and the convex parts are inserted into the water outflow ports.

[0006] A plurality of surrounding walls are disposed fixedly on the bottom surface of the movable part, and the surrounding walls surround the convex parts, and the surrounding walls are provided with a plurality of inclined openings penetrating the inside and outside of the surrounding walls; there are three control positions: high control position, middle control position and low control position, the distance between the movable part and the cover assembly is the largest when the movable part is located in the high control position, the distance between the movable part and the cover assembly is the smallest when the movable part is located in the low control position, whether the movable part and the cover assembly is cooperated or not is controlled by locating the movable part in the high control position and the middle control position, when the movable part is located in the middle control position, the movable part cooperates with the cover assembly, and the water flow entering the interior of the surrounding walls from the inclined openings cooperates with the water flow entering from the water outflow ports to deliver a fluttering spray.

[0007] The shower further comprises a transmission mechanism, which is connected to the operating member and the movable part in a transmission way, and the operating member controls the movable part to switch among the control positions.

[0008] The transmission mechanism comprises a sliding seat which can be controlled by the operating member to slide, the sliding seat can be slidably connected to the fixing assembly in a direction away from or in proximity to the cover assembly, the sliding seat is connected to the movable part in a transmission way to drive the movable part to switch among the control positions by the

sliding of the sliding seat.

[0009] The transmission mechanism comprises a rotating part, the rotating part can rotationally connect to the fixing assembly, and the operating member is connected to the rotating part in a transmission way to drive the rotating part to rotate; the end surface of the sliding seat is provided fixedly with an annular wall around the axis of the rotating part, the end surface of the annular wall is provided with a plurality of switching surfaces with different heights relative to the end surface of the sliding seat, a guiding surface is arranged between the adjacent switching surfaces, an abutting rod parallel to the axis of the rotating part is disposed under the rotating part, the end of the abutting rod abuts against the end surface of the annular wall, so that the rotating of the rotating part can drive the sliding part to slide.

[0010] The shower comprises an elastic body, which is abutted between the sliding seat and the rear of the cover assembly.

[0011] The central angles of the plurality of switching surfaces are equal, a guiding surface is provided between each two adjacent switching surfaces, the guiding surfaces are helical and the central angles of the plurality of the guiding surfaces are equal.

[0012] The transmission mechanism further comprises a stepping mechanism, which is connected between the operating member and the rotating part in a transmission way, and the stepping mechanism drives the rotating part to rotate a predetermined angle through each movement of the operating member.

[0013] The stepping mechanism comprises a ratchet pawl mechanism, a swing shaft and a pushing rod, the ratchet pawl mechanism is connected to the rotating part in a transmission way to drive the rotating part to rotate, the swing shaft is swingably connected to the fixing assembly, and the pushing rod is slidably connected to the fixing assembly, the operating member is connected to one end of the swing shaft in a transmission way and the other end of the swing shaft abuts against the pushing rod, the pushing rod is connected to the ratchet pawl mechanism in a transmission way to drive the ratchet pawl mechanism.

[0014] The movable plate is provided with a through hole, and the sliding seat is between the movable plate and the cover assembly, and abuts against the movable plate, the annular wall is disposed in the through hole, and the abutting rod passes through the through hole and abuts against the end surface of the annular wall.

[0015] The transmission mechanism comprises a rotating part , the rotating part can rotationally connect to the fixing assembly, and the operating member is connected to the rotating part in a transmission way to drive the rotating part to rotate; the end surface of the movable is provided fixedly with an annular wall around the axis of the rotating part, the end surface of the annular wall is provided with a plurality of switching surfaces with different heights relative to the end surface of the sliding seat, a guiding surface is arranged between the adjacent switching surfaces, under the rotating part, an abutting rod parallel to the axis of the rotating part is disposed under the rotating part, the end of the abutting rod abuts against the end surface of the annular wall, so that the rotating of the rotating part can drive the movable plate to slide.

[0016] The shower comprises an elastic body, which is abutted between the movable and the rear of the cover assembly.

[0017] The cyclic repetitive motion of the movable part comprises at least that the middle line of the movable part moves circularly around its eccentric position, and the convex parts rotate relative to the center line of the water outflow ports.

[0018] The convex parts are conical structure with a large head and a small tail.

[0019] The driving mechanism comprises a driving part which can rotate under the action of water flow, the driving part is connected to the movable part in a transmission way so that the movable part in at least one of the control positions can do cyclic repetitive motion.

[0020] The shower further comprises a control mechanism, which cooperates with the sliding seat and the driving mechanism, makes the driving mechanism and the sliding seat to be in the engagement state in at least one of the control positions to stop the driving mechanism to drive, and to be in the disengagement state in at least one of the control positions.

[0021] The sliding seat is provided with the first gear on the slide seat, the driving mechanism is provided with the second gear, whether the first gear and the second gear mesh or not is controlled through the sliding of the sliding seat, and whether the first gear and the second gear mesh or not control the control mechanism to be in the engagement or the disengagement state.

[0022] The shower further comprises a control mechanism, which cooperates with the movable part and the driving mechanism, the control mechanism makes the driving mechanism and the movable part to be in the engagement state in at least one of the control positions so that the driving mechanism can drive the movable part to move, and to be in the disengagement state in at least one of the control positions to make the driving mechanism idle.

[0023] The shower further comprises a control mechanism, which cooperates with the fixing assembly and the driving mechanism, makes the driving mechanism and the fixing assembly to be in the engagement state in at least one of the control positions to stop the driving mechanism to drive, and to be in the disengagement state in at least one of the control positions.

[0024] There are three control positions: high control, middle control and low control, the distance between the movable part and the cover assembly is the largest when the movable part is located in the high control position, the distance between the movable part and the cover assembly is the smallest when the movable part is located in the low control position, when in the high control

position, the movable part i does not moves, and when in the middle control position and the low control position, the movable part does cyclic repetitive motion .

[0025] The fixing assembly further comprises a rear cover part, the rear cover part and the cover assembly is relatively fixedly connected together in a sealed manner.

[0026] The second technical scheme adopted by the invention to solve its technical problems is:

A shower which can produce different sprays from same water outflow port, comprises a fixing assembly with a water outlet chamber, the fixing assembly is provided with a cover assembly, the cover assembly is provided with a plurality of water outflow ports that can fluidly connect the water outlet chamber; wherein: the shower further comprises a movable part, an operating member, a driving mechanism and a control mechanism; the movable part is movably disposed in the fixing assembly and comprises a movable plate , and the movable plate is provided with a plurality of convex parts protruding from the movable plate; the operating member is connected to the movable part in a transmission way and the operating member can drive the movable part to switch among at least two control positions, the distance between the movable part in different control positions and the cover assembly are difference, and when the movable part move to at least one of three control positions, the convex parts are inserted into the water outflow ports; the control mechanism control the movable part to stop moving in at least one of the control positions, and to do cyclic repetitive motion in other control positions; when the movable part is in different control positions, different spray patterns will be produced.

[0027] The third technical scheme adopted by the invention to solve its technical problems is:

A shower which can produce different sprays from same water outflow port, comprises a fixing assembly with a water outlet chamber, the fixing assembly is provided with a cover assembly, the cover assembly is provided with a plurality of water outflow ports that can fluidly connect the water outlet chamber; wherein: the shower further comprises a movable part, an operating member and a driving mechanism; the movable part is movably disposed in the fixing assembly and comprises a movable plate, and the movable plate is provided with a plurality of convex parts protruding from the movable plate; the operating member is connected to the movable part in a transmission way and the operating member can drive the movable part to switch among at least two control positions , the distance between the movable part in different control positions and the cover assembly are difference, and when the movable part move to at least one of three control positions, the convex parts are inserted into the water outflow ports, and does not move in at least one of the control positions and does cyclic repetitive motion in other control positions. When the movable part is in different control positions, different spray patterns will be produced.

[0028] The forth technical scheme adopted by the invention to solve its technical problems is:

A shower which can produce different sprays from same water outflow port, comprises a fixing assembly with a water outlet chamber, the fixing assembly is provided with a cover assembly, the cover assembly is provided with a plurality of water outflow ports that can fluidly connect the water outlet chamber; wherein: the shower further comprises a movable part, an operating member, a driving mechanism and a control mechanism; the movable part is movably disposed in the fixing assembly and comprises a movable plate , and the movable plate is provided with a plurality of convex parts protruding from the movable plate; the operating member is connected to the movable part in a transmission way and can drive the movable part to switch among at least two control positions , the distance between the movable part in different control positions and the cover assembly are difference, and when the movable part move to at least one of three control positions, the convex parts are inserted into the water outflow ports; the control mechanism is used to control whether the movable part does cyclic repetitive motion or not in at least one of the control positions; Different spray patterns will be produced when it is in different control positions and whether the movable part moves or not in at least one of the control positions.

[0029] Compared with background art, this technical scheme has the following advantages:

The operating member is connected to the movable part and the operating member can drive the movable part to switch among at least three control positions, the distance between the movable part in different control positions and the cover assembly are difference, and when the movable part move to at least one of three control positions, the convex parts are inserted into the water outflow ports, when the moving part is in different control positions, different spray patterns will be produced, the shortcomings of background art can be overcame and the following technical effects are produced: A . a shower, the same water outflow port can deliver at least three sprays, and the same water outflow port delivers different particle sprays, which can meet the needs of different populations; B. the surface cover size can be made smaller, and a kind of water spray has a large effluent area; C. it solves the problem that the multi-function shower sprinkles residual water before the function switching. D. compared with multi-function shower, the same water outflow port delivers different particle sprays, and the full surface cover produces water at the same time under each control position, making the water spray more full.

