Feb. 25, 1947. H. H. HARR 2,416,582

MIXING AND DISPENSING FAUCET

Filed Aug. 11, 1945 2 Sheets-Sheet 1

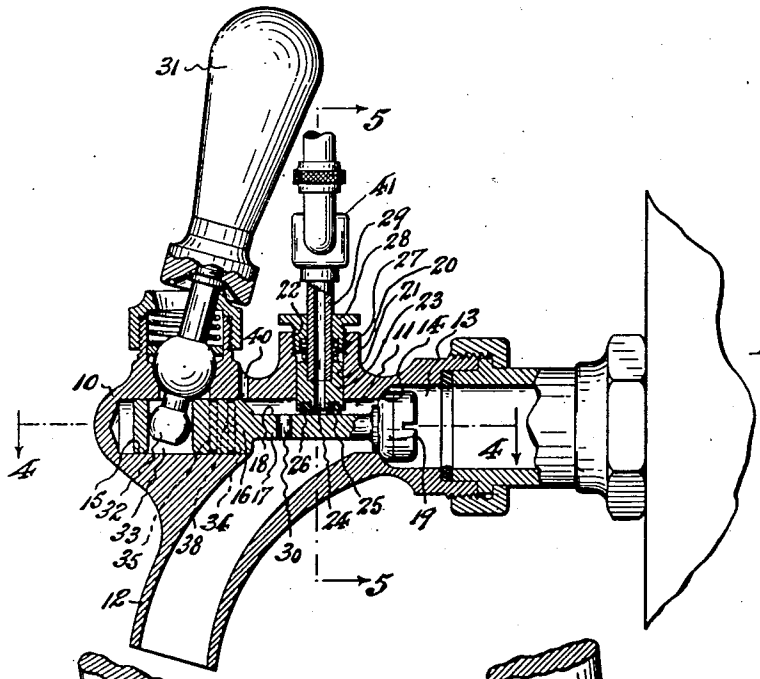


Fig. 1

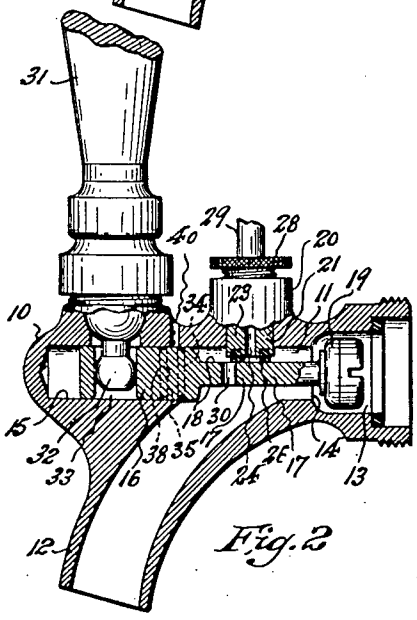


Fig. 2

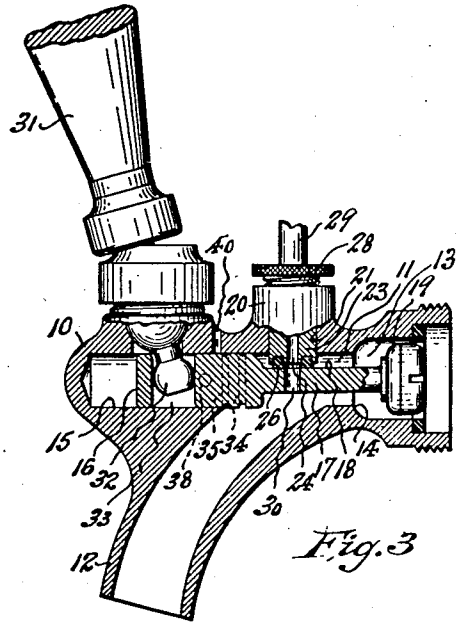


Fig. 3

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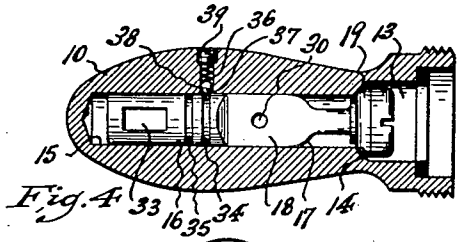


