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

(11) **EP 3 839 155 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
25.06.2025 Bulletin 2025/26

(21) Application number: **19217981.0**

(22) Date of filing: **19.12.2019**

(51) International Patent Classification (IPC):
E03B 9/02 *(2006.01)* ***E03C 1/04*** *(2006.01)*
E03C 1/10 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
E03B 9/025; E03C 1/0404; E03C 1/104; E03C 1/108

(54) EXTERIOR TAP WITH INTEGRATED SAFETY MEASURES

AUSSENHAHN MIT INTEGRIERTEN SICHERHEITSMASSNAHMEN

ROBINET EXTÉRIEUR AVEC MESURES DE SÉCURITÉ INTÉGRÉES

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(43) Date of publication of application:
23.06.2021 Bulletin 2021/25

(73) Proprietor: **Altus BV**
2270 Herenthout (BE)

(72) Inventor: **Smans, Mark**
2980 Halle - Zoersel (BE)

(74) Representative: **IP HILLS NV**
Bellevue 5/501
9050 Gent-Ledeberg (BE)

(56) References cited:
DE-A1- 2 020 610
DE-U- 1 941 696
US-A- 5 094 261
US-B1- 6 386 223

EP 3 839 155 B1

Description

Field of the invention

[0001] The present invention generally relates to the field of exterior taps. In particular, an exterior tap is presented that allows for a minimalistic appearance while integrating backflow preventing safety measures.

Background of the Invention

[0002] An exterior tap is typically mounted at an outside wall of a building, e.g. to provide a water supply to the garden. As the tap is clearly visible, it may interfere with the sleek appearance of a façade, e.g. a façade in white plaster. In the prior art, taps with a minimalistic appearance are found, but they lack a number of specific technical features, making them unsuitable for outside use.

[0003] Indeed, specific technical measures are required due to the fact that a hose may be connected to an exterior tap. As the hose may be lying on the ground or have its end in an outside reservoir, a risk exists that polluted water flows back towards the supply side, thereby contaminating the potable water supply. Two situations exist in which such a backflow may be triggered.

[0004] In a first situation, water pressure in the supply pipe may fail or be reduced, e.g. when a water main bursts. Reduced pressure in the pipe may allow contaminated water from the soil, from storage, or from other sources to be drawn up into the drinking water system. In order to prevent such a backflow, the use of an anti-siphon device, also referred to as backflow preventer or atmospheric vacuum breaker, is required for an outside tap. An anti-siphon device works by allowing air to enter the water system if an upstream pressure drop occurs. Inside is a small valve that allows the water to flow when a normal water pressure is found in the system, while closing the air entrance to the device. If the pressure in the upstream side is reduced to atmospheric pressure or below, the valve changes position and allows air to enter the system, breaking the siphon.

[0005] In a second situation, a risk of contaminated water flowing back arises when the downstream pressure is raised, e.g. due to connecting a high-pressure cleaner. In order to protect potable water supplies from contamination, often a non-return valve or check valve is used within the tap. The non-return valve opens due to an upstream water pressure, but blocks a backflow following an increased downstream pressure.

[0006] Many taps having a minimalistic appearance are designed for inside use or do not allow to connect a hose. Therefore, they are not equipped with the required safety measures as described above. On the other hand, solutions are known in the prior art providing the required safety measures, but not having the desired sleek design.

[0007] For example, a hose-bibb vacuum breaker is a screw-on type anti-siphon device having circumferentially positioned vents to allow air to enter the system when an upstream pressure drop occurs. Also in a classical exterior tap, e.g. shown at https://buks-vedder.de/shop/sanitaer/auslaufventile/174/auslaufventil-1/2-mit-rohrbeluefter-rueckflussverhinderer-dvgw, often such circumferentially positioned vents are visible in the outlet part of the tap. However, in order to allow a sufficient air supply towards those vents, a significant gap between the outlet housing and the hose connector is present in axial direction. This results in a lack of alignment in axial direction, therefore not allowing for a sleek appearance of the tap.

[0008] Examples of a screw-on type anti-siphon device are found in DE1941696U and DE2020610A1. Both present an anti-siphon device that may be screwed on the outlet of a tap. In DE1941696U, the circumferentially positioned vents are mostly shielded by the surrounding housing of the anti-siphon device. Therefore, in order to allow a sufficient air supply towards the vents, a significant gap between the housing of the anti-siphon device and the hose connector must be present in axial direction, thereby not allowing for a sleek appearance of the tap. In DE2020610A1, an embodiment is presented wherein a union nut is used to attach an anti-siphon device to a tap outlet. The union nut carries the housing of the anti-siphon device, and is screwed onto an external thread of the tap outlet. As the radial ventilation openings of the anti-siphon device are shielded by the union nut, the union nut comprises at least one bore, allowing air to reach the radial ventilation openings. The union nut is an additional component, mounted externally onto the tap outlet, thereby disrupting the appearance of the tap outlet. Moreover, a substantial axial gap is present between the outlet of the tap and a mounted hose connector, thereby not allowing for a sleek appearance. Finally, the one or more bores in the union are visible to the user, thereby further disrupting the appearance of the tap.

[0009] Another solution is found in US2006/0196561. A wall hydrant is presented having a check valve to prevent backflow caused by excessive water pressure at the outlet port. Moreover, a vacuum breaker is used to prevent undesirable back siphonage backflow. The vacuum breaker is located on top of the faucet, exterior to the faucet housing. It is therefore clearly visible and does not allow for a sleek appearance of the faucet.

[0010] In EP3139074 and EP2479462 a frost-proof drain fitting for an outside tap is described. Similar to the previous solution, the tap is equipped with two safety measures. Firstly, an aerator is used acting as an anti-siphon device. As in the previous solution, the aerator is positioned on top of the tap, thereby not allowing for a sleek design of the tap. Secondly, a non-return cone is used that only opens at sufficient system pressure in the piping system, and prevents a backflow due to an increased downstream pressure. Moreover, additional protection is obtained by means of a backflow preventer integrated within the tap outlet. When a backflow against the normal flow direction originates from a connected

hose, the backflow preventer blocks passage towards the inside of the tap, and the polluted water is drained by means of a backflow outlet hole provided in the outlet housing.

[0011] Contrary to the aforementioned solutions of US2006/0196561, EP3139074 and EP2479462, where the exterior position of the anti-siphon device prevents a sleek appearance of the tap, in US4696322 a solution is presented to conceal an anti-siphon device within the faucet. For this purpose, an anti-siphon breaker valve is integrated within a hollow ball valve. The upper part of the ball valve comprises vent apertures, being in communication with an auxiliary opening in the tap housing, the auxiliary opening being in connection with outside air. In case of an upstream pressure drop, an anti-siphon air passageway is formed through the auxiliary opening, the vent apertures and the interior of the ball valve, thereby changing the position of the anti-siphon breaker valve and preventing a siphonage backflow. Although the solution of US4696322 allows to conceal the anti-siphon device, the appearance of the faucet is not minimalistic. Moreover, the solution requires custom features, like the use of a hollow ball valve and the provision of an auxiliary opening at the position where the control stem enters the housing. Therefore, the described concept to conceal the anti-siphon device cannot generally be applied to another tap having a completely other design.

[0012] It is an objective of the present invention to disclose an exterior tap, that resolves one or more of the above described shortcomings of the prior art solutions. More particularly, it is an objective to present an exterior tap that allows for a minimalistic appearance, while integrating backflow preventing safety measures.

Summary of the Invention

[0013] According to the present invention, the above identified objectives are realized by a tap for providing an exterior water supply defined by claim 1, the tap comprising:

- an outlet part, comprising an intake port adapted to receive a water flow when the tap is open, and comprising one or more flow channels adapted to guide the water flow towards an outlet side of the tap;
- an anti-siphon device comprised in the outlet part, the anti-siphon device comprising:
    - o circumferentially positioned vents;
    - o a valve movable between a first and a second position, wherein in the first position the intake port is opened and the vents are sealed from the one or more flow channels, and

  in the second position the intake port is closed and a passageway is formed between the vents and the one or more flow channels,

wherein:

- the outlet part comprises a sleeve mounted around the anti-siphon device, such that a circumferential slit is present between the sleeve and the anti-siphon device, the sleeve comprising a wall with varying thickness, and the wall comprising:
    - o a cylindrical outer surface;
    - o an upper wall part with a first thickness, and a lower wall part with a second thickness smaller than the first thickness, such that in mounted condition the circumferential slit is formed between the lower wall part and the anti-siphon device,
- the sleeve comprises a recess, such that an air passageway is present from the exterior environment to the vents via the recess and the circumferential slit,
- the outlet part comprises a connecter, the connector comprising a cylindrical part;

and wherein:

- in mounted condition, the outer surface of the cylindrical part of the connector is aligned with the cylindrical outer surface of the wall of the sleeve, thereby together defining a continuous cylindrical surface, and
- in mounted condition, the cylindrical part of the connector and the sleeve are positioned close to each other, leaving an intermediate axial gap of less than 3 mm.

[0014] Thus, the invention concerns a tap for providing an exterior water supply. An exterior tap is typically mounted at an outside wall of a building, e.g. to provide a water supply to the garden. Typically, a hose may be connected to the tap, possibly after mounting a connector part to the tap.

[0015] The tap comprises an outlet part. An outlet part is defined as a part of the tap having two ends. When the tap is opened by means of an operating handle, the first end receives a water flow from the supply pipe, and at the other end the water flows out towards the environment or a connected hose. When the tap is closed by means of the operating handle, no water flows through the outlet part. The outlet part comprises an intake port adapted to receive a water flow when the tap is open, and comprises one or more flow channels adapted to guide the water flow towards the outlet side of the tap.

[0016] The tap further comprises an anti-siphon device. The anti-siphon device is comprised in the outlet part. This implies that the position of the anti-siphon device is close to the outlet of the tap, and is not positioned for example on top of the tap. For example, when a tap comprises a horizontal supply part and a downwardly

pointing outlet part, the anti-siphon device is located within the downwardly pointing outlet part, and not on top of the horizontal supply part. In other words, the anti-siphon device is not positioned exterior to the tap housing, but is integrated within the outlet part.

[0017] The anti-siphon device is adapted to prevent a backflow of polluted water when a pressure drop occurs at the upstream side, e.g. due to a pipe burst. For this purpose, the anti-siphon device comprises vents and a valve. The vents are openings adapted to let outside air enter into the interior of the anti-siphon device. The vents are circumferentially positioned, which means that across the circumference of the anti-siphon device such vents are present. For example, in an embodiment, the anti-siphon device may have a cylindrical outer surface, and the vents may be positioned at a circular line. At least two vents are present. For example, in an embodiment two vents may be positioned opposite to each other. In another embodiment, a series of vents may be available, e.g. positioned equidistantly across the circumference of the anti-siphon device.

[0018] The valve of the anti-siphon device is movable between a first and a second position. In the first position the intake port is opened and the vents are sealed from the flow channels. Under normal flow conditions, i.e. at normal upstream water pressure, the valve is in the first position, thereby allowing water to flow from the intake port through the flow channels. At the same time, the outside air entering the anti-siphon device by means of the vents is blocked from flowing towards the flow channels or towards the supply side. When the valve is in the second position, the intake port is closed, and a passageway is formed between the vents and the flow channels. The valve moves towards the second position when an upstream pressure drop occurs. For example, the valve is moved towards the second position due to the pressure difference between a negative pressure at the supply side of the valve and an atmospheric pressure at the outlet side of the valve. In the second position of the valve, a connection is formed between the vents and the flow channels, while the connection between the supply side and the flow channels is blocked by the valve. In this way, outside air entering the anti-siphon device by means of the vents may flow towards the flow channels and possibly may be leaking somewhat towards the supply side due to negative upstream pressure and the valve not perfectly closing the intake port. In this way, the upstream pressure drop does not result in polluted water flowing back, and at most some air is drawn by the supply system. In possible embodiments, the valve may be held in the first position when the tap is closed. In other embodiments, the valve may be in the second position for a closed tap.

[0019] The outlet part further comprises a sleeve mounted around the anti-siphon device, such that a circumferential slit is present between the sleeve and the anti-siphon device. In an embodiment, the sleeve may be part of the housing of the tap. The sleeve is mounted around the anti-siphon device, which implies that the anti-siphon device is entirely or partly concealed by the sleeve mounted around it. For example, the sleeve has a hollow body, and the anti-siphon device is located fully or partly within a cavity of the sleeve. The sleeve is mounted such that a slit is present between the sleeve and the anti-siphon device, along the circumference. This implies that, across its entire height or part of its height, the sleeve is not in contact with the anti-siphon device, but some space is present in between, e.g. in radial direction.

[0020] Moreover, the sleeve comprises a recess, such that an air passageway is present from the exterior environment to the vents via the recess and the circumferential slit. A recess may e.g. be an opening in the surface of the sleeve. The recess allows air to enter from the outside environment towards the circumferential slit. Furthermore, air present in the circumferential slit may continue its way through the vents towards the interior of the anti-siphon device. Because of the presence of the circumferential slit, no direct alignment is needed between the recess and a vent of the anti-siphon device.

[0021] The invention is advantageous compared to solutions known in the prior art, because of various aspects. Firstly, an anti-siphon device is present, while still allowing for a minimalistic design of the tap. This means that the required protection against contamination due to back siphonage is provided, but the presence of the anti-siphon device does not interfere with the outside appearance of the tap. Indeed, the fact that the anti-siphon device is integrated within the outlet part of the tap, and is entirely or partly concealed by the sleeve, allows for a minimalistic appearance, contrary to solutions where the anti-siphon device is clearly visible from the outside of the tap.

