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DEVICES FOR ADMIXING LIQUIDS

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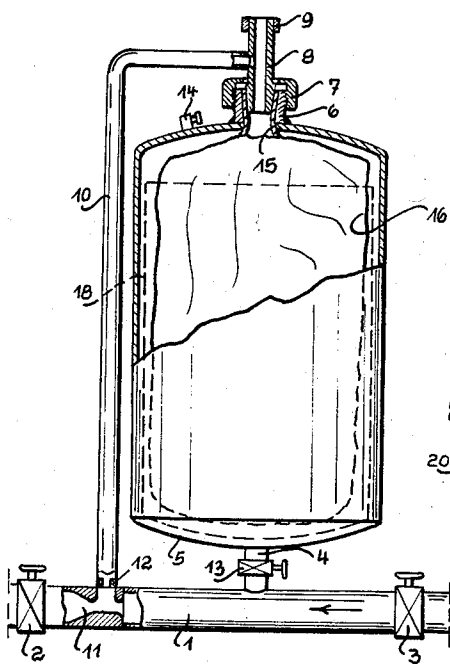


Fig. 1

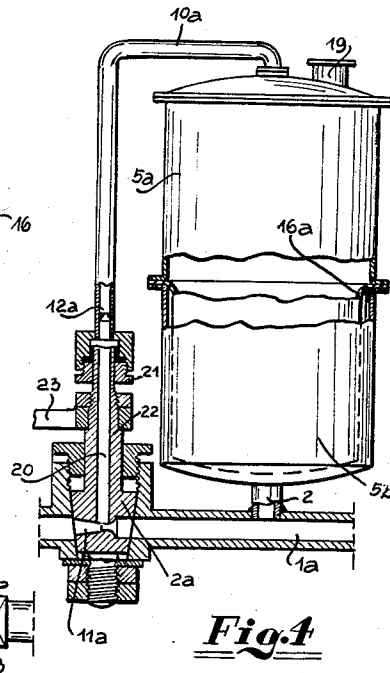


Fig. 4

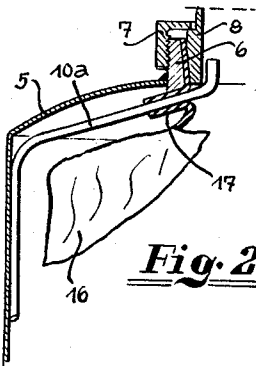


Fig. 2

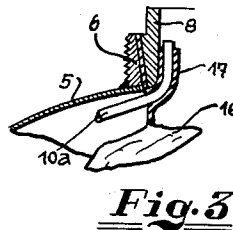


Fig. 3

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DEVICES FOR ADMIXING LIQUIDS

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1 Claim. (Cl. 137—564.5)

This invention relates to a device for admixing a measured quantity of a liquid additive with a main liquid, especially of a disinfectant, cleansing agent, or the like additive with washing water, which device can readily be connected to an installed hot or cold water pipe or to the outlet side of a mixing system.

The known devices for admixing a disinfectant or cleansing agent with washing water, such as are especially indispensable in hospitals, operating chambers and doctors' consulting rooms, generally consist of a storage tank for a previously prepared mixture which is drawn off when desired by way of a water cock. These devices do not in any way meet practical requirements and also do not make it possible to use cold or hot water as desired.

According to the invention there is provided a device for admixing a measured quantity of a liquid additive with a main liquid, comprising pipe means adapted for connection to a supply source, a discharge cock for controlling an outlet from said pipe means, and a storage tank for the additive to be admixed, said tank having an inlet connected with said pipe means, and a venturi outlet also connected with the pipe means, whereby a part of a stream of the main liquid flowing through said pipe means can be diverted through the inlet to the tank to displace additive from the tank through the venturi outlet and into admixture with said stream.

In the storage tank, there is provided a bladder, connected to a discharge pipe of the tank and made of collapsible material resistant to acids and alkalies, so that the storage tank itself does not come into contact with the disinfectant, and it is not possible for the water which is fed into the container, for expelling the disinfectant, to be mixed with the said disinfectant. Interposed in the discharge pipe to the venturi tube outlet is an annular restriction, or pipe orifice, whose purpose is to produce the same pressure difference as the venturi tube in dependence on the desired quantity to be admixed. The storage tank is located above the pipe means or pipe length and is provided at the top with a closable filling pipe leading to the bladder and with a venting cock. A shut-off valve is provided in the feed pipe to the container or in the discharge pipe from the said container, and also in the pipe length before the branch leading to the container.

