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[54] DEVICE FOR THE ADMIXTURE OF ADDITIVE FLUIDS MIXED WITH WATER USED IN WASHING MACHINES, DISHWASHERS AND THE LIKE

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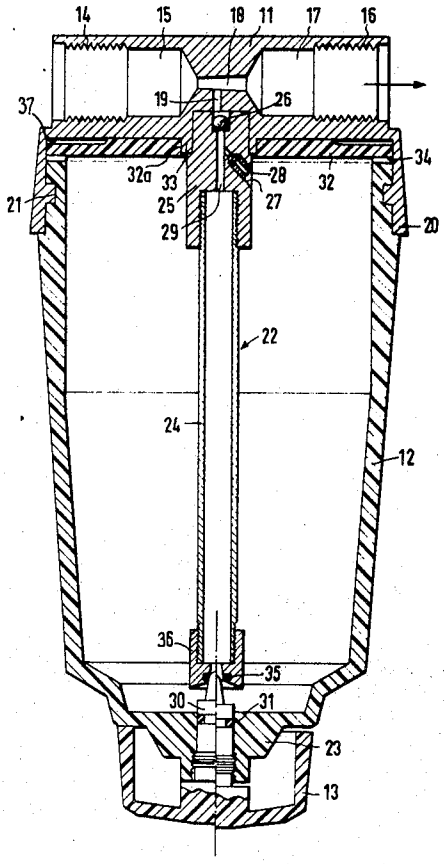
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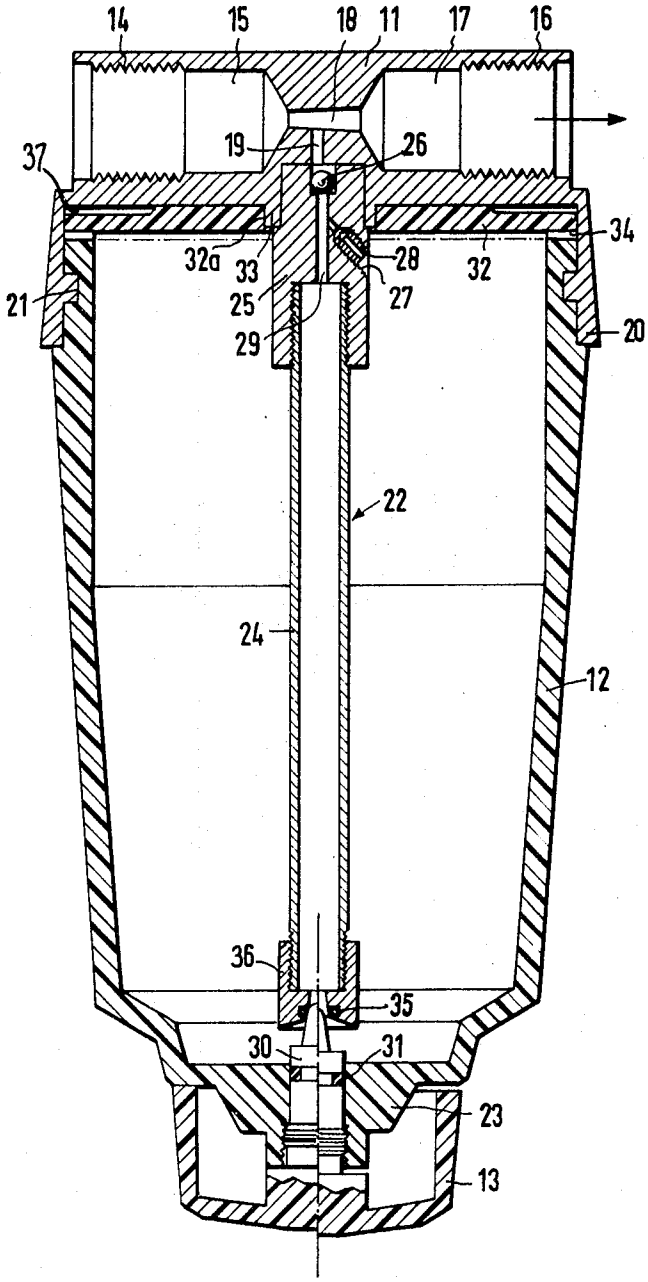
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[57] **ABSTRACT**

A device is provided for supplying a flow of an additive fluid to a primary fluid stream wherein the two fluids are admixed. A venturi type constriction may be formed in a conduit carrying the primary fluid stream and a suction conduit may connect an additive fluid container with the venturi constriction. A check valve may be disposed at a discharge end of the suction conduit and a manually operated regulating valve may be disposed at an intake end of the suction conduit. The conduit carrying the primary fluid may be formed in a head portion of the overall device and the container may be connected to the head portion by a bayonet latch. A secondary air inlet may be provided between the additive fluid container and the discharge end of the suction conduit upstream from the check valve. The manually operated regulating valve may be mounted at a bottom portion of the overall device.

