

[54] **DEVICE FOR THE INTRODUCTION OF FLUENT MEDIUM INTO A MAIN FLOW OF LIQUID PASSING ALONG A CLOSED PASSAGE, SUCH AS A PIPE**

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[51] Int. Cl..... **E03d 9/03**

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[57] ABSTRACT

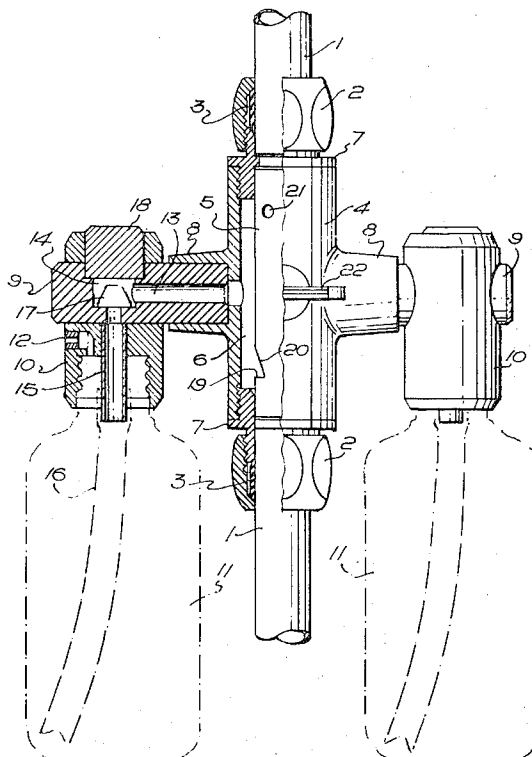
A device which is for insertion in a pipe, such as the riser pipe of a shower, which carries water, said device having a container holding an additive such as shampoo or bubble bath liquid, to be introduced into the flow of water, said device being such that the additive can be fed at will past a one-way valve, to be introduced into the water flow.

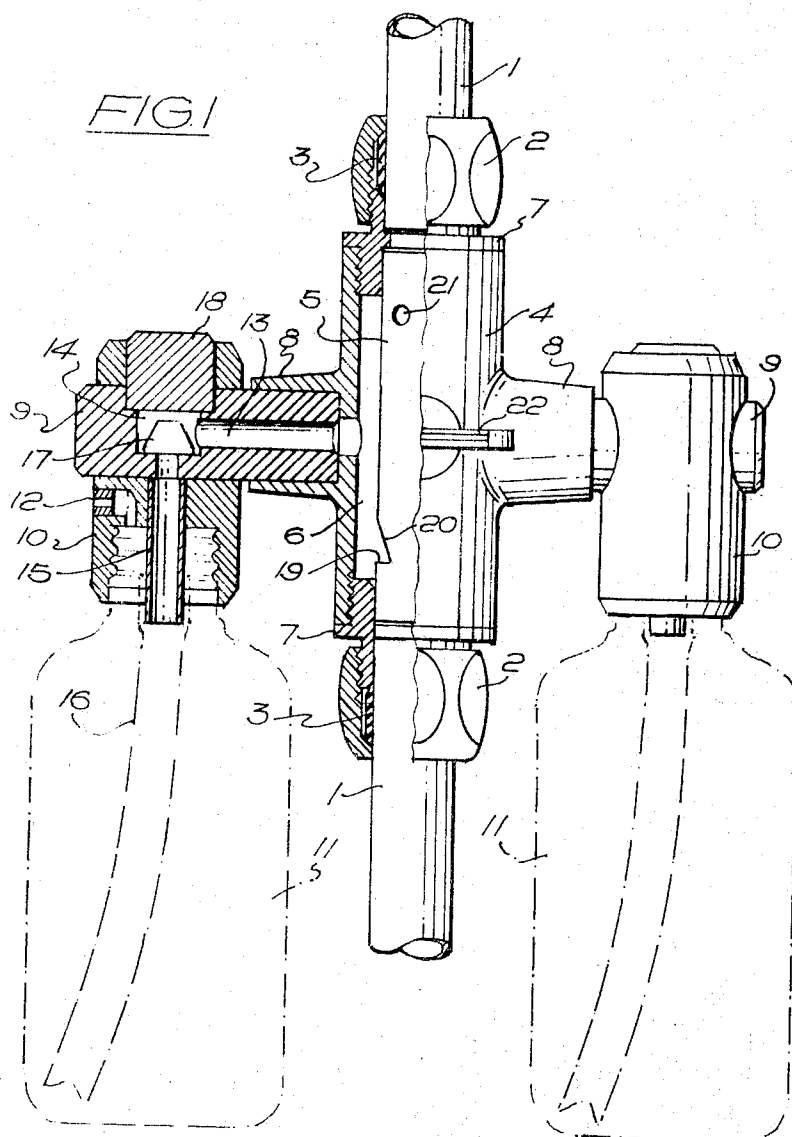
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1 Claim, 5 Drawing Figures