[0030] The transmission mechanism comprises a sliding seat which can be controlled by the operating member to slide, the sliding seat can be slidably connected to the fixing assembly in a direction away from or in proximity to the cover assembly, the sliding seat is connected to the movable part in a transmission way to drive the movable part to switch among the control positions by the sliding of the sliding seat. The structure is simple and

compact.

[0031] The end surface of the sliding seat is provided fixedly with an annular wall around the axis of the rotating part. The end surface of the annular wall is provided with a plurality of switching surfaces with different heights relative to the end surface of the sliding seat. A guide surface is provided between the adjacent switching surfaces. An abutting rod parallel to the axis of the rotating part is provided under the rotating part. The end of the abutting rod is abuts against the end surface of the annular wall. The sliding seat is driven by rotation of the rotating part. The structure is simple and compact, the switching is convenient and labor-saving.

[0032] The transmission mechanism further comprises a stepping mechanism, which is connected between the operating member and the rotating part in a transmission way, and the stepping mechanism drives the rotating part to rotate a predetermined angle by each movement of the operating member, so as to increase the accuracy and stability of the switching control position.

[0033] The control mechanism control the movable part to stop moving in at least one of the control positions, and to do cyclic repetitive motion in at least one of the control positions; when the movable part is in different control positions, different spray patterns will be produced, and the water spray will be more abundant.

[0034] Different spray patterns will be produced when it is in different control positions and whether the movable part moves or not in at least one of control positions, the water sprays are more abundant.

Drawings

[0035] The present invention is further described in connection with the drawings and specific embodiments.

Fig. 1 is a perspective schematic diagram of the shower according to the specific embodiment.

Fig. 2 is a perspective decomposition diagram of the shower according to the specific embodiment.

Fig. 3 is a schematic diagram of the cooperation of the water outlet cover, the elastic body, the sliding seat and the rotating part of the shower according to the specific embodiments.

Fig. 4 is a perspective schematic diagram of the sliding seat of the shower in the specific embodiment.

Fig. 5 is a perspective schematic diagram of the movable part of the shower according to the specific embodiment.

Fig. 6 is a schematic diagram of the cooperation of the water outlet cover, the elastic body, the sliding seat, the movable part and the driving mechanism of the shower according to the specific embodiment.

Fig. 7 is the first schematic cross-sectional view of the shower according to the specific embodiment, at this time, the movable part of the shower is in a high control position and the shower produces spray.

Fig. 8 is the second schematic cross-sectional view of the shower according to the specific embodiment, at this time, the movable part of the shower is in a middle control position and the shower produces fluttering spray.

Fig. 9 is the third schematic cross-sectional view of the shower according to the specific embodiment, at this time, the movable part of the shower is in a low control position and the shower produces particle spray.

Fig. 10 is an enlarged diagram at A of Fig. 7.

Fig. 11 is an enlarged diagram at B of Fig. 8.

Fig. 12 is an enlarged diagram at C of Fig. 9.

Fig. 13 is an enlarged diagram at D of Fig. 7.

Fig. 14 is an enlarged diagram at E of Fig. 8.

Fig. 15 is an enlarged diagram at F of Fig. 9.

Detailed description

[0036] A shower which can produce different sprays from same water outflow port, please refer to Fig. 1 to Fig. 15, comprises a fixing assembly 1, a movable part 2, an operating member 3 and a driving mechanism 4. The fixing assembly 1 is provided with a water outlet chamber 11 connecting to the water supply.

[0037] The fixing assembly 1 is provided with a cover assembly 12, which is provided with a plurality of water outflow ports 13 fluidly connecting the water outlet chamber 11. The movable part 2 is movably disposed in the fixing assembly 1 and comprises a movable plate 21 and a plurality of convex parts 22 protruding from the bottom surface of the movable plate 21. The driving mechanism 4 is connected to the movable part 2 in a transmission way and can drive the movable part 2 to do cyclic repetitive motion. The cyclic repetitive motion is that the middle line of the movable part 2 (such as its own axis) moves circularly around its eccentric position. The operating member 3 and the movable part 2 are connected in a transmission way, and the operating member 3 can drive the movable part 2 to move among the three control positions. The distance between the movable part 2 in different control positions and the cover assembly 12 are difference. When the movable part 2 moves to at least one of three control positions, the convex parts 22 are inserted into the water outflow ports 13. When the movable part 2 does cyclic repetitive motion s, the convex parts 22 rotate relative to the center line (such as the axis) of the water outflow ports 13. Different spray patterns will be produced when the movable part 2 is in different control positions. In this specific embodiment, three control positions are illustrated as an example, but not as limited as this. Two or more than three control positions can be used as required.

[0038] The bottom surface of movable plate 21 of the movable part 2 is fixedly provided with a plurality of surrounding walls 23, which surround the plurality of convex parts 22 respectively. The surrounding walls 23 are provided with inclined openings 24 penetrating inside and outside of the surrounding walls. Each of the convex parts

22 is a conical structure with a large head and a small tail, such as a needle-shaped structure.

[0039] The three control positions are the high control position, middle control position and low control position, the distance between the movable part 2 and the cover assembly 12 is the largest when the movable part 2 is located in the high control position, the distance between the movable part 2 and the cover assembly 12 is the smallest when the movable part 2 is located in the low control position. Wherein:

1. The movable part 2 is disposed in the high control position, as shown in Fig. 7, Fig. 10 and Fig. 13, at this time, the surrounding walls 23 of movable plate 21 will not interfere with the water outflow ports 13. The water outflow ports 13 deliver common spray. According to the need, the movable part 2 can do cyclic repetitive motion or be stationary at this time. If the movable part 2 needs to be stationary, a control mechanism will be added. The following is illustrated with the control mechanism as an example.
2. The movable part 2 is disposed in the middle control position, as shown in Fig. 8, Fig. 11 and Fig. 14. At this time, the movable plate 21 and the water outflow port13 cooperate, and the movable part 2 does cyclic repetitive motion, the convex parts 22 rotate relative to the midline of the water outflow ports 13. Water flow into the water outflow ports 13 from the top surface of the water outflow ports 13 and the inclined openings 24 of the surrounding walls 23 (water flow from inclined openings 24 into interior of the surrounding walls 23 form vortex around the convex parts 22) simultaneously. Water flow from the top surface of the water outflow ports 13 disturbs the vortex, making it unable to form high-speed swirling flow. At the same time, under stir caused by the rotation of the convex parts 22, the shower produces fluttering spray.
3. The movable part 2 is disposed in the low control position, as shown in Fig. 9, Fig. 12 and Fig. 15. At this time, the surrounding walls 23 of the movable plate 21 abut against the rear of the cover assembly 12 sealingly, and the movable part 2 does cyclic repetitive motion. The convex parts 22 rotate relative to the midline of the water outflow ports 13. The flow from the inclined port 24 into the interior of the surrounding walls 23 forms a high-speed swirling flow. Under the stir caused by the rotation of the convex parts 22, the high-speed swirling flow in the water outflow ports 13 produce discrete effect and the shower produces particle spray.

[0040] In the specific embodiment, the shower further comprises a transmission mechanism, which is connected to the operating member 3 and the movable part 2 in a transmission way, and the operating member 3 controls the movable part 2 to switch among the control positions. The transmission mechanism comprises a sliding seat 51 which can be controlled to slide by the operating member 3, a rotating part 52 and a stepping mechanism. The stepping mechanism is connected between the operating member 3 and the rotating part 52 in a transmission way to drive the rotating part 52 to rotate a predetermined angle in positive direction through each movement of the operating member 3. The sliding seat 51 is slidably connected to the fixing assembly 1 along the direction away from or in proximity to the cover assembly 12. The rotating part 52 can rotationally connect to the fixing assembly 1 to drive the sliding seat 51 to slide by the rotation of the rotating part 52. The sliding seat 51 connects the movable part 2 in a transmission way, so that the sliding seat 51 slides to drive the movable part 2 to switch among the control positions. According to the need, no sliding seat is provided. The operating member directly controls the movable part to switch among the control positions or cooperate with other transmission mechanism.

[0041] In a specific structure: an annular wall 53 around the axis of the rotating part 52 is disposed fixedly on the end surface of the sliding seat 51. The end surface of the annular wall 53 is provided with three switching surfaces 54, and the three switching surfaces54 are arranged in the circumferential direction from high to low. The central angles of the three switching surfaces 54 are equal, and a guiding surface 55 is disposed between each adjacent two switching surfaces 54. The guiding surfaces 55 are helical surfaces and the central angles of the plurality of guiding surfaces are equal. At least one abutting rod 56 is fixedly disposed on the bottom of the rotating part 52 and parallel to the axis of the rotating part 52. The end of the abutting rod 56 abuts against the end surface of the annular wall 53, so that the rotating part 52 rotates to drive the sliding seat 51 to slide.