The discharge pipe to the venturi tube may be located outside the storage tank or may be located in the said tank, and in the latter case the discharge pipe can be mounted in an inwardly or outwardly directed, flexible, tubular extension of the bladder.

The tank can be made of transparent material, or can be provided with a window through which the quantity within the bladder can be observed, so that fresh disinfectant or cleansing agent can be added in good time.

In such a device, especially one having an elongated container, the bladder may become drawn together at the top and the liquid contents in the bottom part can no longer be passed upwards. Likewise, it may not be

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possible for water which has penetrated into the upper part of the tank to be removed through the bottom discharge opening. This disadvantage can be obviated by providing in the tank an insert element perforated in the manner of a sieve and arranged loosely in the tank. This ensures that water which has passed into the upper part can readily be discharged therefrom. It is also possible to obviate this disadvantage by dividing the tank centrally and connecting the parts by a flanged or screwed connection and by fixing a cup-shaped membrane to the said joint. With this latter arrangement the container can readily be turned inside out and thus emptied satisfactorily.

When the discharge valve connected after the venturi tube is in the closed position, in order to prevent the additive to be admixed passing into the main pipe, and mingling with the fresh water carried in the said main pipe, due to variations of pressure in the main pipe or as a result of osmotic pressure, the passage through the shut-off member is constructed as a venturi nozzle or pipe orifice to which the discharge pipe is connected. With this construction, no further shut-off members are necessary in the discharge pipe from the tank and thus, when the discharge valve is closed, any passage of the medium to be admixed into the high-pressure pipe is prevented.

For a better understanding of the invention, and to show how the same may be carried into effect, reference will now be made to the accompanying drawings in which:

Figure 1 is a diagrammatic longitudinal sectional view of a device for mixing a disinfectant with water.

Figures 2 and 3 are diagrammatic, fragmentary, sectional views of two modifications of part of the device shown in Figure 1, and

Figure 4 is a partly longitudinal sectional view of a further modification.

Referring now to Figure 1 of the drawings there is shown a device for mixing a measured quantity of disinfectant with water, comprising a pipe length 1 adapted to be connected to a cold, hot or mixed, water supply pipe, and provided at each end with a shut-off cock, 2 and 3, respectively, the cock 2 forming the usual discharge cock or tap. Branched from the pipe length 1 is an inlet pipe 4 which opens into a tank 5 carried by said pipe 4. The tank 5 has an upper pipe 6, in which a nipple 8 is secured by a retaining nut 7. The nipple 8 is closed at the end furthest from the tank by a screw cap 9, and branched from the said nipple is a discharge pipe 10 which opens into the narrowest portion of a venturi tube 11, located in the pipe 1 and arranged in the direction in which the water flows through the pipe length 1 after passing the pipe 4. Also provided in the discharge pipe 10, is an annular restriction or pipe orifice 12, which, is arranged, in dependence on the desired quantity to be admixed, to produce in the pipe 10 the same pressure difference as the venturi tube 11 does in the pipe length 1.

Also provided in the pipe 4 is a shut-off valve 13 which alternatively can be located, with the same method of operation, in the delivery pipe 10, or may be dispensed with altogether. The tank 5 is provided with a venting cock 14. Clamped between the pipe 6 and the nipple 8 is the neck 15 of a bladder 16 having a capacity substantially equal to that of the tank 5.