5 Claims, 1 Drawing Figure





INVENTOR.

GUNTHER BUZZI

DEVICE FOR THE ADMIXTURE OF ADDITIVE FLUIDS MIXED WITH WATER USED IN WASHING MACHINES, DISHWASHERS AND THE LIKE

BACKGROUND OF THE INVENTION

This invention relates to a device for the admixture of additive fluids from a storage container into the water of a showerhead, into bathtub water, or into fresh water used in washing machines and dishwashers or the like. The device can be used as an independent fixture between the discharge fixture and its fixed water connection and an injector pump, which moves the additive fluid from the storage container and which has a regulating valve with a suction pipe duct for the regulation of the suction volume. A head part of the fixture contains the water passage duct and the injector nozzle and has, coaxially with respect to the suction pipe, a downward pointing connection flange for the removable attachment of the storage container.

Such devices are used mostly for admixing a soap or aromatic substances and the like. The known devices of this kind however have a disadvantage in that the regulation of the suction volume of the additive fluid can be accomplished only in a very incomplete manner. Also, the additive fluid may be suctioned in excessively large quantities, so that, on the one hand, the consumption of this additive fluid is very great, whereas, on the other hand, it is also no longer possible to have, for example, a pleasant shower. It is then mostly necessary to dilute the additive fluid in the storage container very heavily in order to keep its concentration in the emerging water jet sufficiently low. But this, again, entails the disadvantage that the quantity, contained in the storage container, will suffice only for a small number of uses of the subsequently connected device. Besides, the known devices entail the further disadvantage that the adjusting valve, with which the additive fluid volume is regulated, is above the storage container; in other words, it is — particularly in fixed shower installations — relatively difficult to reach and it is particularly hard to reach for short people.

OBJECTS AND SUMMARY OF THE INVENTION

It is therefore an object of this invention to create a device of the type described above which will reveal an accurate, sensitive, and easily operated regulating device.

It is another object of this invention that the regulating valve should be so designed that it can be easily cleaned because the additive fluids frequently tend toward clogging or incrustation.

It is still another object of the present invention to create a device of the above-mentioned kind with a regulating valve which will facilitate a control of the valve position at all times.

It is yet another object of the present invention to create a device of the kind described, with which we can reliably prevent a situation in which water can penetrate into the storage container through the suction duct.

It is a further object of the present invention to fashion the above-mentioned device in such a manner that the storage container can be simply removed and so that it can be properly cleaned, without — in accordance with another objective of the invention — the storage container being loosened in an unwanted manner during the activation of the regulating valve.

These and other objectives of the invention are accomplished by providing a device of the above-mentioned kind in which a suction pipe end is designed in the form of a valve seat and in which there is located in a container bottom, coaxially with respect to a connecting flange, a vertically movable valve body which cooperates with a valve seat at the suction pipe end. An adjusting member for the valve body may be provided at the underside of the container for using a device in sprinkler installations, so that the regulation can be easily performed also by short persons, when the overhead sprinklers are suspended high and to obviate any left-hand or right-hand operation.

A regulating valve according to this invention is so designed that one part of it, the valve seat, is attached to the free suction pipe end, while the closing part, the valve body, is attached in the container bottom. Every time the storage container is open, the valve is taken apart and the valve seat is exposed, so that the latter is particularly readily accessible for cleaning. The valve body, located on the bottom of the storage container, can also be easily cleaned and it can be liberated of any possibly adhering remnants of the additive fluid which might influence the functioning of the valve. This always facilitates good and accurate regulation of in-suctioning volume of admixture fluid.

In order to be able to use the device also in connection with discharge fixtures, in which we get a considerable pressure head, such as in strongly adjustable showerheads on in machines which completely interrupt the water through-flow, such as washing machines and dishwashers, a check valve may be provided in the suction pipe duct.