[0022] Another advantage is that, despite the fact that the anti-siphon device is integrated within the outlet part, still a good performance of the anti-siphon device is obtained. Indeed, the presence of the recess in the sleeve ensures that air is provided towards the vents, even when a connector, e.g. a hose connector, is mounted very close to the sleeve. As such, no substantial axial gap is required between the sleeve and a connector, contrary to a hose-bibb vacuum breaker or classical exterior tap where such an axial gap is required to provide air towards the circumferentially positioned vents. Consequently, the presence of the recess in the housing allows for a nice alignment of the sleeve and a mounted connector, leading to a sleek appearance of the tap.

[0023] Furthermore, the circumferential slit between the sleeve and anti-siphon device allows that air can be optimally supplied towards all the circumferentially positioned vents. Indeed, the presence of the circumferential slit allows sufficient air to enter in an equally distributed way, thereby moving the valve promptly in a balanced way when siphonage conditions occur. An optimal supply of air results in an optimal performance of the anti-siphon device, as it is the provided air that

triggers the movement of the valve and that dissolves the occurring negative pressure. The latter is important to prevent that a backflow is actually triggered. As the anti-siphon device is comprised in the outlet part, the negative pressure is dissolved close to the outlet side, thereby preventing that polluted water is sucked into the tap.

[0024] Finally, due to the presence of the circumferential slit, it is allowed that none of the vents is perfectly positioned opposite to the recess in the sleeve. This has the advantage that an optimal performance of the anti-siphon device is obtained, while allowing for a simple and fast assembly of the tap.

[0025] The sleeve comprises a wall with varying thickness. For example, the sleeve is a hollow body surrounded by a wall having a certain thickness. This thickness is not constant, but varies along the height of the sleeve, where the height is defined as the dimension following the central axis of the outlet part. Having a wall with varying thickness has the advantage that a circumferential slit between the sleeve and the anti-siphon device may easily be created. For example, in an embodiment, the sleeve may be mounted such that one part is in contact with the anti-siphon device, while another part, having a smaller thickness, is not in contact with the anti-siphon device but some space is left between the sleeve and the anti-siphon device. In this way, the anti-siphon device can easily be fixed to the sleeve, e.g. by means of screwing, while at the position of the vents, the circumferential slit allows for an optimal air supply towards the vents.

[0026] The wall of the sleeve comprises multiple parts with different thicknesses and/or the thickness of the wall varies in a continuous way. This implies that the varying thickness of the sleeve wall may be obtained in different ways. In an embodiment, the sleeve comprises multiple parts, where not all parts have the same thickness. For example, the circumferential slit is created between a thinner part of the sleeve and the anti-siphon device, while a thicker part of the sleeve is in contact with the anti-siphon device. In another embodiment, the wall thickness varies in a continuous way, as is e.g. the case when the sleeve has a conical inner surface. In yet another embodiment, a combination of multiple parts with different thicknesses and a continuously varying thickness is used for the sleeve wall.

[0027] The wall comprises a cylindrical outer surface, an upper wall part with a first thickness, and a lower wall part with a second thickness, wherein the second thickness is smaller than the first thickness. In an embodiment, the cylindrical outer surface of the sleeve may align with a cylindrical outer surface of a mounted connector, e.g. a hose connector. Therefore, the cylindrical outer surface of the sleeve has the advantage that a flat outer surface of the outlet part may be created, thereby contributing to a sleek appearance of the tap. Moreover, at the interior of the sleeve, a smaller inner diameter may be used for a first part and a larger inner diameter may be used for a second part of the sleeve. In this way, the sleeve comprises an upper wall part with a higher thickness, and a lower wall part with a smaller thickness. By mounting the sleeve around the anti-siphon device, automatically a circumferential slit is created between the sleeve and the anti-siphon device at the position of the lower wall part. This has the advantage that the sleeve is a simple and easily producible part, while an optimal air supply towards the vents is established.

[0028] The outlet part comprises a connecter, the connector comprising a cylindrical part, such that in mounted condition the outer surface of the cylindrical part is aligned with the cylindrical outer surface of the wall of the sleeve. A connector is a part that may be mounted to the tap, e.g. by screwing or clicking. For example, it may be a hose connector, comprising an end that allows to connect a hose. In another embodiment, the connector may be a fitting, a spout, etc. The connector has a cylindrical part, located at the side where the connector is mounted to the tap. In mounted condition, the outer surface of the cylindrical part of the connector aligns with the cylindrical outer surface of the sleeve. This means that both outer surfaces are in line with each other, thereby defining a continuous cylindrical surface. This contributes to a sleek and minimalistic appearance of the tap.

[0029] In mounted condition the cylindrical part of the connector and the sleeve are positioned close to each other, leaving an intermediate axial gap of less than 3 mm, preferably less than 1 mm. The axial direction is defined as the direction of the central axis of the outlet part. In axial direction, the connector is positioned very close to the sleeve, such that the connector is almost in contact with the sleeve. Only a gap of less than 3 mm, preferably less than 1 mm is left between the mounted connector and the sleeve in axial direction. In this way, the anti-siphon device is almost completely concealed by the sleeve and connector. Moreover, the small axial gap is almost invisible for the user, who merely perceives a continuous cylindrical surface defined by the sleeve and connector. The invisibility of both the anti-siphon device and the axial gap contribute to a sleek and minimalistic appearance of the tap.

[0030] Optionally, as is indicated by claim 3, the anti-siphon device comprises screw thread adapted to mount the connector close to the sleeve, leaving an axial gap of less than 3 mm, preferably less than 1 mm, between the sleeve and connector. This implies that the anti-siphon device comprises a part provided with screw thread, this part e.g. being located underneath the part with circumferentially positioned vents. Therefore, the connector can be mounted by screwing it onto the anti-siphon device. This has the advantage that a minimal number of components is needed for assembly, the connector can easily be mounted and removed, and the mounting of the connector automatically results in the small axial gap between the connector and the sleeve.

[0031] Optionally, as is indicated by claim 4, the recess is a hole in the wall of the sleeve, positioned at the bottom side of the cylindrical outer surface of the sleeve, such

that in mounted condition the recess is in contact with the axial gap and is positioned at the back side of the tap. For example, in an embodiment, the sleeve may comprise a lower wall part with smallest thickness, and the recess may be an opening extending over the height of that lower wall part. This implies that air flowing through the recess, directly enters into the circumferential slit, thereby contributing to an optimal air supply towards the vents of the anti-siphon device. Furthermore, in mounted condition the recess is positioned at the back side of the tap. The back side of the tap is defined as the side of the tap which, after mounting the tap to an exterior building wall, is directed towards the building wall. Thus, the back side of the tap is the side being the least visible for the user of the tap. Therefore, positioning the recess at the back side has the advantage that the recess does not or only partly interferes with the sleek front view of the tap, being visible for the user in daily use. Moreover, in an embodiment, the width of the recess may be chosen such that the recess is invisible or almost invisible from a side view, thereby contributing even more to the sleek appearance of the tap.

[0032] Optionally, as is indicated by claim 5, the dimensions of the recess are such that the surface area of the opening defined by the recess is at least 0,9 times, preferably at least 1 time, the joint surface area of the openings defined by the vents. This implies that the area of the recess is chosen large enough, in order to allow a sufficient air flow towards the vents. In other words, even if no axial gap between the sleeve and connector would be present, air may flow towards the vents just like in a prior art solution where the vents are in direct contact with the outside air. This contributes to an optimal functioning of the anti-siphon device, even when the sleeve and connector are very closely positioned. In an embodiment, the shape of the recess may be chosen such that the sufficient area as mentioned above is obtained, but at the same time the width is chosen small enough, making the recess invisible or almost invisible from a side view. This further contributes to a sleek appearance of the tap.

[0033] Optionally, as is indicated by claim 6, the tap comprises an inlet housing connected to the sleeve, the inlet housing comprising a cylindrical outer surface with axis perpendicular to the axis of the cylindrical outer surface of the sleeve. The inlet housing typically covers the supply pipe of the tap or part thereof. The inlet housing and the sleeve together form a housing of the tap, which is T-shaped. Both the horizontal part of the T-shape and the vertical part of the T-shape have a cylindrical surface, contributing to a sleek appearance. As the inlet housing has a cylindrical outer surface, no other parts, like e.g. an anti-siphon device, are mounted on top of the inlet housing, preventing that the flat outer view would be disturbed.

[0034] Further optionally, as indicated by claim 6, the inlet housing comprises a groove positioned in a transversal contact surface. A transversal surface of the inlet housing is a surface being substantially perpendicular to the axial central axis of the cylindrical inlet housing. When mounted to an exterior building wall, such a transversal contact surface is positioned substantially parallel with the height direction of the building wall. The transversal contact surface comprises a groove, e.g. being a circular groove around the central axis of the inlet housing. The presence of a groove has the advantage that space is created to conceal a sealing material. Such a sealing material, e.g. tape or cord of teflon or hemp, is typically used to seal the screw thread of the inlet housing when the latter is mounted within a flange on the building wall. This further contributes to a sleek and minimalistic appearance of the tap, when mounted onto a building wall. Moreover, it contributes to an improved ease of installation.

[0035] Optionally, as is indicated by claim 7, the anti-siphon device comprises an inner hexagon adapted to mount the anti-siphon device. In prior art solutions, often an outer hexagon, e.g. a hexagonal nut, is provided for mounting the anti-siphon device. However, such an outer hexagon interferes with a minimalistic design of the tap. To the contrary, using an inner hexagon means that the anti-siphon device comprises a hollow part with hexagonal interior. The later allows to mount the anti-siphon device in the sleeve using a tool with hexagonal outer contour. Providing an inner hexagon has the advantage that the anti-siphon device can easily be mounted, while the hexagon is not visible from the outside. This contributes to a sleek and minimalistic appearance of the tap.

[0036] Optionally, as is indicated by claim 8, the anti-siphon device comprises a cylindrical body. The cylindrical body comprises radial channels extending between the circumferentially positioned vents and a central space within the body. This implies that the anti-siphon device has a cylindrical outer surface, and channels run in radial direction from the vents at the outer surface towards a central space within the anti-siphon device. The central space has a closed end and an open end, where in mounted condition the open end is at the side of the intake port. Moreover, the anti-siphon device comprises axial channels, being comprised in the flow channels. Axial channels are channels in the direction of the central axis of the outlet part of the tap. The axial channels are adapted to receive a water flow and guide the water towards the outlet.

[0037] Furthermore, the valve is adapted to close the open end of the central space when the valve is in its first position. This implies that air flowing through the vents and radial channels, enters the central space, but is further blocked by the valve. Therefore, at normal flow conditions the vents are sealed from the flow channels, and water flows through the axial channels when the tap is open.

[0038] Moreover, the valve is adapted to open the open end of the central space in the second position of the valve, such that an air passageway is formed between the central space and the axial channels. Thus, when the valve is in its second position, the open end of the central space remains open, and the axial channels are in com-

munication with the central space of the anti-siphon device such that air may leave the central space towards the flow channels. This prevents that a backflow of polluted water is triggered in case an upstream pressure drop occurs.

[0039] Typically, the valve is held in the first position under its own weight and/or the pressure of a supplied water flow, and the valve is moved to the second position through a pressure difference between atmospheric air pressure within the central space and a negative pressure at the position of the intake port. In an embodiment, the valve may be in the first position when the tap is closed, remain in the first position when the tap is open and normal flow conditions occur, and move to the second position under back siphonage conditions. In another embodiment, the valve may be in the second position when the tap is closed, may move to the first position when the tap is open due to the pressure of the supplied water flow, and may move to the second position under back siphonage conditions. The valve moving to the second position is triggered by a pressure difference at both sides of the valve. If a negative pressure arises at the upstream side of the valve, e.g. due to a pipe burst, the valve is pushed to the second position by the air at atmospheric pressure present within the central space of the anti-siphon device.

[0040] Optionally, as is indicated by claim 9, the tap comprises an operating handle and a non-return valve connected to said operating handle, the non-return valve being positioned within the inlet housing and being adapted to directly control the water supply to the intake port of the outlet part. An operating handle is a component allowing to open and close the tap, like e.g. a rotary control, dial, lever or button. The operating handle is connected to a non-return valve. This implies that when opening a closed the tap, the non-return valve is changed in position, such that water may start to flow. The valve is a non-return valve, which means that it is adapted to open under the pressure of a flow in one direction, e.g. by compressing a spring, but blocks a flow in the opposite direction. The presence of a non-return valve has the advantage that a backflow of water is blocked, thereby preventing that any polluted water flows into the supply pipe. Such a backflow may be triggered by a downstream pressure increase, e.g. due to connecting a high-pressure cleaner. The non-return valve is positioned within the inlet housing and is adapted to directly control the water supply to the intake port of the outlet part. This implies that the non-return valve is located within the inlet housing, but at a position close to the intake port of the outlet part. This results in a compact design, where nearby the intake port both the opening/closing of the tap and the blocking of a high-pressure backflow is controlled. Such a compact design contributes to a minimalistic appearance of the tap, where especially the operating handle may have a small size. For example, in an embodiment, the operating handle may be a cylindrical rotary button aligned with the cylindrical outer surface of the inlet housing, the length of the button in axial direction being small due to the compact design of the internally connected non-return valve.

