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(54) A CONCEALED FLOW REGULATOR

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Description

Field of the invention

[0001] The present invention relates to a concealed flow regulator.

Background of the invention

[0002] A setting-in element of sanitary ware is disclosed in Chinese patent database with announcement number CN202298777U, CN202139650U, the setting-in element has a housing, the housing is disposed with thread and a housing side with outlet side of flowing hole, at least an insert element is provided to assembled to the housing. The setting-in element is disposed with a flow regulator of ventilation, the periphery wall of the housing defines at least a ventilation passage at a part area of the double-wall structure formed, the housing side of the ventilation passage which face the outlet side is open and is connected to a ventilation opening leading to the inside of the housing. The sealing portion is disposed at the upper end of the inner side of the housing, it can only realize axial sealing, but can not achieve peripheral sealing.

[0003] With respect to the prior art attention is drawn to WO 2013/162359 A1 which discloses a tap provided with a tap outflow having a first channel and a second channel and a jet aerator having a jet aerator housing which forms a downstream end of the tap outflow. The jet aerator is further provided with a jet breaker having a jet breaker wall with liquid passage openings, at least one wire mesh layer which is included downstream of the jet breaker wall in the jet aerator housing, an aeration chamber which is situated between the jet breaker and the at least one wire mesh layer, and an air supply of which an entrance opens into the environment and of which an exit opens into the aeration chamber. The tap outflow is further provided with a coupling assembly which is situated upstream of the jet breaker wall in the jet aerator housing and which forms a liquid-tight connection between the first conduit and the jet breaker wall, such that liquid from the first channel is kept separate from liquid from the second channel upstream of the jet breaker wall. Further, from DE 103 12 856 A1 a sanitary insert unit for outlet fittings is known.

[0004] From WO 2011/108023 A1 is known an aerated-water generator for taps which is equipped with: a cylindrical housing; a spout block disposed inside the housing and having a cup-shaped spout section to which tap water is provided, and which comprises a plurality of radial water grooves formed on a guide surface provided on the internal base of the spout section, said water grooves guiding the tap water in a radial direction and making the tap water spout at least in a horizontal direction from the top of spout outlets; an elastic ring disposed on the guide surface; a cylindrical pressurisation block having a pressure receiving section which receives water

pressure, and the bottom end of which abuts the top of the elastic ring; and an air/water mixing section which generates aerated water by guiding the tap water spouted from the spout outlets downwards and mixing the tap water with air.

[0005] US 2016/024769 A1 discloses a sanitary insert unit, configured for insertion into a discharge fitting. The insert unit includes an upstream sieve connected to a throughflow regulator. The throughflow regulator includes a control gap and a throttle body that deforms under pressure to regulate throughflow by varying an opening size of the control gap. The sieve and throughflow regulator are arranged upstream of a jet diffuser which includes a plurality of radial openings. The sieve, throughflow regulator and jet diffuser are arranged to be, at least partially, received within a housing.

[0006] Finally, from DE 20 2013 002 189 U1 a sanitary fixture with a jet and/or flow regulator unit is known.

Summary of the Invention

[0007] The present invention is provided with a concealed flow regulator, which overcomes the disadvantages of the existing known technology.

[0008] The technical proposal of the present invention is that:

A concealed flow regulator, comprising a housing portion (100) and a water diversion device (200) assembled in the housing portion (100), the housing portion (100) is disposed with a mutation cavity (110) and a suction passage (120) connecting an inner and an outer of the mutation cavity (110), the diversion device (200) is used to divide water, negative pressure generates when the divided water flows into the mutation cavity (110), air is sucked to mix with water to produce bubble water under an action of the negative pressure; an external revolution surface of the housing portion (100) is disposed with external thread (150), the housing portion (100) can be threaded to a water supplying opening (700) via the external thread (150); wherein the suction passage (120) is disposed with an internal port (121) faced to the mutation cavity (110) and an external port (122) disposed in the external revolution surface, an air flowing clearance is formed, when the flow regulator is in its installed condition, between the housing portion (100) and the inner wall of the water supplying opening (700), the air flowing clearance is connected to the external port, so that air can enter the mutation cavity (110) through the air flowing clearance, the external port and the internal port, wherein the flow regulator further comprises an annular seat (300) and an elastic water stop ring (400), the annular seat (300), the water diversion device (200) and the housing portion (100) are assembled together; the diversion device (200) comprises a periphery wall (210), a central base (220) in the periphery wall (210) and a deflecting annular wall (230) fixedly connecting the periphery wall (210) and the central base (220), the periphery wall (210) is disposed with diversion holes (211), the external pe-

riphery surface of the deflecting annular wall (230) is gradually larger downwardly radially from the central base (220) to the periphery wall (210), the central base (220) has at least a part extending out of an internal hole of the annular seat (300), a flowing clearance is formed between the central base (220) and the hole wall of an internal hole of the annular seat, the flowing clearance is disposed above the deflecting annular wall (230) to make water directly flow to the deflecting annular wall (230) through the flowing clearance; the water stop ring (400) is supported on the annular seat (300) to surround and fit to the central base (220), so that the flowing area of the flowing clearance is adjustable by the water pressure so as to save water.

[0009] In another preferred embodiment, the external revolution surface of the housing portion (100) comprises an external smooth surface below the external thread (150), an external diameter of the external smooth surface is smaller than an external diameter of the external thread (150), the external port of the suction passage (120) is located on the external smooth surface, the external smooth surface and an internal wall of the water supply opening (700) are annularly arranged with space, the annular space forms above mentioned air flowing clearance.

[0010] In another preferred embodiment, the housing portion (100) comprises a housing (130) and a fixed ring (140), the housing (130) has an outer wall (131), the fixed ring (140) is fixedly connected to the upper portion of the outer wall (131); the outer wall (131) is step structural with big end down, the step structure has a step surface, the internal port (121) is located on the step surface.

[0011] In another preferred embodiment, when the flow regulator is in its installed condition, the water supplying opening (700) is disposed with a step face (710) and an internal revolution surface extending outwardly from the external periphery of the step face, the internal revolution surface is disposed with internal thread, the lower portion of the internal revolution surface is an internal smooth surface; the external thread of the housing portion (100) is threaded to the internal thread, the internal smooth surface and the external smooth surface are arranged with space.

[0012] In another preferred embodiment, the flow regulator further comprises a sealing portion (600) having a surrounding portion (610) and a capping portion (620) extending inwardly from the internal periphery of the surrounding portion (610); the housing portion (100) comprises a housing (130) and a fixed ring (140), the housing (130) comprises an outer wall (131), the fixed ring (140) is fixedly connected to the upper portion of the outer wall (131), the fixed ring (140) is disposed with an annular protrusion (142) protruding outwardly radially, the annular protrusion (142) is supported on the upper end face of the housing (130), the fixed ring (140) has an assembly portion (143) located on the annular protrusion (142), the surrounding portion (610) is surrounded and fixedly sleeved on the outer side of the assembly portion (143),

the capping portion (620) is at least capping the end face of the upper end portion of the assembly portion (143).

[0013] In another preferred embodiment, the assembly portion (143) is concaved with an annular groove (144), the bottom portion of the surrounding portion (610) is protruding inwardly with a protruding portion (611), the protruding portion (611) is fitly connected in the annular groove (144).

[0014] In another preferred embodiment, the bottom portion of the surrounding portion (610) is supported on the annular surface of the annular protrusion (142), the surrounding portion (610) is pressed and deformed to extend out of the annular protrusion to achieve peripheral sealing.

[0015] In another preferred embodiment, the annular seat (300) is fixedly connected to the periphery wall (210); a protruding wall (310) is protruded on the annular seat (300) to surround the internal hole of the annular seat (300), the external side of the water stop ring is contacted with the internal side of the protruding wall (310).

[0016] In another preferred embodiment, a filter (500) is further provided, the filter (500) is assembled to the protruding wall (310).

[0017] In another preferred embodiment, the upper periphery of the periphery wall (210) protrudes outwardly with a support plate (212), the external periphery of the support plate (212) protrudes upwardly to form a connecting wall (213), the annular seat (300) is supported on the support plate (212), the annular seat (300) is fixedly connected the diversion device (200) by the cooperation of the connecting wall (213) and the annular seat (300).

[0018] In another preferred embodiment, the fixed ring (140) is disposed with a conical surface (141) corresponding to the diversion holes (211), the conical surface (141) surrounds the diversion device (200), so that water flows out of the diversion holes (211) and impacts the conical surface.

[0019] In another preferred embodiment, an external revolution surface of the deflecting annular wall (230) comprises a part of the conical surface.

[0020] In another preferred embodiment, the external revolution surface of the deflecting annular wall (230) comprises a smooth curve.

