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(54) **Vacuum device applicable to shower taps and the like**

(57) Shower draining device, characterised in that it comprises a part with an internal passage for interior water between its ends, which has at its ends a male connection and a female connection for connecting respec-

tively to a tap body and an intermediate pipe which opens into the shower head, the wall of said part having a hole which connects the exterior of the device to the interior passage for water.

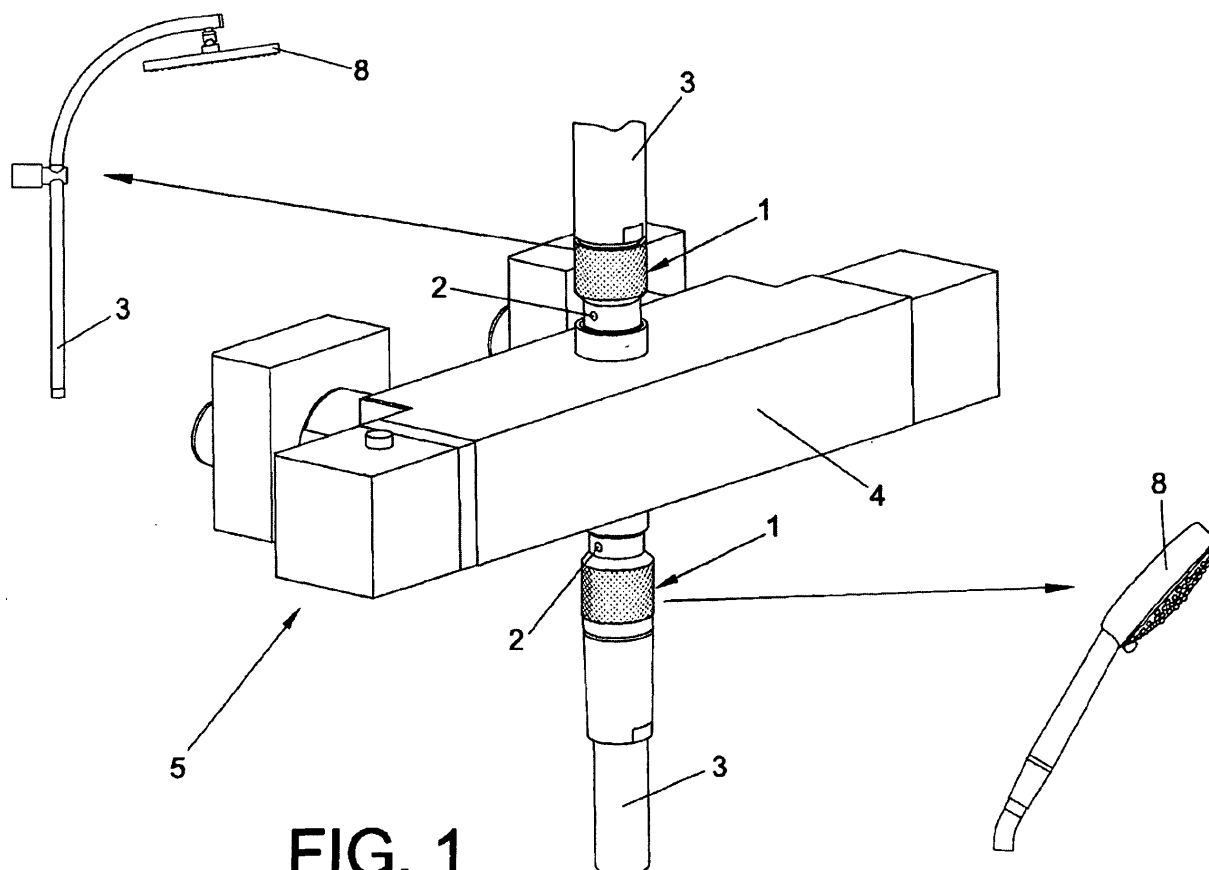


FIG. 1

Description

Subject-matter of the invention

[0001] The present invention relates to vacuum devices applicable to shower taps and the like.

