July 27, 1943. A. GORDON 2,325,242

MIXING UNIT

Filed Jan. 24, 1941

Fig. 1

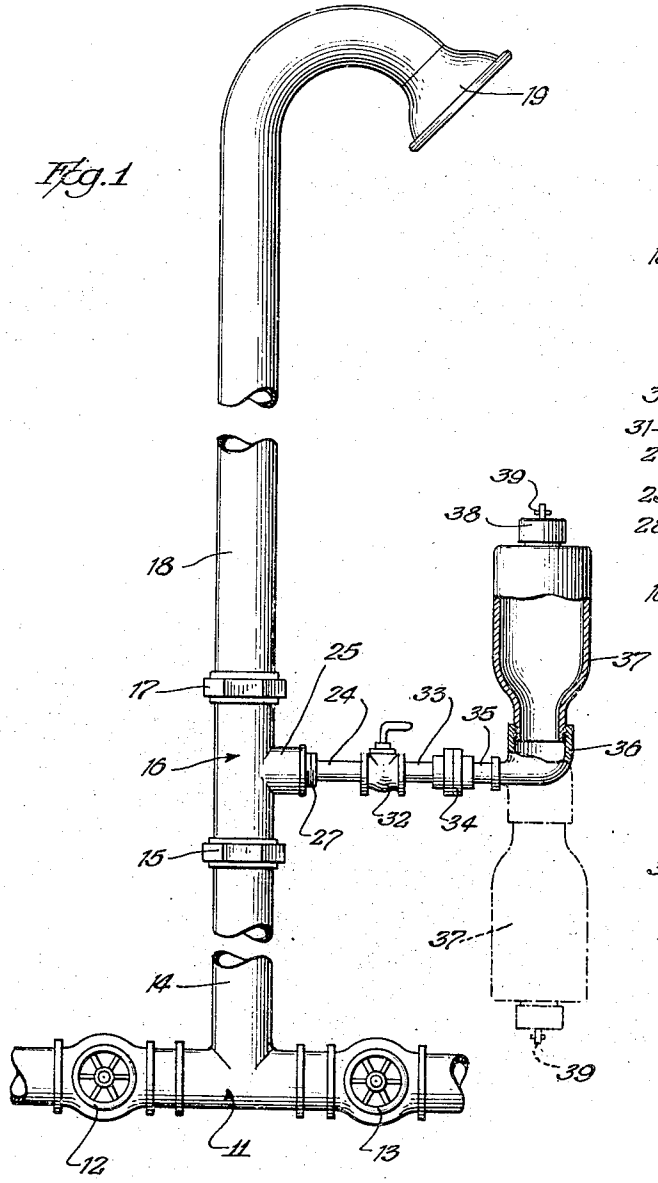


Fig. 2

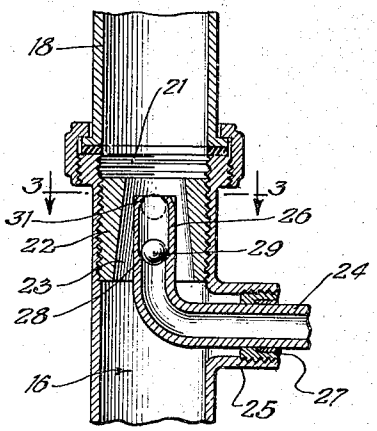
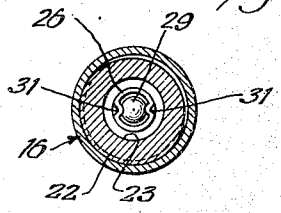


Fig. 3



Inventor.
Arthur Gordon
By:-
Rasmussen & Bugman
Attys:-

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MIXING UNIT

Arthur Gordon, Chicago, Ill.

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3 Claims. (Cl. 299—83)

This invention relates in general to mixing units, and more particularly to a unit adapted to be incorporated with any desired type of water fixture to supply liquid soap or any other chemical washing compound for mixture with the water.

A principal object of the invention is the provision of means for selectively delivering either plain water or any particular mixture of a desired compound therewith to facilitate showering, shampooing, or the washing of dishes, automobiles, animals, or any other desired object.

Another important object of the invention is the provision of a mixing unit which may readily be attached to, or incorporated in, any type of water fixture to enable the latter to selectively supply either plain water or a desired mixture of water and any particular chemical compound.

A further important object of the invention is the provision in such a unit of means for accurately controlling the mixture with, and the delivery of a desired quantity of liquid chemical to, the water passing through the fixture.

Another object of the invention is the provision in such a mixing unit of a container for a desired liquid chemical which is readily adapted for removal for replacement or refilling.

