

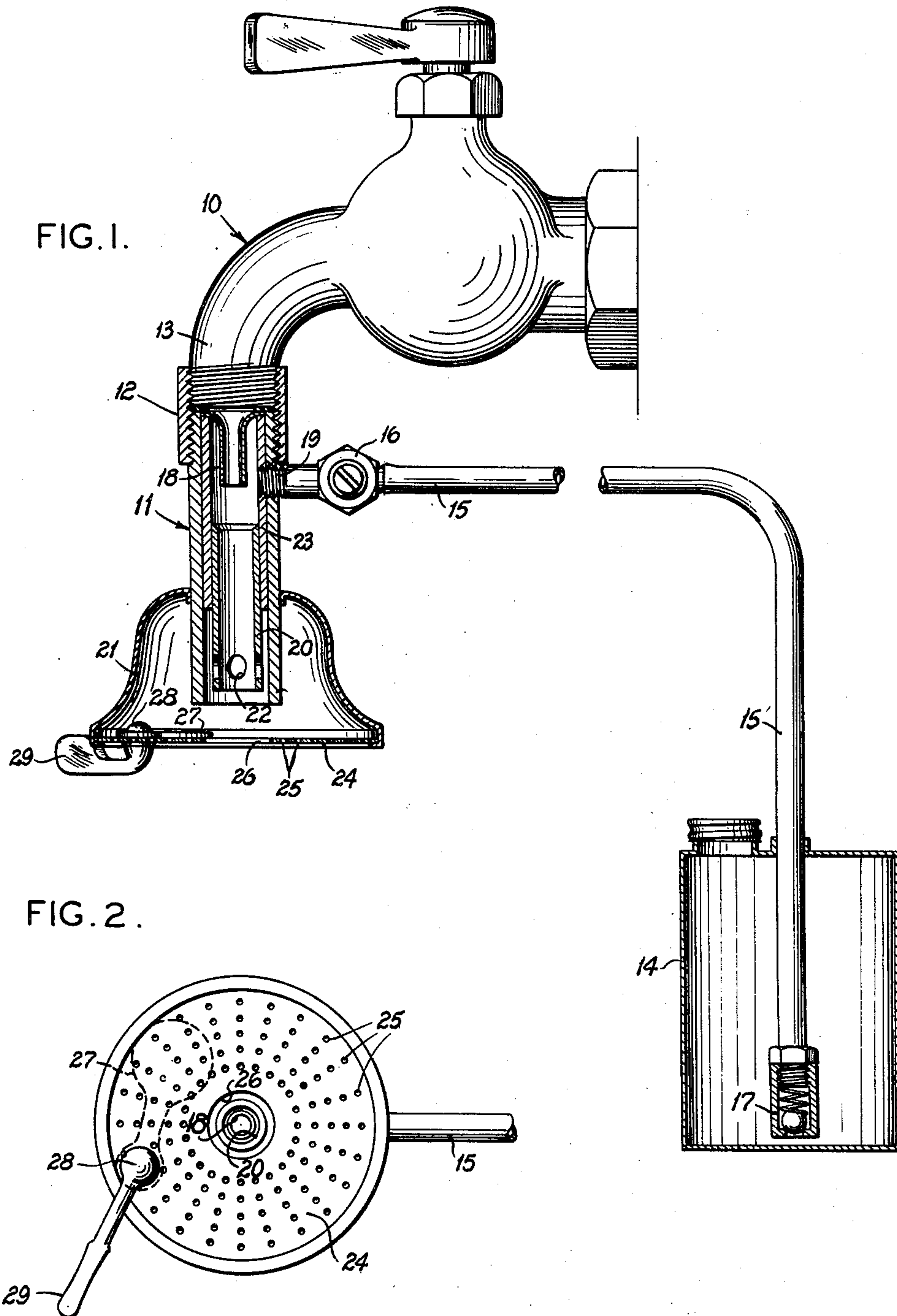
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A. E. PRACK

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LIQUID MIXING AND DISPENSING APPARATUS

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INVENTOR;
ALBERT E. PRACK
BY *Lawrence H. Cohen*
ATTORNEY

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LIQUID MIXING AND DISPENSING
APPARATUS

Albert E. Prack, St. Louis, Mo., assignor to Prack,
Incorporated, St. Louis, Mo., a corporation of
Missouri

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My invention relates to liquid mixing and dispensing apparatus, and has particular reference to a plumbing fixture or faucet attachment for introducing soap or other chemical in liquid form into the stream of water flowing through the fixture.

