



US 20220170249A1

(19) **United States**(12) **Patent Application Publication**
SCHÜRLE et al.(10) **Pub. No.: US 2022/0170249 A1**(43) **Pub. Date: Jun. 2, 2022**(54) **AERATOR**(52) **U.S. Cl.**CPC **E03C 1/084** (2013.01)(71) Applicant: **Neoperl GmbH**, Müllheim (DE)(72) Inventors: **Holger SCHÜRLE**, Müllheim (DE);
Wladimir WEISS, Gottenheim (DE)(57) **ABSTRACT**(73) Assignee: **Neoperl GmbH**, Müllheim (DE)(21) Appl. No.: **17/437,136**(22) PCT Filed: **Feb. 3, 2020**(86) PCT No.: **PCT/EP2020/052530**

§ 371 (c)(1),

(2) Date: **Sep. 8, 2021**

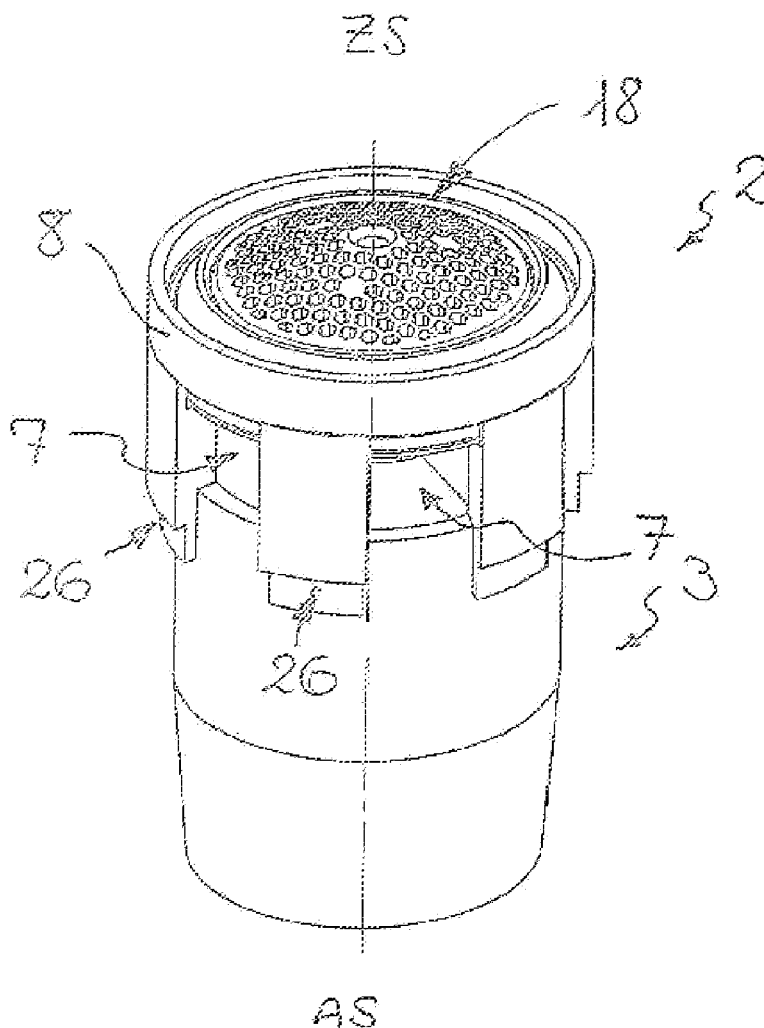
The invention relates to a jet regulator (1) having at least one jet splitter (2) which divides the inflowing waterflow, having a sleeve-shaped internal housing (3) which is encased by an external housing (4), and having at least one ventilation duct (5) which is disposed between the internal housing (3) and the external housing (4) and has at least one inflow opening (6) and at least one passage opening (7) which is provided on the housing circumference of the internal housing (3). It is a characteristic of the jet regulator (1) according to the invention that the at least one jet splitter (2) is configured as an atomizer nozzle which divides the inflowing waterflow into a substantially hollow-conical water jet, and that an impact zone (19) of an encircling annular shape is disposed in the flow direction below the at least one passage opening (7) on the internal circumference of the internal housing (3), the water jet divided so as to be hollow-conical impacting the housing internal circumference of the internal housing (3) in said impact zone (19) (cf. FIG. 2).

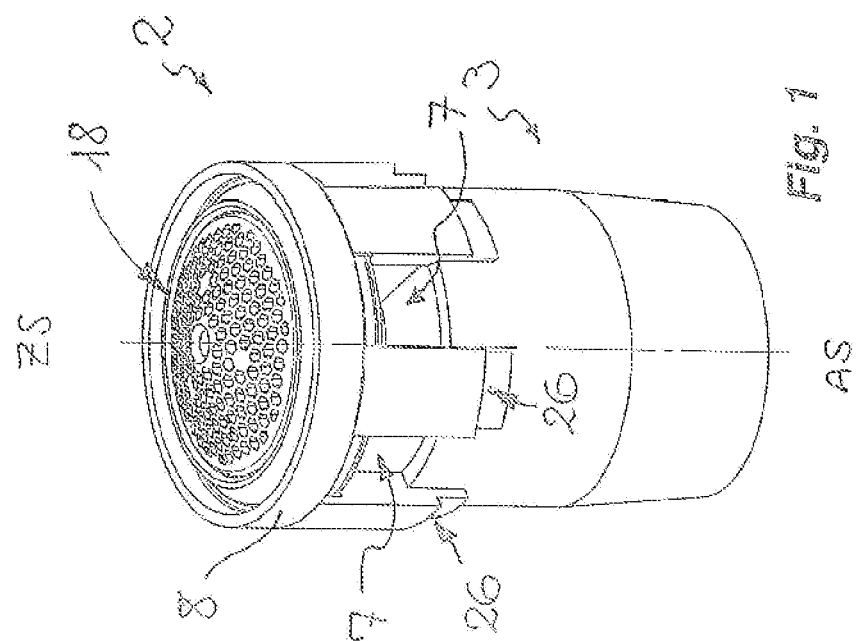
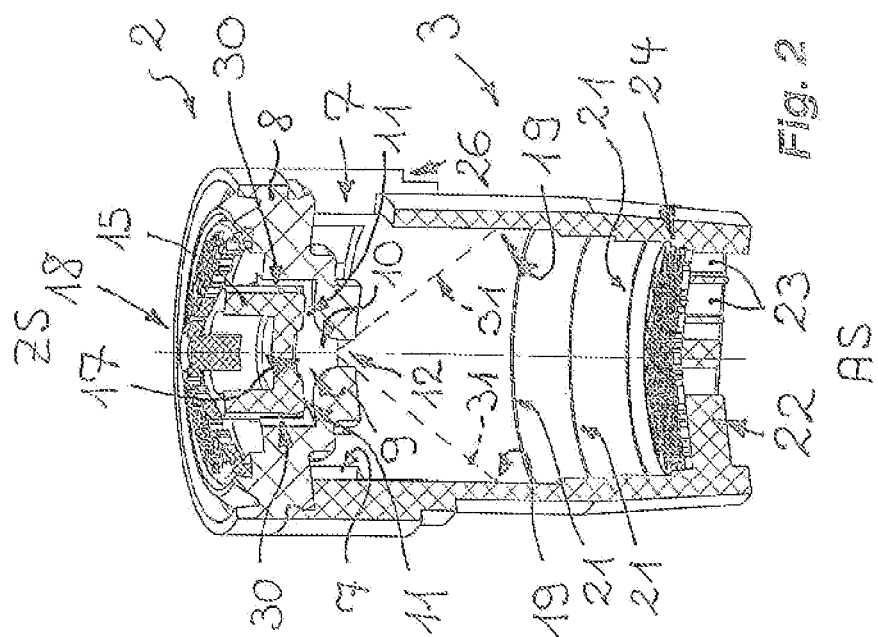
(30) **Foreign Application Priority Data**