A further object of the invention is the provision of such a mixing unit which is simple and inexpensive to manufacture and easy to install and service.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, when taken in connection with the accompanying drawing, discloses a preferred embodiment thereof.

In the drawing,

Figure 1 is a side elevational view of a mixing unit embodying the features of the invention as combined with a shower fixture, part of the soap container being shown in section;

Fig. 2 is a detail vertical section of the mixing chamber of the unit of Fig. 1; and

Fig. 3 is a detail horizontal section taken substantially on the line 3—3 of Fig. 2.

Referring more particularly to Figs. 1 to 3, reference numeral 11 indicates in general a valve unit of well-known construction adapted for use with a shower, and including the usual valves 12 and 13 for supplying the desired amounts of hot and cold water to the upwardly extending shower pipe 14. The upper end of the pipe 14 is connected, by means of a standard union 15, to the lower end of a special T-fitting, which is indicated generally by reference numeral 16. The upper end of the fitting 16 is connected by a union 17 to the lower end of a mixing or supply pipe 18, which in turn is curved at its upper end in the usual manner and connected to a shower head 19 of any desired construction.

The upper end of the T-fitting 16 is interiorly threaded at 21 to receive a threaded bushing 22 having a tapered bore 23, the upper end of which is smaller in diameter than the lower end. A tube 24 of smaller outer diameter than the upper end of the bore 23 extends through the third or horizontal connection 25 of the T-fitting 16, and is provided with an upwardly extending inner end 26 which is disposed at right angles to the main portion of the said tube 24. The tube 24 is retained in proper position in the fitting 16 by means of a suitable packing member or gland 27 of well-known construction. The bore of the vertical end portion 26 of the tube 24 is enlarged to provide a shoulder 28 at its lower end which functions as a stationary valve seat for a ball or movable valve member 29. The ball 29 is freely movable within this enlarged bore of the vertical portion 26 of the tube 24, and is prevented from removal from the upper, open end thereof by two inwardly crimped portions 31 formed at the end of the tube. As will thus be seen from Figs. 2 and 3, the ball 29 will normally seat on the shoulder 28 to prevent the flow of any fluid downwardly into the tube 24. The flow of fluid upwardly through the tube 24 will move the ball 29 to its broken line position of Fig. 2, in which position, as will be seen from Fig. 3, there is sufficient clearance between the ball and the enlarged end bore of the upper portion 26 of the tube to permit fluid to flow upwardly therepast.

The outer end of the tube 24 is connected to a suitable type of manual or automatic valve or petcock 32 (Fig. 1), which is in turn connected to one end of a tube 33. The other end of the tube 33 is connected to one side of a union 34, which is provided with a ground joint to enable rotary movement of one side thereof relative to the other, in well-known manner. The other side of the swivel union 34 is interconnected by means of a nipple 35 with the lower end of a container receiving fitting 36. The upper end of the fitting 36 is threaded to receive a suitable glass or metal container 37 which is adapted to be filled with any desired type of liquid soap or other chemical washing compound. At its opposite end, the container 37 is provided with a cap member 38 having an air inlet or check valve 39 of

any suitable construction slidably mounted therein.

With this arrangement, the container 37 may be swung from its normal or upper position of Fig. 1 to its lower or broken line position to permit removal thereof from the fitting 36 for the purpose of being filled or replaced. In this reversed or lower position of the container 37, the check valve 39 will be automatically closed. After the container 37 has been filled with the desired type of liquid soap or other chemical washing compound, or whenever the device is to be used, it is swung upwardly to its full line position of Fig. 1. The swivel union 34 is provided with sufficient friction to retain the filled container 37 in such upper position, or, if it is desired, a suitable bracket may be provided for performing this function.

With the container 37 in its upper or operative position, the valves 12 and 13 may be opened and adjusted to enable the desired quantity and mixture of water to flow upwardly through the pipe 14, fitting 16 and pipe 18 to the shower head 19. The valve 32 may then be opened, or it may be opened automatically under temperature responsive or other control means, to permit liquid to flow from the container 37 to and through the tube 24. Since the liquid level in the container 37 will normally be above the upper end of the end portion 26 of the tube 24, gravity will cause the liquid which is permitted to pass through the valve 32 to flow upwardly out of the tube 24, the check valve 39 functioning to facilitate this action by permitting air to enter the upper end of the container 37. As the liquid discharges from the upper end portion 26 of the tube 24, it will be carried upwardly by the water flowing therepast to the shower head 19, and be thoroughly mixed with such water as it flows through the pipe 18. The bushing 22 with its tapered bore 23 is provided to insure the discharge of the desired quantity of chemical liquid from the upper end portion 26 of the tube 24, even though the liquid level in the container 37 may fall below the upper end of the tube. As will be seen in Fig. 2, the disposition of the upper end portion 26 of the tube 24 within the bushing 22 is such that the latter will function as a Venturi tube to cause the water flowing therethrough to draw up any liquid which may be in the tube 24 and discharge the same therefrom. In so functioning, the bushing 22, by causing an increased velocity of the water as it flows past the upper end of the tube 24, will also insure proper and thorough mixing of the liquid soap or other chemical compound with the water in the lower portion of the pipe 18 and before such mixture is delivered to the shower head 19. It will be seen that the valve 32 may be operated to exactly control the amount of liquid soap or other chemical compound delivered to the tube 24, so that any desired quantity may be mixed with the water flowing from the shower head.

