March 3, 1964 C. W. LAMBTON 3,123,253

MIXING DEVICE FOR DELIVERING LIQUID MIXTURES OR SOLUTIONS

Filed Sept. 19, 1961

Fig. 1

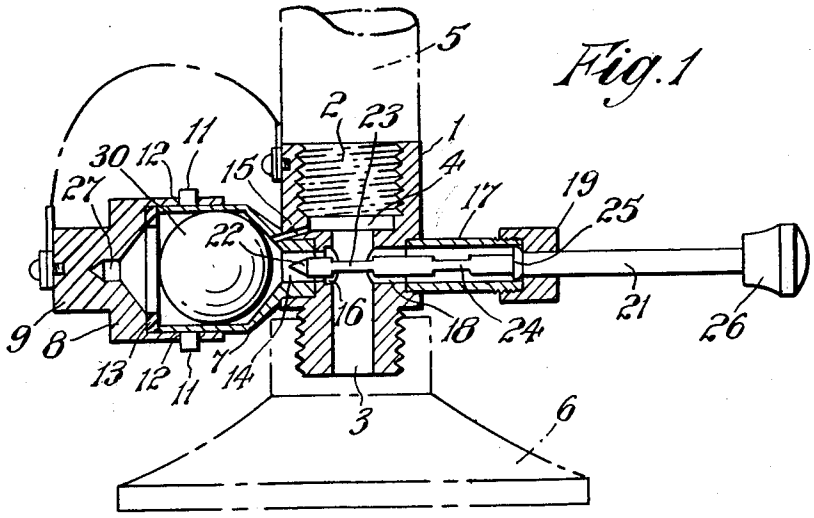


Fig. 2

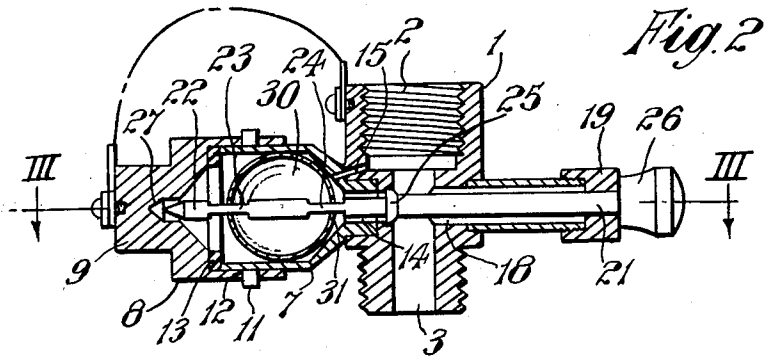
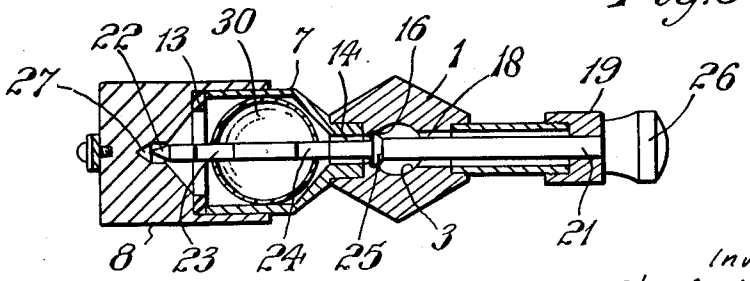


Fig. 3



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United States Patent Office 3,123,253 Patented Mar. 3, 1964

3,123,253

MIXING DEVICE FOR DELIVERING LIQUID MIXTURES OR SOLUTIONS

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Filed Sept. 19, 1961, Ser. No. 139,229
8 Claims. (Cl. 222—82)

The present application is a continuation-in-part application of application Serial No. 800,711, filed March 20, 1959, entitled "Device for Delivering Liquid Mixtures" and issued as United States Patent No. 3,003,703 on October 10, 1961.

The invention relates to a mixing device for delivering liquid mixtures or solutions.