[0041] Optionally, as is indicated by claim 10, the operating handle comprises a cover element and a rotating element, the cover element being adapted to cover a transverse surface of the rotating element, and the cover element comprising a screw adapted to connect the cover element to the rotating element. The rotating element is typically the part which is rotated by the user to open or close the tap. In mounted condition, a cover element is connected to the rotating element, being located at the front end of the tap. The cover element thereby covers the front part of the rotating element. The cover element comprises a screw. This implies that the screw forms a single entity with the rest of the cover element. In other words, no individual screw is used, but the screw is integrated within the cover element. This has the advantage that enough screw thread may be provided to allow for a qualitative connection, but at the same time the cover element may be thin and the operating handle may be short in length. This further contributes to a sleek and minimalistic appearance of the tap.

[0042] Optionally, as is indicated by claim 11, the rotating element comprises a circumferentially positioned collar, the collar being adapted to cover an internally positioned slit ring. A slit ring is typically made of an elastic material and is typically used to avoid a metal-to-metal contact when rotating the operating handle. A slit ring may be positioned between the rotating element and the non-moving inlet housing, thereby providing for a fluent and durable rotation of the operating handle. Furthermore, the rotating element comprises a collar, e.g. a protrusion along the circular edge of the rotating element. When a slit ring is positioned between the rotating element and the inlet housing, the collar allows to conceal the slit ring. This further contributes to a sleek appearance of the tap.

Brief Description of the Drawings

[0043]

Fig. 1 gives two three-dimensional views of an exterior tap according to the invention.

Fig. 2 shows an exterior tap according to the invention, mounted in a wall-mounted flange.

Fig. 3 gives a cross-section of an exterior tap according to the invention.

Fig. 4a and 4b show an anti-siphon device integrated within a tap according to the invention, and illustrates two different positions of the valve of the anti-siphon device.

Fig. 5 gives a three-dimensional view of the anti-

siphon device as integrated within the tap of Fig. 3.

Fig. 6a and 6b shows two cross sections of the anti-siphon device of Fig. 5, following two different radial directions.

Fig. 7a and b give a top view and bottom view of the anti-siphon device as integrated within the tap of Fig. 3.

Fig. 8a-c conceptually illustrate the functioning of the anti-siphon device of Fig. 3.

Fig. 9 gives a back view of a tap according to the invention.

Fig. 10 gives an exploded view of a tap according to the invention.

Fig. 11 gives a closer view of the operating handle of the tap presented in Fig. 3.

Fig. 12, Fig. 13 and Fig. 14 each give a cross section of a tap according to the invention, mounted resp. in a wall-mounted flange, at a cover plate and at a wall.

Detailed Description of the Embodiments

[0044] Fig. 1 shows an embodiment of an exterior tap 100. Two different three-dimensional views are given. The tap 100 comprises a cylindrical inlet housing 107 and screw thread 108. The screw thread 108 is adapted to mount the tap 100 in a wall mounted flange 200, as is shown in Fig. 2. The wall mounted flange is typically fixed within a hole of a wall, for example by means of a fastener described in EP17209793. The tap 100 further comprises an operating handle 109, adapted to open and close the tap 100. In the embodiment of Fig. 1, the operating handle 109 is a cylindrical rotary button, of which the position is aligned with the cylindrical inlet housing 107.

[0045] The tap 100 comprises an outlet part 101. In the embodiment of Fig. 1, the central axis of the outlet part 101 is perpendicular to the central axis of the inlet housing 107. The outlet part 101 comprises a sleeve 102 and a connector 103. In the embodiment of Fig. 1, the connector 103 is a hose connector 103. In other embodiments the connector may have another function, e.g. it may be a fitting, a spout, etc. In the embodiment of Fig. 1, the sleeve 102 is fixed to the inlet housing 107, e.g. they may both be produced as a single component being the housing of the tap 100. The hose connector 103 comprises an end 111 adapted to connect a hose, e.g. to provide a water supply to the garden. The hose connector 103 further comprises a cylindrical part 104, located at the side where the hose connector 103 is mounted to the tap 100. In mounted condition, the outer surface of the cylindrical part 104 aligns with the cylindrical outer surface of the sleeve 102.

[0046] The axial direction is defined as the direction of the central axis of the outlet part 101. Following the axial direction, a small axial gap 106 is present between the sleeve 102 and the cylindrical part 104 of the hose connector 103. Furthermore, the sleeve 102 comprises a recess 105. In the embodiment of Fig. 1, the recess 105 is a hole positioned at the bottom side of the sleeve 102, such that in mounted condition the recess 105 is in contact with the axial gap 106. The recess 105 is positioned at the back side of the tap 100.

[0047] Fig. 3 shows a cross-section of the tap 100. The outlet part 101 comprises an intake port 302. When the tap 100 is open, water flows from the supply pipe 303 through the intake port 302 into the outlet part 101. The outlet part 101 comprises flow channels 401, indicated in Fig. 4a and b, adapted to guide the water flow towards the end 111. The hose connector 103 comprises internal ribs 310 adapted to break the outgoing water flow and generate a nebulized jet.

[0048] Fig. 3 shows that an anti-siphon device 300 is integrated within the outlet part 101. The anti-siphon device 300 is adapted to prevent a backflow of water from a connected hose towards the potable water supply when an upstream pressure drop occurs, e.g. due to a pipe burst. The anti-siphon device 300 and its functioning are further illustrated in Fig. 4 to 8.

[0049] Fig. 5 gives a three-dimensional view of the anti-siphon device 300. The anti-siphon device 300 comprises a cylindrical body 501 and a valve 400. For reasons of clarity, the valve 400 is shown in an exploded view. The cylindrical body 501 comprises vents 500, being positioned along the circumference of the cylindrical body 501. In the embodiment of Fig. 5 four vents 500 are provided, being positioned equidistantly along the circumference. In another embodiment, another number or positioning of the vents 500 may be provided. The vents 500 allow atmospheric air to enter into a central space 403 within the cylindrical body 501. For this purpose, the cylindrical body 501 comprises radial channels 402 extending between the vents 500 and the central space 403, as is clear from Fig. 6b. The valve 400 comprises a cover 502 and an elongated part 503. Fig. 6a-b show that in mounted condition of the anti-siphon device 300, the elongated part 503 is positioned within the central space 403, while the cover 502 is adapted to close the open top end of the central space 403. Fig. 6a-b also show that an O-ring 405 is used for sealing.

[0050] Fig. 6b gives an axial cross section, following a radial direction such that the radial channels 402 are visible. On the other hand, the cross section of Fig. 6a is made along another radial direction, such that axial channels 401 are visible. When the anti-siphon device 300 is mounted into the tap 100 and the tap 100 is open, water entering through the intake port 302 flows through the axial channels 401. The axial flow channels 401 are also shown on Fig. 7a and Fig. 7b, where a top view resp. a bottom view of the anti-siphon device 300 is given.

[0051] In Fig. 6a and Fig. 6b, the valve 400 is in a first

position. However, the valve 400 is movable between a first position and a second position, as is illustrated in Fig. 4a and 4b. In the first position, as is illustrated in Fig. 4a, the intake port 302 is opened and the vents 500 are sealed from the flow channels 401. In the second position, as illustrated in Fig. 4b, the intake port 302 is closed and a passageway is formed between the vents 500 and the flow channels 401.

[0052] This is further clarified in Fig. 8a, 8b and 8c, where the functioning of the anti-siphon device 300 is illustrated in a conceptual way. Fig. 8a, 8b and 8c resp. show the condition of the anti-siphon device 300 when the tap 100 is closed, when normal flow conditions apply, and in a situation where an upstream pressure drop occurs. When the tap 100 is closed, Fig. 8a shows that the valve 400 is in the first position, where it is held under its own weight, thereby closing the central space 403. In another embodiment however, the valve 400 may be in the second position when the tap is closed, e.g. by using a spring. In Fig. 8b, a water flow 802 enters through the intake port 302. The valve 400 is still in its first position, such that no water may enter into the central space 403. Instead, water flows through the axial flow channels 401, as is indicated with the arrows 801. Outside air may enter into the central space 403, through the vents 500 and radial channels 402. However, entered air cannot leave the central space 403, as the valve 400 closes the top end of the central space 403. In the situation of Fig. 8c, an upstream pressure drop occurs, e.g. due to a pipe burst. As an atmospheric pressure is exerted on the bottom side of the valve 400, and a negative pressure at the top side of the valve 400, the valve is moved towards its second position. In the second position, the intake port 302 is blocked by the valve 400. At the same time, outside air may enter the central space 403, and may leave the central space 403 at the open top end, see 803 and 804 in Fig. 8c. In this way, a connection is made between the central space 403 and the axial flow channels 401, such that atmospheric air may fill these flow channels 401. In this way, no water will be sucked from a connected hose. At most, some air is sucked towards the supply side, due to a non-perfect closing of the valve 400, see the leaking flow 805.

[0053] The valve 400 is designed such that it is movable between the first and second position under the mentioned pressure difference. For example, Fig. 6a-b show that the tap 400 comprises an elongated recess 404, adapted to reduce the weight of the valve 400.

[0054] The anti-siphon device 300 is integrated within the outlet part 101 of the tap 100, as is shown in Fig. 3 and in Fig. 4a and b. Fig. 4a gives a detail of Fig. 3, wherein the radial flow channels 401 are visible, similar to Fig. 6a, and wherein the valve 400 is in the first position. Fig. 4b gives a cross section showing the radial flow channels 402, similar to Fig. 6b. In Fig. 4b the valve 400 is in the second position.

[0055] The sleeve 102 comprises a cylindrical outer surface, as is clear from Fig. 1. Moreover, Fig. 4a and b show that the sleeve 102 comprises a wall with an upper wall part 407 and a lower wall part 406. The figure shows that the upper wall part 407 has a larger thickness than the lower wall part 406. In mounted condition, the upper wall part 407 is in contact with the anti-siphon device 300, by means of the screw thread 408. However, the lower wall part 406 is not in contact with the anti-siphon device 300, due to the lower thickness of the lower wall part 406. Instead, Fig. 3 and Fig. 4a-b show that some space is left in radial direction between the lower wall part 406 and the anti-siphon device 300, thereby resulting in a circumferential slit 301.

[0056] Fig. 1 shows that the sleeve 102 comprises a recess 105. The recess 105 allows outside air to enter into the circumferential slit 30. Thus, an air passageway is present from the exterior environment to the vents 500 via the recess 105 and the circumferential slit 301. Next, an air flow may continue its way towards the internal space 403 of the anti-siphon device 300, by means of the vents 500 and the radial channels 402. In this way, outside air may enter the anti-siphon device 300 in an optimal way, resulting in an optimal performance of the anti-siphon device 300. Because of the presence of the circumferential slit 301, no direct alignment is needed between the recess 105 and a vent 500 of the anti-siphon device 300.

[0057] Fig. 3 and Fig. 4a-b show that the recess 105 extends over the height of the lower wall part 406. Moreover, the back view of the tap 100 given in Fig. 9 shows that the recess is positioned centrally, at the back side of the sleeve 102. The back side is the side which, after mounting the tap 100 to a building wall, is directed towards the building wall. In the embodiment of Fig. 9, the width 1202 of the recess 105 is 6,1 mm, the height 1201 is 6,1 mm and the radius 1200 is 3,05 mm. These dimensions are chosen such that the surface of the recess 105 is about equal to the sum of the surfaces of the vents 500, were each vent 500 has a circular surface with radius 2 mm. In this way a sufficient amount of air may flow towards the vents 500, even when the axial gap 106 is kept very small. On the other hand, the width 1202 of the recess 105 is chosen such that the recess 105 is almost invisible when looking at the tap 100 from a side view. In this way, the presence of the recess 105 guarantees an optimal functioning of the anti-siphon device 300, while not disturbing the sleek appearance of the tap 100.

[0058] In another embodiment, the circumferential slit 301 may be created in another way. For example, the sleeve 102 may have a wall with a conical inner surface. Moreover, in other embodiments, another shape or positioning of the recess 105 is possible.

[0059] Fig. 4a and b show that the anti-siphon device 300 is mounted within the sleeve 102, by means of screw thread 408. Moreover, the anti-siphon device 300 comprises an inner hexagon 309, as is visible on Fig. 3, 4, 6 and 7b. The inner hexagon 309 allows to easily mount the anti-siphon device 300, using a tool with hexagonal outer contour. As the hexagon is not visible from outside, it does not disturb the outer appearance of the tap, see Fig.

1.

[0060] Fig. 3 and Fig. 4a-b further show that the anti-siphon device 300 comprises screw thread 308 adapted to mount the hose connector 103. The screw thread 308 was not drawn on Fig. 5 and Fig. 6a and b. As is clear from Fig. 1, Fig. 2, Fig. 3 and Fig. 9, in mounted condition the hose connector 103 is positioned very close to the sleeve 102, leaving an axial gap 106 of less than 3 mm, preferably less than 1 mm, between the sleeve 102 and the cylindrical part 104 of the hose connector 103. In the embodiment shown in Fig. 9, the height 1203 of the axial gap 106 is 0,9 mm. Moreover, the figures show that the cylindrical part 104 and the sleeve 102 are aligned, thereby defining a continuous cylindrical surface. The anti-siphon device 300 is almost completely concealed by this cylindrical surface. Only the recess 105 reveals a small part of the anti-siphon device 300, but due to its position directed towards the building wall, it is not eye-catching. As a result, the user merely perceives a sleek cylindrical outlet part, leading to a minimalistic appearance of the tap 100, see Fig. 1 and Fig. 2. Moreover, also the inlet housing 107, which has a cylindrical outer surface without any disturbances, and the cylindrical operating handle 109 aligned with the inlet housing 107, contribute to this minimalistic appearance. Despite the minimalistic design, the necessary safety measures are provided within the tap 100, due to the integrated anti-siphon device 300. Finally, due to the fact that the anti-siphon device 300 is almost completely covered by the sleeve 102 and hose connector 103, a chromium plating of the anti-siphon device 300 is not required, thereby avoiding the cost and environmental impact of such a chromium plating.