Whenever it is wished to dispense with the soap or other chemical compound and a clear shower is desired, the user has merely to close the valve 32. When this is done, the supply of liquid soap to the mixing tube 18 will be automatically shut off. After the valves 12 and 13 have been closed to shut off the flow of water to the shower head, the ball 29 will function to prevent any water remaining in the pipe 18 from entering the tube 24.

While the invention as above described is particularly adapted for use with a shower fixture, it is also capable of use with any other desired type of water supplying fixture.

It is to be noted that one of the particular features of my invention is the provision of soap dispensing means in combination with a water supply, such as a shower head, at a higher level. In the devices as heretofore known, the soap supply was always placed at a level higher than the water outlet. This was ordinarily done in order to make use of gravity to feed the soap; and in such devices, there is no danger of water flowing back into the soap receptacle after being shut off. It is not practicable, however, to have a soap supply above the level of a shower head or similar device which is ordinarily above the reach of a normal operator. For example, with a shower head, say 6 feet or more above the floor, the soap receptacle would have to be still higher where it would be very inaccessible for refilling and cleaning. However, in such a device, the operating valves for the shower are ordinarily at a normal height to be within ordinary reach and consequently when the water is shut off there is always some water remaining in the standpipe to the shower head under a considerable head of pressure. This water will flow back into the soap container unless means are provided to prevent this. I have accomplished this by providing the check valve 29 which always prevents water from flowing from the pipe 18 into the soap container 37. I use the word "soap" container to cover soap, disinfectant, or any other chemical or washing compound as heretofore described. It will be seen, however, that pressure in the pipe 18 when the water is turned on will be even greater than when it is turned off and consequently an ordinary check valve would seat in all cases. I have provided, however, the Venturi tube 22 to cause the flow of liquid past the pipe 26 to unseat the valve 29 to withdraw soap from the container 37. When the water is shut off, however, the valve 29 seats to prevent back flow water from the tube 18 into the soap container.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the forms hereinbefore described being merely preferred embodiments thereof.

I claim:

1. A water supply pipe having a valve controlled inlet, and an outlet above the inlet; a liquid chemical feed pipe connected to the water supply pipe between the outlet and the inlet; a liquid chemical container supplying liquid chemical to said feed pipe, said container being at a higher level than the connection of said feed pipe with the water supply pipe but below the level of the water outlet; a check valve in the liquid chemical feed pipe preventing flow of water from the supply pipe to the liquid chemical container when the water inlet is shut off; and means for causing flow of water in said supply pipe from the inlet to the outlet to unseat said check valve.

2. A water supply pipe having a valve controlled inlet, and an outlet above the inlet; a liquid chemical feed pipe terminating in a discharge nozzle in the water supply pipe between the outlet and the inlet; a liquid chemical container supplying liquid chemical to said feed pipe,

said container being at a higher level than the connection of said feed pipe with the water supply pipe but below the level of the water outlet; a check valve in said nozzle preventing flow of water from the supply pipe to the liquid chemical feed pipe when the water inlet is shut off; and means for causing flow of water in said water supply pipe from the inlet to the outlet to unseat said check valve.

3. A water supply pipe having a valve controlled inlet, and an outlet above the inlet, a liquid chemical feed pipe terminating in a discharge nozzle in the water supply pipe between the outlet and the inlet; a liquid chemical container supplying liquid chemical to said feed pipe, said container being at a higher level than the connection of said feed pipe with the water supply pipe but below the level of the water outlet; a check valve in said nozzle preventing flow of water from the supply pipe to the liquid chemical feed pipe when the water inlet is shut off; and a Venturi tube in the supply pipe around the liquid chemical discharge nozzle, whereby flow of water in said supply pipe from the inlet to the outlet will unseat the check valve in said nozzle.

ARTHUR GORDON.