It is an object of the invention to provide a mixing device of simple construction, adapted to be fitted to a water supply, which can be used to introduce into such supply a quantity of perfume, soap, detergent, deodorant, antiseptic or other chemical substance as desired by the user so as to form a mixture or solution thereof in the water supply, but which at the same time does not interfere with the normal supply of the water when the mixture or solution is not required.

It is another object of the invention to provide a mixing device for delivering mixtures or solutions, comprising a body member having inlet and outlet openings for water, a passage extending between the openings, a hollow housing being provided adjacent the body member for receiving a container of a substance to be mixed with the water, the housing communicating with the passage by an aperture, a piercing member being provided which is guided for movement into piercing engagement with the container for opening the container and permitting discharge of the contents thereof into water flowing through the passage.

The container for use with the mixing device of the invention is made of a substantially water insoluble material which can be easily pierced. The container may therefore advantageously be made of a synthetic plastic material, gelatine, or alginate material, and may be spherical or of any other desired shape.

The above and other objects of the invention will become apparent from the following description taken with reference to the drawings which are given by way of example and in which:

FIG. 1 is a longitudinal sectional view through a mixing device of the invention, showing a piercing member thereof in an inoperative position;

FIG. 2 is a longitudinal sectional view, corresponding to FIG. 1, showing the piercing member in an operated position; and

FIG. 3 is a sectional view taken along the line III—III of FIG. 2.

The mixing device comprises a body member 1 which may be machined from metal stock. The body member 1 has an inlet opening 2 and an outlet opening 3 for water which passes through a passage 4 between the said openings, for example from a water supply pipe 5 to a shower nozzle or head 6 which are indicated by broken lines.

A hollow housing 7 is secured to the body member 1 so as to extend generally perpendicularly therefrom. The housing 7 has a watertight closure member 8 releasably connected thereto by means of radial pins 11 provided on the housing 7 and corresponding bayonet slots 12 formed in the closure member 8. A gripping portion 9 of the closure member 8 facilitates manual turning of the closure member 8. Watertightness of the closure is ensured by a rubber sealing ring 13 which is pressed against the free end of the housing 7 when the pins 11 are engaged by the bayonet slots 12. The housing 7 communicates with the passage 4 by a bore 14 which meets the passage 4 perpendicularly, and by an aperture 15 which is directed generally towards the inlet opening 2. The bore 14 terminates at the passage 4 in a portion 16 which is of larger diameter.

At the opposite side of the body member 1 to the housing 7, a sleeve 17 is secured which extends perpendicularly to the passage 4 in axial alignment with the bore 14. The interior of the sleeve 17 is connected to the passage 4 by a bore 18 in the body member 1. An end cap 19 is threadedly coupled to the free end of the sleeve 17.

The end cap 19 and the sleeve 17 serve for guiding a piercing pin 21 which has a point 22, two spaced portions 23 and 24 of reduced cross-section, a portion 25 of increased diameter and a knob 26. The body of the pin 21 is a sliding fit in an aperture in the end cap 19 of the sleeve 17, while the portion 25 of the pin 21 is a sliding fit in the sleeve 17 itself, the portion 25 preventing withdrawal of the pin 21 beyond the position shown in FIG. 1. The pin 21 may be moved by means of the knob 26, from the position shown in FIG. 1 to the position shown in FIG. 2, in which position the point 22 of the pin is received in a bore 27 in the closure member 8.

The mixing device is used and operates as follows:

The closure member 8 is removed from the housing 7 with the aid of the gripping portion 9, and a container, indicated in FIGS. 2 and 3 by reference numeral 30, of a substance, for example perfume, to be added to water passing through the passage 4, is inserted in the housing 7, after which the housing 7 is watertightly closed to the outside by re-applying the closure member 8. Water is then supplied by the pipe 5 so as to pass through the passage 4 to the shower nozzle or head 6. The piercing pin 21 is then moved by means of the knob 26 into the position shown in FIG. 2, the point 22 of the pin passing through the container 30 at two oppositely lying wall portions thereof and entering the bore 27, the portion 25 of the pin 21 entering the portion 16 of the bore 14, and limiting the movement of the pin 21.