[0061] Fig. 3 further shows that the tap 100 comprises a non-return valve 304. The non-return valve 304 is also shown in the exploded view of Fig. 10. In mounted condition, the non-return valve 304 is connected to the operating handle 109. Turning the rotary operating handle 109 results in a displacement of the non-return valve 304, thereby opening or closing the entrance towards the intake port 302. When the tap 100 is open, water may flow from the supply pipe 303 towards the outlet part 101 by compressing a spring 305. However, the non-return valve 304 blocks a water flow in the opposite direction, as the spring 305 is not compressed. In this way, water flowing back due to an increased downstream pressure is blocked and cannot flow into the supply pipe 303.

[0062] The non-return valve 304 is positioned within the inlet housing 107 and is adapted to directly control the water supply to the intake port 302. The cross-section of Fig. 11 gives a closer view on the positioning of the non-return valve 304. In particular, the non-return valve 304 is integrated within the inlet housing 107 in such a way that the distance 905 between the headwork seat 907 and the central axis 908 of the outlet part is kept small. In the embodiment shown in Fig. 11, the distance 905 is 13 mm. Due to the small distance 905, the operating handle 109 can have a small length 906, and the length 910 between the sleeve and operating handle 109 can be small. In the embodiment of Fig. 11, the length 906 of the operating handle 109 is 22 mm, and the length 910 is 4 mm. The small lengths 906 and 910 further contribute to the minimalistic appearance of the tap 100.

[0063] Fig. 11 shows that the operating handle 109 comprises a cover element 900 and a rotating element 901. The rotating element 901 may be rotated by the user to open or close the tap 100. The cover element 900 is connected to the rotating element 901, thereby covering the front end of the rotating element 901. The cover element 900 comprises a screw 902, which forms an integral unity with the rest of the cover element 900. This is clearly visible in Fig. 10, where the cover element 900 comprising the screw 902 is presented as an individual component. The screw 902 allows for a qualitative connection between the cover element 900 and the rotating element 901. Moreover, the integration of the screw 902 within the cover element 900 allows for a thin cover element 900 and a short length 906 of the operating handle 109. In the embodiment of Fig. 10, the dimension 911 of the cover element 900 is 7,6 mm.

[0064] Furthermore, Fig. 11 shows that the rotating element 901 comprises a circumferentially positioned collar 903, which allows to cover an internally positioned slit ring 904. The slit ring 904 is typically made of elastic material and is used to avoid a metal-to-metal contact when rotating the rotating element 901. The slit ring 904 is also visible in the exploded view of Fig. 10. In mounted condition, the slit ring 904 is positioned between the rotating element 901 and the non-moving inlet housing 107, thereby providing for a fluent and durable rotation of the operating handle 109. In the embodiment of Fig. 11, the collar 903 is a protrusion along the circular edge of the rotating element 901. The collar 903 allows to conceal the slit ring 904, thereby further contributing to the sleek appearance of the tap 100.

[0065] In the shown embodiment of the tap 100, the rotating element 901 and the cover element 900 have a cylindrical outer surface, which is aligned with the cylindrical outer surface of the inlet housing 107. Furthermore, Fig. 1 and Fig. 2 show that the outer surface of the rotating element 901 is profiled, thereby offering an improved grip. In the shown embodiment, a profile with grooves having a triangular cross section is used. The use of such triangular grooves avoids that dirt such as sand or soil sticks between the profile grooves.

[0066] Fig. 3 further shows that the non-return valve 304 comprises a sealing ring 311. Additionally, two O-rings 306 and 307 are provided for sealing. Moreover, Fig. 1 and Fig. 3 show that the inlet housing 107 comprises a groove 110. The groove 110 lies in a transversal contact surface of the inlet housing 107, the transversal contact surface being substantially perpendicular to the central axis of the inlet housing 107. The groove 110 allows to conceal a sealing of the screw thread 108, a sealing which is e.g. provided in tape or cord of teflon or hemp. Therefore, the groove 110 contributes to a sleek

appearance of the tap 100 when the latter is mounted onto a wall, and allows for an easy installation of the tap 100.

[0067] Fig. 12, Fig. 13 and Fig. 14 give a cross section of the tap 100, where the tap 100 is mounted resp. in a wall-mounted flange 200, at a cover plate 1300 and at a building wall 1400. The figures illustrate that in various embodiments, the groove 110 allows to conceal a sealing of the screw thread 108. Finally, Fig. 12 shows that the wall-mounted flange 200 comprises a notch 1000 along its circumference. The notch 1000 allows to mount the flange 200 against a building wall being not perfectly flat, while creating the visual perception of a flat surface by means of the straight surface 1001 being positioned at a certain distance 1002 of the building wall.

[0068] Although the present invention has been illustrated by reference to specific embodiments, it will be apparent to those skilled in the art that the invention is not limited to the details of the foregoing illustrative embodiments, and that the present invention may be embodied with various changes and modifications without departing from the scope thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims. It will furthermore be understood by the reader of this patent application that the words "comprising" or "comprise" do not exclude other elements or steps, that the words "a" or "an" do not exclude a plurality, and that a single element, such as a computer system, a processor, or another integrated unit may fulfil the functions of several means recited in the claims. Any reference signs in the claims shall not be construed as limiting the respective claims concerned. The terms "first", "second", third", "a", "b", "c", and the like, when used in the description or in the claims are introduced to distinguish between similar elements or steps and are not necessarily describing a sequential or chronological order. Similarly, the terms "top", "bottom", "over", "under", and the like are introduced for descriptive purposes and not necessarily to denote relative positions. It is to be understood that the terms so used are interchangeable under appropriate circumstances and embodiments of the invention are capable of operating according to the present invention in other sequences, or in orientations different from the one(s) described or illustrated above.

Claims

1. A tap (100) for providing an exterior water supply, comprising:

- an outlet part (101), comprising an intake port (302) adapted to receive a water flow when said tap (100) is open, and comprising one or more flow channels (401) adapted to guide said water flow towards an outlet side of said tap (100);
- an anti-siphon device (300) comprised in said outlet part (101), said anti-siphon device (300) comprising:
  - o circumferentially positioned vents (500);
  - o a valve (400) movable between a first and a second position, wherein:
    - in said first position said intake port (302) is opened and said vents (500) are sealed from said one or more flow channels (401), and
    - in said second position said intake port (302) is closed and a passageway is formed between said vents (500) and said one or more flow channels (401);

wherein:

- said outlet part (101) comprises a sleeve (102) mounted around said anti-siphon device (300), such that a circumferential slit (301) is present between said sleeve (102) and said anti-siphon device (300), said sleeve (102) comprising a wall (406, 407) with varying thickness, and said wall comprising:
  - o a cylindrical outer surface;
  - o an upper wall part (407) with a first thickness, and a lower wall part (406) with a second thickness smaller than said first thickness, such that in mounted condition said circumferential slit (301) is formed between said lower wall part (406) and said anti-siphon device (300),
- said sleeve (102) comprises a recess (105), such that an air passageway is present from the exterior environment to said vents (500) via said recess (105) and said circumferential slit (301),
- said outlet part (101) comprises a connecter (103), said connector (103) comprising a cylindrical part (104);

CHARACTERIZED IN THAT:

- in mounted condition, the outer surface of said cylindrical part (104) of said connector (103) is aligned with said cylindrical outer surface of said wall of said sleeve (102), thereby together defining a continuous cylindrical surface, and
- in mounted condition, said cylindrical part (104) of said connector (103) and said sleeve (102) are positioned close to each other, leaving an intermediate axial gap (106) of less than 3 mm.

2. A tap (100) according to claim 1, wherein the intermediate axial gap (106) is less than

1 mm.

3. A tap (100) according to one of the previous claims, wherein said anti-siphon device (300) comprises a screw thread (308) adapted to mount said connector (103) close to said sleeve (102), leaving said axial gap (106) of less than 3 mm, preferably less than 1 mm.

4. A tap (100) according to one of the previous claims, wherein said recess (105) is a hole in said wall positioned at the bottom side of said cylindrical outer surface, such that in mounted condition said recess (105) is in contact with said axial gap (106) and is positioned at the back side of said tap (100).

5. A tap (100) according to one of the previous claims, wherein the dimensions of said recess (105) are such that the surface area of the opening defined by said recess (105) is at least 0,9 times, preferably at least 1 time, the joint surface area of the openings defined by said vents (500).

6. A tap (100) according to one of the previous claims, wherein said tap (100) comprises an inlet housing (107) connected to said sleeve (102), said inlet housing (107) comprising a cylindrical outer surface with an axis perpendicular to the axis of said cylindrical outer surface of said sleeve (102), and said inlet housing (107) comprising a groove (110) positioned in a transversal contact surface.

7. A tap (100) according to one of the previous claims, wherein said anti-siphon device (300) comprises an inner hexagon (309) adapted to mount said anti-siphon device (300).

8. A tap (100) according to one of the previous claims,

wherein said anti-siphon device (300) comprises a cylindrical body (501) comprising:

- radial channels (402) extending between said circumferentially positioned vents (500) and a central space (403) within said body (501);
- axial channels (401) comprised in said flow channels,

and wherein said valve (400) is adapted

- to close an open end of said central space (403) in said first position, and
- to open said open end in said second position, such that an air passageway is formed between said central space (403) and said axial channels (401).

9. A tap (100) according to claim 6, wherein said tap (100) comprises an operating handle (109) and a non-return valve (304) connected to said operating handle (109), said non-return valve (304) being positioned within said inlet housing (107) and being adapted to directly control the water supply to said intake port (302) of said outlet part (101).

10. A tap (100) according to claim 9, wherein said operating handle (109) comprises a cover element (900) and a rotating element (901), said cover element (900) being adapted to cover a transverse surface of said rotating element (901), and said cover element (900) comprising a screw (902) adapted to connect said cover element (900) to said rotating element (901).

11. A tap according to claim 10, wherein said rotating element (901) comprises a circumferentially positioned collar (903), said collar (903) being adapted to cover an internally positioned slit ring (904).

Patentansprüche

1. Hahn (100) zum Bereitstellen einer Außenwasserzufuhr, umfassend:

- einen Auslassteil (101), umfassend einen Einlaufstutzen (302), der dazu ausgelegt ist, eine Wasserströmung aufzunehmen, wenn der Hahn (100) offen ist, und umfassend einen oder mehrere Strömungskanäle (401), die dazu ausgelegt sind, die Wasserströmung in Richtung einer Auslassseite des Hahns (100) zu führen;
- eine Anti-Siphon-Vorrichtung (300), die in dem Auslassteil (101) umfasst ist, wobei die Anti-Siphon-Vorrichtung (300) Folgendes umfasst:

◦ umlaufend positionierte Belüftungen (500);
◦ ein Ventil (400), das zwischen einer ersten und einer zweiten Position bewegbar ist, wobei:

▪ in der ersten Position der Einlaufstutzen (302) geöffnet ist und die Belüftungen (500) gegenüber dem einen oder den mehreren Strömungskanälen (401) abgedichtet sind, und
▪ in der zweiten Position der Einlaufstutzen (302) geschlossen ist und ein Durchgang zwischen den Belüftungen (500) und dem einen oder den mehreren Strömungskanälen (401) ausgebildet ist;

wobei:

- der Auslassteil (101) eine Hülse (102) umfasst, die derart um die Anti-Siphon-Vorrichtung (300) herum montiert ist, dass ein umlaufender Schlitz (301) zwischen der Hülse (102) und der Anti-Siphon-Vorrichtung (300) vorhanden ist, wobei die Hülse (102) eine Wand (406, 407) mit variierender Dicke umfasst und die Wand Folgendes umfasst:

  ◦ eine zylindrische äußere Oberfläche;
  ◦ einen oberen Wandteil (407) mit einer ersten Dicke und einen unteren Wandteil (406) mit einer zweiten Dicke, die derart kleiner als die erste Dicke ist, dass im montierten Zustand der umlaufende Schlitz (301) zwischen dem unteren Wandteil (406) und der Anti-Siphon-Vorrichtung (300) ausgebildet ist,

- die Hülse (102) derart eine Aussparung (105) umfasst, dass ein Luftdurchgang von der Außenumgebung über die Aussparung (105) und den umlaufenden Schlitz (301) zu den Belüftungen (500) vorhanden ist,
- der Auslassteil (101) einen Verbinder (103) umfasst, wobei der Verbinder (103) einen zylindrischen Teil (104) umfasst;

DADURCH GEKENNZEICHNET, DASS:

- im montierten Zustand die äußere Oberfläche des zylindrischen Teils (104) des Verbinders (103) mit der zylindrischen äußeren Oberfläche der Wand der Hülse (102) ausgerichtet ist, wodurch diese zusammen eine durchgehende zylindrische Oberfläche definieren, und
- im montierten Zustand der zylindrische Teil (104) des Verbinders (103) und die Hülse (102) nahe beieinander positioniert sind, wobei ein dazwischenliegender axialer Spalt (106) von weniger als 3 mm belassen wird.