[0021] In another preferred embodiment, the external revolution surface of the deflecting annular wall (230) comprises an arc with the center of circle outward.

[0022] Compared to the existing known technology, the technical proposal of the present invention has advantages as follows:

1. the external port of the suction passage is disposed on the external revolution surface of the housing, the air flowing clearance is formed between the housing portion and the inner wall of the water supplying opening, the air flowing clearance is connected to the external port, so that air at the outer side can enter the mutation cavity through the air flowing

clearance, the external port and the internal port, on one hand, the air is sucked through the housing portion and the water supplying opening, the air inlet is disposed between the housing portion and the water supplying opening, so that the flow regulator can be assembled in the water supplying opening and be concealed, on the other hand, it sucks high volume of air, the structure is compact and the manufacturing cost is low.

2. the external wall is a step structure of big end down, the internal port is disposed on the step surface of the step structure, the air and the water are mixed well.

3. the external thread of the housing portion is thread to the internal thread, the internal smooth surface and the external smooth surface are arranged with space so as to ensure the connecting of the suction passage.

4. the sealing portion has a surrounding portion and a capping portion, the surrounding portion can obtain the peripheral sealing, the capping portion can obtain the axial sealing, so that it has well sealing performance, the connecting of the sealing portion and the capping portion is strong and stable, it prevents the shift of the sealing portion during assembling.

5. The fixed ring has an annular protrusion protruding outwardly radically, the annular protrusion is supported on the upper end face of the housing, the fixed ring has an assembly portion disposed above the annular protrusion, the surrounding portion surrounds on the outer side of the assembly portion in fixing way, the capping portion at least covers the end face at the upper end portion of the assembly portion, the assembling is convenient and fast, the connecting is strong and stable.

6. the assembly portion is concaved with an annular groove, the bottom of the surrounding portion is protruding inwardly with a protruding portion, the protruding portion is fitting to connect in the annular groove, thus being convenient to position the sealing portion and the fixed ring.

7. it has a deflecting annular wall, the water flowing clearance is disposed in the deflecting annular wall that water flows through the water flowing clearance and then directly flows to the deflecting annular wall, it can reduce the pressure loss of the water during flowing from the water flowing clearance to the diversion holes, so that it can obtain higher volume even in low water pressure and reduce the noise of the impacting of the water. The water stop ring is supported on the support seat and surrounds the central seat, when the water pressure works on the elastic water stop element, the elastic water stop element is pressed to deform inwardly radically, so that it has well water saving effect and the water volume keeps high and stable.

8. the diversion device and the annular seat can be two separate components, the structure has advan-

tage that when to develop products with different flow volumes, it can just develop two different diversion devices, and it can adjust the arrangement and the size of the diversion holes according to different flow volumes of the diversion devices to achieve well outlet effect of the outlet devices.

Brief description of the drawings

[0023] The present invention will be further described with the drawings and the embodiments.

FIG.1 illustrates a schematic diagram of the flow regulator of a preferred embodiment.

FIG.2 illustrates a schematic diagram of the flow regulator of the preferred embodiment in another view angle.

FIG.3 illustrates an exploded and schematic diagram of the flow regulator of the preferred embodiment.

FIG.4 illustrates a sectional diagram of the flow regulator of the preferred embodiment.

FIG.5 illustrates a schematic diagram of the housing of the flow regulator of the preferred embodiment.

FIG.6 illustrates a schematic diagram of the housing of the flow regulator of the preferred embodiment in another view angle.

FIG.7 illustrates a schematic diagram of the fixed ring of the flow regulator of the preferred embodiment.

FIG.8 illustrates a schematic diagram of the sealing portion of the flow regulator of the preferred embodiment.

FIG.9 illustrates a schematic diagram of the diversion device of the flow regulator of the preferred embodiment.

FIG.10 illustrates a sectional and schematic diagram of the diversion device of the flow regulator of the preferred embodiment.

FIG.11 illustrates a schematic diagram of the annular seat of the flow regulator of the preferred embodiment.

Detailed description of the embodiments

[0024] Please referring to FIGs 1-11, the concealed flow regulator comprises a housing portion 100, a diversion device 200 assembled in the housing portion 100, an annular seat 300, an elastic water stop ring 400, a filter 500 and a sealing portion 600, the annular seat 300, the diversion device 200 are fixedly assembled to the housing portion 100.

[0025] The housing portion 100 comprises a housing 130 and a fixed ring 140, the housing portion 100 is configured with a mutation cavity 110.

[0026] The housing 130 comprises an outer wall 131 and an inserting element 132 fixedly connected at the bottom portion of the outer wall 131, the inserting element 132 is a grid outlet mesh. The outer wall 131 is disposed

with a plurality of suction passages 120 annularly arranged running through the inside and outside of the outer wall 131. The outer wall 131 is step structural with big end down, the step structure has a step surface, the internal port 121 of the suction passage 120 is located on the step surface, so that the internal port is faced to the mutation cavity 110 and connected to the mutation cavity 110, the external port 122 of the suction passage 120 is located on the external revolution surface of the outer wall 131 of the housing 130, so that the suction passage 120 connects the inner side and the outer side of the mutation cavity 110.

[0027] The housing portion 100 is detachably assembled to the water supplying opening like the outlet of the tap, the assembly structure is that: the external revolution surface of the housing portion 100 is disposed with external thread 150, the lower portion of the external revolution surface of the housing 130 is an external smooth surface 133, which is located below the external thread 150, the external diameter of the external smooth surface is smaller than that of the external thread 150; the water supplying opening 700 has a step face 710 and an internal revolution surface extending outwardly from the external periphery of the step face, the internal revolution surface is disposed with internal thread, the lower portion of the internal revolution surface is an internal smooth surface; the external thread of the housing portion 100 is threaded to the internal thread, the internal smooth surface and the external smooth surface are arranged with annular space, which forms the air flowing clearance 160, the opening of the air flowing clearance 160 is located between the internal smooth surface and the external smooth surface and faced downwardly. Therein, the external port of the suction passage 120 is located on the external smooth surface, the air flowing clearance is connected to the external port, so that air at the outer side enters the mutation cavity 110 through the air flowing clearance, the external port and the internal port. As needed, the external smooth surface is disposed with a plurality of ribs 134 arranged peripherally with space, the ribs are fitted to contact with the internal smooth surface, the portion of two adjacent ribs forms the air flowing clearance or a portion of the air flowing clearance.

[0028] The fixed ring 140 is fixedly connected to the upper portion of the outer wall 131, the fixed ring 140 is disposed with an annular protrusion 142 protruding outwardly radically, the annular protrusion 142 is supported on the upper end face of the outer wall of the housing 130, the fixed ring 140 has an assembly portion 143 located on the annular protrusion 142. The sealing portion 600 has a surrounding portion 610 and a capping portion 620 extending inwardly from the internal periphery of the surrounding portion 610. The sealing portion 600 and the fixed ring 140 are fixedly assembled, the assembling structure is that: the surrounding portion 610 is surrounded and fixedly sleeved on the outer side of the assembly portion 143, the bottom portion of the surrounding portion 610 is supported on the annular surface of the annular

protrusion 142, the surrounding portion 610 is pressed and deformed to extend out of the annular protrusion to achieve peripheral sealing, the capping portion 620 is at least capping the end face of the upper end portion of the assembly portion 143, after the flow regulator is assembled to the water supplying opening, the capping portion 620 abuts against the step surface to achieve axially sealing. Preferred, the assembly portion 143 is concaved with an annular groove 144, the bottom portion of the surrounding portion 610 is protruding inwardly with a protruding portion 611, the protruding portion 611 is fitly connected in the annular groove 144.

[0029] In this embodiment, the front end face of the fixed ring is disposed with the sealing portion, firstly, the sealing portion can fit to the tap in the end face axial sealing and the periphery face peripheral sealing so as to prevent water leakage, the end face fitting has advantage that the sealing is stable and it is easy to manufacture, it solves the problem of traditional concealed flow regulator that the side sealing face is easy to be scratched during the manufacturing of the internal thread as it is near to the internal thread of the tap that results in water leakage, at the same time, this structure makes it easier to thread than the structure sealing in the side surface; secondly, the sealing portion of the end face of the traditional flow regulator is connected to the housing in interference fitting way, it will come off during transportation, so that it needs reassemble the spacer during the assembling, it is a waste of time in assembling, the sealing of the new structure comprises the surrounding portion and the capping portion, it won't come off easily, and with the cooperation of the concave-convex, it is more strong and stable.

[0030] The diversion device 200 comprises a periphery wall 210, a central base 220 in the periphery wall 210 and a deflecting annular wall 230 fixedly connecting the periphery wall 210 and the central base 220, the upper periphery of the periphery wall 210 protrudes outwardly with a support plate 212, the external periphery of the support plate 212 protrudes upwardly to from a connecting wall 213, the periphery wall is disposed with the diversion holes 211 to divide the water flowing. The connecting wall 231 is fixedly connected to the fixed ring 140, so as to fixedly assemble the annular seat 300, the diversion device 200 to the housing portion 100.