The connection between the connecting flange and the storage container may comprise a bayonet latch which is properly secured against the unwanted separation of the container from a head part by means of corresponding measures, so that the storage container cannot be separated from the head part, perhaps during handling and during the adjustment of the regulating valve.

The storage container may consist of a transparent, injectable plastic material in order to have control over the content of the additive fluid in the container at all times.

In another feature of the invention, a secondary air duct may be provided and adjusted by means of an adjustable nozzle. The secondary air duct may run into the injector suction duct between the suction pipe end and the check valve. This secondary air duct may comprise a staggered drill-hole, which connects the suction duct with the uppermost space of the storage container. The drill-hole may have a conical transition and thread in the wide drill-hole section into which there is inserted a regulating screw which has a longitudinal notch slit and a corresponding conical point. Such a secondary air duct provides air admixture to the incoming additive fluid and thereby provides air to the water on the discharge side of the device. The quantity of the admixture fluid is thereby adjustable and can thus also be fully turned off, so that a water jet can be obtained on the discharge side of the device. Such a design may be used for bathing and sprinkling devices, in which air admixture is particularly desirable for reasons of oxygen enrichment and for massage reasons. The air admixture also offers the advantage that the shower water, which is displaced perhaps with a liquid soap, will foam particularly strongly. In other words, a small admixture volume of soap will readily generate a strong foam development and will thus offer a good cleaning effect.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is described below in detail with the help of an example shown in the drawing.

The only illustration here shows the device according to the invention in a longitudinal cross-section, whereby the bayonet latching device between the storage container and the head part is shown in a simplified manner.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The essential components of the device are the head part **11**, the storage container **12**, and the turning knob **13** which activates the regulating valve on the underside of the storage container.

The head part **11** is provided with a water through-flow duct whose direction of flow is indicated with an arrow. The through-flow duct consists of a wide inflow part, provided with a connecting thread **14** for a pipeline, a wide outflow part **17**, which is provided with a connecting thread **16** for the connection of the subsequently connected discharge fixture, and a

narrow part **18**, which is in between, through which the water must flow at high speed, thus producing a low pressure in an injector suction duct **19** which runs into this narrow part **18**.

Along its lower edge, the head part has a connecting flange **20** which points downward, when the water inflow and outflow duct **15**, **18**, **17** is horizontal. This connecting flange is used to provide connection with the storage container **12**, for which we can use any kind of suitable connection which, in our case here, is designed as a bayonet latching device **21**, illustrated in a simplified manner.

Coaxially with respect to the connecting flange **20**, a suction pipe **22** is inserted into the head part **11**. When the storage container **12** is in place, this suction pipe **22** extends almost to the storage container's bottom **23**.

The suction pipe, which has been designated generally as **22**, is in our case made up of three parts. It consists of a pipe piece **24**, which, at its upper end, for purposes of connection to the head part **11**, has a valve head piece **25** and, on the lower end, a valve seat **36**. The valve head piece **25** is provided, on the place of connection with the injector suction duct **19** of the head part, with a ball-check-valve **26**, whereby the center line of the injector suction duct **19** in the head part **11** and of the check valve ball drill-hole are off center from each other, so that the ball **26** cannot close off the injector suction duct **19** during suction operations.

Furthermore, valve head piece **25** is provided with a secondary air duct **27** which connects the suction duct of the suction pipe **22** with the upper most storage space of the container. This secondary air duct is an off center drill-hole with a wide external and a narrow internal cross section and a conical transition between these two cross sections. The wide drill-hole cross section has an interior thread and in this drill-hole section there is inserted a regulating screw **28** which is provided with a corresponding conical point and which has a longitudinal notch slit that extends into the screw core.

As a result of the low pressure in the suction duct **29** of the suction pipe **22**, secondary air duct **22** suctions in air, in addition to the container fluid and the volume of this air can be determined by adjusting the regulating screw **28**. In this way the discharged water can be displaced with air bubbles so that, for example, we obtain a good massage effect during showering, and that the water, provided with the admixture fluid, will furthermore foam well.

The connection of the storage container **12** to the connecting flange **20** with the bayonet latching device **21** is so loose that sufficient air can penetrate through the crack; this air is needed, on the one hand, in order to be able to suction out the container fluid and, on the other hand, in order to be able to suction air in through the secondary air duct **27**.