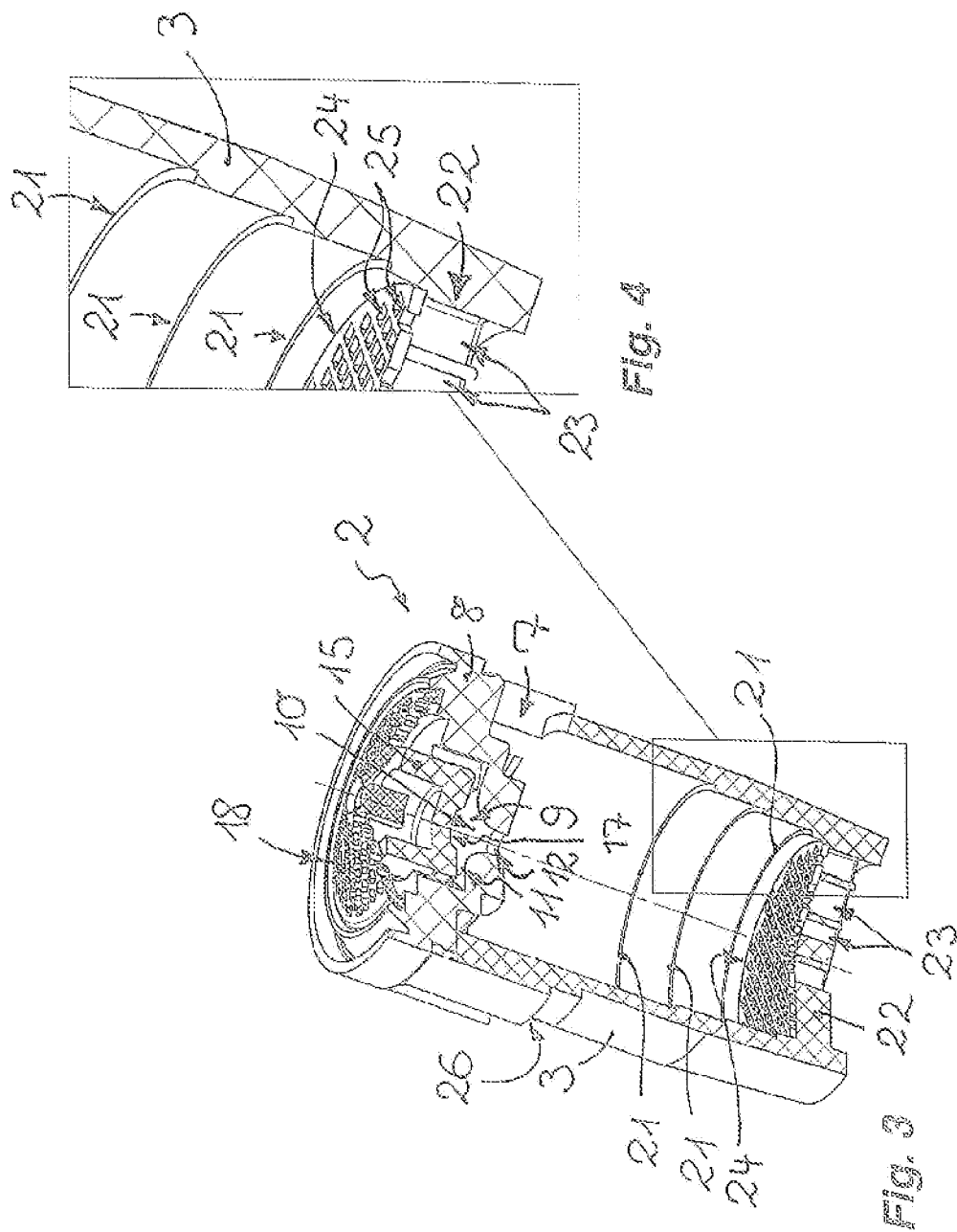
Mar. 8, 2019 (DE) 202019101312.5

Publication Classification(51) **Int. Cl.****E03C 1/084**

(2006.01)