2. Hahn (100) nach Anspruch 1,
wobei der dazwischenliegende axiale Spalt (106) weniger als 1 mm beträgt.

3. Hahn (100) nach einem der vorhergehenden Ansprüche,
wobei die Anti-Siphon-Vorrichtung (300) ein Schraubgewinde (308) umfasst, das dazu ausgelegt ist, den Verbinder (103) nahe bei der Hülse (102) zu montieren, wobei der axiale Spalt (106) von weniger als 3 mm, bevorzugt weniger als 1 mm, belassen wird.

4. Hahn (100) nach einem der vorhergehenden Ansprüche,
wobei die Aussparung (105) ein Loch in der Wand ist, das derart an der Unterseite der zylindrischen äußeren Oberfläche positioniert ist, dass im montierten Zustand die Aussparung (105) in Kontakt mit dem axialen Spalt (106) ist und an der Rückseite des Hahns (100) positioniert ist.

5. Hahn (100) nach einem der vorhergehenden Ansprüche,
wobei die Abmessungen der Aussparung (105) derart sind, dass der Flächeninhalt der durch die Aussparung (105) definierten Öffnung mindestens das 0,9-Fache, bevorzugt mindestens das 1-Fache, des gemeinsamen Flächeninhalts der durch die Belüftungen (500) definierten Öffnungen beträgt.

6. Hahn (100) nach einem der vorhergehenden Ansprüche,
wobei der Hahn (100) ein Einlassgehäuse (107) umfasst, das mit der Hülse (102) verbunden ist, wobei das Einlassgehäuse (107) eine zylindrische äußere Oberfläche mit einer Achse senkrecht zu der Achse der zylindrischen äußeren Oberfläche der Hülse (102) umfasst und das Einlassgehäuse (107) eine Nut (110) umfasst, die in einer transversalen Kontaktoberfläche positioniert ist.

7. Hahn (100) nach einem der vorhergehenden Ansprüche,
wobei die Anti-Siphon-Vorrichtung (300) einen Innensechskant (309) umfasst, der dazu ausgelegt ist, die Anti-Siphon-Vorrichtung (300) zu montieren.

8. Hahn (100) nach einem der vorhergehenden Ansprüche,

wobei die Anti-Siphon-Vorrichtung (300) einen zylindrischen Körper (501) umfasst, der Folgendes umfasst:

- radiale Kanäle (402), die sich zwischen den umlaufend positionierten Belüftungen (500) und einem zentralen Raum (403) innerhalb des Körpers (501) erstrecken;
- axiale Kanäle (401), die in den Strömungskanälen umfasst sind,

und wobei das Ventil (400) dazu ausgelegt ist,

- ein offenes Ende des zentralen Raums (403) in der ersten Position zu schließen und
- das offene Ende in der zweiten Position derart zu öffnen, dass ein Luftdurchgang zwischen dem zentralen Raum (403) und den axialen Kanälen (401) ausgebildet ist.

9. Hahn (100) nach Anspruch 6,
wobei der Hahn (100) einen Bedienungsgriff (109) und ein Rückschlagventil (304) umfasst, das mit dem Bedienungsgriff (109) verbunden ist, wobei das Rückschlagventil (304) innerhalb des Einlassgehäuses (107) positioniert ist und dazu ausgelegt ist, die Wasserzufuhr zu dem Einlaufstutzen (302) des Auslassteils (101) direkt zu steuern.

10. Hahn (100) nach Anspruch 9,
wobei der Bedienungsgriff (109) ein Abdeckelement (900) und ein Drehelement (901) umfasst, wobei das Abdeckelement (900) dazu ausgelegt ist, eine Queroberfläche des Drehelements (901) abzudecken, und das Abdeckelement (900) eine Schraube (902) umfasst, die dazu ausgelegt ist, das Abdeckelement (900) mit dem Drehelement (901) zu verbinden.

11. Hahn nach Anspruch 10,
wobei das Drehelement (901) einen umlaufend positionierten Kragen (903) umfasst, wobei der Kragen (903) dazu ausgelegt ist, einen innen positionierten Schlitzring (904) abzudecken.

Revendications

1. Robinet (100) destiné à fournir une alimentation en eau extérieure, comprenant :

- une partie de sortie (101), comprenant un orifice d'admission (302) adapté pour recevoir un écoulement d'eau lorsque ledit robinet (100) est ouvert, et comprenant un ou plusieurs canaux d'écoulement (401) adaptés pour guider ledit écoulement d'eau vers un côté de sortie dudit robinet (100) ;
- un dispositif antisiphon (300) compris dans ladite partie de sortie (101), ledit dispositif antisiphon (300) comprenant :

◦ des évents positionnés circonférentiellement (500) ;
◦ une soupape (400) mobile entre une première et une seconde position,

▪ dans ladite première position, ledit orifice d'admission (302) étant ouvert et lesdits évents (500) étant isolés hermétiquement dudit ou desdits canaux d'écoulement (401), et
▪ dans ladite seconde position, ledit orifice d'admission (302) étant fermé et un passage étant formé entre lesdits évents (500) et ledit ou lesdits canaux d'écoulement (401) ;

- ladite partie de sortie (101) comprenant un manchon (102) monté autour dudit dispositif antisiphon (300), de sorte qu'une fente circonférentielle (301) soit présente entre ledit manchon (102) et ledit dispositif antisiphon (300), ledit manchon (102) comprenant une paroi (406, 407) d'épaisseur variable, et ladite paroi comprenant :

◦ une surface externe cylindrique ;
◦ une partie de paroi supérieure (407) possédant une première épaisseur, et une partie de paroi inférieure (406) possédant une seconde épaisseur inférieure à ladite première épaisseur, de sorte que dans l'état monté, ladite fente circonférentielle (301) soit formée entre ladite partie de paroi inférieure (406) et ledit dispositif antisiphon (300),

- ledit manchon (102) comprenant un évidement (105), de sorte qu'un passage d'air soit présent allant de l'environnement extérieur auxdits évents (500) par l'intermédiaire dudit évidement (105) et de ladite fente circonférentielle (301),
- ladite partie de sortie (101) comprenant un connecteur (103), ledit connecteur (103) comprenant une partie cylindrique (104) ;

CARACTÉRISÉ EN CE QUE :

- dans l'état monté, la surface externe de ladite partie cylindrique (104) dudit connecteur (103) est alignée avec ladite surface externe cylindrique de ladite paroi dudit manchon (102), définissant ainsi ensemble une surface cylindrique continue, et
- dans l'état monté, ladite partie cylindrique (104) dudit connecteur (103) et ledit manchon (102) sont positionnés à proximité l'un de l'autre, laissant un espace axial intermédiaire (106) inférieur à 3 mm.

2. Robinet (100) selon la revendication 1,
ledit espace axial intermédiaire (106) étant inférieur à 1 mm.

3. Robinet (100) selon l'une des revendications précédentes,
ledit dispositif antisiphon (300) comprenant un filetage de vis (308) adapté pour monter ledit connecteur (103) à proximité dudit manchon (102), laissant ledit espace axial (106) inférieur à 3 mm, de préférence inférieur à 1 mm.

4. Robinet (100) selon l'une des revendications précédentes,
ledit évidement (105) étant un trou dans ladite paroi

positionné au niveau du côté inférieur de ladite surface externe cylindrique, de sorte que dans l'état monté, ledit évidement (105) soit en contact avec ledit espace axial (106) et soit positionné au niveau du côté arrière dudit robinet (100).

5. Robinet (100) selon l'une des revendications précédentes,
lesdites dimensions dudit évidement (105) étant de sorte que la superficie de l'ouverture définie par ledit évidement (105) soit au moins 0,9 fois, de préférence au moins 1 fois, la superficie de joint des ouvertures définies par lesdits évents (500).

6. Robinet (100) selon l'une des revendications précédentes,

ledit robinet (100) comprenant un boîtier d'entrée (107) raccordé audit manchon (102), ledit boîtier d'entrée (107) comprenant une surface externe cylindrique avec un
axe perpendiculaire à l'axe de ladite surface externe cylindrique dudit
manchon (102), et ledit boîtier d'entrée (107) comprenant une rainure (110) positionnée dans une surface de contact transversale.

7. Robinet (100) selon l'une des revendications précédentes,
ledit dispositif antisiphon (300) comprenant un hexagone interne (309) adapté pour monter ledit dispositif antisiphon (300).

8. Robinet (100) selon l'une des revendications précédentes,
ledit dispositif antisiphon (300) comprenant un corps cylindrique (501) comprenant :

- des canaux radiaux (402) s'étendant entre lesdits évents positionnés circonférentiellement (500) et un espace central (403) à l'intérieur dudit corps (501) ;
- des canaux axiaux (401) compris dans lesdits canaux d'écoulement, et ladite soupape (400) étant adaptée
- pour fermer une extrémité ouverte dudit espace central (403) dans ladite première position, et
- pour ouvrir ladite extrémité ouverte dans ladite seconde position, de sorte qu'un passage d'air soit formé entre ledit espace central (403) et lesdits canaux axiaux (401).

9. Robinet (100) selon la revendication 6,
ledit robinet (100) comprenant une poignée d'actionnement (109) et un clapet anti-retour (304) raccordé à ladite poignée d'actionnement (109), ledit clapet anti-retour (304) étant positionné à l'intérieur dudit boîtier d'entrée (107) et étant adapté pour commander directement l'alimentation en eau dudit orifice d'admission (302) de ladite partie de sortie (101).

10. Robinet (100) selon la revendication 9,
ladite poignée d'actionnement (109) comprenant un élément de couvercle (900) et un élément rotatif (901), ledit élément de couvercle (900) étant adapté pour couvrir une surface transversale dudit élément rotatif (901), et ledit élément de couvercle (900) comprenant une vis (902) adaptée pour raccorder ledit élément de couvercle (900) audit élément rotatif (901).

11. Robinet selon la revendication 10,
ledit élément rotatif (901) comprenant un collier positionné circonférentiellement (903), ledit collier (903) étant adapté pour couvrir un anneau fendu positionné intérieurement (904).

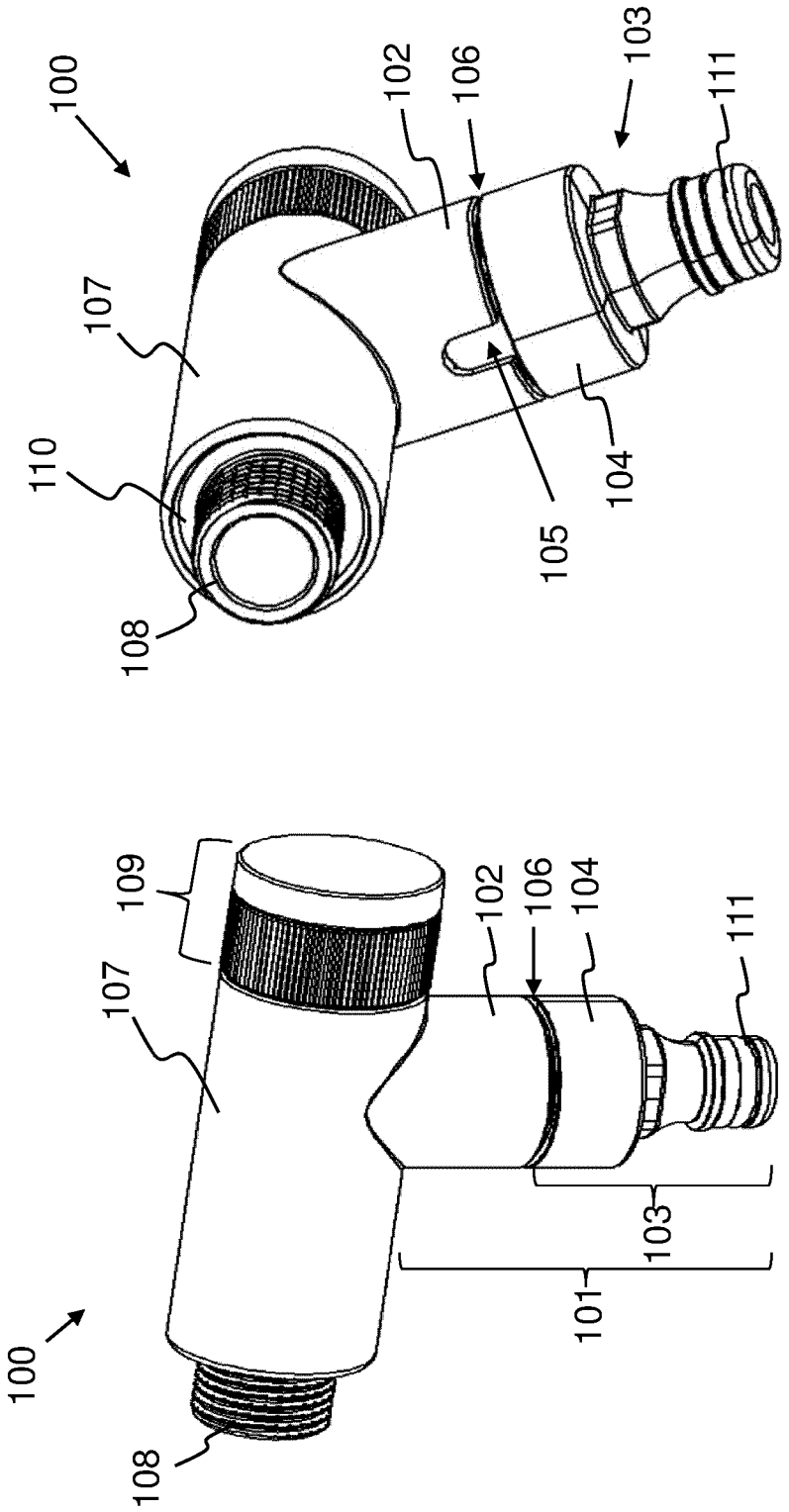
100
102
106
103
111
107
110
104
105
108
109
102
106
104
111
107
100
103
101
108