The reduced cross-section portions 23 and 24 of the pin 21 are so positioned along the length of the pin that when the pin has been moved by means of the knob 26 as far as possible, the portions 23 and 24 lie in register with the pierced wall portions of the container 30. Since the container 30 is pierced by passage therethrough of full diameter parts of the pin 21, then in the position of the pin shown in FIG. 2, a clearance, indicated by reference numeral 31, exists between the pin 21 and the container or capsule 30 at both of the portions 23 and 24. The contents of the container 30 can escape into the housing 7 through these clearances.

Some of the water flowing into the passage 4 flows into the aperture 15 and thence into the housing 7. This water has a flushing effect and fills the housing 7 and gradually replaces the contents of the container 30 as the contents thereof pass out of the container through the clearances 31. Water from the housing 7, containing a proportion of perfume from the container 30 flows into the passage 4 through the bore 14, the restricted passage existing between the pin portion 25 and the bore portion 16 ensuring that the flow from the housing 7 is sufficiently slow that the contents of the container 30 are not completely expended before a reasonable showering time has elapsed.

After use of the mixing device, or immediately before a next use thereof, the expended container 30 is removed from the housing 7. If it is not desired to use the entire contents of the container in one shower, after use of the shower the piercing pin 21 may be moved into a position part way between the positions of FIGS. 1 and 2 so that full diameter portions of the pin 21 are in register with the pierced openings in the container 30 whereby a temporary sealing of the container 30 is effected.

While the mixing device of the invention has been

described herein as applied to a shower, it should be understood that it is applicable for many other mixing purposes and that many modifications, omissions and additions may be made thereto without departing from the spirit and scope of the invention.

I claim:

1. A mixing device for delivering liquid mixtures comprising, in combination,

a body member having inlet and outlet openings for a liquid;

passage means in said body member for the flow of liquid between said inlet and outlet openings;

housing means supported adjacent said body member;

a mixing chamber in said housing means, said body member having an aperture formed therein communicating with said passage means and with the mixing chamber of said housing means and adapted to deliver liquid to the mixing chamber of said housing means and said body member having a bore formed therein spaced from said aperture communicating with the mixing chamber of said housing means and with said passage means and adapted to deliver a liquid mixture to said passage means;

holding means in said housing means for holding a capsule in the mixing chamber adjacent said bore so that upon piercing of said capsule the contents thereof will mix with liquid in the mixing chamber of said housing means and the liquid mixture thus formed will enter said passage means through said bore;

piercing means supported in operative proximity with the mixing chamber of said housing means for piercing said capsule while the same is held by said holding means; and

guiding means guiding said piercing means into the mixing chamber of said housing into piercing engagement with said capsule to discharge the contents of said capsule into the mixing chamber of said housing means to mix with liquid in the mixing chamber of said housing means.

2. A mixing device for delivering liquid mixtures comprising, in combination,

a body member having inlet and outlet openings for a liquid;

passage means in said body member for the flow of liquid between said inlet and outlet openings;

housing means supported adjacent said body member;

a mixing chamber in said housing means, said body member having an aperture formed therein communicating with said passage means and with the mixing chamber of said housing means and adapted to deliver liquid to the mixing chamber of said housing means, said aperture extending from the mixing chamber of said housing means to said passage means in the direction of said inlet opening, and said body member having a bore spaced from said aperture communicating with the mixing chamber of said housing means and with said passage means and adapted to deliver a liquid mixture to said passage means;

holding means in said housing means for holding a capsule in the mixing chamber adjacent said bore so that upon piercing of said capsule the contents thereof will mix with liquid in the mixing chamber of said housing means and the liquid mixture thus formed will enter said passage means through said bore;

piercing means supported in operative proximity with the mixing chamber of said housing means for piercing said capsule while the same is held by said holding means; and

guiding means guiding said piercing means into the mixing chamber of said housing into piercing engagement with said capsule to discharge the contents of said capsule into the mixing chamber of said

housing means to mix with liquid in the mixing chamber of said housing means.