[0042] Further, the stepping mechanism comprises a ratchet pawl mechanism, a swing shaft 31 and a pushing rod 32. The ratchet pawl mechanism consists of a ratchet 33 and the pawl 34 which is rotationally connected to the fixing assembly 1. One end of the pawl 34 is rotationally connected to the fixing assembly 1, and the other end of the pawl 34 abuts the ratchet of the ratchet 33. The swing shaft 31 is swingably connected to the fixing assembly 1, and the pushing rod 32 is slidably connected to the fixing assembly 1. The operating member 3 is connected to the end of the swing shaft 31 in a transmission way, and the other end of the swing shaft 31 abuts against the pushing rod 32, and the pushing rod 32 abuts against the middle of the pawl 34. The user operates the operating member 3, which is movable and drives the swing shaft 31 to swing. The other end of the swing shaft 31 abuts against the pushing rod 32. The pushing rod 32 slides and abuts against the pawl 34 to act on the ratchet 33 to drive the ratchet 33 to rotate forward at a predetermined angle. According to need, anti-rotation claw 35 can further be provided. One end of anti-rotation claw 35 rotationally rotates to connect the fixing assembly 1, and the other end abuts against the ratchet to prevent the pawl from reversing. The operating member is swingably

connected or slidably connected to the fixing assembly, for example. If necessary, other mechanisms can be used to connect the rotating part, such as the operating member is rotationally connect to the fixing assembly, and the rotating part can be driven by the rotating of the operating member.

[0043] In the present specific embodiment, the shower further comprise an elastic body 57, the elastic body 57 abuts between the sliding seat 51 and the rear of the cover assembly 12 to drive the movable part to the high control position(when the the movable part is switched to the high control position). The movable plate 21 is provided with a though hole25. The sliding seat 51 is disposed between the movable plate 21 and the cover assembly 12, and abuts against the movable plate 21 from bottom to top. The annular wall 53 is disposed in the through hole 25, and the abutting rod 56 passes through the through hole 25 and abuts against the end surface of the annular wall 53.

[0044] The driving mechanism 4 comprises a driving part 41 which can rotate under the action of water flow, the driving part 41 is connected to the movable part 2 in a transmission way so that the movable part in at least one of the control positions can do cyclic repetitive motion. The transmission connection is as follows: the driving part 41 comprises an impellers 411 and an eccentric shaft 412 which is eccentrically disposed on the bottom of the driving part 41, the eccentric shaft 412 is adapted to insert into the through hole 25 of movable plate 21 and cooperate to be synchronous rotation connection, for example, the movable plate is provided with a convex key, the eccentric shaft is provided with a groove, the groove and the convex key cooperate, and the movable plate is always in synchronous rotation connection with the eccentric shaft when the movable plate is moving up and down (switching of different control positions); Moreover, the eccentric shaft 412 is provided with a through hole 413 , the annular wall 53 is disposed in the through hole, and the abutting rod 56 passes through the through hole 413 to cooperate with the end surface of the annular wall 53. According to need, a connecting mechanism can further be provided to connect the impeller part and the movable plate 21, such as a gear mechanism, etc. At this time, the axis of the impeller part and the rotation of movable plate can be staggered.

[0045] The control mechanism comprises a clutch mechanism, the clutch mechanism cooperates with the sliding seat 51 and the driving mechanism 4. The control mechanism makes the driving mechanism and the sliding seat to be in the engagement state when the movable part is in the high control position, so that the driving mechanism 4 stops to drive and the movable part 2 stops to move; the driving mechanism and the sliding seat are in the disengagement state when the movable part is in the middle control position and low control position, the driving mechanism 4 rotates and drives the movable part 2 to do cyclic repetitive motion. The specific structure is as follows: the sliding seat 51 is provided with a first gear 511 around the annular wall, and the driving part 41 of the driving mechanism 4 is provided with a second gear 414, the sliding of the sliding seat controls whether the first gear and the second gear mesh or not, and whether the first gear and the second gear mesh or not controls the control mechanism to be in the engagement state or the disengagement state.

[0046] In the present specific embodiment: the fixing assembly 1 further comprises an upper coverl4; the cover assembly 12 comprises a water outlet coverl21, a decorative cover122 and a transparent cover 123. The decorative cover and the transparent cover all are provided with penetrating matching holes. The water outlet cover 121, the transparent cover 123 and the decorative cover 122 are sequentially attached together, and the plurality of water outflow ports pass through the plurality of matching holes respectively. The upper cover14 and cover assembly 12 are relatively sealed and connected fixedly to form the water outlet chamber 11 described above, for example, the upper coverl4 and the water outlet cover121 are sealed and connected fixedly to form the water outlet chamber 11.

[0047] The fixing assembly 1 further comprises a fixing seat and a rear cover 16. The rear cover 16 comprises the hand-held part 162 and the rear cover part 161 connected fixedly to the hand-held part 162. The fixing seat15 comprises a matching part 151, a connecting part 152 and a sealing cover 153 matching the waterway. The matching part is connected fixedly on the upper coverl4. The connecting part is connected to the hand-held part of the rear cover; the rear cover part and the decorative cover cooperate and are connected to an assembly space. The fixing seat and upper cover are disposed in the assembly space. The rotating part 52 is rotationally connected to the matching part of the fixing seat, and the upper cover is provided with a second through hole. The rotating part 52 passes through the second through hole and extends out above the fixing seat. The driving mechanism is connected to the upper part of the upper cover, the synchronous rotating joint of the eccentric shaft and the movable plate is disposed in the second through hole. The ratchet rotates synchronously to connect the extended part of the rotating part 52. The pushing rod is connected to the fixing seat in a transmission way, and the swing shaft is swingably connected to the fixing seat. The operating member is movably connected to the position where the hand-held part of the shower and the cover assembly are connected, one-handed switching can be achieved. The hand-held part is equipped with a waterway joint 163, which leads water into the water outlet chamber 11 through the waterway of the fixing seat.

[0048] The invention may be summarized as follows: The invention discloses a shower which can produce different sprays from same water outflow port, comprising a fixing assembly with a water outlet chamber, a movable part, an operating member and a driving mechanism, the fixing assembly is provided with a cover assembly which is provided with a plurality of water outflow ports that can

fluidly connect the water outlet chamber. The operating member is connected to the movable part in a transmission way and the operating member can drive the movable part to switch among at least three control positions, when the movable part is located in different control positions, different spray patterns will be produced. The same water outflow port of the shower can deliver at least three sprays, and the same water outflow port can deliver different particle sprays, which can meet the needs of different populations for particle sprays.

[0049] As mentioned above, it is only a preferred embodiment of the present invention, so the scope of embodiment of the present invention cannot be limited accordingly. That is, the equivalent changes and modifications made according to the patent scope and description content of the present invention should still be within the scope of the present invention.

Claims

1. A shower which can produce different sprays from same water outflow port, comprises a fixing assembly with a water outlet chamber, the fixing assembly is provided with a cover assembly, the cover assembly is provided with a plurality of water outflow ports that fluidly connect the water outlet chamber; wherein: the shower further comprises a movable part, an operating member and a driving mechanism; the movable part is movably disposed in the fixing assembly and comprises a movable plate, and the movable plate is provided with a plurality of convex parts protruding from the movable plate, the driving mechanism is connected to the movable part in a transmission way and drives the movable part to do cyclic repetitive motion; the operating member is connected to the movable part in a transmission way and the operating member can drive the movable part to switch among at least three control positions, the distance between the movable part in different control positions and the cover assembly are difference, and when the movable part moves to at least one of three control positions, the convex parts are inserted into the water outflow ports; when the movable part is located in different control positions, different spray patterns will be produced.

2. The shower which can produce different sprays from same water outflow port, in particular also according to claim 1, wherein: a plurality of surrounding walls are fixedly disposed on the bottom surface of the movable part, and the surrounding walls surround the convex parts, and the surrounding walls are provided with a plurality of inclined openings penetrating the inside and outside of the surrounding walls; there are three control positions: high control, middle control and low control, the distance between the movable part and the cover assembly is the largest when the movable part is located in the high control position, the distance between the movable part and the cover assembly is the smallest when the movable part is located in the low control position, the surrounding walls in the low control position abut against the rear of the cover assembly and the convex parts are inserted into the water outflow ports.

3. The shower which can produce different sprays from same water outflow port according to claim 1 and/or 2, wherein: a plurality of surrounding walls are disposed fixedly on the bottom surface of the movable part, and the surrounding walls surround the convex parts, and the surrounding walls are provided with a plurality of inclined openings penetrating the inside and outside of the surrounding walls; there are three control positions: high control position, middle control position and low control position, the distance between the movable part and the cover assembly is the largest when the movable part is located in the high control position, the distance between the movable part and the cover assembly is the smallest when the movable part is located in the low control position, whether the movable part and the cover assembly is cooperated or not is controlled by locating the movable part in the high control position and the middle control position; when the movable part is located in the middle control position, the movable part cooperates with the cover assembly, and the water flow entering the interior of the surrounding walls from the inclined openings cooperates with the water flow entering from the water outflow ports to deliver a fluttering spray.

4. The shower which can produce different sprays from same water outflow port according to any one or more of claims 1 to 3, where: the shower further comprises a transmission mechanism, which is connected to the operating member and the movable part in a transmission way, and the operating member controls the movable part to switch among the control positions .

5. The shower which can produce different sprays from same water outflow port according to claim 4, wherein: the transmission mechanism comprises a sliding seat which can be controlled to slide by the operating member, the sliding seat can be slidably connected to the fixing assembly in a direction away from or in proximity to the cover assembly, the sliding seat is connected to the movable part in a transmission way to drive the movable part to switch among the control positions through the sliding of the sliding seat.