Inserted into the bottom **23** of the container **12** we have an axially movable regulating valve body **30** which is axially shifted in the known manner by means of turning knob **13**. A packing **31** provides for the tight sealing in the container bottom **23**. Since suction pipe **22** and valve bottom **30** are coaxial with respect to each other and with a valve seat piece **36** placed on top of the lower end of the suction pipe piece **24**, we can change the width of the entry opening into the suction pipe duct by moving the valve body **30** with respect to the valve seat piece **36**. The left half and the right half of the illustration represent two different adjustments, whereby the one on the left shows the completely closed condition of the valve while the one on the right shows the opened condition.

When storage container **12** is taken off, we can easily reach the valve seat, so that it can be thoroughly cleaned and so that we can thus make sure that it will not become clogged or so that it will not stick. When the device is open, the valve body on the bottom **23** of storage container **12** is likewise easily accessible.

In the device illustrated here, both the valve seat piece **36** and the valve body **30** consist of metal; it is therefore a good idea to punch a groove into the valve seat piece **36** and to insert an O-ring **35** which will then cooperate with the valve body **30**. If other materials are selected for the valve seat piece **36** and/or the valve body, this may then be superfluous.

Markers may be displayed on the turning knob **13** and the container **12** in order to give the user a guide for the regulation of the valve opening width. The storage container **12** is also advantageously made of a transparent plastic material so that we can always see how much it contains.

Since the regulating valve is adjusted with the help of the turning knob on the valve's underside, it is important to make sure that the connection between the fixed head part **11** and the removable container **12** is secured by means of a locking device so that the container will not be inadvertently loosened during the regulation of the through-flow volume. In the example shown here, this is done by means of a pressure plate **32** which may be formed with a polygonal middle cut-out **32*a***, with which it may be mated with a corresponding polygonal placement part **33**, on the head part **11**, so that it cannot be rotated. Furthermore, the edge zones of the pressure plate **32** are hollow as at **37** and the plate, at least partly on its underside along the circumference thereof, is equipped with notches **34** which engage corresponding notches on the upper edge of the storage container **12**. Here the dimensions in the axial direction of the device have been so selected that the edges of the pressure plate will be elastically bent upward during the insertion and turning of the storage container into the bayonet locking device, while the notches jump over each other. Other locking devices may be used in lieu of the locking device of the preferred embodiment.

What is claimed is:

1. A device for the admixture of additive fluids to a stream of water for use in washing machines, dishwashers and the like comprising:

a. an additive fluid storage container;

b. a head portion;

c. a suction pipe connecting between said storage container and the stream of water;

d. a downwardly directed flange formed on said head portion for removably connecting said head portion to said storage container; and

e. bayonet-locking means disposed between said storage container and said downwardly directed flange on said head portion,

said bayonet-locking means including a pressure plate; and said pressure plate being elastically urged against an upper edge of said storage container while permitting air to pass between said pressure plate and said upper edge of said storage container.

2. A device according to claim **1** wherein said upper edge of said storage container is formed with notched cam means;

and wherein said pressure plate is formed with notched recess means; and

said notched cam means and said notched recess means being engageable to hold said head portion and said storage container against relative rotational movement.

3. A device according to claim **1** wherein said pressure plate comprises an elastic plastic material formed with a hollow periphery.

4. A device for the admixture of additive fluids to a stream of water for use in washing machines, dishwashers and the like comprising:

a. a head portion;

b. a conduit for carrying the stream of water formed in said head portion;

c. an injector nozzle formed in said head portion;

d. an additive fluid storage container connected to said head portion;

e. a suction pipe communicating between said storage container and the stream of water;

f. a check valve disposed in said suction pipe;

g. a secondary air duct formed into said suction pipe upstream of said check valve; and

h. an adjustable nozzle means disposed in said secondary air duct for adjusting the flow of air therethrough.

5. A device according to claim **4** wherein the center line of said secondary air duct intercepts an additive fluid passageway formed by said suction pipe;

said secondary air duct being formed with a variable diameter along the length thereof;

said variable diameter of said secondary air duct comprising a conical transition;

threading being formed in a wide portion of said secondary air duct;

said secondary air duct connecting said suction pipe with an upper most space in said storage container;

a regulating screw being inserted within said secondary air duct and engaging said threading thereof;

said regulating screw having a longitudinally aligned notched slot;

said regulating screw having a configuration corresponding to the conical configuration of said secondary air duct; and

said secondary air duct comprising a drill hole.

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