3. A mixing device for delivering liquid mixtures comprising, in combination,

a body member having inlet and outlet openings for a liquid;

passage means in said body member for the flow of liquid between said inlet and outlet openings;

housing means supported adjacent said body member, said housing means having an opening formed therethrough for admitting a capsule therein and a liquid tight closure member for covering the opening formed therethrough;

a mixing chamber in said housing means, said body member having an aperture formed therein communicating with said passage means and with the mixing chamber of said housing means and adapted to deliver liquid to the mixing chamber of said housing means, and said body member having a bore spaced from said aperture communicating with the mixing chamber of said housing means and with said passage means and adapted to deliver a liquid mixture to said passage means;

holding means in said housing means for holding a capsule in the mixing chamber adjacent said bore so that upon piercing of said capsule the contents thereof will mix with liquid in the mixing chamber of said housing means and the liquid mixture thus formed will enter said passage means through said bore;

piercing means supported in operative proximity with the mixing chamber of said housing means for piercing said capsule while the same is held by said holding means; and

guiding means guiding said piercing means into the mixing chamber of said housing into piercing engagement with said capsule to discharge the contents of said capsule into the mixing chamber of said housing means to mix with liquid in the mixing chamber of said housing means.

4. A mixing device for delivering liquid mixtures comprising, in combination,

a body member having inlet and outlet openings for a liquid;

passage means in said body member for the flow of liquid between said inlet and outlet openings;

housing means supported adjacent said body member;

a mixing chamber in said housing means, said body member having an aperture formed therein communicating with said passage means and with the mixing chamber of said housing means and adapted to deliver liquid to the mixing chamber of said housing means, and said body member having a bore spaced from said aperture communicating with the mixing chamber of said housing means and with said passage means and adapted to deliver a liquid mixture to said passage means;

holding means in said housing means for holding a capsule in the mixing chamber adjacent said bore so that upon piercing of said capsule the contents thereof will mix with liquid in the mixing chamber of said housing means and the liquid mixture thus formed will enter said passage means through said bore;

piercing means supported in operative proximity with the mixing chamber of said housing means for piercing said capsule while the same is held by said holding means; and

guiding means guiding said piercing means transversely through said passage means and through said bore into the mixing chamber of said housing into piercing engagement with said capsule to discharge the contents of said capsule into the mixing chamber of said housing means to mix with liquid in the mixing chamber of said housing means.

5. A mixing device for delivering liquid mixtures comprising, in combination,

a body member having inlet and outlet openings for a liquid;

passage means in said body member for the flow of liquid between said inlet and outlet openings;

housing means supported adjacent said body member;

a mixing chamber in said housing means, said body member having an aperture formed therein communicating with said passage means and with the mixing chamber of said housing means and adapted to deliver liquid to the mixing chamber of said housing means, and said body member having a bore spaced from said aperture communicating with the mixing chamber of said housing means and with said passage means and adapted to deliver a liquid mixture to said passage means;

holding means in said housing means for holding a capsule in the mixing chamber adjacent said bore so that upon piercing of said capsule the contents thereof will mix with liquid in the mixing chamber of said housing means and the liquid mixture thus formed will enter said passage means through said bore;

piercing means supported in operative proximity with the mixing chamber of said housing means for piercing said capsule while the same is held by said holding means; and

guiding means guiding said piercing means transversely through said passage means and through said bore into the mixing chamber of said housing into piercing engagement with said capsule to discharge the contents of said capsule into the mixing chamber of said housing means to mix with liquid in the mixing chamber of said housing means, said guiding means including means for arresting further piercing operation of said piercing means after operation of said piercing means to pierce said capsule while the same is held in said holding means.