[0031] The capping portion 620 at least covers the connecting portion of the fixed ring 140 and the diversion device 200, preferred the connecting portion of the fixed ring 140 and the connecting wall 213, thus preventing water flowing out of the connecting portion directly and ensuring the water of aerating.

[0032] Water is divided from the diversion device 200 and then flows to the mutation cavity 110, the water flowing area is enlarged and negative pressure generates when the divided flowing enters the mutation cavity 110, the negative pressure sucks air in through the suction passage 120, air and water are mixed to generate bubble water. Preferred, the fixed ring 140 has a conical surface

141 corresponding to the diversion holes 211, the conical surface 141 surrounds the diversion device 200, so that water flows out of the diversion holes 211 and impacts the conical surface and then flows downwardly, the mutation cavity 110 comprises the clearance of the conical surface and the periphery wall and the portion of the housing portion below the diversion device. As needed, the periphery wall comprises a surrounding wall and an annular bottom wall extending inwardly from the periphery of the bottom of the surrounding wall radically, the diversion holes can be disposed at the surrounding wall or the annular bottom wall, the annular bottom wall is not figured out, the diversion holes are disposed at the surrounding wall, it should be noted that the diversion holes also can be disposed at the annular bottom wall.

[0033] The external periphery surface of the deflecting annular wall 230 is gradually larger downwardly radically from the central base 220 to the periphery wall 210, the central base 220 has at least a part extending out of the internal hole of the annular seat 300, a flowing clearance is formed between the central base 220 and the hole wall of the internal hole of the annular seat, the flowing clearance is disposed above the deflecting annular wall 230 to make water directly flow to the deflecting annular wall 230 through the flowing clearance. The external revolution surface of the deflecting annular wall 230 comprises a part of the conical surface. In another case, the external revolution surface of the deflecting annular wall 230 comprises a smooth curve, or in another case, the external revolution surface of the deflecting annular wall 230 comprises an arc with the center of circle outward.

[0034] The annular seat 300 is fixedly assembled to the periphery wall 210, the assembling structure is that the annular seat 300 is supported on the support plate 212, the connecting wall 213 and the annular seat 300 are coupled to make the annular seat 300 and the diversion device 200 fixedly connected together. The annular seat 300 is protruding upwardly with a protruding wall surrounding the internal hole of the annular seat 300, the water stop ring 400 is supported on annular seat 300, the external side of the water stop ring 400 is contacted with the internal side of the protruding wall 310, the water stop ring 400 surrounds the central base 220 in fitting way, so that water flowing area of the water flowing clearance can be adjusted by the water pressure. Preferred, the portion of the central base 220 corresponding to the water stop ring 400 is annularly arranged with a plurality of protrusions 221 with space. When in low pressure, the elastic water stop ring is pressed with low force, it just slightly deforms, at this time the flowing area of the elastic water stop ring and the protrusions 221 of the central base 220 of the diversion device is larger, the flow volume can be controlled in a certain value; when in high pressure, the elastic water stop ring is pressed with high force and it deforms greater, at this time, the water stop ring and the protrusions 221 of the central base 220 of the diversion device are cooperated to each other, so that the flowing area is reduced during the increasing of the

pressure, the flow volume can be controlled in a certain value; so the flow regulator has volume adjusting function, it can regulate the volume in a certain range of pressure.

5 **[0035]** The filter 500 is assembled to the protruding wall 310.

10 **[0036]** In this embodiment, the diversion device and the annular seat are manufactured separately and they can be fixedly assembled together, in other case, they can be manufacturing integrately as needed, if they are separately manufactured, it can just change the diversion device to develop flow regulators with different flow volume. The structure has advantages, it can configure diversion holes with different sizes according to different flow volume classes to achieve best spraying outlet effect. Water flows out of the diversion holes of the diversion device and impacts the conical surface of the fixed ring to be rectified and finally flows out of the outlet of the housing, the effect is that the outlet volume is more stable, and it is water saving, the water is more soft.

15 **[0037]** Although the present invention has been described with reference to the preferred embodiments thereof for carrying out the patent for invention, it is apparent to those skilled in the art that a variety of modifications and changes may be made without departing from the scope of the patent for invention which is intended to be defined by the appended claims.

30 Claims

1. A concealed flow regulator, comprising a housing portion (100) and a water diversion device (200) assembled in the housing portion (100), the housing portion (100) is disposed with a mutation cavity (110) and a suction passage (120) connecting an inner and an outer of the mutation cavity (110), the diversion device (200) is used to divide water, negative pressure generates when the divided water flows into the mutation cavity (110), air is sucked to mix with water to produce bubble water under an action of the negative pressure; an external revolution surface of the housing portion (100) is disposed with external thread (150), the housing portion (100) can be threaded to a water supplying opening (700) via the external thread (150); wherein the suction passage (120) is disposed with an internal port (121) faced to the mutation cavity (110) and an external port (122) disposed in the external revolution surface, an air flowing clearance (160) is formed, when the flow regulator is in its installed condition, between the housing portion (100) and the inner wall of the water supplying opening (700), the air flowing clearance (160) is connected to the external port, so that air can enter the mutation cavity (110) through the air flowing clearance (160), the external port and the internal port, **characterised in that** the flow regulator further comprises an annular seat (300) and an elastic water

stop ring (400), wherein the annular seat (300), the water diversion device (200) and the housing portion (100) are assembled together; wherein the diversion device (200) comprises a periphery wall (210), a central base (220) in the periphery wall (210) and a deflecting annular wall (230) fixedly connecting the periphery wall (210) and the central base (220), the periphery wall (210) is disposed with diversion holes (211), the external periphery surface of the deflecting annular wall (230) is gradually larger downwardly radically from the central base (220) to the periphery wall (210), the central base (220) has at least a part extending out of an internal hole of the annular seat (300), a flowing clearance is formed between the central base (220) and the hole wall of the internal hole of the annular seat, the flowing clearance is disposed above the deflecting annular wall (230) to make water directly flow to the deflecting annular wall (230) through the flowing clearance; wherein the water stop ring (400) is supported on the annular seat (300) to surround and fit to the central base (220), so that the flowing area of the flowing clearance is adjustable by the water pressure so as to save water.

2. The concealed flow regulator according to claim 1, wherein the external revolution surface of the housing portion (100) comprises an external smooth surface below the external thread (150), an external diameter of the external smooth surface is smaller than an external diameter of the external thread (150), the external port of the suction passage (120) is located on the external smooth surface, the external smooth surface and an internal wall of the water supplying opening (700) are annularly arranged with space, the annular space forms above mentioned air flowing clearance.
3. The concealed flow regulator according to claim 1 and/or 2, wherein the housing portion (100) comprises a housing (130) and a fixed ring (140), the housing (130) has an outer wall (131), the fixed ring (140) is fixedly connected to the upper portion of the outer wall (131); the outer wall (131) is step structural with big end down, the step structure has a step surface, the internal port (121) is located on the step surface.
4. The concealed flow regulator according to any one or more of claims 1 to 3, wherein, when the flow regulator is in its installed condition, the water supplying opening (700) is disposed with a step face (710) and an internal revolution surface extending outwardly from the external periphery of the step face, the internal revolution surface is disposed with internal thread, the lower portion of the internal revolution surface is an internal smooth surface; the external thread of the housing portion (100) is threaded to the internal thread, the internal smooth surface

and the external smooth surface are arranged with space.

5. The concealed flow regulator according to any one or more of claims 1 to 4, wherein the flow regulator further comprises a sealing portion (600) having a surrounding portion (610) and a capping portion (620) extending inwardly from the internal periphery of the surrounding portion (610); the housing portion (100) comprises a housing (130) and a fixed ring (140), the housing (130) comprises an outer wall (131), the fixed ring (140) is fixedly connected to the upper portion of the outer wall (131), the fixed ring (140) is disposed with an annular protrusion (142) protruding outwardly radically, the annular protrusion (142) is supported on the upper end face of the housing (130), the fixed ring (140) has an assembly portion (143) located on the annular protrusion (142), the surrounding portion (610) is surrounded and fixedly sleeved on the outer side of the assembly portion (143), the capping portion (620) is at least capping the end face of the upper end portion of the assembly portion (143).
6. The concealed flow regulator according to claim 5, wherein the assembly portion (143) is concaved with an annular groove (144), the bottom portion of the surrounding portion (610) is protruding inwardly with a protruding portion (611), the protruding portion (611) is fitly connected in the annular groove (144).
7. The concealed flow regulator according to claim 5 and/or 6, wherein the bottom portion of the surrounding portion (610) is supported on the annular surface of the annular protrusion (142), the surrounding portion (610) is pressed and deformed to extend out of the annular protrusion to achieve peripheral sealing.
8. The concealed flow regulator according to claim 1, wherein the annular seat (300) is fixedly connected to the periphery wall (210); a protruding wall (310) is protruded on the annular seat (300) to surround the internal hole of the annular seat (300), the external side of the water stop ring is contacted with the internal side of the protruding wall (310).
9. The concealed flow regulator according to claim 8, wherein a filter (500) is further provided, the filter (500) is assembled to the protruding wall (310).
10. The concealed flow regulator according to any one or more of claims 1 to 9, wherein the upper periphery of the periphery wall (210) protrudes outwardly with a support plate (212), the external periphery of the support plate (212) protrudes upwardly to form a connecting wall (213), the annular seat (300) is supported on the support plate (212), the annular seat (300) is fixedly connected the diversion device (200) by

the cooperation of the connecting wall (213) and the annular seat (300).