Fig. 1

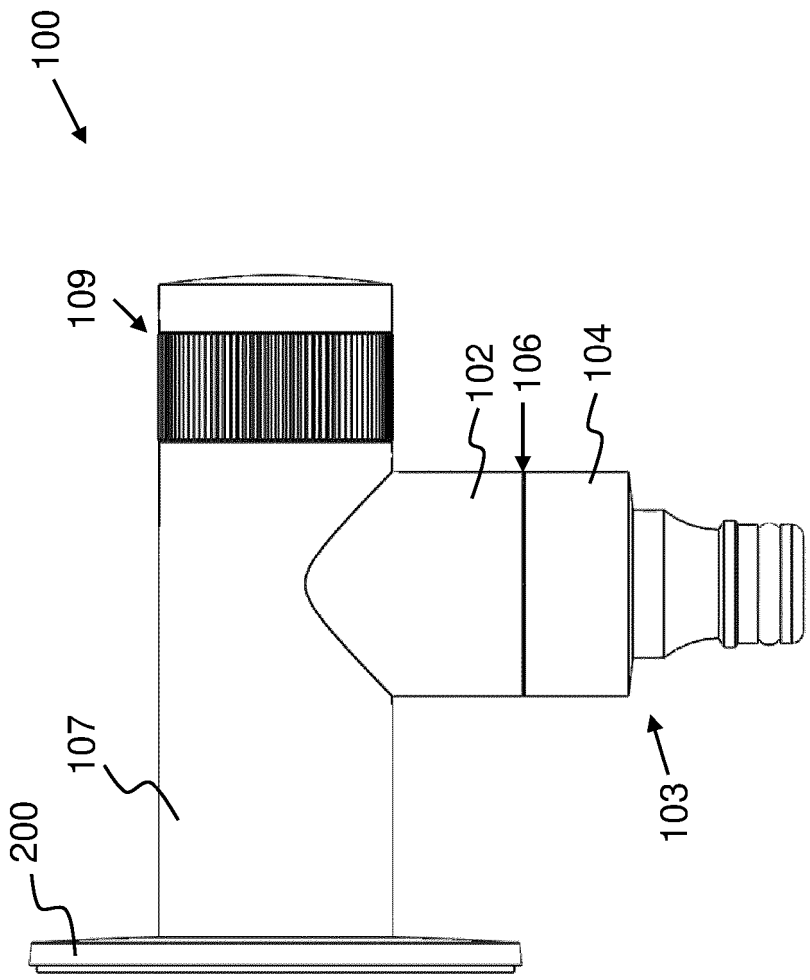

Fig. 2

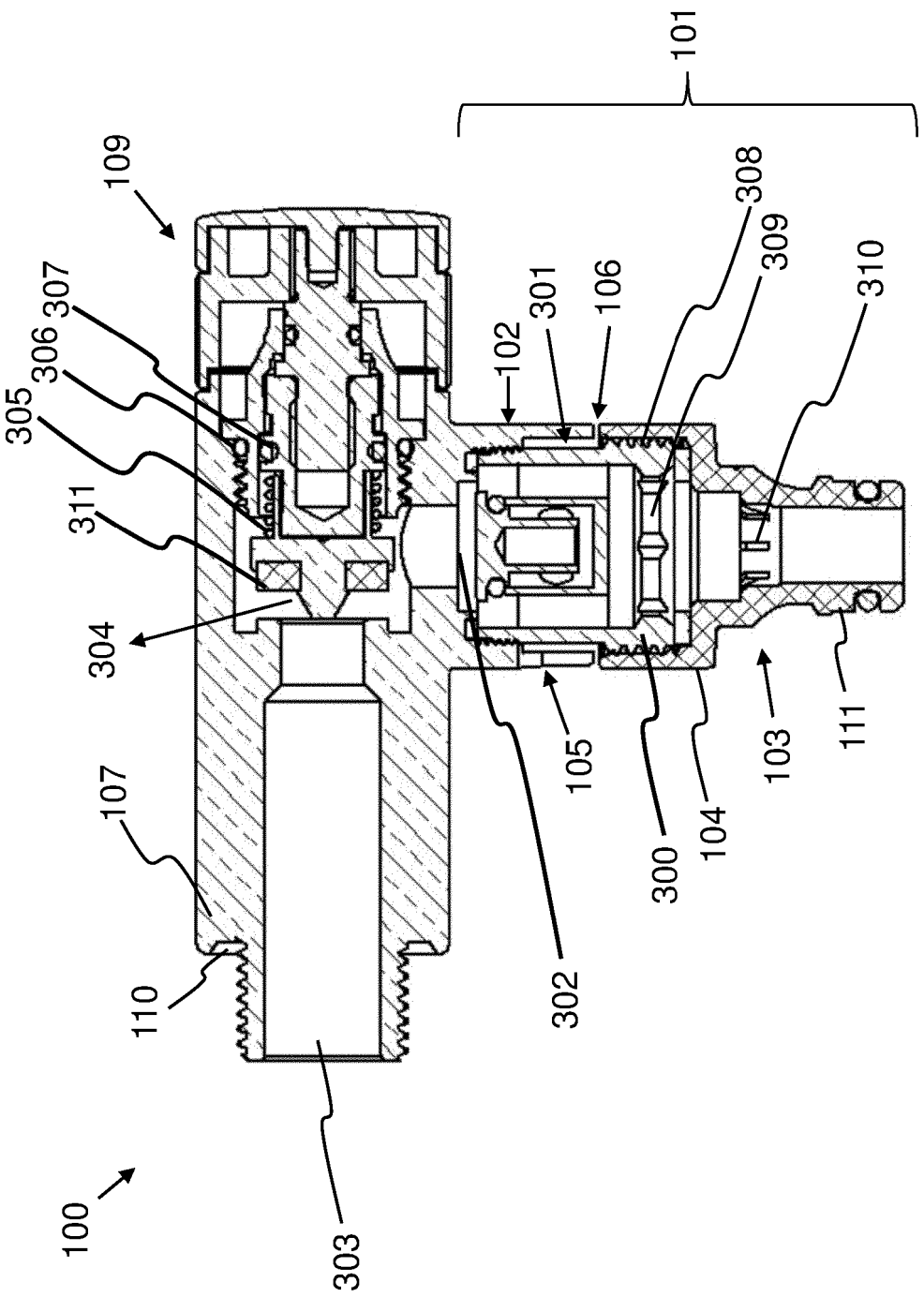
101
109
308
309
310
307
306
305
301
106
102
311
304
105
300
104
103
111
107
110
302
303
100

Fig. 3

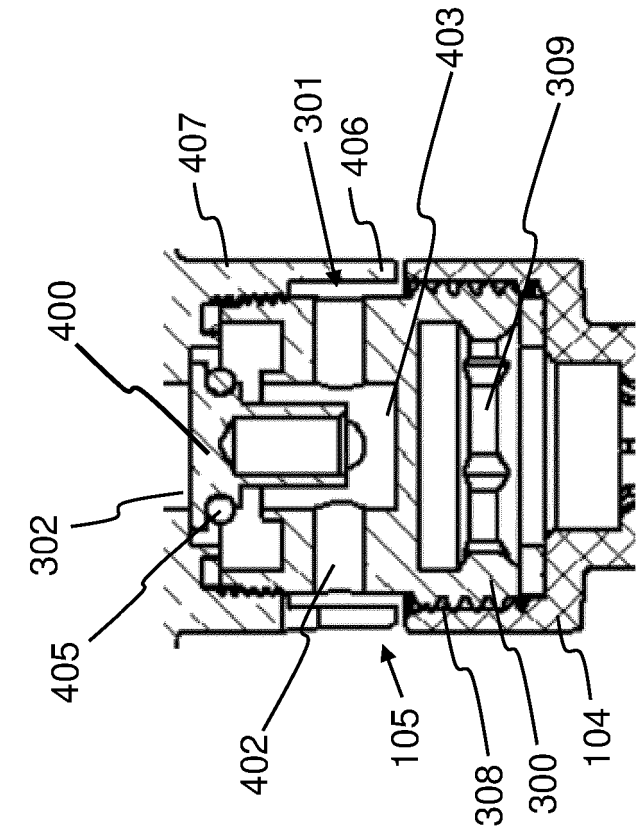
400
302
405
402
105
308
300
104
309
403
406
301
407

Fig. 4b

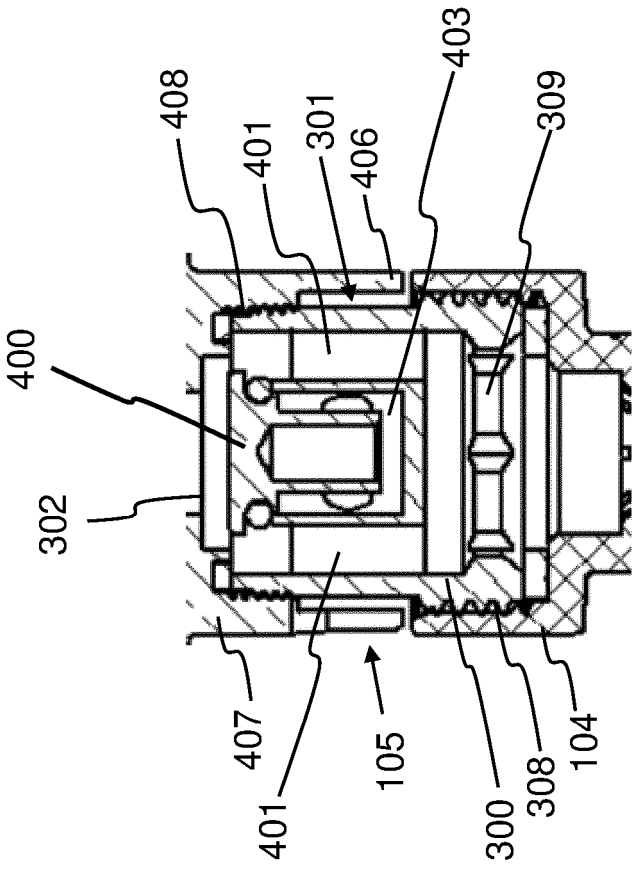
400
302
407
401
105
300
308
104
309
403
406
301
401
408