6. A mixing device for delivering liquid mixtures comprising, in combination,

a body member having inlet and outlet openings for a liquid;

passage means in said body member for the flow of liquid between said inlet and outlet openings;

housing means supported adjacent said body member;

a mixing chamber in said housing means, said body member having an aperture formed therein communicating with said passage means and with the mixing chamber of said housing means and adapted to deliver liquid to the mixing chamber of said housing means, and said body member having a bore spaced from said aperture communicating with the mixing chamber of said housing means and with said passage means and adapted to deliver a liquid mixture to said passage means;

holding means in said housing means for holding a capsule in the mixing chamber adjacent said bore so that upon piercing of said capsule the contents thereof will mix with liquid in the mixing chamber of said housing means and the liquid mixture thus formed will enter said passage means through said bore;

piercing means supported in operative proximity with the mixing chamber of said housing means for piercing said capsule while the same is held by said holding means, said piercing means comprising an elongated member adapted to move to pierce opposite side areas of said capsule; and

guiding means guiding said piercing means transversely through said passage means and through said bore into the mixing chamber of said housing into piercing engagement with said capsule to discharge the contents of said capsule into the mixing chamber of said housing means to mix with liquid in the mixing chamber of said housing means, said guiding means including means for arresting further piercing movement of the elongated member of said piercing means after movement thereof to pierce opposite side areas of said capsule.

7. A mixing device for delivering liquid mixtures comprising, in combination,

a body member having inlet and outlet openings for a liquid;

passage means in said body member for the flow of liquid between said inlet and outlet openings;

housing means supported adjacent said body member;

a mixing chamber in said housing means, said body member having an aperture formed therein communicating with said passage means and with the mixing chamber of said housing means and adapted to deliver liquid to the mixing chamber of said housing means, and said body member having a bore spaced from said aperture communicating with the mixing chamber of said housing means and with said passage means and adapted to deliver a liquid mixture to said passage means;

holding means in said housing means for holding a capsule in the mixing chamber adjacent said bore so that upon piercing of said capsule the contents thereof will mix with liquid in the mixing chamber of said housing means and the liquid mixture thus formed will enter said passage means through said bore;

piercing means supported in operative proximity with the mixing chamber of said housing means for piercing said capsule while the same is held by said holding means, said piercing means comprising an elongated rod-like member adapted to move to pierce opposite side areas of said capsule, said elongated rod-like member having portions of reduced cross-section formed therein at positions which correspond to the pierced side areas of said capsule when said capsule is pierced by said piercing means; and

guiding means guiding said piercing means transversely through said passage means and through said bore into the mixing chamber of said housing into piercing engagement with said capsule to discharge the contents of said capsule into the mixing chamber of said housing means to mix with liquid in the mixing chamber of said housing means, said guiding means including means for arresting further piercing movement of said elongated rod-like member after movement thereof to pierce opposite side areas of said capsule.

8. A mixing device for delivering liquid mixtures comprising, in combination,

a body member having inlet and outlet openings for a liquid;

passage means in said body member for the flow of liquid between said inlet and outlet openings;

housing means supported adjacent said body member;

a mixing chamber in said housing means, said body member having an aperture formed therein communicating with said passage means and with the mixing chamber of said housing means and adapted to deliver liquid to the mixing chamber of said housing means, and said body member having a bore spaced from said aperture communicating with the mixing chamber of said housing means and with said passage means and adapted to deliver a liquid mixture to said passage means;

holding means in said housing means for holding a capsule in the mixing chamber adjacent said bore so that upon piercing of said capsule the contents thereof will mix with liquid in the mixing chamber of said housing means and the liquid mixture thus formed will enter said passage means through said bore;

piercing means supported in operative proximity with the mixing chamber of said housing means for piercing said capsule while the same is held by said holding means, said piercing means comprising an elongated rod-like member adapted to move to pierce

opposite side areas of said capsule, said elongated rod-like member having portions of reduced cross-section formed therein at positions which correspond to the pierced side areas of said capsule when said capsule is pierced by said piercing means; and

guiding means guiding said piercing means transversely through said passage means and through said bore into the mixing chamber of said housing into piercing engagement with said capsule to discharge the contents of said capsule into the mixing chamber of said housing means to mix with liquid in the mixing chamber of said housing means, said guiding means including means for arresting further piercing movement of said elongated rod-like member after movement thereof to pierce opposite side areas of said capsule, sleeve means mounted on one side of said

body member transversely to said passage means, the sleeve means of said guiding means coaxially guiding the elongated rod-like member of said piercing means, and said housing means being supported on the opposite side of said body member.

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