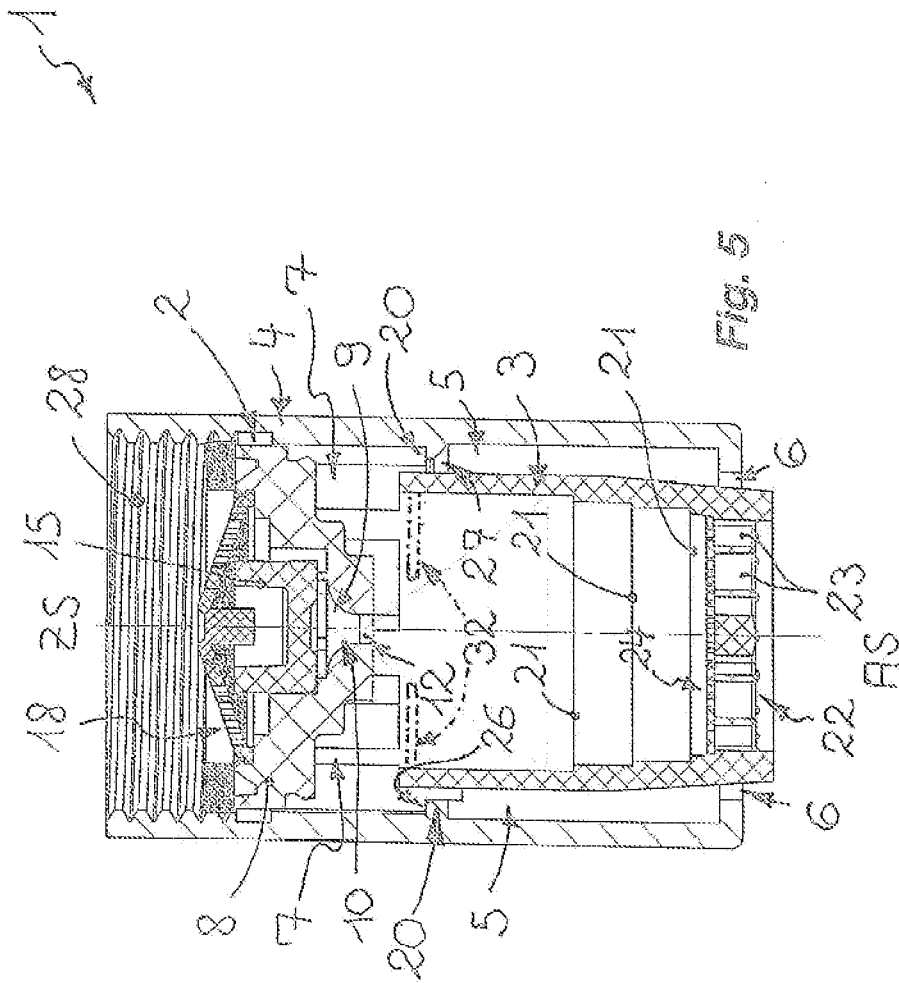
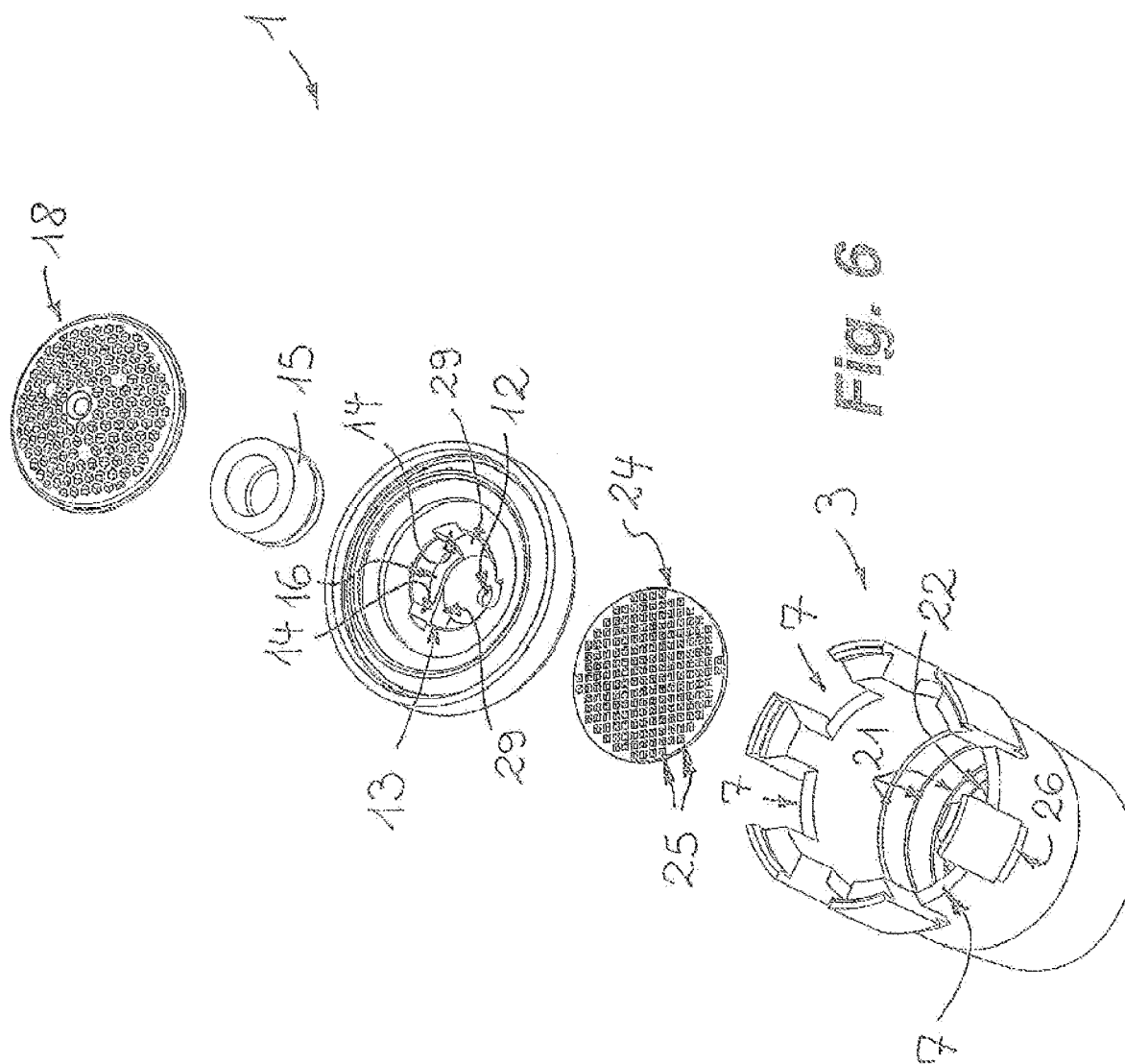


Fig. 5



AERATOR

TECHNICAL FIELD

[0001] The invention relates to a jet regulator having at least one jet splitter which divides the inflowing water flow, having a sleeve-shaped internal housing which is encased by an external housing, and having at least one ventilation duct which is disposed between the internal housing and the external housing and which has at least one inflow opening and at least one passage opening, the latter being provided on the housing circumference of the internal housing.