[0002] Such devices are useful to allow the draining of the water retained in the intermediate flexible or rigid pipe starting from the tap and opening into a shower head through which the water flows out during the shower. When the tap is turned off, the water retained in the intermediate pipe and inside some of the inner compartments of the tap itself flows to the exterior with the aid of the devices according to this invention, so this retained water is drained without inconveniencing the user.

[0003] By draining the retained water, the formation and proliferation of legionella bacteria and other microorganisms which require moisture for their proliferation is prevented.

Background to the invention

[0004] At present the water pipes which start from shower taps, shower trays and other components have the disadvantage that when the user turns off the tap, a small amount of water is retained within these pipes, and can cause the proliferation of legionella bacteria and other microorganisms that require a high degree of humidity to develop and proliferate.

Description of the invention

[0005] In order to achieve the objectives and avoid the drawbacks mentioned in the preceding paragraphs, the invention provides, in a first aspect, a shower draining device according to claim 1. The dependent claims 2 to 11 describe preferred embodiments of the device according to the present invention. This device can be applied to shower taps and the like and can be made, for example, in the form of a union inserted in the connection of an intermediate pipe which starts from the main body of a corresponding tap and which itself opens into a shower head. With this arrangement, when the user turns off the tap, the water retained in this intermediate pipe, instead of staying inside it during the period of non-use, is passively drained through the hole, which will preferably be radial. In contrast, when the tap is turned on and the user is showering, air may enter through the hole up to the liquid channel which runs inside the intermediate pipe. The admission of air through the orifice during operation is ensured by the Venturi effect, similarly to that in Bunsen burners or water sucking pumps.

[0006] The radial hole of the draining device or union will also serve to drain the internal compartment or compartments of the tap itself, which collect water when the tap is turned off, if the draining device is placed below the tap.

[0007] Preferred embodiments of the invention in-

clude, inter alia, situating the hole in a widening after a narrowing of the water passage through the draining device. A second narrowing of the water passage after said widening, and preferably concentric to it, as well as a subsequent second widening after the second narrowing are also provided.

[0008] The respective diameters of orifice, water passage, narrowing and widening may be optimised as a function of the design pressures, taking into account the above-mentioned general principles of functionality.

[0009] A draining device or union with a corresponding drain hole can be interposed in each intermediate pipe starting from the shower tap.

[0010] Another advantage of the present invention is that the device also functions as a flux reductor, avoiding, for example, a dramatic leakage of the plates of the shower head whenever the holes of the shower head become blocked by calcareous impurities. Moreover, the present invention avoids the sudden, eventful, noisy, unpleasant emptying of the shower heads.

[0011] According to a second aspect, the present invention also includes a shower of the type which has a main tap body, a shower head, and an intermediate pipe connecting the main body and the tap, and which is characterised in that an orifice which connects the outside to the water passage is situated at the interface between the main body of the tap and the intermediate pipe. In this case, this orifice fulfils the above-mentioned functions for the draining device or union.

[0012] Preferred embodiments of the shower according to the present invention will correspond to those of the draining device according to the present invention. Some preferred embodiments of the invention are recited in claims 12 to 19.

[0013] The accompanying illustrative non-limiting drawings of an embodiment of the invention will assist the understanding of this specification and form an integral part thereof.

Brief description of the drawings

[0014]

Fig. 1 shows a perspective view of a shower tap which incorporates the draining device according to the invention, applicable to shower taps and the like, which in this example is formed as a union, which permits the emptying or draining of a volume of retained water.

Fig. 2 shows a perspective view of the union.

Fig. 3 shows a sectional view of this union.

Description of the preferred embodiment

[0015] Using the numbering adopted in the figures, the draining device applicable to shower taps and the like

comprises a fitting in form of a union -1-, provided with a radial hole or orifice -2-, this union -1- being inserted at the interface or connection with an intermediate pipe -3- which starts from a main body -4- of the tap -5-. In the example shown, the union -1- has two terminal threads, an external thread -6- to which the intermediate pipe -3- is coupled and an internal thread -1- to connect to the main body -4- of the tap -5-.