Fig. 4a

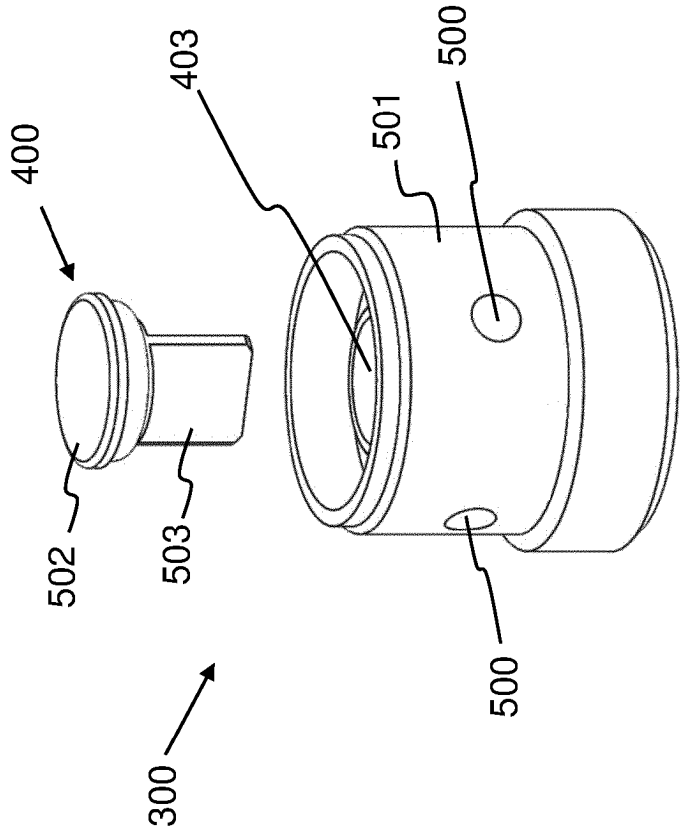

Fig. 5

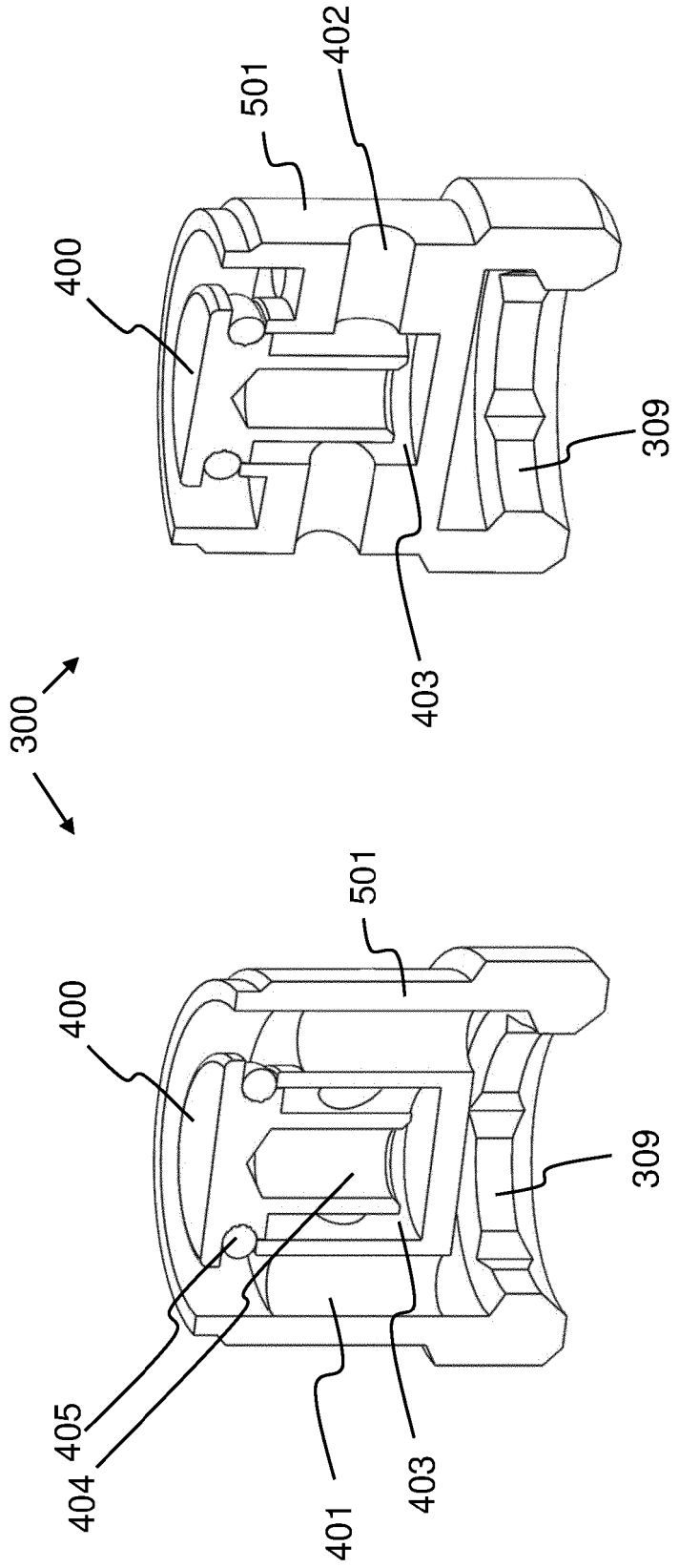

Fig. 6b

Fig. 6a

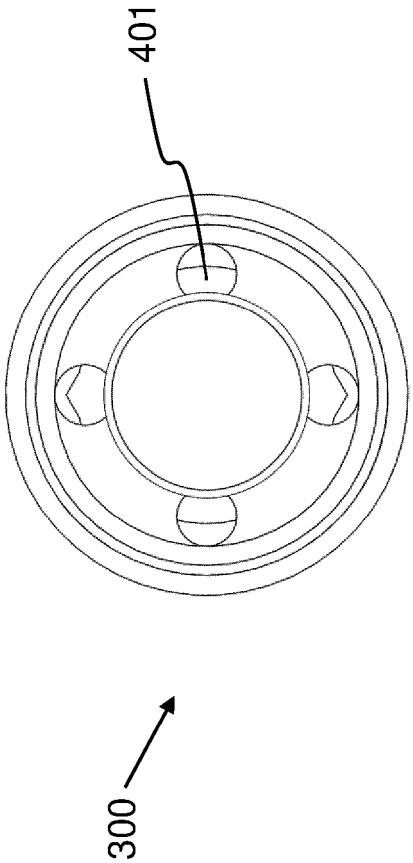

Fig. 7a

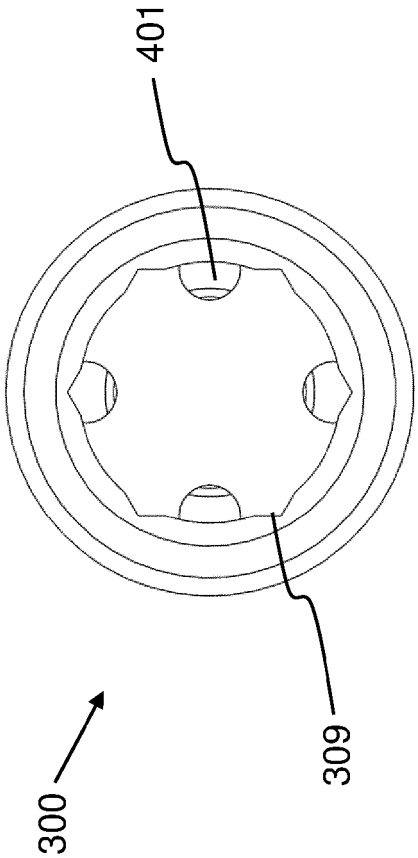

Fig. 7b

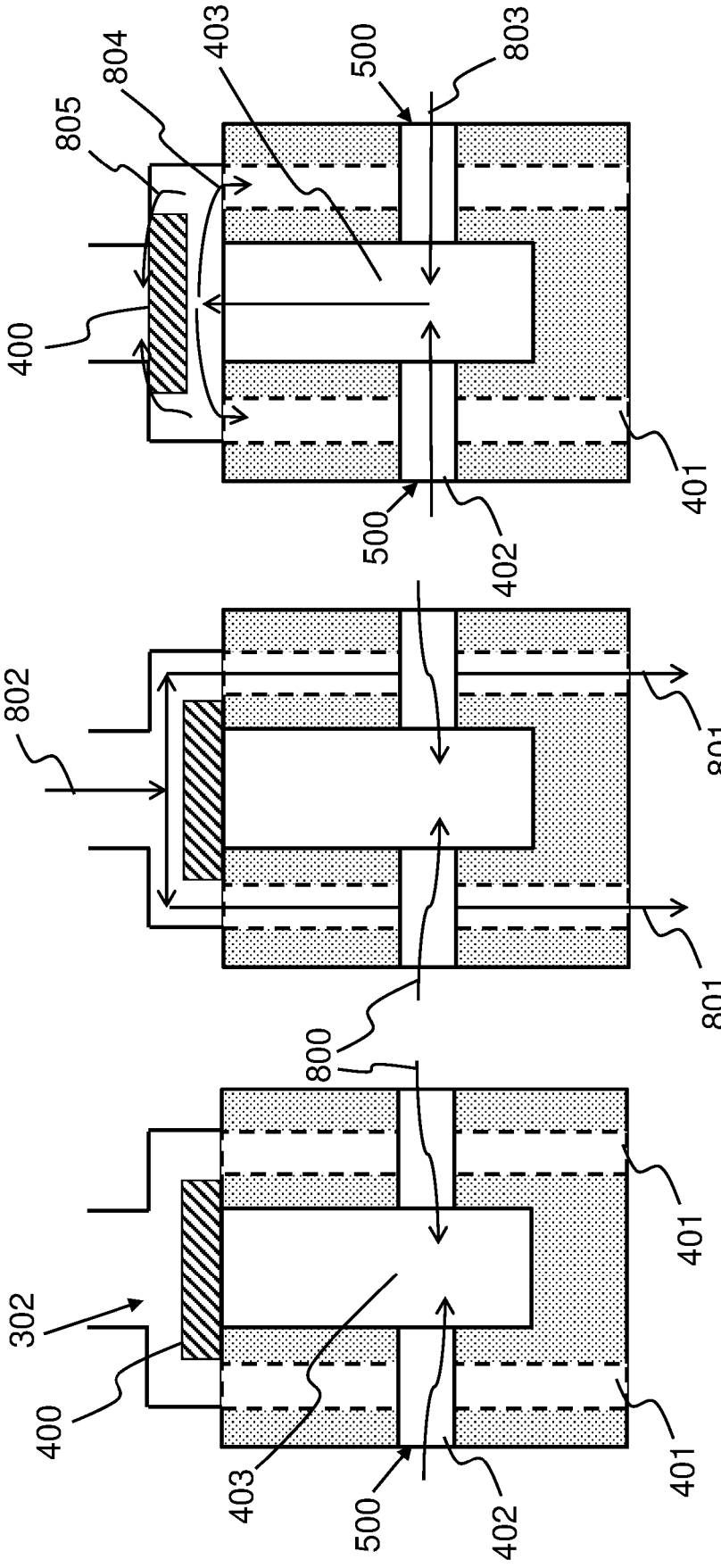

Fig. 8c

Fig. 8b

Fig. 8a

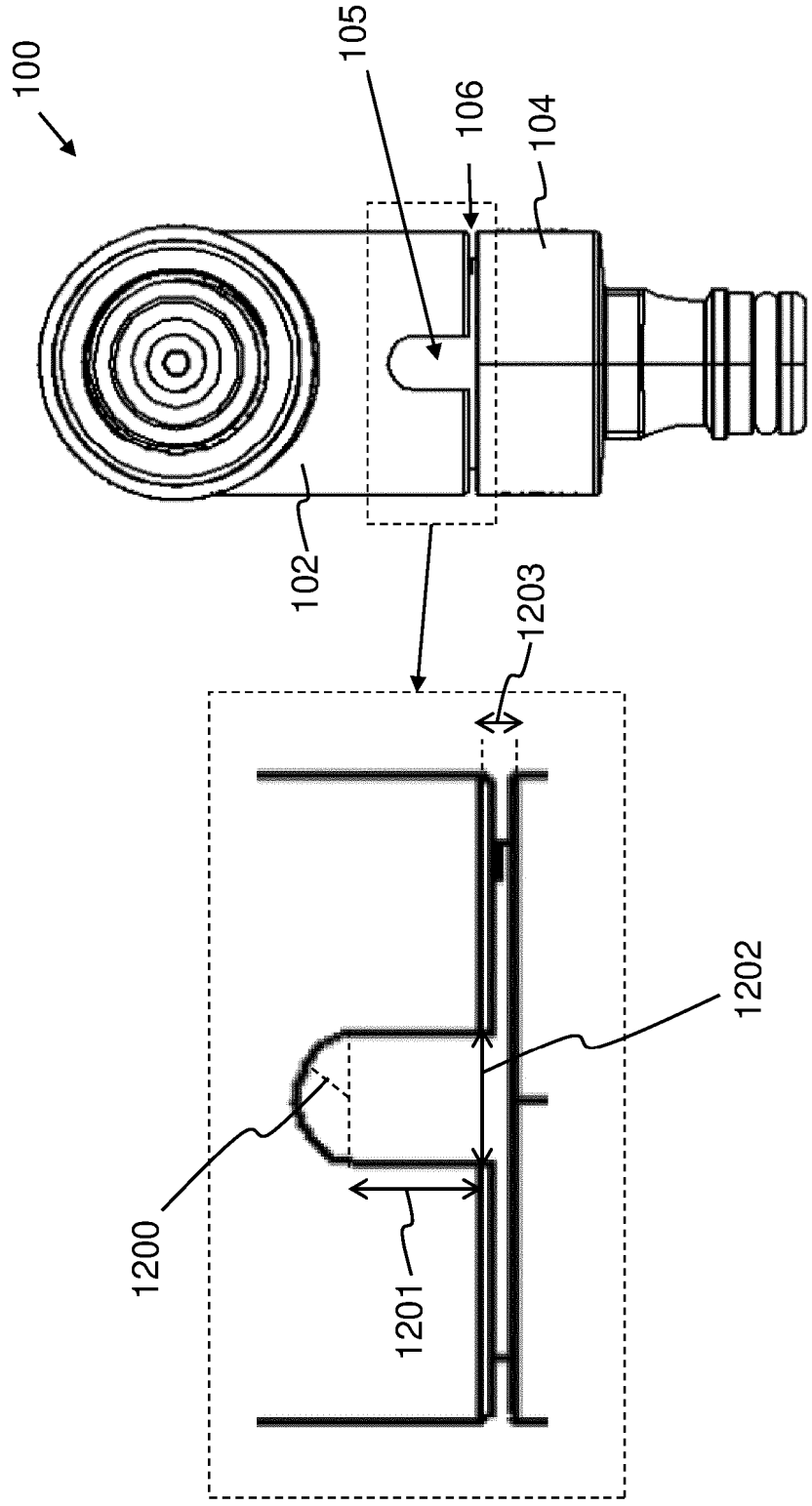

Fig. 9

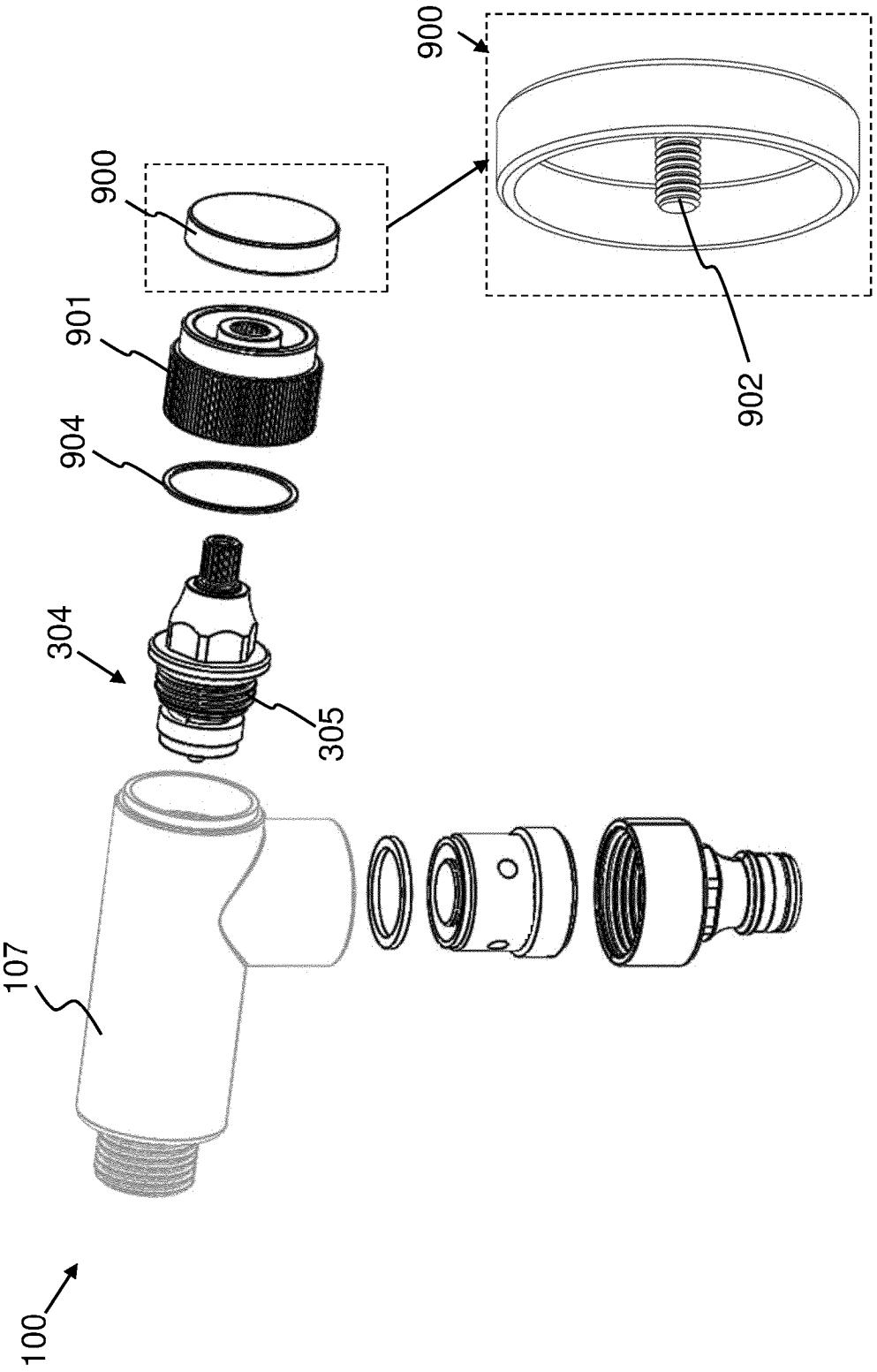

Fig. 10

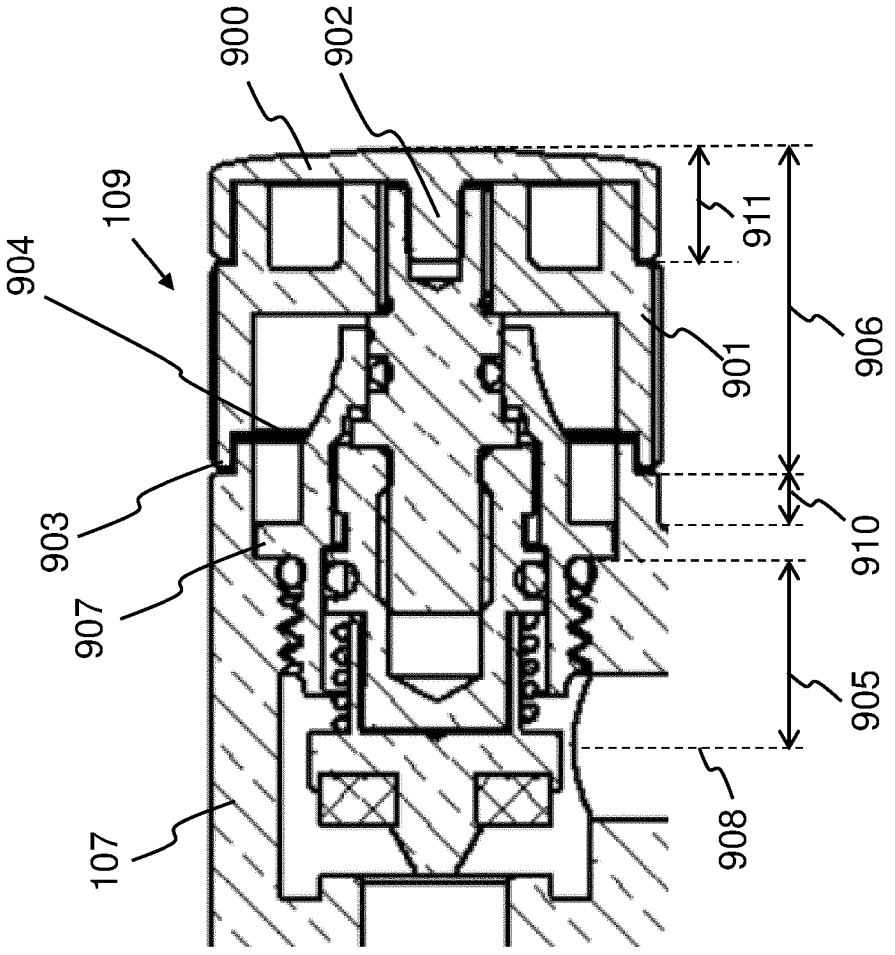

Fig. 11

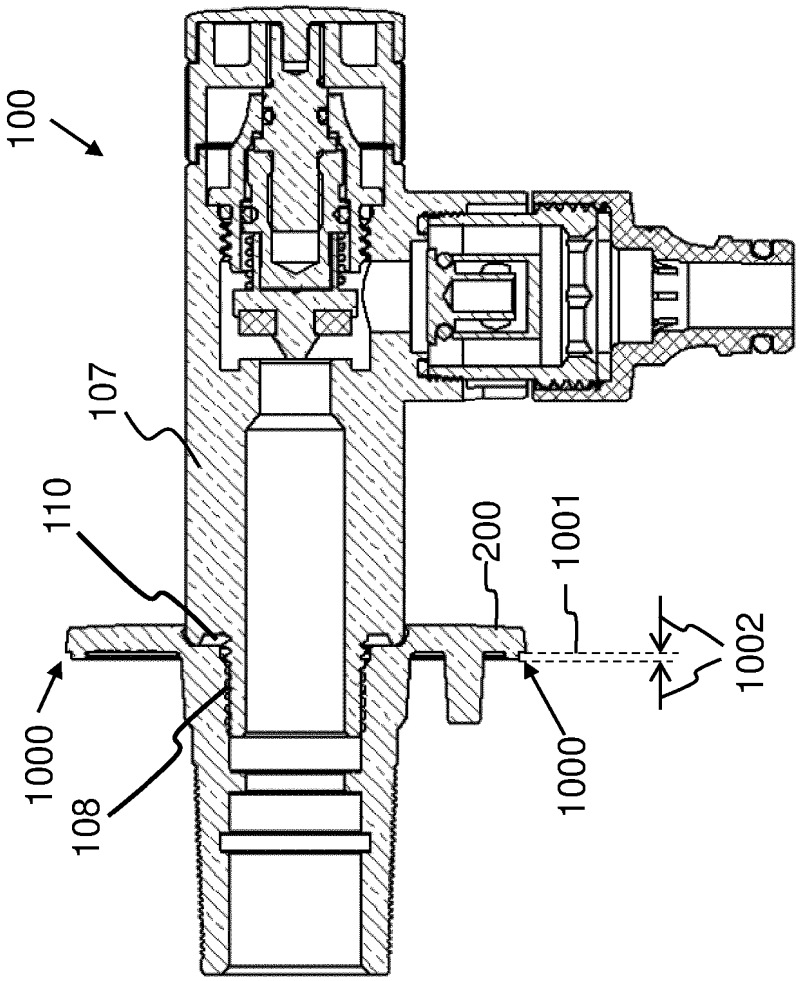