BACKGROUND

[0002] A device for spraying a pressurized liquid, which can serve as a mouthpiece of a sanitary outflow fitting or as a shower head, is already known from WO 2012/055 051 A1. The known device has a central supply channel for the liquid, said supply channel running along the device axis. A plurality of turbulence chambers which have in each case one inlet for supplying the liquid into the respective turbulence chamber as well as one outlet nozzle for a liquid jet to exit the turbulence chamber are provided about the device axis so as to be spaced apart from the latter. The turbulence chambers are connected to the supply channel by way of inlet ducts which are disposed so as to be substantially transverse to the device axis. Each of the outlet nozzles is disposed obliquely to the device longitudinal axis in such a manner that liquid jets exiting the outlet nozzles converge at a predetermined spacing from the outlet nozzles. The jet pattern of the water jet exiting the known device is however in need of improvement.

[0003] Therefore, an atomizer nozzle which can likewise be assembled on the water outflow of a sanitary outflow fitting has been achieved, so as to atomize the pressurized inflowing water and, as a result thereof, form said water so as to form a homogenous water jet (cf. DE 20 2013002 283 U1). The known atomizer nozzle has a swirl chamber, at least one supply channel which is oriented transversely to the nozzle longitudinal axis and runs tangentially into the swirl chamber opening into said swirl chamber in such a manner that the water flowing into the swirl chamber is imparted a swirl about the swirl chamber longitudinal axis. The swirl chamber in the outflow direction tapers in the direction toward a nozzle channel such that the water jet which in the swirl chamber is set in rotation about the swirl chamber longitudinal axis is collected in ever decreasing circular paths and is conducted through the nozzle channel until the water jet exits into the atmosphere at the duct end region of the nozzle channel, where a fluid lamination is formed which on the free circumferential peripheral region of said fluid lamination bursts into fine individual droplets in such a manner that a homogenous water jet formed from fine water droplets is created.

[0004] However, with the aid of the known jet regulators configured as an atomizer nozzle, the water flowing out of the water outflow cannot readily be mixed with the ambient air in such a manner that a homogenous, gently bubbling and well blended water jet is formed.

[0005] A water-saving shower head is known from DE 10 2006 013 881 A1, said water-saving shower head with the aid of water turbulences in conjunction with the ambient air suctioned by the turbulence forming a water/air mixture. The known water-saving shower head to this end has a housing

with a centrally disposed air inlet, the latter being surrounded by a water outlet aperture which is molded so as to be concentric, conical or hyperbolic and has bores. The known water-saving shower head is connected to a pressurized water line by way of an inflow pipe. A control aperture is provided in this inflow pipe, said control aperture shaping the inflowing water so as to form an inverted hyperbolic water turbulence. This water turbulence in the housing of the known water-saving shower head forms a vacuum which causes ambient air to be suctioned into the housing by way of the central air inlet. This air, by way of the water outlet aperture, is fed to the water flowing through the housing.

[0006] The water mixed with the ambient air exits the known water-saving shower head by way of the bores in the water outlet aperture in the form of short dash-type water structures which are filled with intermediate spaces of air. As a result of this particular shaping of the outflowing water/air mixture, the user is given the impression of being situated below an uninterrupted water jet. However, a homogenous and gently bubbling outflow jet cannot be shaped in the known water-saving shower head.

SUMMARY

[0007] There is therefore the object of achieving a jet regulator of the type mentioned at the outset, which even at ideally low flow rates is distinguished by positive splitting of the inflowing water and by an optimized mixing of the split water with the ambient air such that a homogenous, gently bubbling and well blended outflow jet is formed in this jet regulator.

[0008] This object is achieved according to the invention in the jet regulator of the type mentioned at the outset having one or more of the features disclosed herein.

[0009] The jet regulator according to the invention, which is able to be assembled on the water outflow of a sanitary outflow fitting, has at least one jet splitter which divides the inflowing water jet and splits the latter into small water particles or water jets. To this end, the jet regulator according to the invention has a sleeve-shaped internal housing which is encased by an external housing. At least one ventilation duct by way of which the ambient air destined for mixing with the water flowing through the internal housing can be suctioned is disposed here between the internal housing, the latter forming a water-conducting line portion, and the external housing. The at least one ventilation duct has an inflow opening and at least one passage opening which is provided on the housing circumference of the internal housing and by way of which the ambient air emanating from the ventilation duct can flow into the housing interior of the internal housing. The at least one jet splitter of the jet regulator according to the invention is configured as a jet atomizer nozzle which atomizes the inflowing water flow so as to form a spray of fine droplets (mist) and generates an aerosol of fine droplets mixed with ambient air, said aerosol in the internal housing forming a hollow-conical jet of separated liquid components. The atomizer nozzle serving as the jet splitter here is distinguished by good dividing and splitting of the jet, even at a comparatively minor flow rate. An impact zone of an encircling annular shape in the flow direction is disposed below the at least one passage opening on the internal circumference of the internal housing, the water jet divided so as to be hollow-conical impacting the housing internal circumference of the internal housing in said impact zone. The

housing interior of the internal housing here serves as a mixing chamber in which the water jet divided so as to be hollow-conical is also additionally blended with the ambient air emanating from the at least one passage opening, before the water jet blended with air, in the flow direction after the impact zone, is again shaped so as to form a gently bubbling outflow jet with a homogenous cylindrical jet external circumference. The water droplets which exit the atomizer nozzle still as a fine mist and which may be contaminated with bacteria and could constitute a health risk when inhaled, in the internal housing, in the flow direction below the impact zone, are thus shaped so as to form a homogenous jet which to this extent is not a health risk.

