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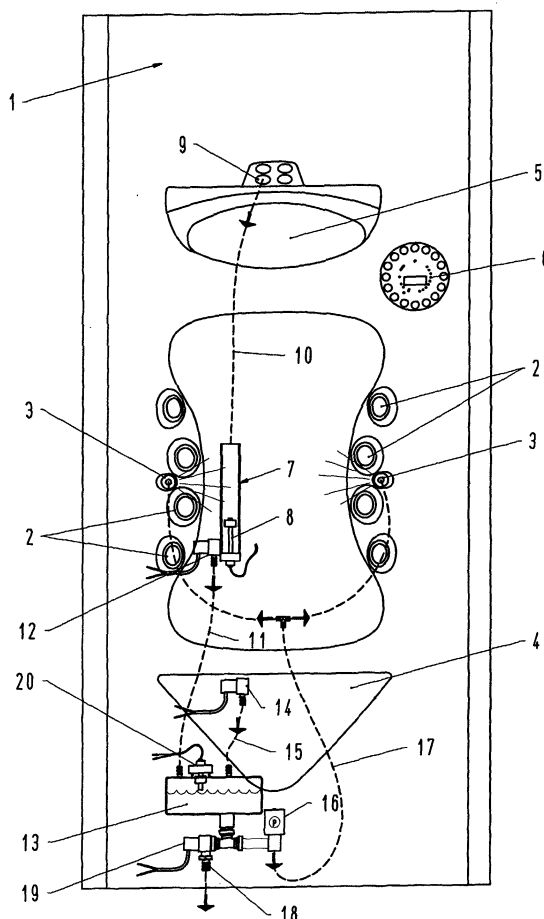
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(54) **Hydraulic system for the metered delivery of additive products in a sanitary apparatus**

(57) A measuring container (13) receives from a reservoir (7) and the water mains respective amounts of

aromatising oil and water so as to instantly prepare a metered and homogeneous mixture, with which an atomising nozzle (3) is then supplied.



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## Description

**[0001]** The present invention refers to a hydraulic system for the metered delivery of additive products, such as aromatic substances or the like, in a sanitary apparatus such as for instance a shower booth of the fitted type.

**[0002]** Largely known in the art are shower booths that are variously equipped in view of inducing in the user definite psycho-physical sensations of well-being through the possibly combined delivery of water, vapours, scents, sounds, lights, etc.

**[0003]** However, as far as scents are in particular concerned, which are usually available in the form of water-soluble oils that should possibly be metered in a very accurate manner, while undergoing a marked dilution, it has hitherto proved practically impossible for them to be delivered correctly in an automatic manner to optimum amounts and proportions, ie. in such a quantity and proportion as to appropriately aromatize the atmosphere in the room where a person stands in accordance with the different conditions and circumstances.

**[0004]** This problem becomes more marked in the particular case of a shower booth, owing to the fact that, unlike what actually happens in a bathtub, in a shower booth the user is not submerged in a mass of water, but is merely flushed, ie. sprayed by water and/or steam jets.

In bathtubs it is on the other hand a largely known practice to deliver aromatising and essential oils into a mass of water by means of one or more injectors which, under the actuation of a manual or semi-automatic control, are supplied from corresponding multi-dose reservoirs. As a result, the metering of the scents turns unavoidably out as being of an undesirably approximate character, ie. inaccurate.

**[0005]** In any case, since in bathtubs such oils are delivered into the mass of water in their usual highly concentrated condition, the need arises for the same water to be subsequently stirred very thoroughly in order to aromatize the ambience to an acceptable extent.

**[0006]** It would therefore be desirable, and it is actually a main purpose of the present invention, to provide a hydraulic system for the automatic metered delivery of additive products in a sanitary apparatus, which is not only simple and reliable, but also enables such additive products to be effectively delivered in particularly accurate amounts and proportions, in accordance with the different circumstances and requirements.

**[0007]** A further purpose of the present invention is to provide a hydraulic system of the above cited kind, which has a substantially long self-sufficiency so as to enable multiple doses of additive products to be delivered.

**[0008]** According to the present invention, these aims are reached in a hydraulic system for the automatic metered delivery of additive products in a sanitary apparatus embodying the characteristics as recited in the ap-

ended claims.

**[0009]** The features and advantages of the present invention will anyway be more readily and clearly understood from the description that is given below by way of non-limiting example with reference to the accompanying Figure, which is a schematic and partial view of a sanitary apparatus provided with a hydraulic system according to a preferred embodiment of the present invention.

In the example described below, reference is made to a shower booth of an automatic type comprising at least a variously fitted and equipped wall 1, eg. featuring a plurality of nozzles 2 for issuing dorsal water jets, at least an atomising spray nozzle 3, a seat 4, an upper resting and containment protrusion 5, as well as control means (schematically indicated at 6) for the automatic actuation of the main operating organs and members under control of an electronic unit (not shown) or the like.

**[0010]** The hydraulic system according to the present invention is adapted to be substantially fitted on the rear side of the wall 1 and comprises at least a storage reservoir 7 for each additive products that has to be delivered.