[0016] The intermediate pipe -3- opens into a shower head -8- so that when the user turns off the tap -5-, some water is retained within the intermediate pipe -3-, this water flowing out passively through the radial hole -2- of the union -1-.

[0017] Fig. 3 shows a cross section of the draining device or union -1-. The course and radial arrangement of the orifice -2- which connects the internal water passage -9-, -10-, -11-, -12- to the outside can be seen.

[0018] As can be seen, the union -1- has a second threaded part -13- inside the water passage and located upstream of the orifice -2-. This part is pierced and forms a narrowing -9- before the zone -10- in which the orifice -2- is located. Therefore, the water, when flowing through the union -1- in the direction of the shower head -8-, has to flow through the narrowing -9- before meeting up with the narrowing -10- in which the orifice -2- is situated. Upon having to pass through the narrowing, the fluid picks up speed at the expense of its pressure (applying Bernoulli's theorem) and this means that when the water flows at great speed to the shower head, there is no loss of water to the outside. The formation of a sealed recirculation zone in the corners of the first widening -10- helps prevent loss of liquid. However, the water retained once the tap has been turned off has no kinetic energy and flows out through the orifice -2- with the momentum provided by the weight of the liquid column. By applying Bernoulli's theorem, one possibility would be to match the hole -2- to the first narrowing -9-. However, tests show that the embodiment in the figures is more advantageous in practice with respect to this alternative configuration. In the embodiment shown, and to prevent the water from flowing out through the orifice -2- while using the shower, a second narrowing -11- has been provided after the first widening -10-, followed by a second widening -12- in the region where the intermediate pipe -3- is connected.

[0019] The first narrowing -9- and the second narrowing -11- are concentric, the second narrowing being of a slightly greater diameter. The area of passage of the first narrowing -9- is slightly greater than the area of passage of the orifice -2-.

[0020] On the other hand, it should be noted that as many unions -1- can be placed as water outlets of the tap -5-, for example two will be needed for a double thermostat, as is clearly reflected in the figures. In the example shown in the figures, the two outlets from the main body -4- of the tap -5- are provided with a respective draining device -1-.

[0021] The draining afforded by the draining device of the present invention helps to mitigate the occurrence of

legionella bacteria and other microorganisms.

[0022] Numerous modifications of the example shown are possible without departing from the scope of the invention. In particular, the provision of the orifice and preferably narrowings and widenings of the water passage can be completely in the intermediate pipe or placed completely in the main body of the tap, although the embodiment shown has the advantage over these alternative embodiments of ease of manufacture and its possible installation in existing showers.

Claims

1. Shower draining device, **characterised in that** it comprises a part with an internal passage for interior water between its ends, which has at its ends a male connection and a female connection for connecting respectively to a tap body and an intermediate pipe which opens into the shower head, the wall of said part having a hole which connects the exterior of the device to the interior passage for water.
2. Device according to claim 1, **characterised in that** said hole is radial.
3. Device according to either claim 1 or claim 2, **characterised in that** the cross-section of said internal water passage has a narrowing at the entrance and a subsequent widening.
4. Device according to claim 3, **characterised in that** said hole connects the outside to said widening.
5. Device according to either claim 3 or claim 4, **characterised in that**, after this widening, the water passage includes a second narrowing of the internal water passage.
6. Device according to claim 5, **characterised in that**, after the second narrowing, there is a second widening of the internal water passage.
7. Device according to either claim 5 or claim 6, **characterised in that** the first and second narrowings are concentric.
8. Device according to any of claims 5 to 7, **characterised in that** the second narrowing has an area greater than the first narrowing.
9. Device according to any of claims 3 to 8, **characterised in that** the area of passage of the first widening is greater than the area of passage of the orifice.
10. Device according to any of claims 3 to 9, **characterised in that** the first narrowing is formed by a second threaded part in the water passage of the device.