[0010] In order for the ambient air to be able to be fed uniformly to the mixing chamber provided in the housing interior of the internal housing, it is advantageous for the ventilation duct to be configured as an annular gap which is disposed between the internal housing and the external housing.

[0011] A preferred refinement according to the invention provides that at least one cross-sectional constriction is configured in the at least one ventilation duct. The at least one ventilation duct formed in the region between the internal housing and the external housing reduces the transmission of disturbing noises caused by the water flowing through. An acoustic obstacle which additionally reduces the transmission of these disturbing noises to the outside is formed by the at least one cross-sectional constriction provided in the at least one ventilation duct.

[0012] A simple and preferred embodiment according to the invention here provides that the at least one cross-sectional constriction is configured as an annular flange which projects on the internal circumference of the external housing.

[0013] It is advantageous for the at least one cross-sectional constriction in the flow direction of the water jet flowing through the jet regulator to be disposed below the at least one passage opening.

[0014] In order for the good blending of the water flowing through and the ambient air to be additionally facilitated, it is advantageous for at least one flow obstacle to be provided in the internal housing. For this purpose, a preferred embodiment according to the invention provides that the internal housing tapers or narrows, preferably in stages, toward the outflow end side thereof. This at least one stage provided on the housing internal circumference of the internal housing can encircle the housing internal circumference or else be segmented or interrupted. Other protrusions which project from the housing internal circumference of the internal housing into the housing interior thereof are also conceivable as flow obstacles which facilitate the blending of water and ambient air.

[0015] In order for the configuration of a homogenous outflow jet to be facilitated, it is advantageous for a flow rectifier which has a mesh structure, net structure or honeycomb structure having flow-conducting passage bores to be provided on the outflow end side of the internal housing. This flow rectifier, which is provided on the outflow end of the internal housing, forms a homogenous outflow jet from the swirled water which in the housing interior of the internal housing is blended with ambient air.

[0016] In order for the rectifying of the outflowing water in the flow rectifier to be facilitated, it is advantageous for at least the majority of the passage bores in the flow

direction to have a longitudinal extent which is larger in comparison to the maximum width of the passage bores.

[0017] In order to counteract the flow rectifier being raised in the housing interior of the internal housing that serves as the mixing chamber, and in order to counteract manipulations on the flow rectifier that compromise the functioning of the latter, it is advantageous for the flow rectifier to be integrally molded on the internal circumference of the internal housing.

[0018] Positive shaping of the exiting water is facilitated when at least one perforated plate in the flow direction is disposed upstream of the flow rectifier.

[0019] An embodiment in which the at least one perforated plate has bores, the maximum width of the latter being smaller in comparison to the width of the passage bores of the flow rectifier is preferred here.

[0020] A simple and expedient embodiment according to the invention provides that the at least one perforated plate is inserted in the housing interior of the internal housing and is preferably placed on the flow rectifier.

[0021] In order to be able to assemble the jet regulator according to the invention on the water outflow of a sanitary outflow fitting, it is advantageous for the external housing on the inflow-proximal housing circumference thereof to have a coupling which interacts with a mating coupling on the water outflow of the sanitary outflow fitting. A particularly simple and advantageous embodiment according to the invention here can consist in the coupling provided on the external housing being configured as a thread which acts with a mating thread on the water outflow of the sanitary outflow fitting.

[0022] The construction and production of the jet regulator according to the invention is substantially simplified when the internal housing on the external circumference has at least one insert detent, and when the internal housing is able to be inserted into the external housing until the insert detent bears on a contact face provided on the housing internal circumference of the external housing.

[0023] A preferred embodiment according to the invention provides that the insert detent is configured as a segmented or encircling annular shoulder.

[0024] The positionally accurate disposal of the unit formed from the jet splitter and the internal housing in the external housing of the jet regulator according to the invention is facilitated when the inflow-proximal end face of the annular flange serving as the cross-sectional constriction serves as a contact face for the at least one insert detent.

[0025] In order for the emission of such disturbing noises, which are generated by the water flowing through the jet regulator according to the invention, to be additionally prevented, it is advantageous for the inflow opening of the at least one ventilation duct to be provided on the outflow side of the jet regulator. For this purpose, a preferred embodiment according to the invention provides that the outflow-proximal peripheral end region of the external housing is angled in the direction toward the internal housing and/or of the internal housing is angled in the direction toward the external housing. The inflow opening thus has a reduced cross section in comparison to the available duct cross section of the ventilation duct in the duct portion that is downstream in the flow direction, as a result of which the emission of the disturbing noises reflected in the ventilation

duct is additionally impeded and an operation of the jet regulator according to the invention at a low noise level is additionally facilitated.

[0026] A preferred refinement according to the invention provides that the jet regulator has a single, preferably central, jet splitter, and wherein the longitudinal axes of the jet splitter, of the internal housing and of the external housing are disposed so as to be mutually coaxial.

[0027] The assembly of the jet regulator according to the invention is substantially simplified, and the cohesion of the component parts forming the jet regulator according to the invention during storage and transportation is facilitated when the jet splitter on the inflow-proximal end side of the internal housing is able to be connected and preferably able to be releasably latched to the latter.

[0028] A preferred refinement according to the invention provides that the jet splitter configured as an atomizer nozzle has a swirl chamber, at least one supply channel which is oriented transversely to the nozzle longitudinal axis and preferably runs tangentially into the swirl chamber opens into said swirl chamber, that in the flow direction at least one inflow channel is disposed upstream of each supply channel, and that the swirl chamber in the outflow direction tapers in the direction toward a nozzle channel, the water jet exiting into the internal housing at the duct end region of said nozzle channel.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029] Refinements according to the invention are derived from the description hereunder of an exemplary embodiment according to the invention in conjunction with the claims and the drawing. The invention will be described in even more detail hereunder by means of a preferred exemplary embodiment.