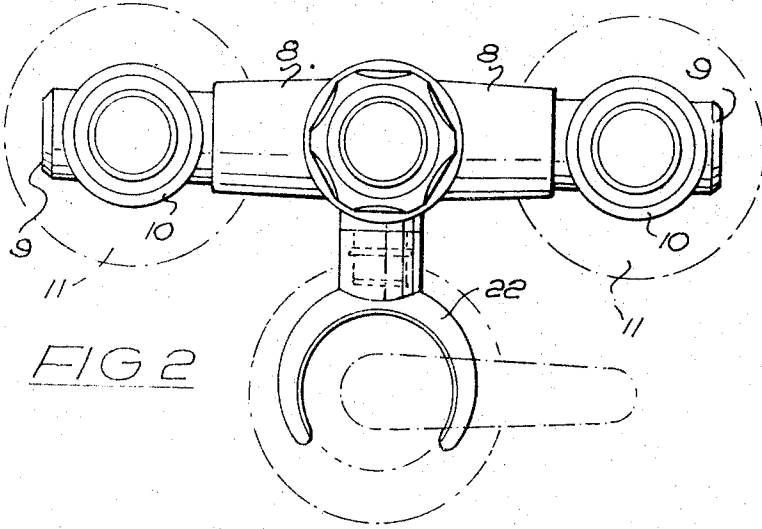


FIG 2

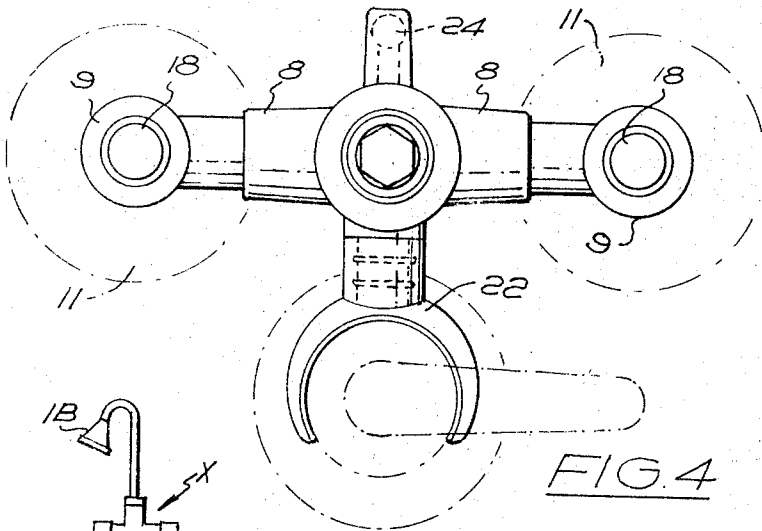


FIG. 4

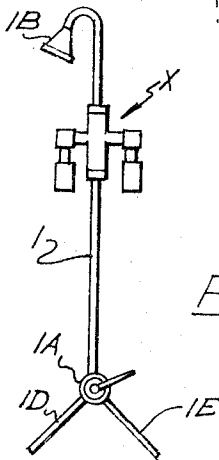
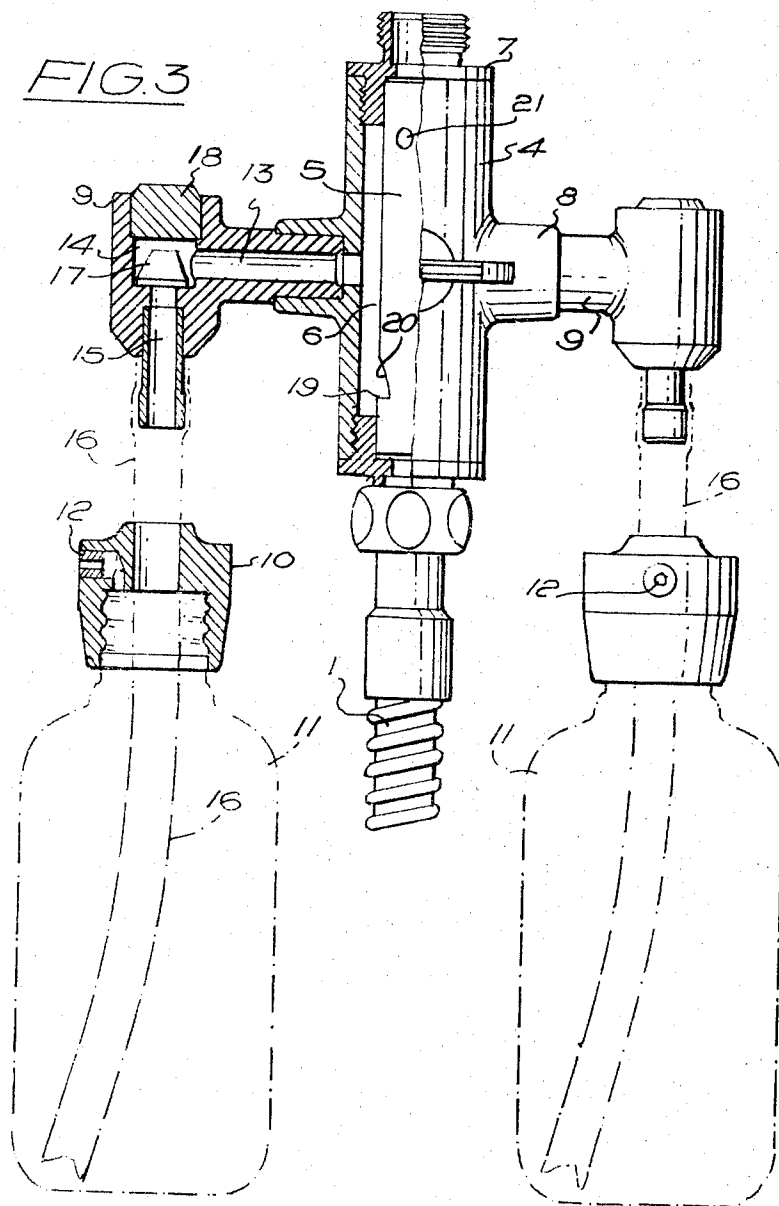


FIG. 5

FIG. 3



DEVICE FOR THE INTRODUCTION OF FLUENT MEDIUM INTO A MAIN FLOW OF LIQUID PASSING ALONG A CLOSED PASSAGE, SUCH AS A PIPE

This invention relates to a device for the introduction of fluent medium, such as powder material or liquid, into a main flow of liquid passing along a closed passage, such as a pipe.

The device according to the invention has suitable application in connection with shower units, spray units and brushes on hoses in which liquid is supplied through a pipe or the like to a shower rose, or spray nozzle or brush head and into which liquid it is desired to introduce fluent medium such as bubble bath fluid, perfume, disinfectant, deodorizers, medication, detergent, pesticide, insecticide, fertilizer and so on.

Such applications arise in connection with shower units, used as domestic showers, in public swimming baths, wash rooms, hospitals and the like; in connection with garden and agricultural spray units; and spray units on wash hoses used for example for cleaning motor vehicles.

According to the present invention there is provided a device for the insertion of fluent medium into a main flow of liquid passing along a closed passage, said device comprising a casing adapted to be connected with the passage so that a fluent medium feed cavity in the casing communicates hydraulically with the passage as a result of forming a break in the means defining the passage, a feed means by which fluent medium may be fed into said cavity past a one way valve of the device.

The device preferably includes a short open ended tube and end connecting pieces by which the tube may be connected to the means defining the passageway, when such means is broken and separated and the tube positioned to form part of such passageway, the cavity being in the form of an annulus around the tube which communicates with the tube interior through holes in the tube wall.

The one way valve may be constituted by a valve plug which is adapted to fall under gravity to a position cutting off a first bore in the casing which leads from the feed means, from a second bore in the casing leading to said cavity.

The feed means preferably comprises a bottle of flexible material which can be squeezed by hand to force fluent medium therein past said one way valve and into said cavity.

The device may have two such feed means each adapted to supply fluent medium to said cavity through its own one way valve.

The or each bottle is preferably associated with a one way air intake, to enable the bottle to draw in air when squeezed and released, to replace fluent medium displaced therefrom as a result of the squeezing.

Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, wherein:

FIG. 1 is a half sectional elevation of a device according to the invention when fitted in a feed water pipe;

FIG. 2 is a plan of the device shown in FIG. 1;

FIGS. 3 and 4, respectively are views similar to FIGS. 1 and 2, but show a modified form of the invention; and

FIG. 5 shows diagrammatically one example of a shower unit fitted with a device as illustrated in FIGS. 1 and 2 or FIGS. 3 and 4.

Referring to the drawings and firstly to FIGS. 1 and 2, the device is positioned in and secured to the riser pipe 1 of a shower unit which may have, for example as illustrated in FIG. 5, a mixing valve 1A at the lower end of the riser pipe 1 and a shower rose 1B at the top end of pipe 1 as is conventional practice. The mixer valve 1A serves to control the quantity of hot and cold water being delivered through pipes 1D and 1E which are delivered to pipe 1 and eventually to rose 1B. The device which is indicated generally by the letter X in FIG. 5 is shown as being connected in the pipe 1.

In effect, the interior of the pipe 1 constitutes a passageway through which liquid, in this case a mixture of hot and cold water or in some cases simply cold water or simply hot water, is passing and by inserting the device according to the invention it in fact defines a length of this passage through which the liquid flows.

Referring in more detail to FIGS. 1 and 2, the device comprises a casing, in this example of metal, which is made up of a cylindrical portion 4 having 2 diametrically opposed and outwardly extending integral bosses 8 from each of which extends a radial support arm 9. Attached to each support arm 9 is a cylindrical adaptor 10.

Within the cylindrical portion 4 is a smaller diameter tube 5 which is open ended and which is held in position centrally of the cylindrical portion 4 by means of end spacing washers 7 screwed to the ends of portion 4 so that within the casing and surrounding the tube 5 is an annular cavity 6 which will be referred hereinafter to as the "mixing cavity".

Washers 7 have through bores to enable liquid passing along pipe 1 to continue through tube 5 and into the other section of pipe 1 and these flanges also have screwed hub portions by which gland nuts 2 may be screwed thereto in order to compress a resilient annular seal 3 onto the pipe 1 to form a liquid tight seal between the pipe 1 and each flange 7.

The interior of pipe 5 communicates with mixing chamber 6 by means of up stream apertures 20 and down stream apertures 21 in the wall of tube 5. The down stream apertures 20 are formed by slitting the wall and then indenting same as shown whereas apertures 21 are simply circular holes in the tube wall. Formation of the apertures 20 in the manner described tends to force liquid passing up the pipe 1 into the mixing cavity 6 for a purpose to be explained hereinafter.

Each cylindrical connector 10 is provided with a threaded bore into which a flexible container 11 having a screwed neck portion may be screwed, as shown in FIG. 1, and the adaptor also houses a one way air intake valve 12 by which air can be drawn into container 11 as will be explained hereinafter.

Each adaptor 10 also carries a short rigid pipe 15 extending into and located centrally of the threaded bore and to this pipe 15 is attached a dip tube 16 of flexible material which extends to the bottom of the flexible bottle 11. The interior of tube 15 leads through a first passage in arm 9 to a cavity 14 in the arm and in which is contained a one way valve plug 17 of generally frusto-conical form as shown. A second and radial passage 13 leads from cavity 14 through arm 9 to an aperture

in the wall of cylindrical portion 4 whereby said passage 13 communicates with the mixing cavity 6.

A core plug 18 which may be removably secured in the position shown serves to close the cavity 14 so that the plug 17 is held captive therein and will fall under gravity to the position shown in which it disconnects the first passage from the said second passage 13 and also prevents flow of liquid from passage 13 back into bottle 11.

As shown in FIG. 2, the casing is also provided with an additional support fork 22 by which a further plastic bottle which may carry, for example hair shampoo to be delivered through a suitably shaped dispensing cap into the hand by squeezing the container shown in outline in the figure. The shampoo would then be applied directly to the hair, can be supported on the device.

The operation of the device is straight forward. Each of the bottles 11 will carry a suitable solution or fluent material which is desired to be introduced into the water stream flowing through pipe 1 to the shower rose 1B. Assume that one of the bottles contains bubble bath liquid. In order to insert some of this liquid into the water stream the appropriate bottle simply is squeezed by hand resulting in closure of the associated air intake valve 12 and the ejection of a quantity of liquid past one way valve 17 and into mixing cavity 6 causes a mixing of the injected liquid with the water and a subsequent gradual withdrawal of the liquid containing the bubble bath solution into the main water stream through holes 21 and the solution is carried to and ejected from the rose 1B entrained with the supply water.