6. The shower which can produce different sprays from same water outflow port according to claim 5, wherein: the transmission mechanism comprises a rotating part, the rotating part can be rotationally connected

to the fixing assembly, and the operating member is connected to the rotating part in a transmission way to drive the rotating part to rotate; the end surface of the sliding seat is provided fixedly with an annular wall around the axis of the rotating part, the end surface of the annular wall is provided with a plurality of switching surfaces with different heights relative to the end surface of the sliding seat, a guiding surface is arranged between the adjacent switching surfaces, an abutting rod parallel to the axis of the rotating part is disposed under the rotating part, the end of the abutting rod abuts against the end surface of the annular wall, so that the rotating of the rotating part can drive the sliding part to slide.

7. The shower which can produce different sprays from same water outflow port according to claim 5 and/or 6, wherein: the shower further comprises an elastic body, which is abutted between the sliding seat and the rear of the cover assembly.

8. The shower which can produce different sprays from same water outflow port according to claim 6 and/or 7, wherein: the central angles of the plurality of switching surfaces are equal, a guiding surface is provided between each two adjacent switching surfaces, the guiding surfaces are helical and the central angles of the plurality of guiding surfaces are equal.

9. The shower which can produce different sprays from same water outflow port according to any one or more of claims 6 to 8, wherein: the transmission mechanism further comprises a stepping mechanism, which is connected between the operating member and the rotating part in a transmission way, and each movement of the operating member drives the rotating part to rotate a predetermined angle..

10. The shower which can produce different sprays from same water outflow port according to claim 9, wherein: the stepping mechanism comprises a ratchet pawl mechanism, a swing shaft and a pushing rod, the ratchet pawl mechanism is connected to the rotating part in a transmission way to drive the rotating part to rotate, the swing shaft is swingably connected to the fixing assembly, and the pushing rod is slidably connected to the fixing assembly, the operating member is connected to one end of the swing shaft in a transmission way and the other end of the swing shaft abuts against the pushing rod, the pushing rod is connected to the ratchet pawl mechanism in a transmission way to drive the ratchet pawl mechanism.

11. The shower which can produce different sprays from same water outflow port according to any one or more of claims 6 to 10, wherein: the movable plate is provided with a through hole, and the sliding seat is between the movable plate and the cover assembly and abuts against the movable plate, the annular wall is disposed in the through hole, and the abutting rod passes through the through hole and abuts against the end surface of the annular wall.

12. The shower which can produce different sprays from same water outflow port according to any one or more of claims 4 to 11, wherein: the transmission mechanism comprises a rotating part, the rotating part can be rotationally connected to the fixing assembly, and the operating member is connected to the rotating part in a transmission way to drive the rotating part to rotate; the end surface of the movable plate is fixedly provided with an annular wall around the axis of the rotating part, the end surface of the annular wall is provided with a plurality of switching surfaces with different heights relative to the end surface of the sliding seat, a guiding surface is arranged between the adjacent switching surfaces, an abutting rod parallel to the axis of the rotating part is disposed under the rotating part, the end of the abutting rod abuts against the end surface of the annular wall, so that the rotating of the rotating part can drive the movable plate to slide.

13. The shower which can produce different sprays from same water outflow port according to any one or more of claims 1 to 12, wherein: the shower further comprises an elastic body, the elastic body abuts between the movable plate and the rear of the cover assembly.

14. The shower which can produce different sprays from same water outflow port according to any one or more of claims 1 to 13, wherein: the cyclic repetitive motion of the movable part comprises at least that the middle line of the movable part moves circularly around its eccentric position, and the convex parts rotate relative to the center line of the water outflow ports.

15. The shower which can produce different sprays from same water outflow port according to any one or more of claims 1 to 14, where: each of the convex parts is a conical structure with a large head and a small tail.

16. The shower which can produce different sprays from same water outflow port according to any one or more of claims 1 to 15, where: the driving mechanism comprises a driving part which can rotate under the action of water flow, the driving part is connected to the movable part in a transmission way so that the movable part in at least one of the control positions can do cyclic repetitive motion.

17. The shower which can produce different sprays from

same water outflow port according to any one or more of claims 5 to 16, wherein: the shower further comprises a control mechanism, which cooperates with the sliding seat and the driving mechanism, making the driving mechanism and the sliding seat to be in the engagement state in at least one of the control positions to stop the driving mechanism to drive, and to be in the disengagement state in at least one of the control positions.

18. The shower which can produce different sprays from same water outflow port according to claim 17, wherein: the sliding seat is provided with a first gear, the driving mechanism is provided with a second gear, whether the first gear and the second gear mesh or not is controlled by the sliding of the sliding seat, and whether the first gear and the second gear mesh or not controls the control mechanism to be in the engagement or the disengagement state.

19. The shower which can produce different sprays from same water outflow port according to any one or more of claims 1 to 18, where: the shower further comprises a control mechanism, which cooperates with the movable part and the driving mechanism, the control mechanism makes the driving mechanism and the movable part to be in the engagement state in at least one of the control positions so that the driving mechanism can drive the movable part to move, and to be in the disengagement state in at least one of the control positions to make the driving mechanism idle.

20. The shower which can produce different sprays from same water outflow port according to any one or more of claims 1 to 19, wherein: the shower further comprises a control mechanism, which cooperates with the fixing assembly and the driving mechanism, making the driving mechanism and the fixing assembly to be in engagement state in at least one of the control positions to stop the driving mechanism to drive, and to be in disengagement state in at least one of the control positions.

21. The shower which can produce different sprays from same water outflow port according to any one or more of claims 17 to 20, in particular according to claim 17 or 18 or 19, wherein: there are three control positions: high control, middle control and low control, the distance between the movable part and the cover assembly is the largest when the movable part is located in the high control position, the distance between the movable part and the cover assembly is the smallest when the movable part is located in the low control position, when the movable part is located in the high control position ,the movable part does not moves, and when the movable part is located in the middle control position and the low control position , the movable part does cyclic repetitive motion .

22. The shower which can produce different sprays from same water outflow port according to any one or more of claims 1 to 21, wherein: the fixing assembly further comprises a rear cover part, the rear cover part and the cover assembly is relatively fixedly connected together in a sealed manner.

23. A shower which can produce different sprays from same water outflow port, comprises a fixing assembly with a water outlet chamber, the fixing assembly is provided with a cover assembly, the cover assembly is provided with a plurality of water outflow ports that can fluidly connect the water outlet chamber; wherein: the shower further comprises a movable part, an operating member, a driving mechanism and a control mechanism; the movable part is movably disposed in the fixing assembly and comprises a movable plate , and the movable plate is provided with a plurality of convex parts protruding from the movable plate; the operating member is connected to the movable part in a transmission way and the operating member can drive the movable part to switch among at least two control positions , the distance between the movable part in different control positions and the cover assembly are difference, and when the movable part move to at least one of three control positions, the convex parts are inserted into the water outflow ports; the control mechanism control the movable part to stop moving in at least one of the control positions and to do cyclic repetitive motion in at least one of the control positions; when the movable part is located in different control positions, different spray patterns will be produced.

24. A shower which can produce different sprays from same water outflow port, comprises a fixing assembly with a water outlet chamber, the fixing assembly is provided with a cover assembly, the cover assembly is provided with a plurality of water outflow ports that can fluidly connect the water outlet chamber; wherein: the shower further comprises a movable part, an operating member and a driving mechanism; the movable part is movably disposed in the fixing assembly and comprises a movable plate , and the movable plate is provided with a plurality of convex parts protruding from the movable plate; the operating member is connected to the movable part in a transmission way and the operating member can drive the movable part to switch among at least two control positions , the distance between the movable part in different control positions and the cover assembly are difference, and when the movable part move to at least one of three control positions, the convex parts are inserted into the water outflow ports; and the movable part does not move in at least

one of the control positions and do cyclic repetitive motion in at least one of the control positions; when the movable part is located in different control positions, different spray patterns will be produced.

25. A shower which can produce different sprays from same water outflow port, comprises a fixing assembly with a water outlet chamber, the fixing assembly is provided with a cover assembly, the cover assembly is provided with a plurality of water outflow ports that can fluidly connect the water outlet chamber; wherein: the shower further comprises a movable part, an operating member, a driving mechanism and a control mechanism; the movable part is movably disposed in the fixing assembly and comprises a movable plate, and the movable plate is provided with a plurality of convex parts protruding from the movable plate; the operating member is connected to the movable part in a transmission way and the operating member can drive the movable part to switch among at least two control positions, the distance between the movable part in different control positions and the cover assembly are difference, and when the movable part move to at least one of three control positions, the convex parts are inserted into the water outflow ports; the control mechanism is used to control whether the movable part do cyclic repetitive motion or not in at least one of the control positions; different spray patterns will be produced when the movable part is in different control positions and whether the movable part is movable in at least one of the control positions or not.