The extensive use of liquid detergents in the home and in commercial establishments has increased the need for a practical mixing and dispensing device that operates automatically to effect the most satisfactory and economical proportioning of the liquids. The provision of an improved device of this character is the chief object of the present invention.

In dispensing devices of this kind it is desirable to provide means for controlling the introduction of the liquid soap, so that either pure water or soap solution may be selectively obtained. An important object of my invention is achieved in a novel method of and means for controlling the introduction of soap into the water stream. Whereas in former mixing and dispensing apparatus for a similar purpose the admission of soap into the stream of water is controlled by a valve in the soap supply line, in my improved device the introduction of the soap is controlled at the discharge or outlet end of the fixture. A valve in the soap line may be and preferably is provided, but such a valve need be used only for regulating the rate of flow of the soap solution, as for obtaining the most satisfactory proportioning of the liquids, and not for completely closing off the soap supply. In the present device the valve in the soap line may be maintained in a predetermined condition of adjustment, with the valve handle removed to prevent tampering, since the valve in the soap supply line is not relied upon for changing the character of the discharge flow from pure water to soap water solution.

Another object of the invention is achieved in provisions of a faucet attachment of the character described, embodying means for effecting the discharge of the combined liquids in the form of a spray in order to obtain thorough intermixing thereof and the production of rich suds, or alternatively, for discharging pure water in a single, concentrated stream.

With these and other objects and advantages in view, the invention resides in the novel method employed for controlling the induction of soap or other liquid into the mixing chamber of a dispensing device, and in the combination and arrangement of parts for carrying out this and other purposes as set forth in the following

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description and particularly pointed out in the appended claims.

In the accompanying drawing:

Fig. 1 is a side elevational view showing an embodiment of my invention, parts of the apparatus appearing in section, and

Fig. 2 is a bottom plan view of the mixing chamber and discharge head.

Referring now by numerals of reference to the drawings, 10 designates generally a common type of faucet, representative of any water outlet fixture. The device of my invention comprises a pipe member 11 externally threaded at its upper end for connection as by a nipple 12 to the spout 13 of the outlet fixture. The pipe 11 affords an induction passage for any liquid to be introduced into and combined with the water received from the faucet 10. Since the present invention is especially useful as a mixing and dispensing device for liquid soap, that material will be referred to herein. The liquid soap is adapted to be drawn from a vented supply receptacle 14 through a so-called inductor tube 15 the upper end of which is in lateral communication with the passage in pipe 11 at a point spaced a short distance below its upper end. The inductor tube is preferably provided with a flow regulating valve 16 which may be conveniently located near the junction of the tube with pipe 11. Valve 16 is intended chiefly as a means for accurately regulating the flow rate of the liquid soap so that the most efficient and economical use of the soap may be had. The setting of valve 16 for optimum conditions will depend upon a number of different factors, as, for example, the specific gravity and viscosity of the particular soap, and the pressure of the water in the supply system. After valve 16 has been adjusted to a setting found to give the best results with the particular soap and the water pressure involved, the valve may be locked or otherwise maintained in its adjusted position, since other means to be hereinafter explained are employed for controlling the admission of the soap into the water stream.

The lower end of inductor tube 15 is provided with an automatic check valve 17 for preventing liquid in the tube from flowing back into the soap supply, while permitting the soap to flow freely in the opposite direction. Check valves are well known, and the type employed herein consists of a metal ball adapted to be raised off of a valve seat by the flow of the liquid in the permitted direction of flow, the ball dropping down onto the seat and checking the flow when the pressure is in the reverse direction. In the present in-

stance the check valve 17 serves to maintain the inductor tube 15 filled with liquid soap, in readiness for instant delivery into the jet passage in pipe 11, and further prevents water from flowing through the inductor tube and into the soap supply receptacle 14.