11. The concealed flow regulator according to any one or more of claims 3 to 10, wherein the fixed ring (140) is disposed with a conical surface (141) corresponding to the diversion holes (211), the conical surface (141) surrounds the diversion device (200), so that water flows out of the diversion holes (211) and impacts the conical surface. 5
12. The concealed flow regulator according to any one or more of claims 1 to 11, wherein an external revolution surface of the deflecting annular wall (230) comprises a part of the conical surface. 10
13. The concealed flow regulator according to any one or more of claims 1 to 11, wherein the external revolution surface of the deflecting annular wall (230) comprises a smooth curve. 15
14. The concealed flow regulator according to any one or more of claims 1 to 11, in particular according to claim 8, wherein the external revolution surface of the deflecting annular wall (230) comprises an arc with the center of circle outward. 20

Patentansprüche

1. Ein verborgener Strömungsregulierer, welcher einen Gehäuseteil (100) und eine Wasserumlenkeinrichtung (200), die in dem Gehäuseteil (100) zusammengebaut sind, aufweist, der Gehäuseteil (100) ist mit einem Mutationshohlraum (110) und einem Saugdurchlass (120), der ein Inneres und ein Äußeres des Mutationshohlraums (110) verbinden, angeordnet, die Umlenkeinrichtung (200) wird verwendet, um Wasser zu teilen, negativer Druck erzeugt, wenn das geteilte Wasser in den Mutationshohlraum (110) strömt, Luft wird angesaugt, um sich mit Wasser zu vermischen, um Blasenwasser unter eine Einwirkung des negativen Drucks zu erzeugen; eine äußere Rotationsfläche des Gehäuseteils (100) ist mit einem äußeren Gewinde (150) angeordnet, der Gehäuseteil (100) kann mit einer Wasserlieferöffnung (700) über das äußere Gewinde (150) verschraubt werden; wobei der Saugdurchlass (120) mit einem inneren Anschluss (121), der zu dem Mutationshohlraum (110) hinweist, und einen äußeren Anschluss (122), der in der äußeren Rotationsfläche angeordnet ist, angeordnet ist, ein Luftströmungsfreiraum (160) wird gebildet, wenn der Strömungsregulierer in seinem installierten Zustand ist, zwischen dem Gehäuseteil (100) und der Innenwand der Wasserlieferöffnung (700) ist der Luftströmungsfreiraum (160) mit dem äußeren Anschluss verbunden, damit Luft in den Mutationshohlraum (110) eintreten kann, 25

und zwar durch den Luftströmungsfreiraum (160), den äußeren Anschluss und den inneren Anschluss, **dadurch gekennzeichnet, dass** der Strömungsregulierer ferner einen ringförmigen Sitz (300) und einen elastischen Wasserstoppring (400) aufweist, wobei der ringförmige Sitz (300), die Wasserumlenkeinrichtung (200) und der Gehäuseteil (100) zusammengebaut sind;

wobei die Umlenkeinrichtung (200) eine Umfangswand (210), eine zentrale Basis (220) in der Umfangswand (210) und eine ablenkende Ringwand (230), welche die Umfangswand (210) und die zentrale Basis (220) fest verbindet, aufweist, die Umfangswand (210) ist mit Umlenklöchern (211) angeordnet, die äußere Umfangsoberfläche der ablenkenden Ringwand (230) wird allmählich nach unten größer radial von der zentralen Basis (220) zu der Umfangswand (210), die zentrale Basis (220) hat wenigstens ein Teil, das sich nach außen von einem inneren Loch des ringförmigen Sitzes (300) heraus erstreckt, ein Strömungsfreiraum ist zwischen der zentralen Basis (220) und der Lochwand des inneren Lochs des ringförmigen Sitzes gebildet, der Strömungsfreiraum ist über der ablenkenden Ringwand (230) angeordnet, damit das Wasser direkt zu der ablenkenden Ringwand (230) durch den Strömungsfreiraum strömt;

wobei der Wasserstoppring (400) auf dem ringförmigen Sitz (300) gestützt wird, um die zentrale Basis (220) zu umgeben und an diese zu passen, so dass die Strömungsfläche des Strömungsfreiraums durch den Wasserdruck einstellbar ist, um Wasser zu sparen.

2. Der verborgene Strömungsregulierer nach Anspruch 1, wobei die äußere Rotationsfläche des Gehäuseteils (100) eine äußere glatte Oberfläche unter dem äußeren Gewinde (150) aufweist, ein äußerer Durchmesser der äußeren glatten Oberfläche ist kleiner als ein äußerer Durchmesser des äußeren Gewindes (150), der äußere Anschluss des Saugdurchlasses (120) ist auf der äußeren glatten Oberfläche angeordnet, die äußere glatte Oberfläche und eine innere Wand der Wasserlieferöffnung (700) sind ringförmig mit Raum angeordnet, der ringförmige Raum bildet den oben genannten Luftströmungsfreiraum. 30
3. Der verborgene Strömungsregulierer nach Anspruch 1 und/oder 2, wobei der Gehäuseteil (100) ein Gehäuse (130) und einen befestigten Ring (140) aufweist, das Gehäuse (130) hat eine Außenwand (131), der befestigte Ring (140) ist fest mit dem oberen Teil der Außenwand (131) verbunden; die Außenwand (131) ist stufenstrukturmäßig mit einem großen Ende unten, die Stufenstruktur hat eine Stufenoberfläche, der innere Anschluss (121) ist auf der Stufenoberfläche angeordnet. 35