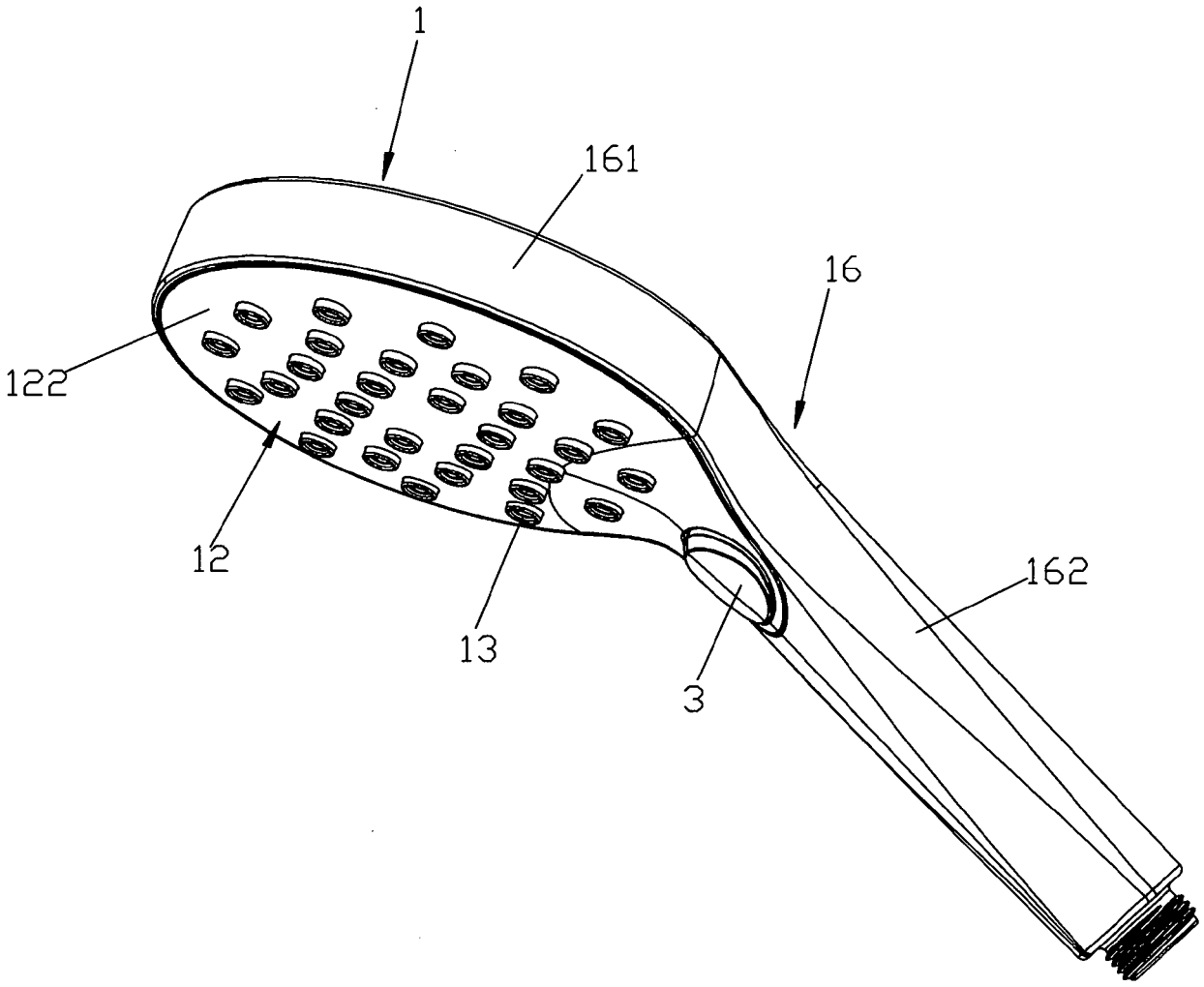

FIG. 1

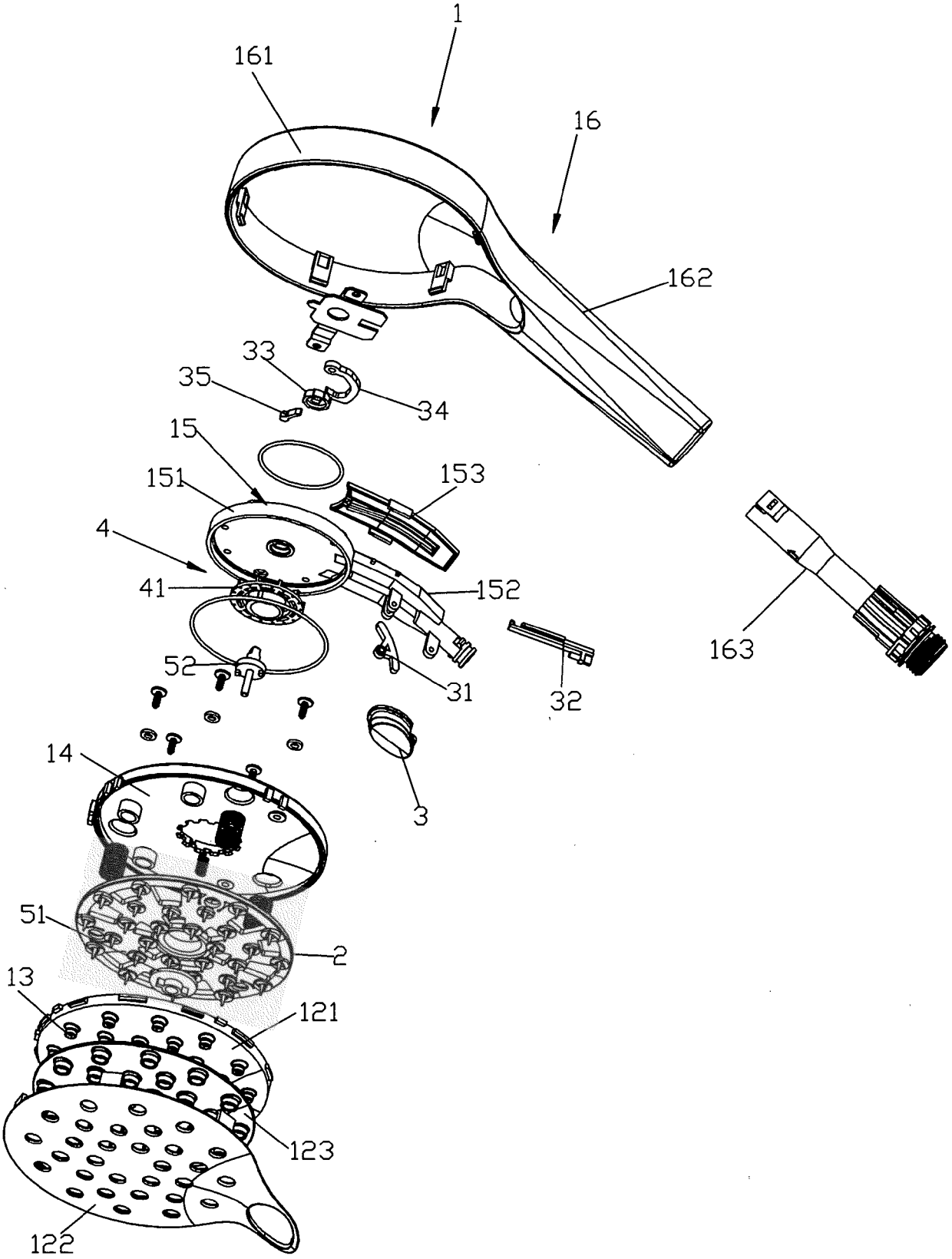
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FIG. 2