Fig. 12

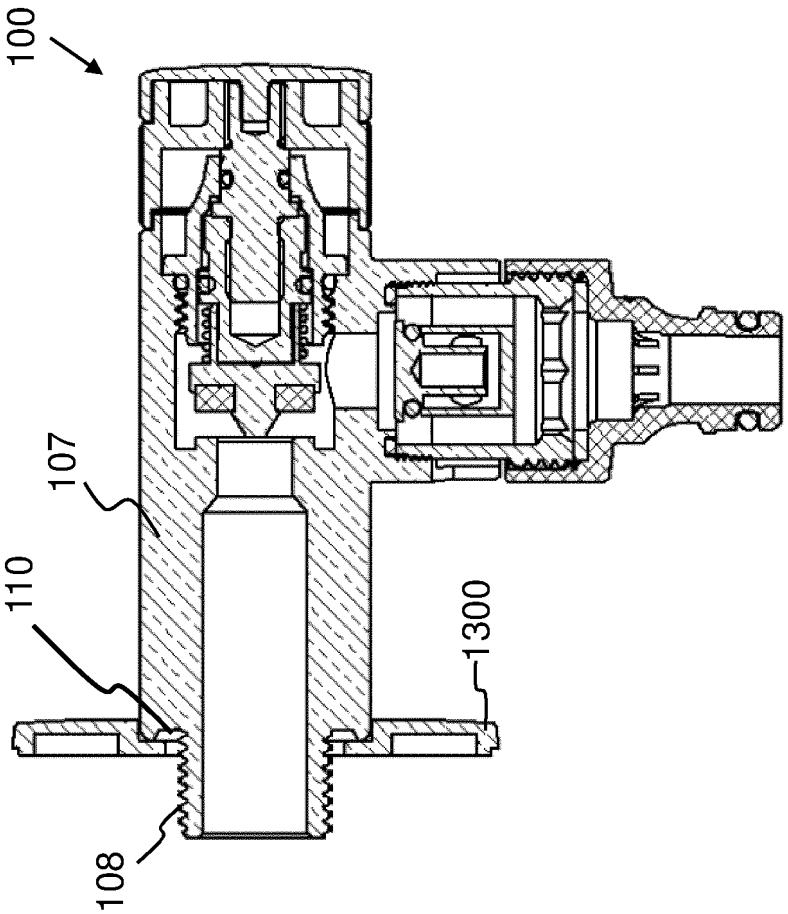

Fig. 13

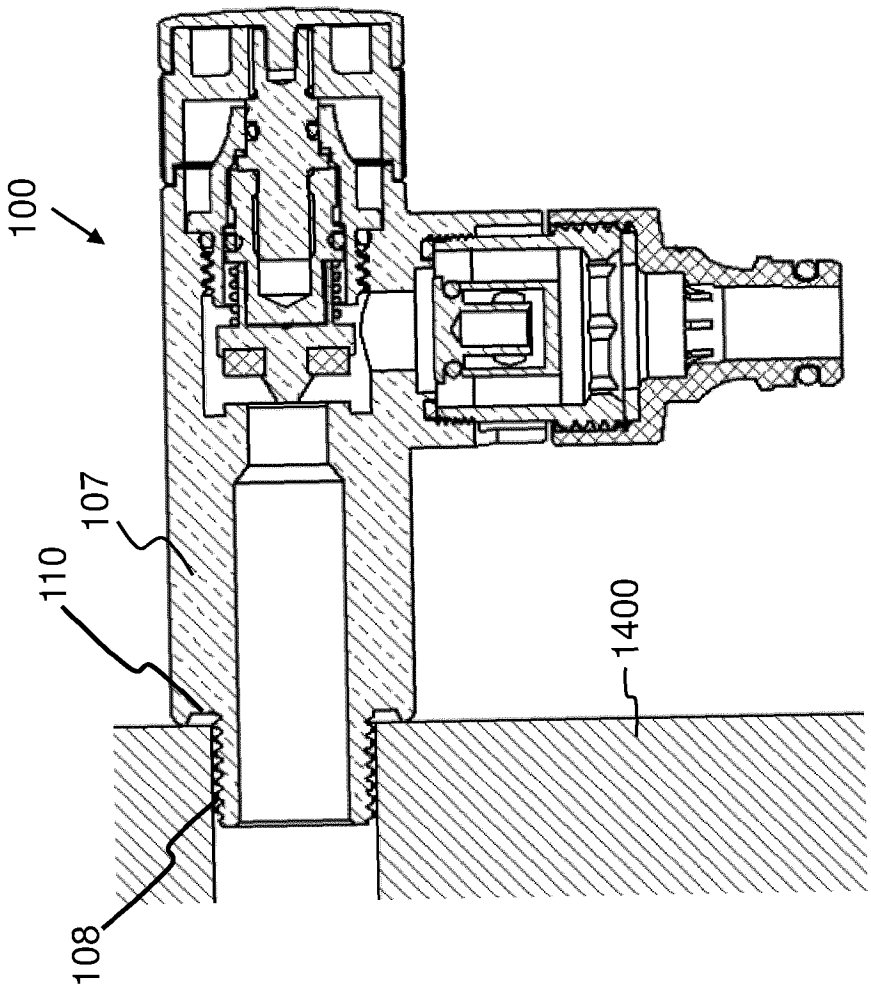

Fig. 14

REFERENCES CITED IN THE DESCRIPTION

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

Patent documents cited in the description

- DE 1941696 U **[0008]**
- DE 2020610 A1 **[0008]**
- US 20060196561 A **[0009] [0011]**
- EP 3139074 A **[0010] [0011]**
- EP 2479462 A **[0010] [0011]**
- US 4696322 A **[0011]**
- EP 17209793 A **[0044]**