[0030] In the drawings:

[0031] FIG. 1 shows a unit formed from an internal housing and a jet splitter of a jet regulator which otherwise is not shown in further detail here;

[0032] FIG. 2 shows the unit formed from the jet splitter and the internal housing, which is able to be releasably latched to the former, from FIG. 1 in a longitudinal section angled along the longitudinal central axis;

[0033] FIG. 3 shows the unit formed from the jet splitter and the internal housing from FIGS. 1 and 2 in a longitudinal section likewise angled along the longitudinal central axis;

[0034] FIG. 4 shows a detailed longitudinal section of the unit shown in FIGS. 1 to 3 in the region of the outflow end side of the internal housing;

[0035] FIG. 5 shows the jet regulator formed while using the unit shown in FIGS. 1 to 4, wherein the unit formed from the jet splitter and the internal housing here is surrounded by an external housing which is able to be assembled on the water outflow of a sanitary outflow fitting, and where the jet regulator here is shown in a longitudinal section that lies in the drawing plane; and

[0036] FIG. 6 shows the unit according to FIGS. 1 to 4, said unit being shown in a perspective exploded view of the component parts thereof and being formed by the jet splitter and a downstream internal housing in the flow direction and being used in the jet regulator according to FIG. 5.

DETAILED DESCRIPTION

[0037] A jet regulator 1 (cf. FIG. 5) and the substantial component parts thereof are shown in various illustrations in FIGS. 1 to 6. The jet regulator 1 is intended to be distinguished by good splitting of the inflowing water and by optimized mixing of the split water with the ambient air, even at ideally low flow rates, such that a homogenous, gently bubbling and well blended outflow jet is formed in this jet regulator 1. To this end, the jet regulator 1 illustrated here is able to be assembled on a sanitary outflow fitting not shown in more detail here. The jet regulator 1 to this end has a jet splitter 2 which divides the inflowing water flow and splits the latter into small water particles or water jets. The jet regulator 1 has a sleeve-shaped internal housing 3 which is encased by an external housing 4. At least one ventilation duct 5 by way of which the ambient air destined for blending with the water flowing through the internal housing 3 can be suctioned here is disposed between the internal housing 3, the latter forming a water-conducting line portion, and the external housing 4.

[0038] The at least one ventilation duct 5 has at least one inflow opening 6 and at least one passage opening 7, said passage opening 7 being provided on the housing circumference of the internal housing 3 and the ambient air emanating from the ventilation duct 5 being able to flow by way of said passage opening 7 into the housing interior of the internal housing 3 that serves as a mixing chamber.

[0039] The at least one jet splitter 2 of the jet regulator 1 is configured as an atomizer nozzle which splits the inflowing waterflow into a substantially hollow-conical water jet and which is distinguished by good dividing and splitting of the jet even at a comparatively low flow rate. The atomizer nozzle serving as the jet splitter 2 has a nozzle body 8 which on the inflow-proximal peripheral end of the internal housing 3 is able to be connected and preferably latched to the latter. A swirl chamber 9 which on the inflow side has a chamber portion 10, the latter in the available cross section being substantially cylindrical or disk-shaped, is provided in the nozzle body 8. At least one supply channel 11 which is oriented so as to be transverse and preferably orthogonal to the nozzle longitudinal axis and runs tangentially into the swirl chamber 2 opens into the swirl chamber 9. To this end, a plurality of supply channels 11, which are each formed by a groove 29 and are uniformly spaced apart in the circumferential direction, open into the swirl chamber 2. The swirl chamber 9 in the outflow direction tapers in the shape of a funnel in the direction toward a nozzle channel 12. The funnel-shaped portion of the swirl chamber 9 in terms of the available cross section thereof is designed such that the swirl chamber 9 in the direction toward the nozzle channel 5 has the shape of a conical or rotationally hyperbolic funnel. The atomizer nozzle serving as the jet splitter 2 in the nozzle body 8 thereof has an inflow-proximal insert opening 13. At least one groove 14, specified for forming an inflow channel 30, is provided on the circumferential wall of this insert opening 13. One inflow channel 30 which is oriented in the nozzle longitudinal direction here is in each case disposed upstream of each supply channel 11 in the flow direction. A plug 15 is able to be inserted into the insert opening 13 up to an annular shoulder 16 which encircles the circumference. The annular shoulder 16 is interrupted by at least one groove 29 which is provided for forming a supply channel 11. While the external circumference of the plug 15 closes the at least one groove 14 toward an inflow channel 30, the end side of

the plug **14** longitudinally closes the at least one groove **11** toward a supply channel **11**. The plug, on end sides of the plug **15** that face the swirl chamber **9**, has a depression **17**. It can be seen in FIGS. **1** to **3**, **5** and **6** that the nozzle body **8** on the inflow side ZS thereof is able to be connected and preferably latched to an attachment screen or filter screen **18**. This attachment screen **18** filters the dirt particles and lime remnants which are entrained in the incident waterflow, said dirt particles and lime remnants otherwise potentially compromising the function of the jet regulator **1**.

[0040] The atomizer nozzle serving as the jet splitter **2** divides the inflowing water flow, wherein this waterflow is atomized so as to form a spray of fine droplets (mist) and forming an aerosol of fine droplets mixed with ambient air. This spray formed from fine droplets exits the atomizer nozzle as a hollow-conical jet which is formed from separated liquid components. This hollow-conical water jet is indicated by dashed lines **31** in FIG. **2**. An encircling annular impact zone **19**, in which the water jet divided so as to be hollow-conical impacts the housing internal circumference of the internal housing **3**, in the flow direction is disposed below the at least one passage opening **7** of the ventilation duct **5**. The housing interior of the internal housing **3** here serves as a mixing chamber in which the water jet divided so as to be hollow-conical is blended with the ambient air emanating from the at least one passage opening **7**, before the water jet blended with air in the flow direction after the impact zone **19** is shaped again so as to form a gently bubbling outflow jet with a homogenous cylindrical jet external circumference. The water droplets which exit the atomizer nozzle still as a fine mist and which may be contaminated with bacteria and could constitute a health risk when inhaled, in the internal housing **3**, in the flow direction below the impact zone **19**, are thus shaped so as to form a homogenous jet which to this extent is not a health risk.

[0041] In order to obtain uniform blending in the housing interior of the internal housing **3** that serves as a mixing chamber, the ventilation duct **5** is configured as an annular gap which is disposed between the internal housing **3** and the external housing **4**. This annular gap can encircle the internal housing **3** and/or also be segmented, at least in a sub-region of the duct longitudinal extent. In order for the targeted uniform blending to be additionally facilitated, at least two, and preferably a plurality of, passage openings **7** which are in particular mutually spaced apart at uniform spacings are provided on the housing circumference of the internal housing **3**.