4. Der verborgene Strömungsregulierer nach einem oder mehreren der Ansprüche 1 bis 3, wobei, wenn der Strömungsregulierer in seinem installierten Zustand ist, die Wasserlieferöffnung (700) mit einer Stufenstirnseite (710) und einer inneren Rotationsfläche, die sich nach außen von dem äußeren Umfang der Stufenstirnseite erstreckt, angeordnet ist, die innere Rotationsfläche ist mit innerem Gewinde angeordnet, der untere Teil der inneren Rotationsfläche ist eine innere glatte Oberfläche; das äußere Gewinde des Gehäuseteils (100) ist mit dem inneren Gewinde verschraubt, die innere glatte Oberfläche und die äußere glatte Oberfläche sind mit Raum angeordnet.
5. Der verborgene Strömungsregulierer nach einem oder mehreren der Ansprüche 1 bis 4, wobei der Strömungsregulierer ferner einen Dichtungsteil (600) mit einem umgebenden Teil (610) und einen Kappenteil (620), der sich nach innen von dem inneren Umfang des umgebenden Teils (610) erstreckt, aufweist; der Gehäuseteil (100) weist ein Gehäuse (130) und einen befestigten Ring (140) auf, das Gehäuse (130) weist eine Außenwand (131) auf, der befestigte Ring (140) ist fest mit dem oberen Teil der Außenwand (131) verbunden, der befestigte Ring (140) ist mit einem ringförmigen Vorsprung (142), der radial nach außen vorsteht, angeordnet, der ringförmige Vorsprung (142) ist auf der oberen Endstirnseite des Gehäuses (130) gestützt, der befestigte Ring (140) hat einen Zusammenbauteil (143), der auf dem ringförmigen Vorsprung (142) angeordnet ist, der umgebende Teil (610) ist auf der Außenseite des Zusammenbauteils (143) umgeben und fest ummantelt, wobei der Kappenteil (620) wenigstens die Endstirnseite des oberen Endteils des Zusammenbauteils (143) verkappt.
6. Der verborgene Strömungsregulierer nach Anspruch 5, wobei der Zusammenbauteil (143) mit einer Ringnut (144) konkav gemacht ist, der untere Teil des umgebenden Teils (610) steht mit einem vorstehenden Teil (611) nach innen vor, der vorstehende Teil (611) ist passend in der Ringnut (144) verbunden.
7. Der verborgene Strömungsregulierer nach Anspruch 5 und/oder 6, wobei der untere Teil des umgebenden Teils (610) auf der Ringoberfläche des ringförmigen Vorsprungs (142) gestützt ist, der umgebende Teil (610) wird gedrückt und verformt, um sich aus dem ringförmigen Vorsprung heraus zu erstrecken, um eine umfangsmäßige Abdichtung zu erreichen.
8. Der verborgene Strömungsregulierer nach Anspruch 1, wobei der ringförmige Sitz (300) fest mit der Umfangswand (210) verbunden ist; eine vorstehende Wand (310) ist auf dem ringförmigen Sitz (300) vorstehend, um das innere Loch des ringförmigen Sitzes (300) zu umgeben, die äußere Seite des Wasserstopprings ist mit der inneren Seite der vorstehenden Wand (310) in Kontakt.
9. Der verborgene Strömungsregulierer nach Anspruch 8, wobei ferner ein Filter (500) vorgesehen ist, der Filter (500) ist mit der vorstehenden Wand (310) zusammengebaut.
10. Der verborgene Strömungsregulierer nach einem oder mehreren der Ansprüche 1 bis 9, wobei der obere Umfang der Umfangswand (210) mit einer Stützplatte (212) nach außen vorsteht, der äußere Umfang der Stützplatte (212) steht nach oben vor, um eine Verbindungswand (213) zu bilden, der ringförmige Sitz (300) ist auf der Stützplatte (212) gestützt, der ringförmige Sitz (300) ist fest mit der Umlenkeinrichtung (200) verbunden, und zwar durch die Zusammenarbeit der Verbindungswand (213) und dem ringförmigen Sitz (300).
11. Der verborgene Strömungsregulierer nach einem oder mehreren der Ansprüche 3 bis 10, wobei der befestigte Ring (140) mit einer konischen Oberfläche (141) angeordnet ist, die den Umlenklöchern (211) entspricht, die konische Oberfläche (141) umgibt die Umlenkeinrichtung (200), so dass Wasser aus den Umlenklöchern (211) strömt und auf die konische Oberfläche auftrifft.
12. Der verborgene Strömungsregulierer nach einem oder mehreren der Ansprüche 1 bis 11, wobei eine äußere Rotationsfläche der ablenkenden Ringwand (230) einen Teil der konischen Oberfläche aufweist.
13. Der verborgene Strömungsregulierer nach einem oder mehreren der Ansprüche 1 bis 11, wobei die äußere Rotationsfläche der ablenkenden Ringwand (230) eine glatte Kurve aufweist.
14. Der verborgene Strömungsregulierer nach einem oder mehreren der Ansprüche 1 bis 11, insbesondere nach Anspruch 8, wobei die äußere Rotationsfläche der ablenkenden Ringwand (230) einen Bogen mit der Mitte des Kreises nach außen aufweist.

Revendications

1. Régulateur d'écoulement dissimulé, comprenant une portion de logement (100) et un dispositif de déviation d'eau (200) assemblé dans la portion de logement (100), la portion de logement (100) est disposée avec une cavité de mutation (110) et un passage d'aspiration (120) reliant un intérieur et un extérieur de la cavité de mutation (110), le dispositif de

déviator (200) est utilisé pour diviser de l'eau, une pression négative est générée lorsque l'eau divisée s'écoule dans la cavité de mutation (110), de l'air est aspiré pour se mélanger avec de l'eau afin de produire de l'eau gazeuse sous un effet de la pression négative ; une surface de révolution externe de la portion de logement (100) est disposée avec un filetage externe (150), la portion de logement (100) peut être filetée sur une ouverture d'alimentation en eau (700) via le filetage externe (150) ; dans lequel le passage d'aspiration (120) est disposé avec un orifice interne (121) faisant face à la cavité de mutation (110) et un orifice externe (122) disposé dans la surface de révolution externe, un espace libre d'écoulement d'air (160) est formé, lorsque le régulateur d'écoulement est dans son état installé, entre la portion de logement (100) et la paroi intérieure de l'ouverture d'alimentation en eau (700), l'espace libre d'écoulement d'air (160) est relié à l'orifice externe, de sorte que de l'air puisse entrer dans la cavité de mutation (110) à travers l'espace libre d'écoulement d'air (160), l'orifice externe et l'orifice interne, **caractérisé en ce que** le régulateur d'écoulement comprend en outre un siège annulaire (300) et un anneau d'arrêt d'eau élastique (400), dans lequel le siège annulaire (300), le dispositif de déviation d'eau (200) et la portion de logement (100) sont assemblés ensemble ; dans lequel le dispositif de déviation (200) comprend une paroi périphérique (210), une base centrale (220) dans la paroi périphérique (210) et une paroi annulaire de déflexion (230) reliant fixement la paroi périphérique (210) et la base centrale (220), la paroi périphérique (210) est disposée avec des trous de déviation (211), la surface périphérique externe de la paroi annulaire de déflexion (230) est progressivement plus grande vers le bas radialement de la base centrale (220) à la paroi périphérique (210), la base centrale (220) a au moins une partie s'étendant hors d'un trou interne du siège annulaire (300), un espace libre d'écoulement est formé entre la base centrale (220) et la paroi de trou du trou interne du siège annulaire, l'espace libre d'écoulement est disposé au-dessus de la paroi annulaire de déflexion (230) pour amener de l'eau à s'écouler directement vers la paroi annulaire de déflexion (230) à travers l'espace libre d'écoulement ; dans lequel l'anneau d'arrêt d'eau (400) est supporté sur le siège annulaire (300) pour entourer la base centrale (220) et s'ajuster à celle-ci, de sorte que l'aire d'écoulement de l'espace libre d'écoulement soit ajustable par la pression d'eau afin de faire des économies d'eau.

2. Régulateur d'écoulement dissimulé selon la revendication 1, dans lequel la surface de révolution externe de la portion de logement (100) comprend une surface lisse externe au-dessous du filetage externe

(150), un diamètre externe de la surface lisse externe est inférieur à un diamètre externe du filetage externe (150), l'orifice externe du passage d'aspiration (120) est situé sur la surface lisse externe, la surface lisse externe et une paroi interne de l'ouverture d'alimentation en eau (700) sont agencées de manière annulaire avec un espace, l'espace annulaire forme l'espace libre d'écoulement d'air susmentionné.

3. Régulateur d'écoulement dissimulé selon la revendication 1 et/ou 2, dans lequel la portion de logement (100) comprend un logement (130) et un anneau fixe (140), le logement (130) a une paroi extérieure (131), l'anneau fixe (140) est fixement relié à la portion supérieure de la paroi extérieure (131) ; la paroi extérieure (131) est une structure étagée avec une grande extrémité en bas, la structure étagée a une surface étagée, l'orifice interne (121) est situé sur la surface étagée.
4. Régulateur d'écoulement dissimulé selon une ou plusieurs des revendications 1 à 3, dans lequel, lorsque le régulateur d'écoulement est dans son état installé, l'ouverture d'alimentation en eau (700) est disposée avec une face étagée (710) et une surface de révolution interne s'étendant vers l'extérieur depuis la périphérie externe de la face étagée, la surface de révolution interne est disposée avec un filetage interne, la portion inférieure de la surface de révolution interne est une surface lisse interne ; le filetage externe de la portion de logement (100) est fileté sur le filetage interne, la surface lisse interne et la surface lisse externe sont agencées avec un espace.
5. Régulateur d'écoulement dissimulé selon une ou plusieurs des revendications 1 à 4, dans lequel le régulateur d'écoulement comprend en outre une portion de scellement (600) ayant une portion d'enveloppement (610) et une portion de recouvrement (620) s'étendant vers l'intérieur depuis la périphérie interne de la portion d'enveloppement (610) ; la portion de logement (100) comprend un logement (130) et un anneau fixe (140), le logement (130) comprend une paroi extérieure (131), l'anneau fixe (140) est fixement relié à la portion supérieure de la paroi extérieure (131), l'anneau fixe (140) est disposé avec une saillie annulaire (142) saillante radialement vers l'extérieur, la saillie annulaire (142) est supportée sur la face d'extrémité supérieure du logement (130), l'anneau fixe (140) a une portion d'assemblage (143) située sur la saillie annulaire (142), la portion d'enveloppement (610) est enveloppée et fixement emmanchée sur le côté extérieur de la portion d'assemblage (143), la portion de recouvrement (620) recouvre au moins la face d'extrémité de la portion d'extrémité supérieure de la portion d'assemblage (143).