In the use of the device hereinbefore described the pipe length 1 is connected to a cold, hot, or mixed water pipe line, the cock 3 is closed, and the cocks 2 and 13 and the venting cock 14 opened. The screw cap 9 is removed and the bladder 16 is filled with the disinfectant or cleansing agent through the nipple 8. In this operation, any air present in the tank 5 and the pipe length 1 can escape

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through the opened venting cock 14. The screw cap 9 is replaced and the shut-off member 2 is closed, whilst the cock 3 is opened, so that first of all air and then an air-water mixture passes out through the venting cock 14. As soon as water only passes out, the venting cock is closed and the device is then ready for operation. Each time the cock 2 is opened, the device then delivers a washing water which, independently of either the pressure in the water pipe line or the opening of the cock 2, is mixed with a quantity of disinfectant determined by the adjustment of the device. During the operation of the device, the cock 3 remains continually open and is only closed when the contents of the bladder 16 have been used up and re-filling is necessary. The procedure is then repeated by again closing the cock 3 and opening the cock 2 and the venting cock 14 by introducing fresh disinfectant through the nipple 8. The water previously present in the tank 5 flows out through the cock 2.

If it is desired to draw clear water from the tap, the shut-off cock 13 is closed.

In order to check the level of the contents of the bladder 16, the tank 5 is either made of transparent material or is provided in known manner with an inspection window.

Referring now to Figures 2 and 3 of the drawings there are shown two modifications of the device, in which a discharge pipe 10a is located inside the tank 5. The nipple 8 then serves merely for filling the bladder 16. With this arrangement of the pipe 10a, the bladder 16 is provided below the neck 15 with a flexible tubular extension 17 which is directed externally (Figure 2), or internally (Figure 3), of the said bladder, and which surrounds the pipe 10a in fluid-tight manner.

The tank 5 contains a sieve-like insert 18 which ensures a reliable discharge of water from the said tank when the bladder 16 is being refilled.

Referring now to Figure 4 of the drawings, there is shown a modification in which the tank comprises two transversely joinable parts 5a and 5b, the bladder being constructed as a cup-shaped membrane 16a. A pipe line 1a is connected by way of the stub pipe 2 to the displacement tank 5a, 5b. The tank 5a, 5b is provided with a filling pipe 19 for refilling purposes. Leading from the filling chamber of the tank 5a, 5b, defined by the bladder 16a, is a discharge or admixing pipe 10a into which an annular restriction or pipe orifice 12a is built.

The outlet from the pipe 1a is controlled by a cock plug 2a the outlet passage of which is constructed in

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the manner of a venturi tube 11a. It is also possible to provide a pipe orifice in place of the venturi tube 11a. The plug 2a has an axial bore 20 which is connected to the pipe 10a with the interposition of a stuffing box 21. Thus, when the plug 2a is in the open position, the additive from the tank 5a, 5b is admixed with the washing water in dependence on the dimensions of the venturi tube 11a and of the orifice 12a.

The neck of the plug 2a is provided with a square portion 22 for receiving an adjusting handle 23. Thus the plug 2a forms the discharge valve of the mixture and at the same time the mixing member and the shut-off valve for the liquid to be admixed.

When the plug 2a is shut-off, the tank 5a, 5b is independent of any pressure drop in the admixing pipe 10a. Therefore it is unnecessary to provide any further supplementary valves, or the like, in order to prevent a return flow from the tank 5a, 5b when the device is inoperative.

I claim:

20 A device for mixing fluids comprising a first conduit adapted to be coupled at one end to a source of fluid under pressure, a tank connected at one end to said conduit, a flexible member in said tank for isolating the ends of said tank, means connected to the other end of the tank for the supply of a liquid thereto, a second conduit coupled to said other end of the tank, and a cock connecting said second conduit to the other end of said first conduit, said cock including an outlet nozzle portion and a venturi portion between said first conduit portion and said outlet nozzle portion, said cock further being supported in said first conduit for rotation, relative to said first and second conduits, between positions respectively permitting flow through said outlet and venturi portions and cutting off said flow.

References Cited in the file of this patent

UNITED STATES PATENTS

967,450	Sholes	Aug. 16, 1910
1,545,700	Schmidt	July 14, 1925
1,875,022	Krueger	Aug. 30, 1932
2,033,427	Guildford	Mar. 10, 1936
2,120,608	Haering	June 14, 1938
2,310,051	Baer	Feb. 2, 1943
2,323,341	McGill	July 6, 1943
2,618,510	Mills	Nov. 18, 1952
2,707,480	Klosse	May 2, 1955
2,714,963	Lester et al.	Aug. 9, 1955
2,768,638	Henke	Oct. 30, 1956