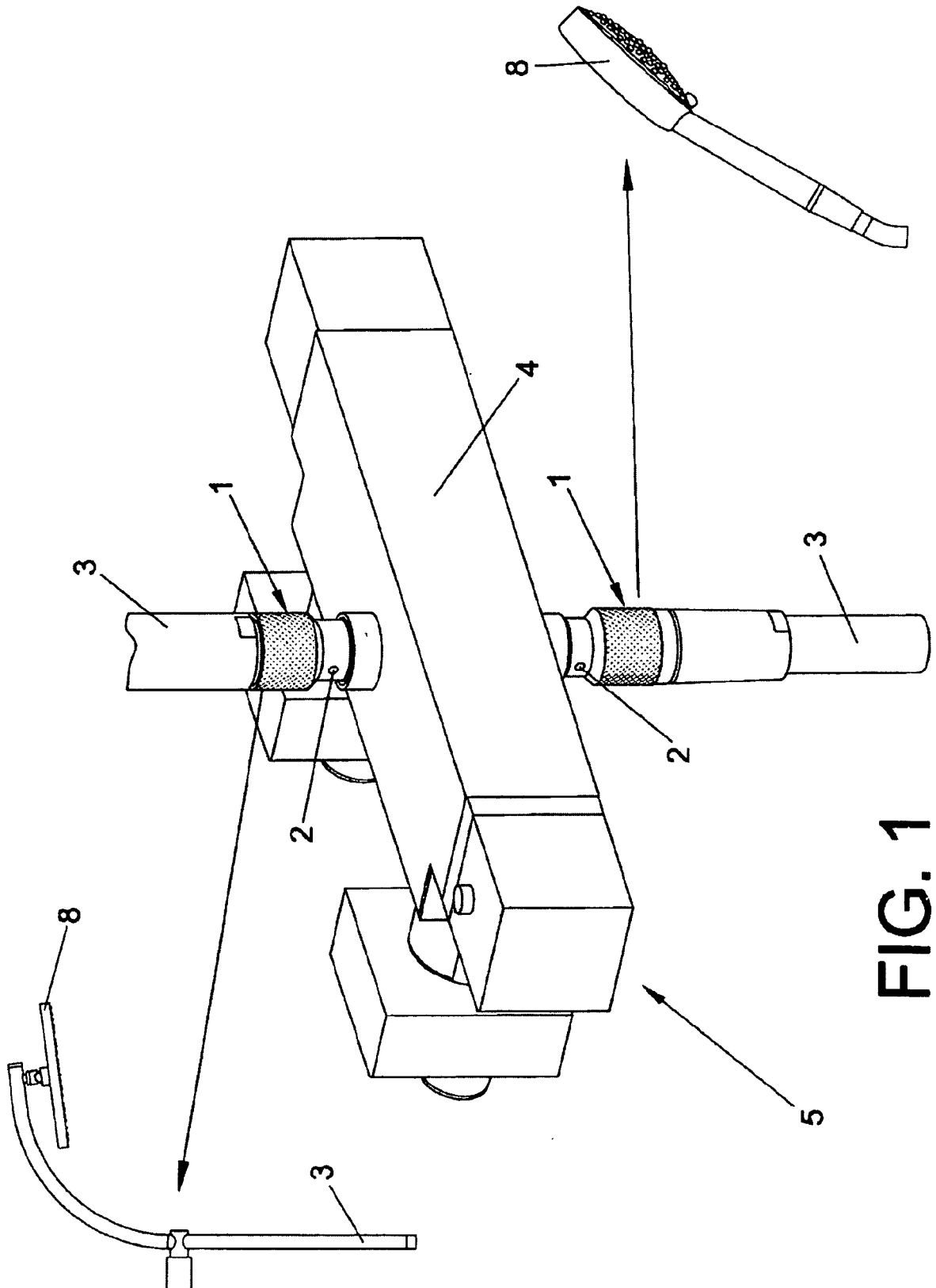
11. Device according to any of claims 1 to 10, **characterised in that** said part is a union.
12. Shower of the type which comprises a main tap body, a shower head and an intermediate pipe which connects the main body and the tap, **characterised in that** an orifice which connects the outside to the water passage is located at the interface between the main body of the tap and the intermediate pipe.
13. Shower according to claim 12, **characterised in that** said radial is radial with respect to the water passage.
14. Shower according to either claim 12 or claim 13, **characterised in that** the water passage section has a first narrowing of the passage in the vicinity of the orifice.
15. Shower according to claim 14, **characterised in that** said first narrowing is downstream of said orifice.
16. Shower according to claim 15, **characterised in that** the water passage has a first widening after said first narrowing.
17. Shower according to claim 16, **characterised in that** the orifice connects the outside to said first widening.
18. Shower according to either claim 16 or claim 17, **characterised in that**, after this first widening, the water passage includes a second narrowing.
19. Shower according to claim 18, **characterised in that** after the second narrowing, the water passage includes a second widening.