[0042] The at least one ventilation duct **5** formed in the region between the internal housing **3** and the external housing **4** already reduces the transmission of disturbing noises caused by the water flowing through the jet regulator **1**. In order for these disturbing noises to be additionally reduced, and in order for the perception of these disturbing noises in the environment of the jet regulator **1** to be additionally minimized, at least one cross-sectional constriction **20** is configured in the at least one ventilation duct **5**. An acoustic obstacle which additionally reduces the transmission of these disturbing noises to the outside is formed by this at least one cross-sectional constriction **20** provided in at least one ventilation duct **5**. This cross-sectional constriction **20** here is configured as an annular flange projecting on the internal circumference of the external housing **4**. The cross-sectional constriction **20** in the flow direction of the water jet flowing through the jet regulator **1** here is disposed

below the at least one passage opening **7** and in the inflow direction of the ambient air in the ventilation duct **5** and is thus disposed ahead of the passage openings **7**. In order for the perception of such disturbing noises in the environment of the jet regulator **1** to be additionally reduced, the inflow opening **6** of the at least one ventilation duct **5** is disposed on the outflow side of the jet regulator **1**. It can be particularly readily seen in FIG. **5** that the outflow-proximal peripheral end region of the external housing **4** for this purpose is angled in the direction toward the internal housing **3**. The inflow opening **6** in comparison to the available duct cross section of the ventilation duct **5**, which in the flow direction of the ambient air guided in the ventilation duct **5** in the following duct portion, has a reduced cross section such that the emission of the disturbing noises reflected in the ventilation duct **5** is additionally impeded and an operation of the jet regulator **1** according to the invention at a low noise level is additionally facilitated.

[0043] In order for good blending of the ambient air suctioned into the housing interior of the internal housing **3**, on the one hand, with the water flowing through the internal housing to be facilitated, on the other hand, it is advantageous for flow obstacles to be provided in the housing interior of the internal housing **3**. As can be seen in FIGS. **2** to **5**, the internal housing **3** to this end tapers toward the outflow end side thereof in stages. The stages provided on the housing internal circumference of the internal housing **3** here can encircle the housing internal circumference, as is the case here, or else be segmented or interrupted. Good blending of air and water here is already facilitated when at least one such stage **21** is provided on the housing internal circumference of the internal housing **3**.

[0044] An aperture **32**, which is indicated by chain-dotted lines in FIG. **5** and in the flow direction oriented from the inflow side ZS toward the outflow side AS is preferably disposed below the passage openings **7** at a minor spacing from the latter, can be provided in the housing interior of the internal housing **3**. This aperture **32** has a central opening which delimits the available cross section of the internal housing **3** in this region to the open cross section of the aperture **32**. The aperture **32** is preferably configured as a perforated disk which is inserted in the internal housing **3**. The aperture **32** sub-divides the housing interior of the internal housing **3** into an air entry chamber, situated in the region of the passage openings **7**, and a mixing chamber provided below the aperture **32**. The opening of the aperture **32** preferably encloses the water jet which emanates from the atomizer nozzle and exits there as a hollow-conical water jet at a spacing from the latter. The aperture **32** prevents aerosols or collision water, which can be created by the water impacting the internal housing, from exiting through the passage openings **7**.

[0045] A flow rectifier **22** which in the outflow direction homogenizes the water flowing in through the internal housing **3** and being blended with the ambient air is provided on the outflow end side of the internal housing **3**.

[0046] This flow rectifier **22** has a mesh structure, honeycomb structure or net structure, the latter being the case here, having flow-conducting passage bores **23**. At least the majority of the passage bores **23** in the flow direction has a longitudinal extent which is larger in comparison to the maximum width of these passage bores **23**. In order to counteract any undesirable manipulation on the flow rectifier **22** of the jet regulator **1**, the flow rectifier **22** is integrally

molded on the internal circumference of the internal housing 3. The passage bores 23 are disposed and configured such that the water jet downstream is regrouped so as to form a uniform outflow jet. At least one perforated plate 24 which has bores 25, the maximum width of the latter being smaller in comparison to the width of the passage bores 23 of the flow rectifier 22, is disposed upstream of the flow rectifier 22. The perforated plate 24 here has a mesh structure which borders the bores 25.

[0047] The at least one perforated plate 24 is inserted into the housing interior of the internal housing 3 and preferably placed on the flow rectifier 22.

[0048] In order to be able to assemble the external housing of the jet regulator 1 shown in FIG. 5 on the water outflow of a sanitary outflow fitting, the external housing 4 on the inflow-proximal housing circumference thereof has a coupling which here is configured as a thread 28 and which interacts with a mating coupling on the water outflow of the sanitary outflow fitting, said mating coupling being formed by a mating thread, for example.

[0049] The internal housing 3 has at least one insert detent 26, wherein the internal housing 3 is able to be inserted into the external housing 4 until this at least one insert detent 26 bears on a contact face provided on the housing interior circumference of the external housing 4. The inflow-proximal end face of the annular flange 20, which serves as a cross-sectional constriction, here serves as the contact face. The insert detent 26 here is configured as a segmented annular shoulder on the external circumference of the internal housing 3.

[0050] The jet regulator 1 has a single and preferably central jet splitter 2. The longitudinal axes of the jet splitter 2, of the internal housing 3 and of the external housing 4 here are disposed so as to be mutually coaxial. The jet splitter 2 on the inflow-proximal end side of the internal housing 3 is able to be releasably connected and preferably able to be releasably latched to the latter.

[0051] The jet ventilator 1 illustrated here is distinguished by a reliable functional mode even at very low flow classes and rates. A central atomizer nozzle is used here as the jet splitter 2. A hollow-conical water jet which flows into the housing interior of the internal housing 3 that serves as a mixing chamber and impacts the internal circumference of the impact zone 19 on the internal housing 3 is formed in this atomizer nozzle. The hollow-conical water jet exiting the jet splitter 2 displays hardly any rotational movement. The length of the internal housing 3 in the housing portion disposed below the passage openings 7 is sized so as to be sufficiently long such that the water building up at the outflow end of the internal housing 3 in the region of the flow rectifier 22 cannot backup into the region of the impact zone 19. A shoulder on the outflow-proximal end of the internal housing 3 can additionally improve the blending of the water with the ambient air.