To insert the device of FIGS. 1 and 2 into an existing shower unit, spray unit or even a garden hose, one method is to sever the hose or pipe and remove a length approximately equal to the length of tube 5, if the pipe is of a rigid material, and is otherwise securely mounted on a wall or other surface or if the pipe is of flexible material, then it need only be severed transversely and the ends moved apart and secured to the fittings 7 and 3 at the ends of the pipe 5.

Where the pipe has a natural connection with, for example a mixing valve or a shower rose, it may not be necessary to sever the pipe at all if the device can be attached at the natural connection point of the pipe with some other part of the system.

The embodiment shown in FIGS. 3 and 4 can be used in all instances where the embodiment of FIG. 1 can be used and has all of the advantages and the main constructional features of the FIG. 1 embodiment. Accordingly, similar reference numerals have been used in FIGS. 3 and 4 and no description is given for parts already described in relation to FIG. 1. The embodiment of FIGS. 3 and 4 has particular advantage however where the unit may be located at a low level, for example, if it is connected between the mixing valve 1A and the end of the pipe 1 normally connected to the mixing valve. When the device is so located it may be difficult for elderly people to bend down and squeeze the appropriate bottle if the bottle is connected directly to the casing. The modification shown in FIGS. 3 and 4 overcomes this difficulty insofar as the bottle 11 is provided with a cap 10 which has the one way air intake valve 12 and the bottle and its cap are carried by the flexible dip tube 16 and are spaced slightly as shown from the support arm 9. Thus, the user of this device can not only squeeze the bottle to cause ejection of the liquid

but can also tilt the bottle from side to side whereby removing upward location of the hand and arm to operate the device.

The device according to the invention as illustrated in FIGS. 1 and 2 or FIGS. 3 and 4 is preferably constructed as far as possible of synthetic plastics material.

It will be appreciated that the use of the device is not essentially restricted to shower units. Thus, for example, it could be inserted in a wash hose in a washing unit for example for a motor vehicle which comprises a hose and a washing brush at the end thereof. Where the unit has a different use then, of course, the plastic bottle will contain the appropriate medium for that use. Thus, in washing motor vehicles the bottle may contain a strong detergent which would not be suitable in the use of the device in a shower unit for human beings.

Although the device in each example is shown as having the tube 5 which becomes part of the passage-way carrying the main stream of liquid, this construction is not essential to the invention. In some examples, the casing may be in hingeable parts which are clamped round the pipe so that a cavity in the casing communicates with the interior of the pipe through one or more holes in the pipe or the casing may be screwed directly into a hole in the pipe.

Also, it may be possible to use other feed means than the plastic bottles shown in the examples. The feed means may therefore comprise hand operated plungers operating through one way valve arrangements to inject the fluent medium into the mixing cavity.

In a modified arrangement, only one of the bottles 11 is adapted as described to insert fluent additive into the water stream, whilst the other may carry for example hair shampoo. In this case squeezing of the hair shampoo would cause dispensing of a quantity of shampoo, or other medium as desired, out of an outwardly located aperture of the support arm 9. The quantity so dispensed would be caught by the hand for direct application to the hair, in the case where the bottle contains hair shampoo. In this modified arrangement, support fork 22 would not be necessary.

I claim:

1. A device for introducing a fluent medium into water flowing to a washing shower, the device comprising a tube having connection means at each end whereby the tube can be connected into the supply pipe through which water flows to the exit port of the shower, a casing surrounding the tube and spaced therefrom whereby a mixing chamber is formed between the casing and tube, deflection means on the tube adapted to divert some of the water flowing in the supply pipe into the mixing chamber, the deflection means having a plurality of bleed off apertures in the tube, a portion of the tube wall adjacent to each aperture being indented relative to the remainder of the tube wall whereby some of the water flowing through the tube is diverted into the mixing chamber by the indented wall portion, the tube having at least one other aperture downstream of the deflection means which permits liquid in the mixing chamber to enter the tube and be entrained in the water flowing to the exit port of the shower, and means having a one way valve for permitting the fluent material to be injected through the valve into the mixing chamber.

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