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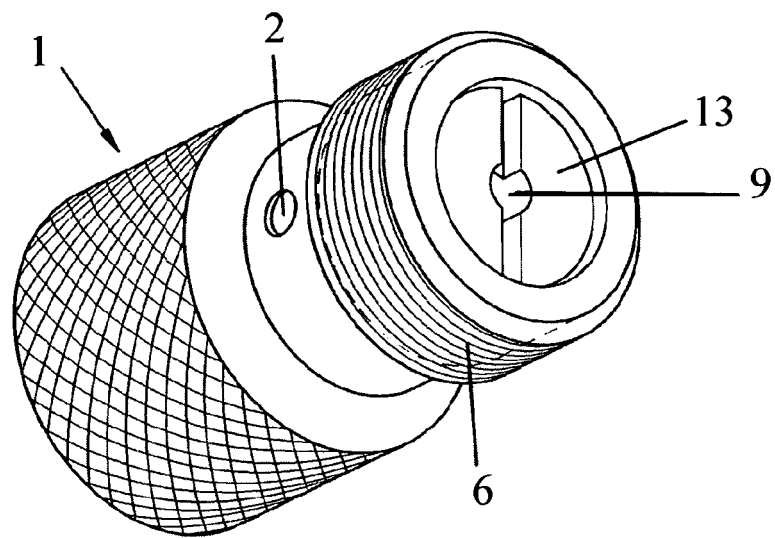


FIG. 2

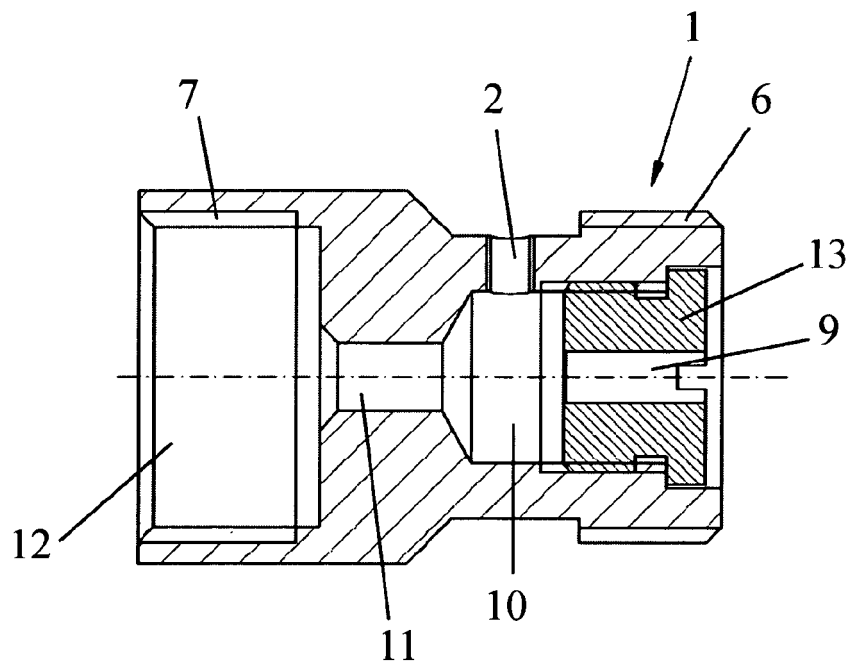


FIG. 3