**[0011]** In this connection, it should be noticed that, owing to reasons of greater descriptive simplicity, the hydraulic system illustrated in the Figure relates to a single additive product, which is preferably formed by a water-soluble aromatising oil in a substantially concentrated form.

**[0012]** The reservoir 7 is of a multi-dose type and preferably comprises a level sensor 8, or the like, adapted to appropriately indicate, eg. visually, a substantial empty condition of the same reservoir.

**[0013]** In this connection, the reservoir 7 can be filled by gravity through an associated closable filling aperture 9 which is preferably situated in correspondence of the upper protrusion 5 and is connected to the reservoir itself via a downpipe 10.

**[0014]** A further downpipe 11 connects the lower portion of the reservoir 7, via an electromagnetic valve 12 or similar device, to the top portion of a mixing container 13 situated therebelow.

**[0015]** Such a mixing container 13 is adapted to be supplied with water from the mains via a pipe 15 associated to an electromagnetic valve 14, or the like, and its bottom is connected to the suction side of a pump 16, whose delivery side is connected to one or more spray nozzles 3 via a pipe 17. Furthermore, the bottom of the mixing container 13 is connected to a drain pipe 18 via an electromagnetic valve 19, a cock or the like.

**[0016]** In a preferred manner, the mixing container 13 is provided with a level sensor 20, or a similar device, adapted to drive the control unit of the shower booth in the same manner as the level sensor 8.

**[0017]** The electromagnetic valves 12, 14 and 19, along with the pump 16, shall be understood as being controlled by the control unit of the shower booth in the

manner that will be described in greater detail further on.

[0018] When the user wants to have the interior, ie. the internal space of the shower booth aromatised, the electromagnetic valve 12 is temporarily opened in order to enable a correspondingly metered amount of additive product to flow down by gravity from the reservoir 7 into the container 13, where such an additive product is then mixed with the water being let in owing to the electromagnetic valve 14 having been caused to open until a pre-established level is reached, as detected by the sensor 20.

[0019] As a result, said mixing container 13 behaves as a volume meter, and therefore in a particularly simple and accurate manner, in which the aromatising oil is diluted to a considerable extent and in a advantageously homogeneous, ie. well-blended manner, thanks to the strong stirring effect brought about by the jet of water flowing in from the pipe 15.

[0020] To this purpose, in fact, the electromagnetic valve 14 is preferably opened at the same time as or at a later time than the electromagnetic valve 12, in such a manner as to allow for the additive product, which may be relatively dense and/or may have a specific gravity that is relatively different from the one of water, to be substantially "homogenized", thereby forming in the mixing container 13 a so-to-say "instant-made" mixture.

Immediately thereafter, the pump 16 is started ( in an either continuous or discontinuous manner) in order to deliver the so formed mixture into the interior of the shower booth through the spray nozzles 3. Since the additive product (or additive products, as the case may be) issuing from the spray nozzles 3 is already diluted in a correct, proper manner, the delivery of such an additive product can therefore be advantageously protracted in its duration (until the container 13 becomes empty), with the advantage of providing in a persisting and, as a result, really effective manner a condition of correct aromatisation inside the shower booth.

[0021] It should be noticed that the above mentioned instant preparation, in said container 13, of a properly metered and proportioned water-additive product mixture gives rise to a number of further important advantages, ie.:

- reduction in additive product usage, since only the amount of mixture is prepared which turns out each time as being the most appropriate one in view of the selected operation program or cycle of the shower apparatus;
- optimum utilization of the inherent properties of the additive product, owing to the latter being preserved in an intact condition up to the moment at which it must be actually used.

[0022] It will be of course appreciated that the afore described hydraulic system may be subject to a number of modifications and variants without departing from the

scope of the present invention.

[0023] For example, by opening the electromagnetic valve 19 it is possible for substantially the whole circuit to be emptied and washed, so as to prepare it for the delivery of a different additive product, such as a disinfectant substance in view of carrying out periodical sanitation operations.

[0024] In this connection, it should be specially stressed that the hydraulic system according to the present invention may be advantageously applied, without any substantial modification in the basic principle thereof, also to such a sanitary apparatus as a bathtub, particularly a bathtub of the whirlpool type.

[0025] It shall be finally appreciated that the atomising nozzles 3 may be replaced by spray nozzles of a different type.

## Claims

1. Hydraulic system for the metered delivery in a sanitary apparatus of at least an additive product that is normally stored in a respective reservoir (7), **characterized in that** it comprises at least a measuring container (13) adapted to receive from said reservoir (7) and supply means (14, 15) respective amounts of additive products and water so as to form in the same container an instant-made metered and homogeneous mixture, with which at least a delivery nozzle (3) is supplied under pressure by pumping means (16).
2. Hydraulic system according to claim 1, **characterized in that** said container (13) is adapted to be substantially filled with said volumetrically metered mixture under control of level sensor means (20).
3. Hydraulic system according to claim 1, **characterized in that** said reservoir (7) is situated at a higher level with respect to the measuring container (13), towards which it is adapted to deliver by gravity respective amounts of additive product via controlled valve means (12).