6. Régulateur d'écoulement dissimulé selon la revendication 5, dans lequel la portion d'assemblage (143) est concave avec une rainure annulaire (144), la portion inférieure de la portion d'enveloppement (610) est saillante vers l'intérieur avec une portion saillante (611), la portion saillante (611) est reliée par ajustement dans la rainure annulaire (144). 5
7. Régulateur d'écoulement dissimulé selon la revendication 5 et/ou 6, dans lequel la portion inférieure de la portion d'enveloppement (610) est supportée sur la surface annulaire de la saillie annulaire (142), la portion d'enveloppement (610) est pressée et déformée pour s'étendre hors de la saillie annulaire afin d'atteindre un scellement périphérique. 10 15
8. Régulateur d'écoulement dissimulé selon la revendication 1, dans lequel le siège annulaire (300) est relié fixement à la paroi périphérique (210) ; une paroi saillante (310) fait saillie sur le siège annulaire (300) pour entourer le trou interne du siège annulaire (300), le côté externe de l'anneau d'arrêt d'eau est au contact du côté interne de la paroi saillante (310). 20
9. Régulateur d'écoulement dissimulé selon la revendication 8, dans lequel un filtre (500) est en outre prévu, le filtre (500) est assemblé sur la paroi saillante (310). 25
10. Régulateur d'écoulement dissimulé selon une ou plusieurs des revendications 1 à 9, dans lequel la périphérie supérieure de la paroi périphérique (210) est saillante vers l'extérieur avec une plaque de support (212), la périphérie externe de la plaque de support (212) est saillante vers le haut pour former une paroi de liaison (213), le siège annulaire (300) est supporté sur la plaque de support (212), le siège annulaire (300) est relié fixement au dispositif de déviation (200) par la coopération de la paroi de liaison (213) et du siège annulaire (300). 30 35 40
11. Régulateur d'écoulement dissimulé selon une ou plusieurs des revendications 3 à 10, dans lequel l'anneau fixe (140) est disposé avec une surface conique (141) correspondant aux trous de déviation (211), la surface conique (141) entoure le dispositif de diversion (200), de sorte que de l'eau s'écoule hors des trous de déviation (211) et frappe la surface conique. 45 50
12. Régulateur d'écoulement dissimulé selon une ou plusieurs des revendications 1 à 11, dans lequel une surface de révolution externe de la paroi annulaire de déviation (230) comprend une partie de la surface conique. 55
13. Régulateur d'écoulement dissimulé selon une ou plusieurs des revendications 1 à 11, dans lequel la surface de révolution externe de la paroi annulaire de déviation (230) comprend une courbe lisse.
14. Régulateur d'écoulement dissimulé selon une ou plusieurs des revendications 1 à 11, en particulier selon la revendication 8, dans lequel la surface de révolution externe de la paroi annulaire de déviation (230) comprend un arc avec le centre de cercle vers l'extérieur.