LIST OF REFERENCE SIGNS

[0052]	1 Jet regulator
[0053]	2 Jet splitter
[0054]	3 Internal housing
[0055]	4 External housing
[0056]	5 Ventilation duct
[0057]	6 Inflow opening
[0058]	7 Passage opening
[0059]	8 Nozzle body

[0060]	9 Swirl chamber
[0061]	10 Chamber portion
[0062]	11 Supply channel
[0063]	12 Nozzle channel
[0064]	13 Insert opening
[0065]	14 Groove
[0066]	15 Plug
[0067]	16 Annular shoulder
[0068]	17 Depression
[0069]	18 Attachment screen or filter screen
[0070]	19 Impact zone
[0071]	20 Cross-sectional constriction
[0072]	21 Annular shoulder
[0073]	22 Flow rectifier
[0074]	23 Passage bores
[0075]	24 Perforated plate
[0076]	25 Bores
[0077]	26 Insert detent
[0078]	27 Ramp
[0079]	28 Thread
[0080]	29 Groove
[0081]	30 Inflow channel
[0082]	31 Lines
[0083]	32 Aperture
[0084]	AS Outflow side
[0085]	ZS Inflow side

1. A jet regulator (1), comprising:

at least one jet splitter (2) configured to divide an inflowing water flow,

a sleeve-shaped internal housing (3) encased by an external housing (4),

at least one ventilation duct (5) disposed between the internal housing (3) and the external housing (4), the at least one ventilation duct includes at least one inflow opening (6) and at least one passage opening (7) provided on a housing circumference of the internal housing (3),

wherein the at least one jet splitter (2) is configured as an atomizer nozzle which divides the inflowing water flow into a substantially hollow-conical water jet,

an impact zone (19) of an encircling annular shape of the internal housing (3) is located, in a flow direction, below the at least one passage opening (7) on an internal circumference of the internal housing (3), and the hollow-conical water jet impacts the housing internal circumference of the internal housing (3) in said impact zone (19).

2. The jet regulator as claimed in claim 1, wherein the ventilation duct (5) is configured as an annular gap located between the internal housing (3) and the external housing (4).

3. The jet regulator as claimed in claim 1, further comprising at least one cross-sectional constriction (20) in the at least one ventilation duct (5).

4. The jet regulator as claimed in claim 1, wherein the at least one cross-sectional constriction (20) is configured as an annular flange which projects on an internal circumference of the external housing (4).

5. The jet regulator as claimed in claim 4, wherein the at least one cross-sectional constriction (20) in the flow direction of the water jet flowing through the jet regulator (1) is located below the at least one passage opening (7).

6. The jet regulator as claimed in claim 1, wherein the internal housing (3) tapers or narrows toward an outflow side thereof.

7. The jet regulator as claimed in claim 6, wherein the internal housing (3) tapers or narrows in stages.

8. The jet regulator as claimed in claim 1, further comprising a flow rectifier (22) which includes at least one of a mesh structure, net structure or honeycomb structure having flow-conducting passage bores (23) located on an outflow side of the internal housing (3).

9. The jet regulator as claimed in claim 8, wherein at least the majority of the passage bores (23) in the flow direction have a longitudinal extent which is larger in comparison to a maximum width of the passage bores (23).

10. The jet regulator as claimed in claim 8, wherein the flow rectifier (22) is integrally molded on the internal circumference of the internal housing (3).

11. The jet regulator as claimed in claim 8, further comprising at least one perforated plate (24) located upstream of the flow rectifier (22) in the flow direction.

12. The jet regulator as claimed in claim 11, wherein the at least one perforated plate (24) has bores (25), and a maximum width of the bores is smaller in comparison to a width of the passage bores (23) of the flow rectifier (22).

13. The jet regulator as claimed in claim 11, wherein the at least one perforated plate (24) is inserted in a housing interior of the internal housing (3).

14. The jet regulator as claimed in claim 1, wherein the external housing (4) on an inflow-proximal housing circumference thereof has a thread (28) configured to interact with a mating thread on a water outflow end of a sanitary outflow fitting.

15. The jet regulator as claimed in claim 1, wherein the internal housing (3) has at least one insert detent (26), and the internal housing (3) is insertable into the external housing (4) until the insert detent (26) bears on a contact face provided on a housing internal circumference of the external housing (4).

16. The jet regulator as claimed in claim 15, wherein the insert detent (26) is configured as a segmented or encircling annular shoulder.

17. The jet regulator as claimed in claim 15, wherein at least one cross-sectional constriction (20) is located in the at least one ventilation duct (5), and an inflow-proximal end face of an annular flange serving as the cross-sectional constriction (20) serves as the contact face for the at least one insert detent (26).

18. The jet regulator as claimed in claim 1, wherein the inflow opening (6) of the at least one ventilation duct (5) is provided on an outflow side of the jet regulator (1).

19. The jet regulator as claimed in claim 18, wherein at least one of (a) an outflow-proximal peripheral end region of the external housing (4) is angled in a direction toward the internal housing (3) or (b) an outflow-proximal peripheral end region of the internal housing (3) is angled in a direction toward the external housing (4).

20. The jet regulator as claimed in claim 1, wherein the at least one jet splitter is a single, jet splitter (2), and the longitudinal axes of the single jet splitter (2), the internal housing (3) and the external housing (4) are mutually coaxial.

21. The jet regulator as claimed in claim 1, wherein the jet splitter (2) is configured to be latched on an inflow-proximal end side of the internal housing (3).

22. The jet regulator as claimed in claim 1, wherein the jet splitter (2) is configured as an atomizer nozzle and has a swirl chamber (9), at least one supply channel (11) which is oriented transversely to a nozzle longitudinal axis and extends tangentially into the swirl chamber (9) opening into said swirl chamber (9), at least one inflow channel is disposed upstream of each said supply channel (11) in the flow direction, and the swirl chamber (9) in an outflow direction tapers in a direction toward a nozzle channel (12), the hollow-conical water jet exiting into the internal housing (3) at a duct end region of said nozzle channel (12).

* * * * *