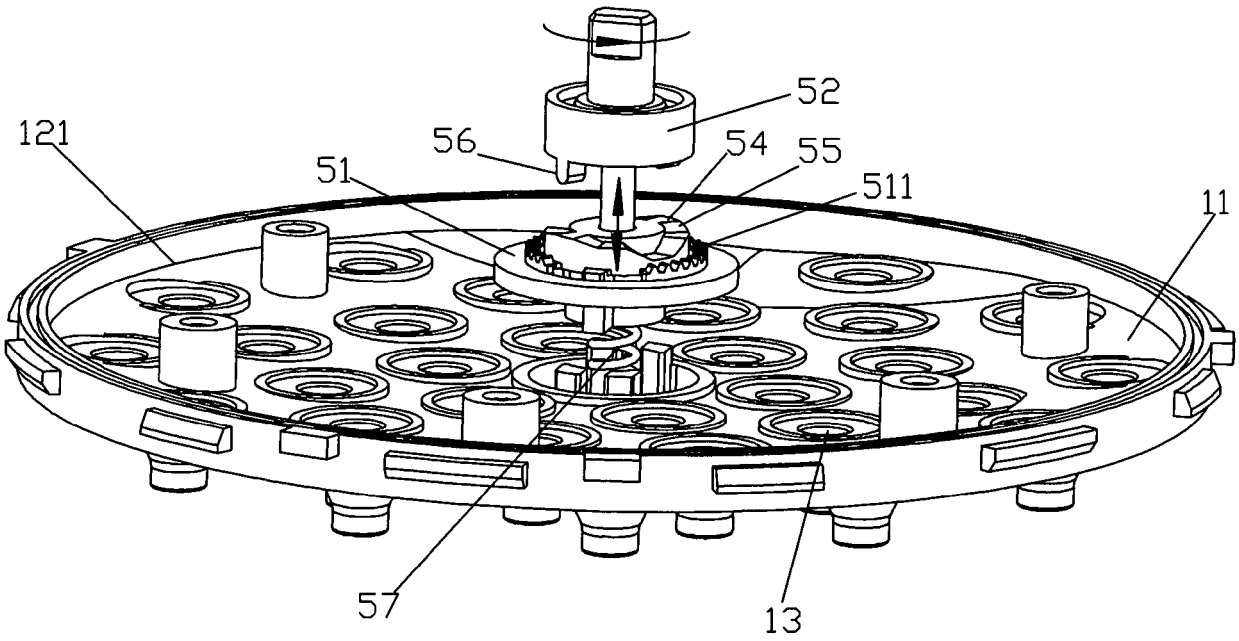

FIG. 3

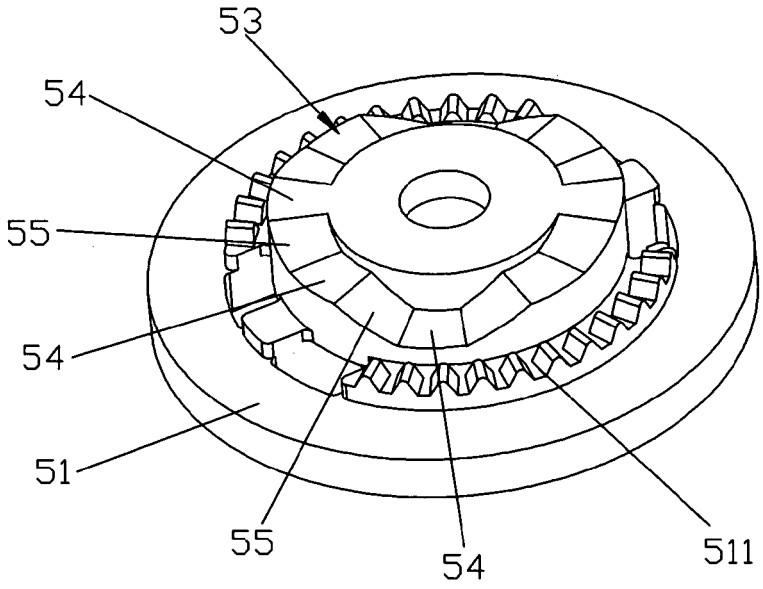

FIG. 4

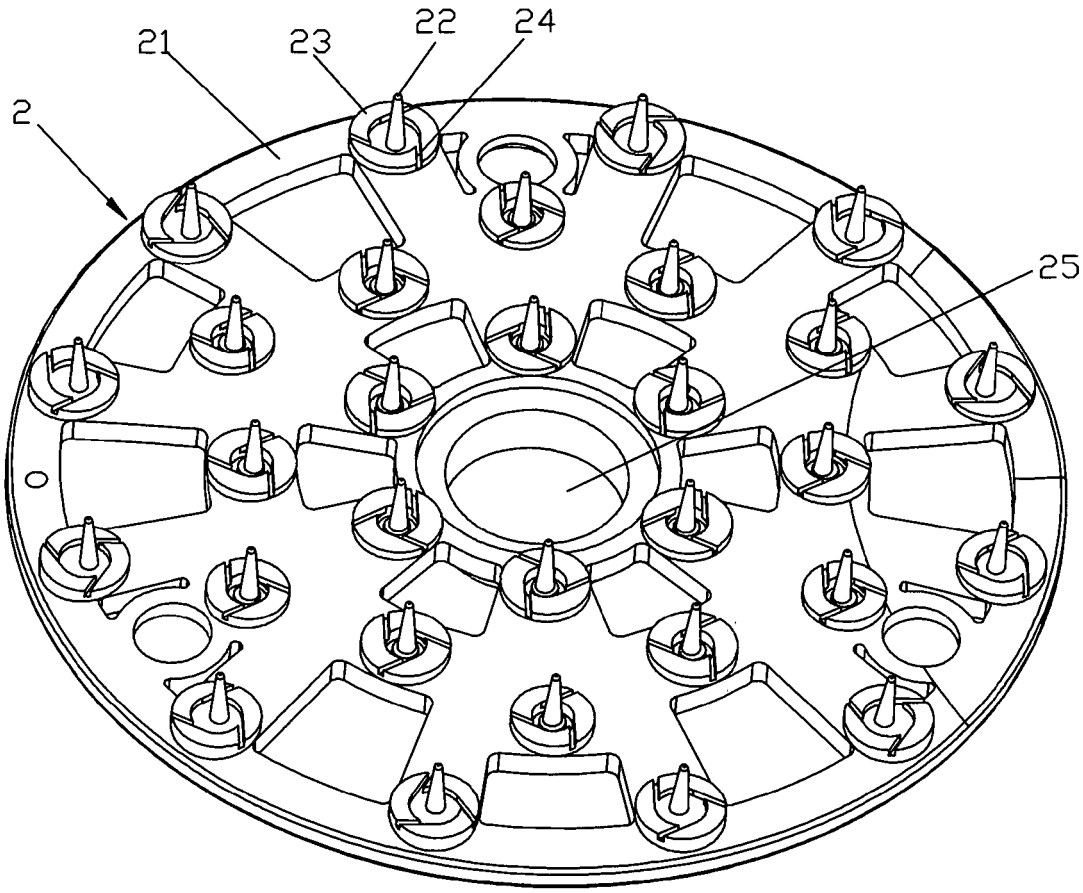
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FIG. 5

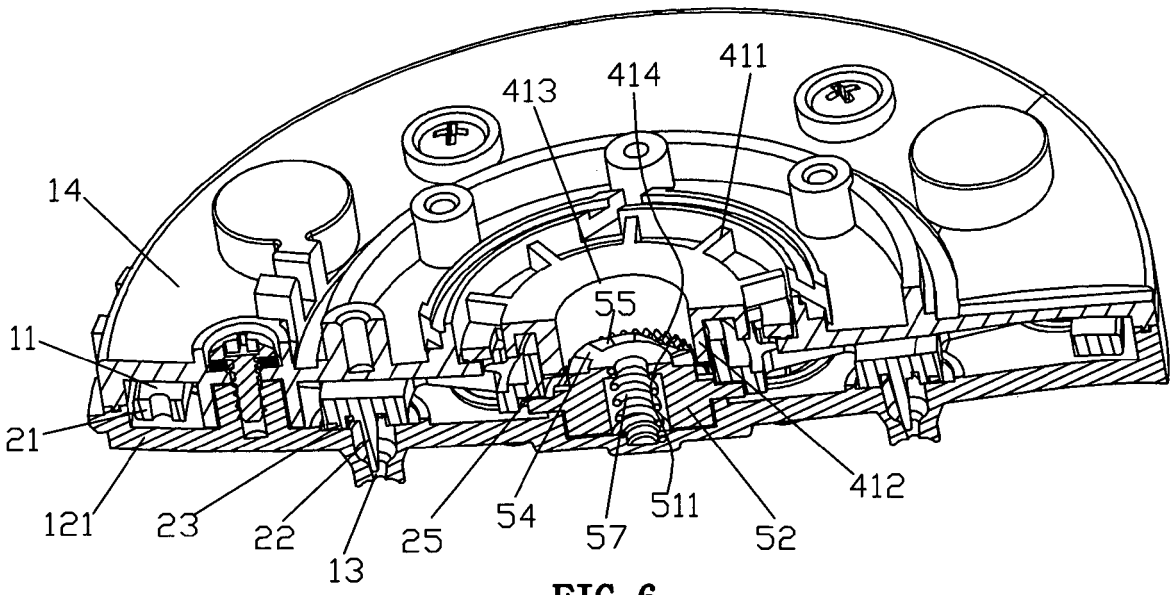
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FIG. 6