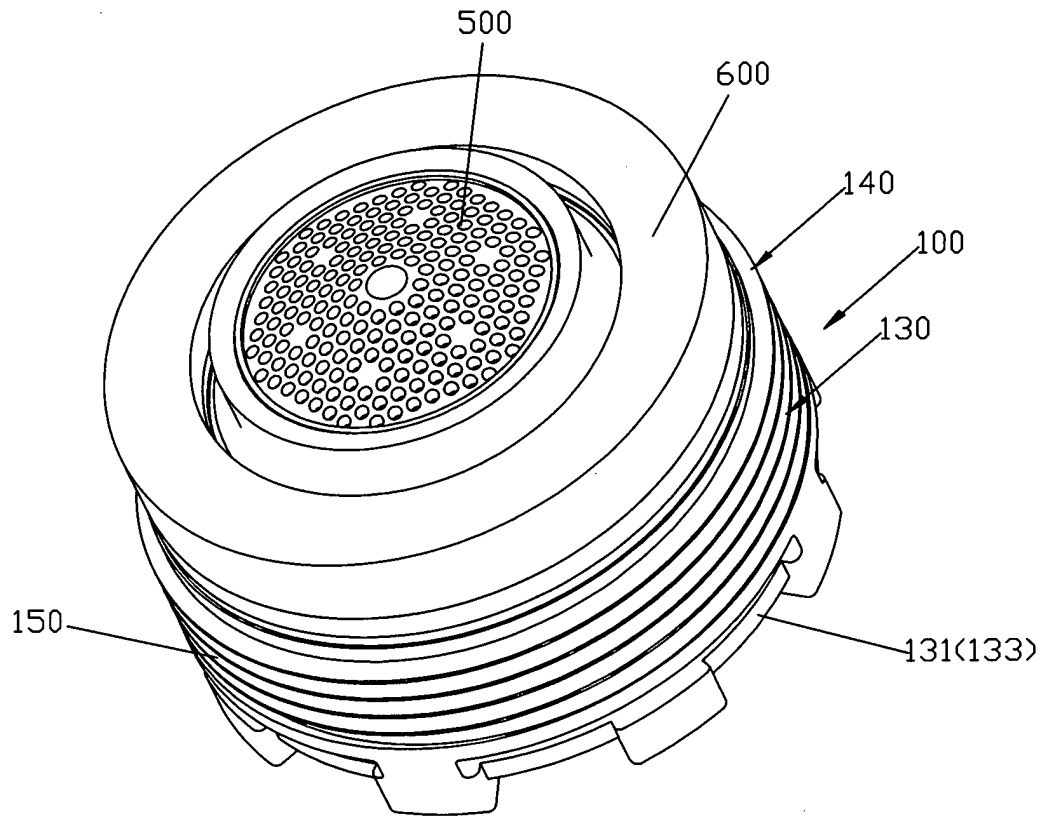


FIG. 1

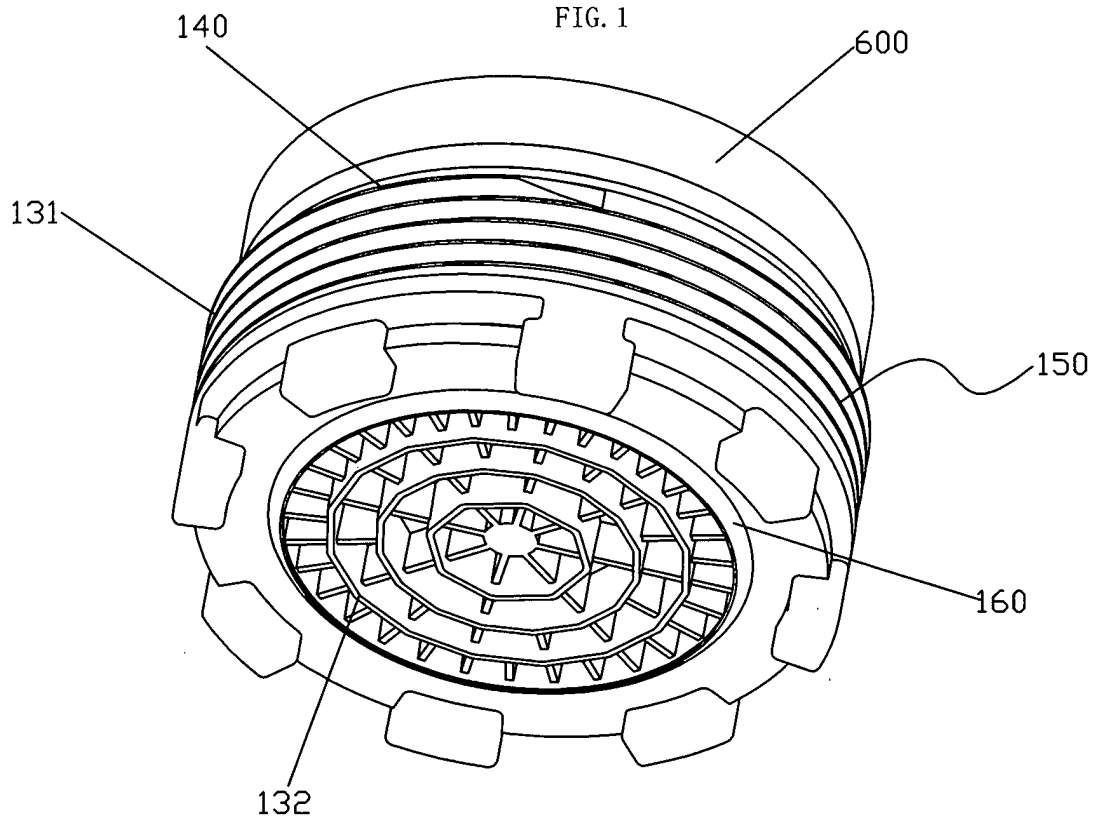


FIG. 2

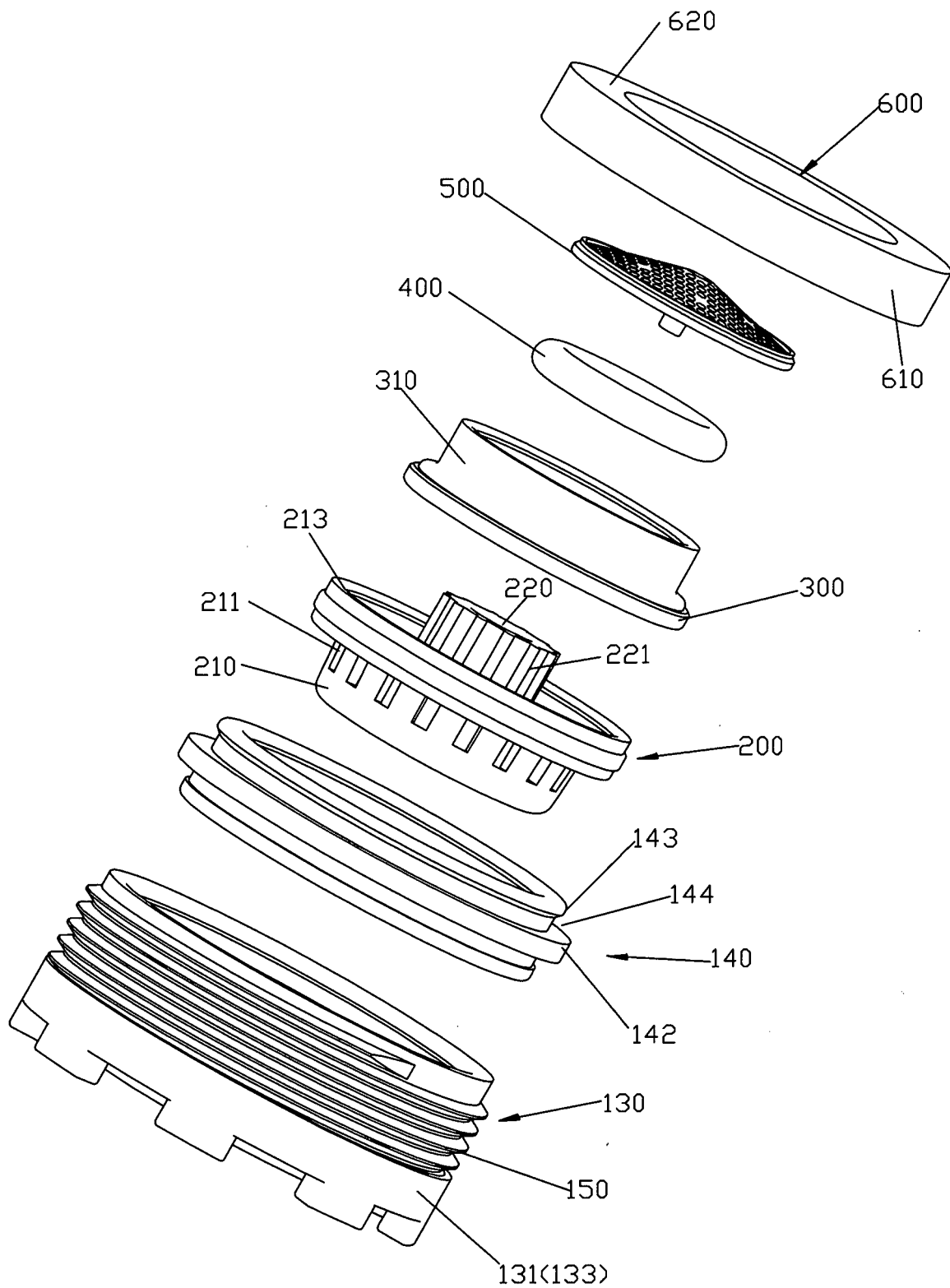


FIG. 3

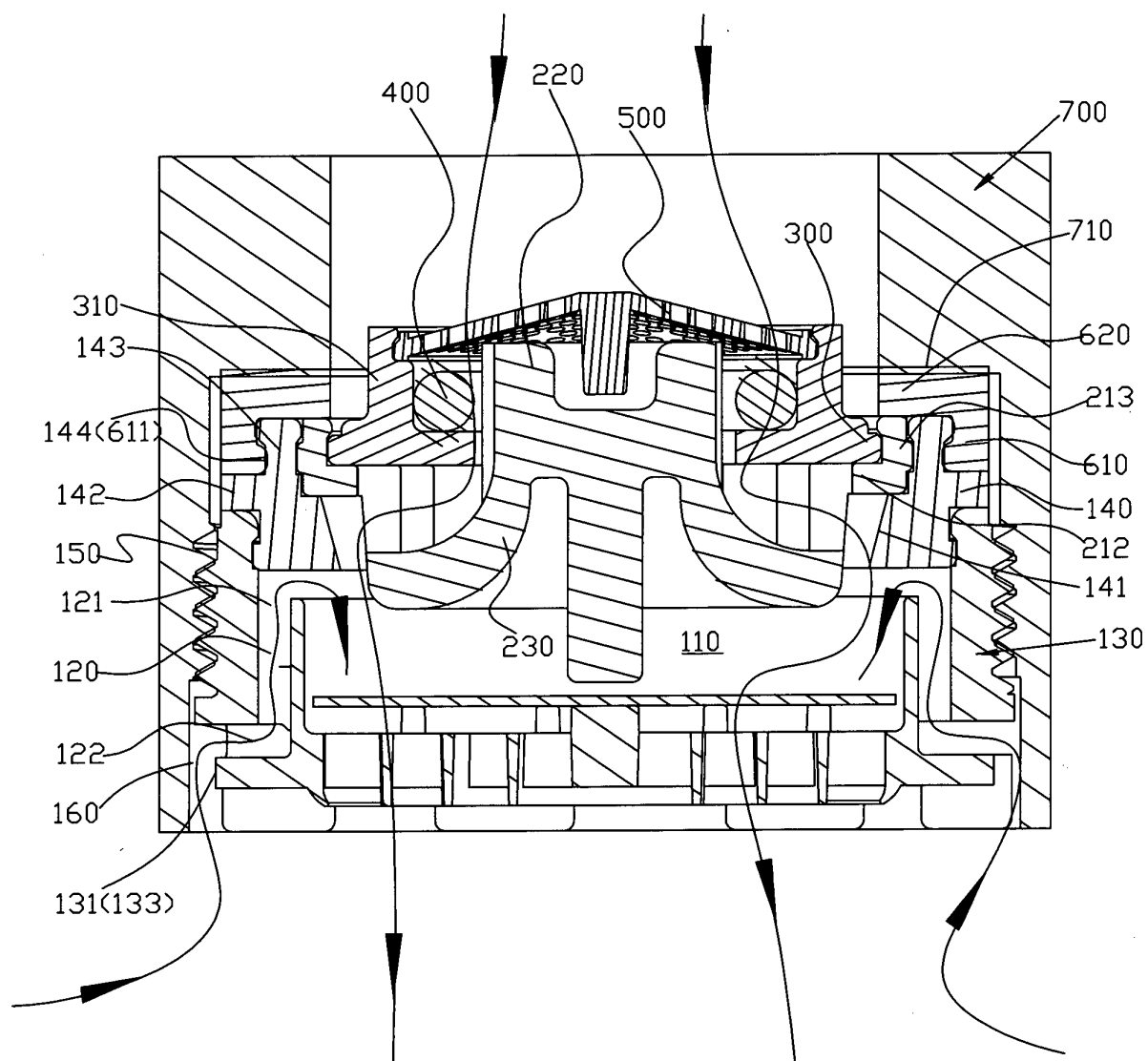
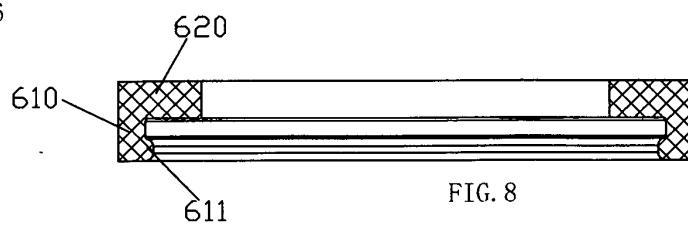
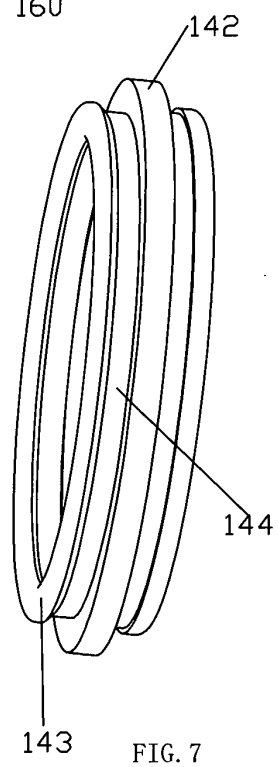