Upward movement of the liquid soap through tube 15 is induced by the movement of the water flowing through pipe 11 under certain conditions to be subsequently explained. Pipe 11 is provided at its upper end with a jet or nozzle member 18 that terminates downwardly at approximately the level of the inductor tube opening 19 and is adapted to direct a jet or stream of water through the open lower end of the pipe. Pipe 11 projects downwardly into the hollow interior of a bell-shaped member 21 that constitutes a mixing chamber and spray discharge head for the liquids, the lower end of pipe 11 being spaced a short distance above the bottom wall of the said chamber. Spaced concentrically within pipe 11 by means of a spacer sleeve 23 is a tube 20, the upper end of which is spaced below the nozzle 18 and the lower end terminates within the pipe 11 and is provided with openings 22 as shown. The inner tube 20 is not an indispensable member of the organization and such member may be eliminated.

The member 21 has a bottom wall or plate 24 characterized by a multiplicity of small perforations or discharge orifices 25, and a relatively large, centrally located discharge opening 26 in axial alignment with the jet nozzle 18. A gate or baffle plate 27 on the inner surface of the orifice plate 25 is pivoted thereto by a pintle 28, for movement to and from a covering position over the central discharge opening 26 in the orifice plate. The baffle 27 is desirably provided with a number of small orifice perforations, and is adapted to be shifted by means of an extension 29 thereon, constituting a control lever.

The jet nozzle 18 is designed to discharge water in a concentrated stream of lesser diameter or sectional area than that of the passageway formed by pipe 11 and tube 20. The water stream is discharged outwardly through the central opening 26 in the orifice plate 25 when the baffle 27 is disposed in an "open" position. Under the conditions noted, the opening 19 at the upper end of the inductor tube is at atmospheric pressure and hence the soap will not be drawn into the stream of water. Under such conditions, then, with the baffle plate in open position, pure water in a concentrated stream may be obtained from the apparatus by operating the handle of the water faucet in the normal manner.

Now when it is desired to obtain soap solution from the apparatus the user manipulates lever 29 to shift the baffle 27 to a position over the central opening 26. The baffle tends to obstruct direct discharge flow, causing the liquids to pass through the perforations in the plates and discharge in the form of a spray. By reason of the somewhat restricted outlet openings the liquid accumulates in the member 21 and occupies the air space in pipes 11 and 20 that previously surrounded the jet. Under these conditions the liquid soap is

caused to be drawn into moving stream of water. During passage through the induction pipe, the spray head chamber and the spray orifices the liquids become thoroughly intermixed. The spray action is especially conducive to the formation of rich, dense suds.

From the foregoing description it will be understood that the character of the discharge flow, both in a physical and a chemical sense, is under the control of the lever 29 at the discharge end of the apparatus.

I have described my invention with reference to a practical, operable device of presently preferred form. It is known that certain changes may be made in the structure herein described without departing from the spirit and full intendment of the invention.

I claim:

1. Liquid mixing and dispensing apparatus of the character described comprising a hollow body member having a relatively large opening and a plurality of small openings in an end wall thereof, a pipe projecting into the opposite end of said body in alignment with the said large opening, said pipe having lateral openings at its discharge end, a tube for liquid soap connected to said pipe, a nozzle in said pipe for projecting water there-through in a stream of lesser diameter than the smallest diameter of the passage through said pipe, and an adjustable gate at said large opening, adapted to restrict discharge flow there-through to an extent to cause the discharging liquid to fill said pipe, whereby to effect induction of soap from said tube.

2. A plumbing fixture for mixing and dispensing liquid soap, comprising a pipe adapted at one end for attachment to a faucet, a hollow body member at the discharge end of said pipe, said member having an apertured wall providing spray orifices and an enlarged opening in alignment with said pipe, means for inducing liquid soap into said pipe including a soap tube connected to said pipe, and a nozzle in said pipe adapted normally to project water outwardly through the passage formed by said pipe and said enlarged opening in an attenuated stream of lesser diameter than the smallest diameter of said passage, whereby to avoid induction of soap into said stream, and an adjustable gate member operable to interrupt said flow through said enlarged opening, whereby to cause liquid soap to flow from said tube into the pipe, and to cause the combined liquids to discharge through said spray orifices.

ALBERT E. PRACK.

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