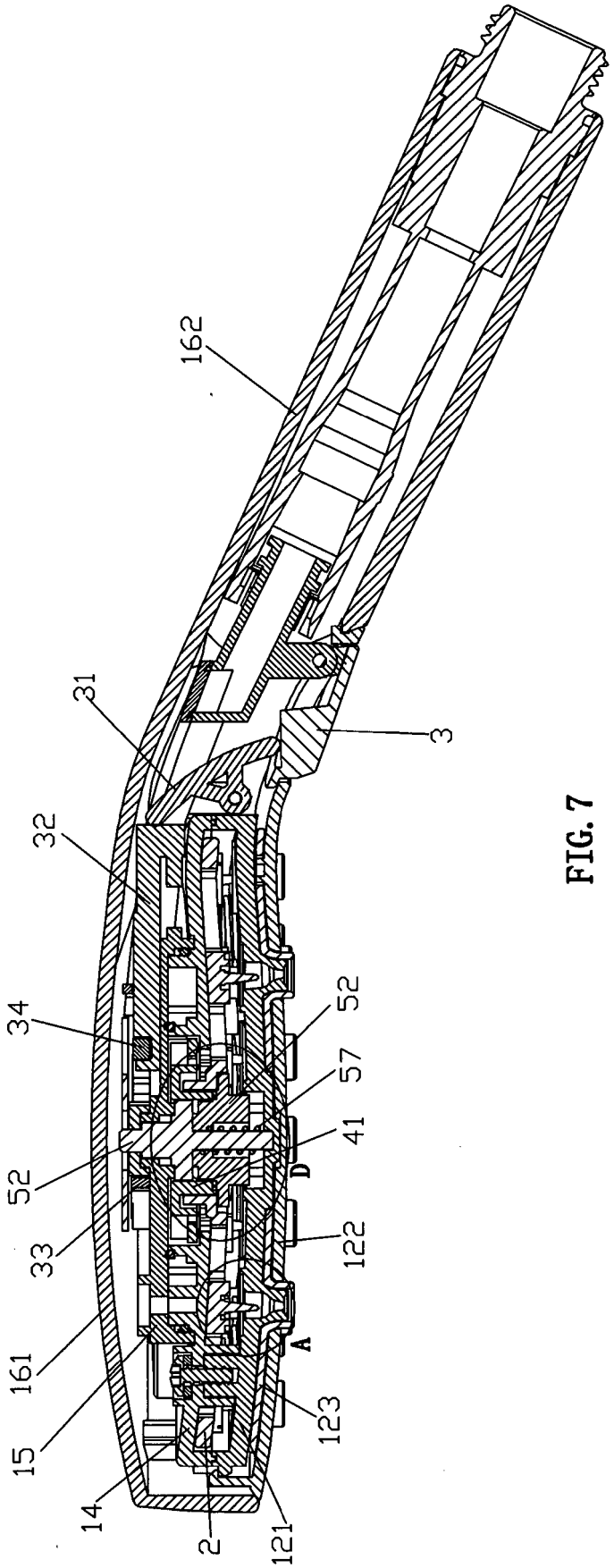

FIG. 7

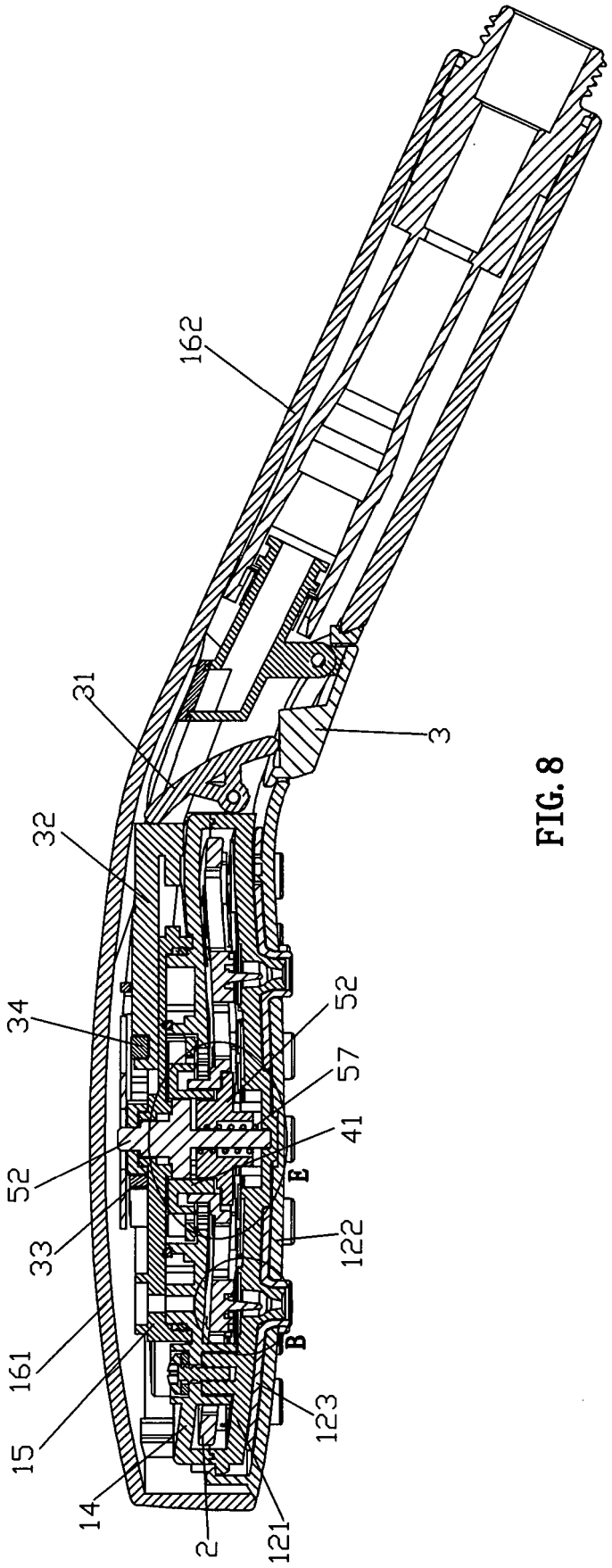

FIG. 8

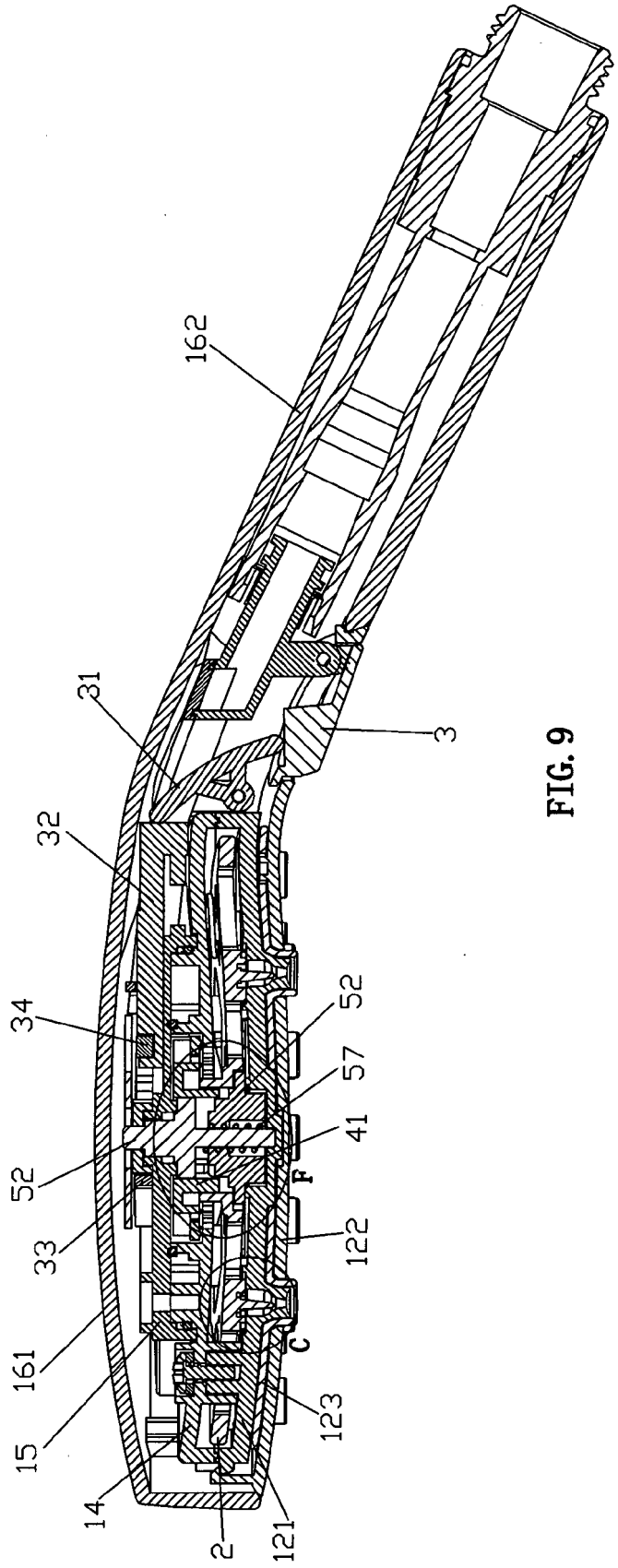

FIG. 9

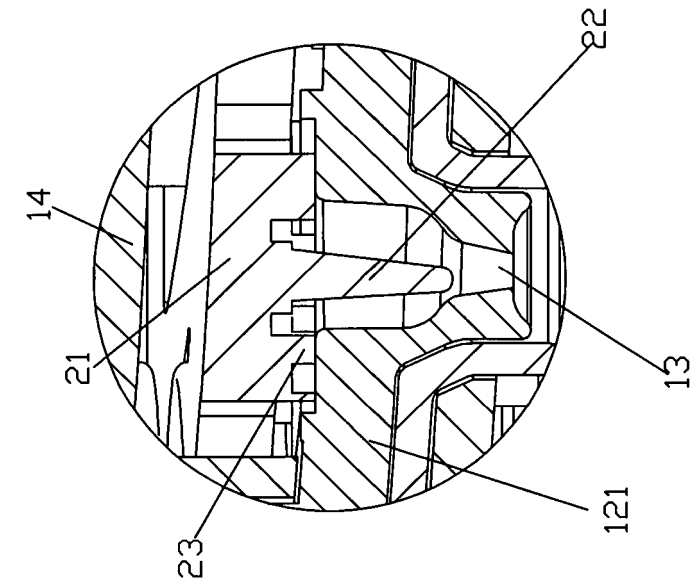

FIG. 12

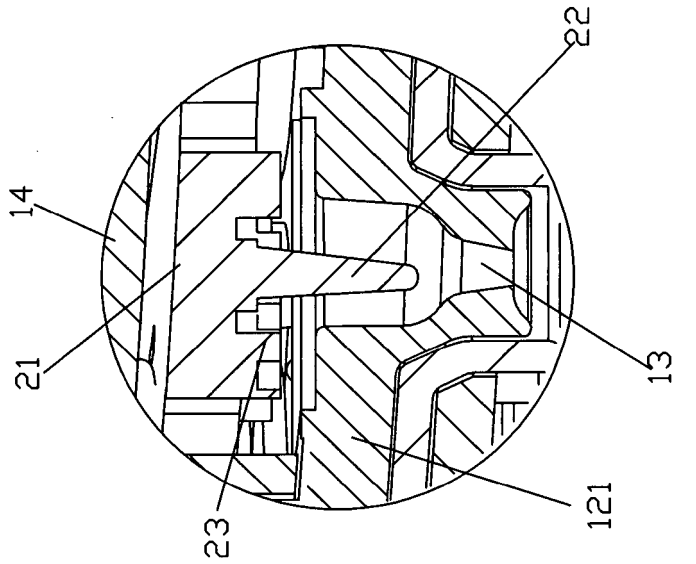

FIG. 11

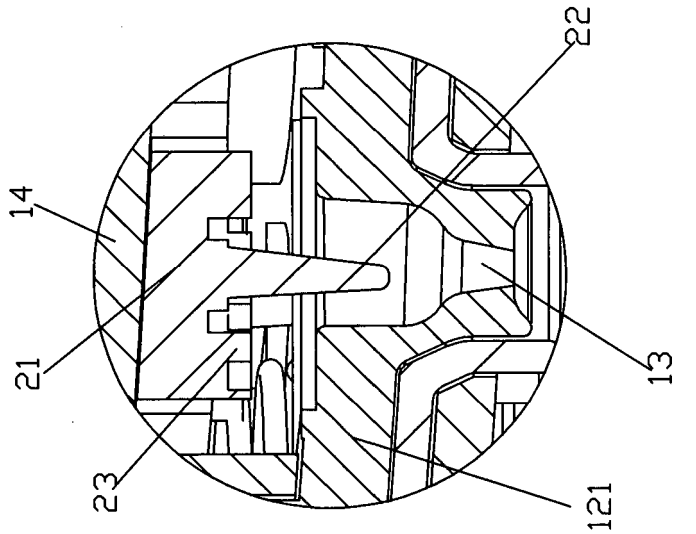

FIG. 10

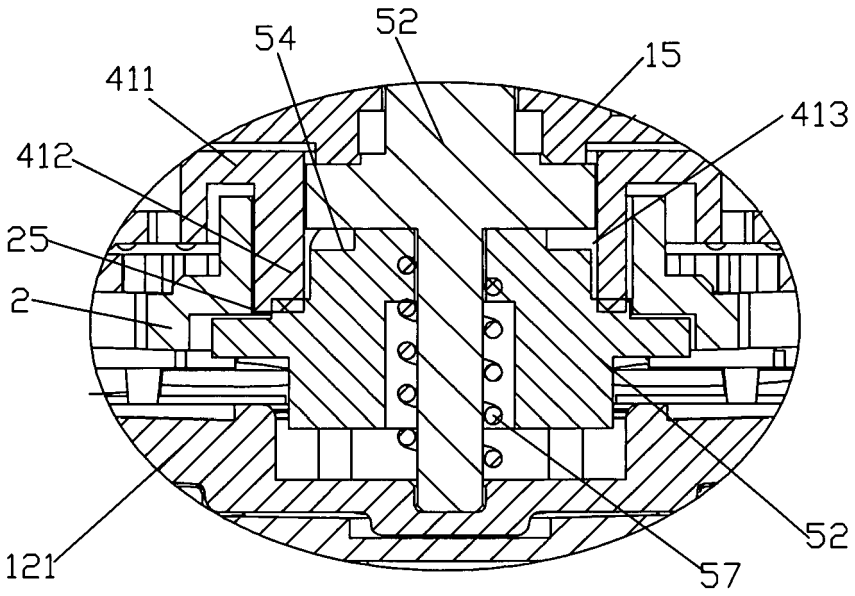
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FIG. 13

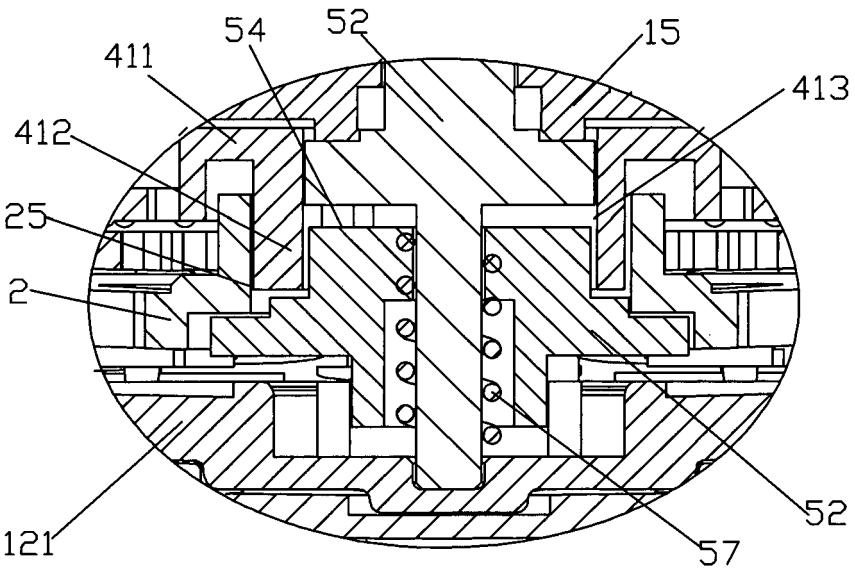
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FIG. 14

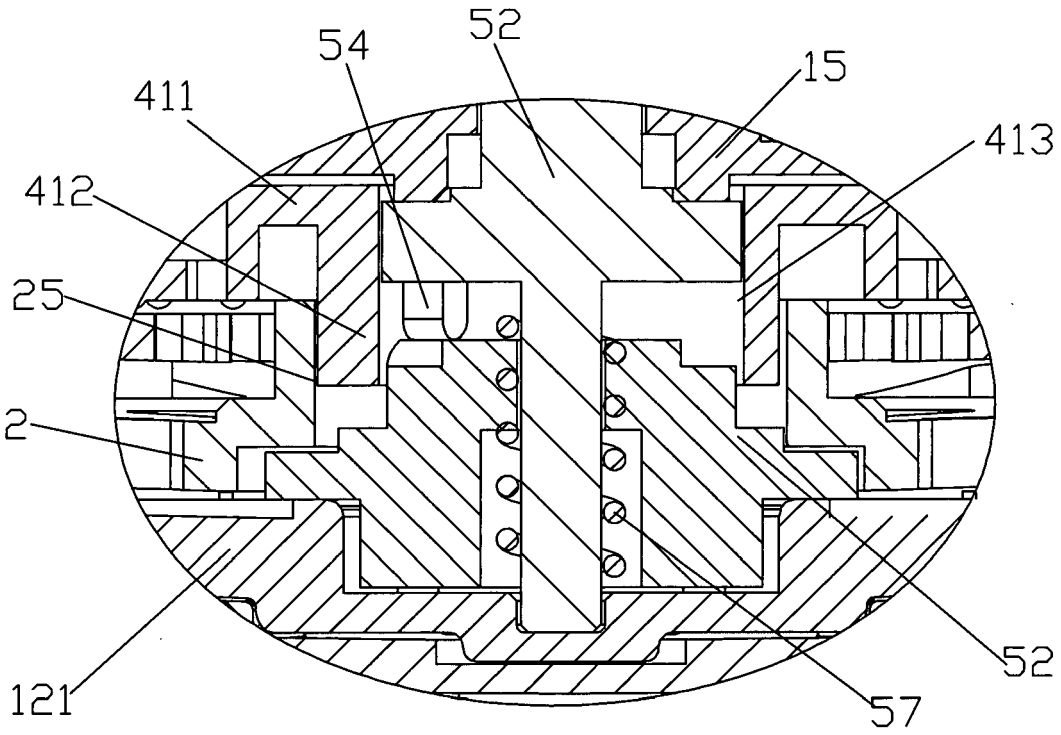

FIG. 15

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EUROPEAN SEARCH REPORT

Application Number
EP 19 00 0285

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 20 2015 006287 U1 (FUJIAN XIHE SANITARY WARE TECH [CN]) 2 February 2016 (2016-02-02) * the whole document *	1-25	INV. B05B1/02 B05B1/12 B05B1/18 B05B1/34 B05B3/00 B05B3/04 B05B3/10 B05B1/26
A	US 2013/001324 A1 (MIEDZIUS CHRISTOPHER [US]) 3 January 2013 (2013-01-03) * abstract; figures 1-5 * * page 1, paragraph 15 - page 2, paragraph 28 *	1-25	
A	DE 10 2014 200741 A1 (HANSGROHE SE [DE]) 16 July 2015 (2015-07-16) * abstract; figures 1-16 * * page 6, paragraph 42 - page 8, paragraph 57 *	1-25	
A	US 2014/008464 A1 (ZHOU HUASONG [CN] ET AL) 9 January 2014 (2014-01-09) * abstract; figures 1-24 * * paragraph [0005] - paragraph [0011] * * paragraph [0052] *	1-25	TECHNICAL FIELDS SEARCHED (IPC) B05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	21 October 2019	Frego, Maria Chiara

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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E : earlier patent document, but published on, or after the filing date
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L : document cited for other reasons

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 19 00 0285

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21-10-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 202015006287 U1	02-02-2016	AU 2015101601 A4	10-12-2015
		CN 104646199 A	27-05-2015
		DE 202015006287 U1	02-02-2016
		FR 3032360 A3	12-08-2016
		US 2016228887 A1	11-08-2016
US 2013001324 A1	03-01-2013	NONE	
DE 102014200741 A1	16-07-2015	CN 106061617 A	26-10-2016
		DE 102014200741 A1	16-07-2015
		EP 3094413 A1	23-11-2016
		US 2016332173 A1	17-11-2016
		WO 2015107028 A1	23-07-2015
US 2014008464 A1	09-01-2014	CN 102580869 A	18-07-2012
		US 2014008464 A1	09-01-2014
		WO 2012092834 A1	12-07-2012

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82