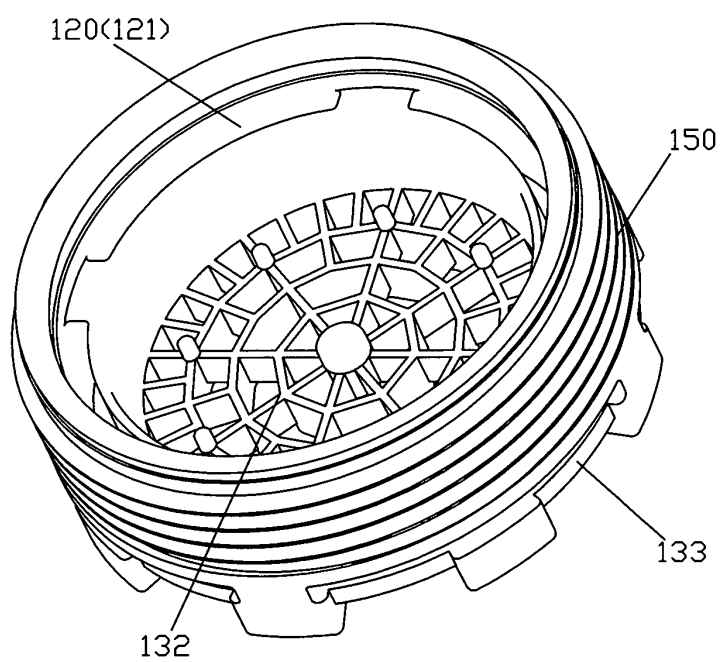
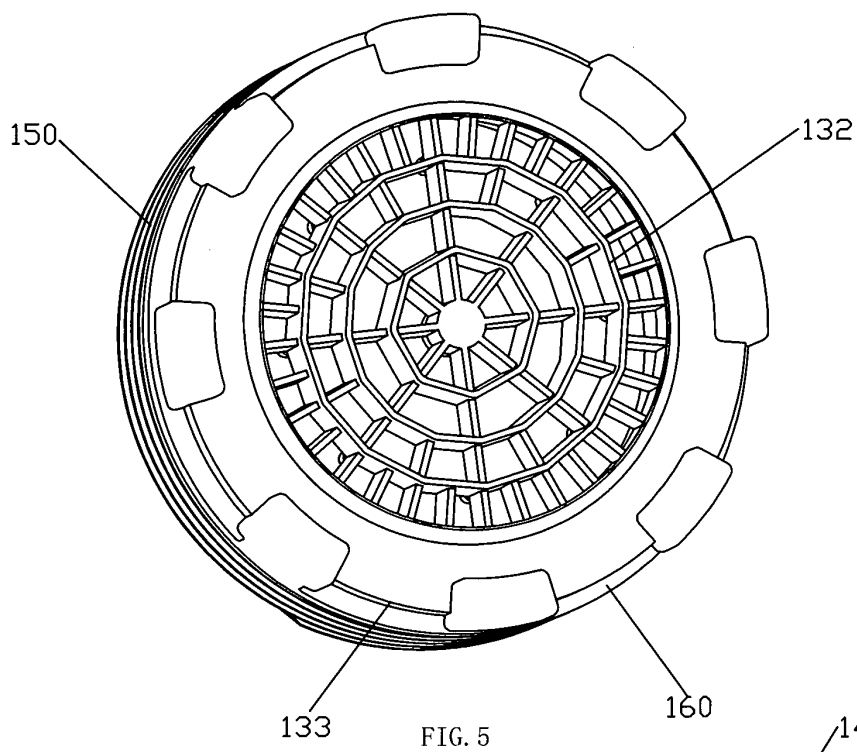
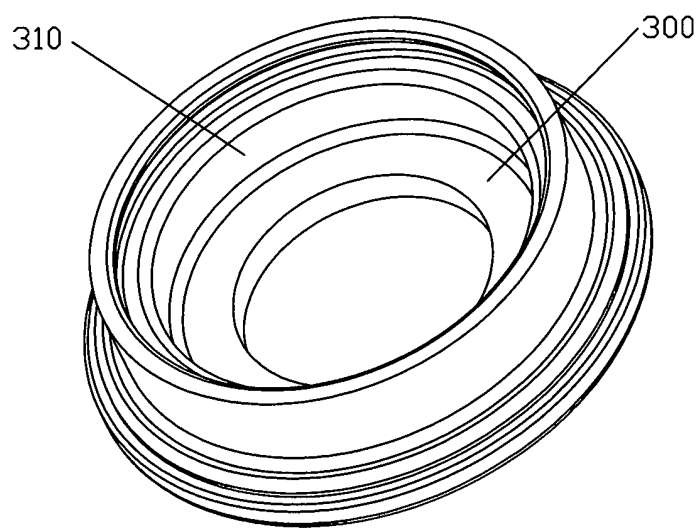
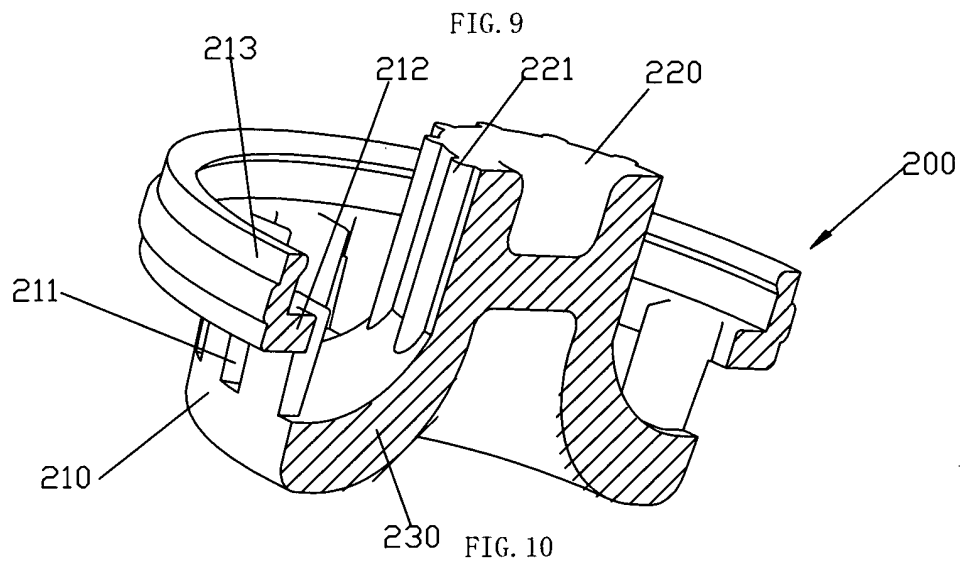
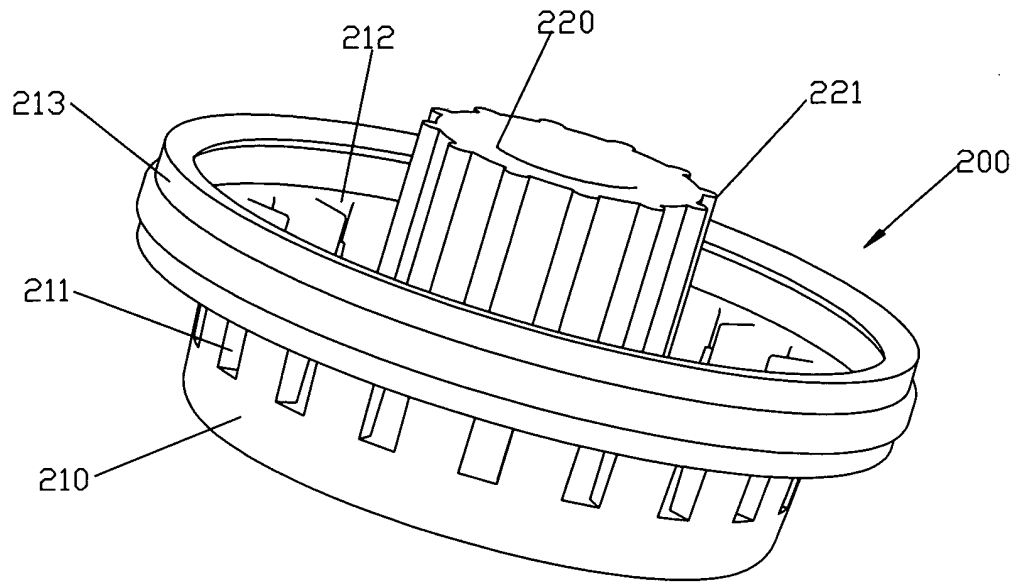


FIG. 4





REFERENCES CITED IN THE DESCRIPTION

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