Fig. 4

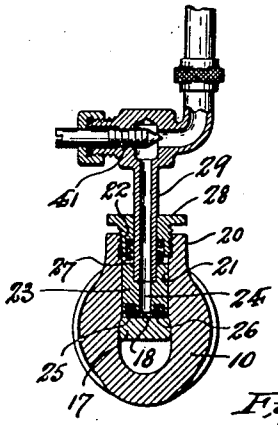


Fig. 5

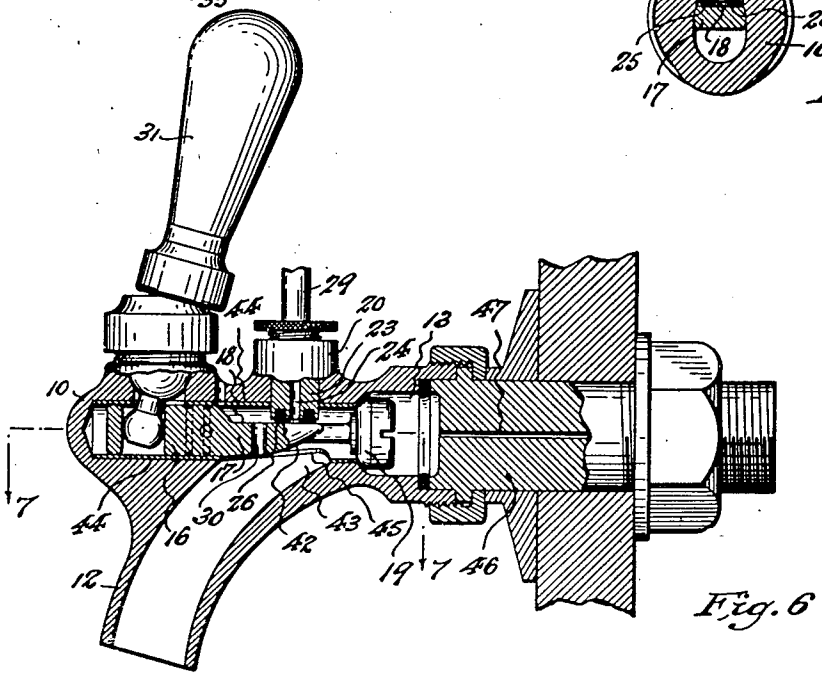


Fig. 6

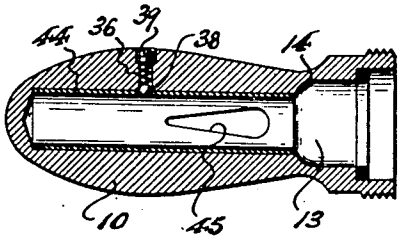


Fig. 7

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UNITED STATES PATENT OFFICE

2,416,582

MIXING AND DISPENSING FAUCET

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Application August 11, 1945, Serial No. 610,320

7 Claims. (Cl. 225—26)

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This invention relates to improvements in means for dispensing beverages of the general kind disclosed in my co-pending application for United States Letters Patent Serial No. 559,344, filed October 19, 1944; the instant invention comprising an improved construction of dispensing faucet adapted to be selectively manipulatable to discharge a single liquid or to mix and discharge a plurality of liquid ingredients simultaneously drawn from independent supply sources.

This invention has for an object to provide a novel construction of dispensing faucet having a plurality of liquid intake means adapted to be respectively connected to independent sources of different liquids, said intake means being controlled by a single movable valve piece including means for selectively actuating the same so as to optionally open one said intake means for the sole discharge of one of said liquids or to open both said intake means for the mixing and discharge of both said liquids; yieldable detent means cooperative with said valve piece being provided for determining, to such end, various positions of the valve piece.

The invention has for another object to provide a faucet for dispensing a mixture of two liquid components, one of which may be defined as the body liquid and the other of which may be defined as the flavoring liquid to be supplied in minor volume relative to a major volume of said body liquid; said faucet having independent intake means for each said liquid, and a valve piece having a sliding relation to the flavoring liquid intake means, said flavoring liquid intake means including novel means for maintaining a leak-proof relation between the same and said valve piece.

The invention has for a further object to provide a faucet adapted to mix and dispense two liquids, one of which is gas charged or under pressure and the other of which is a flavoring liquid, wherein the relation of the intake of the pressure liquid to that of the flavoring liquid, and the form and relation of the common intake control valve means to the faucet chamber and discharge spout is such that out-flow of the pressure liquid is utilized to facilitate induction and controlled simultaneous outflow of the flavoring liquid; said faucet chamber being provided with novel means for reducing and controlling the pressure of the pressure liquid, whereby to prevent abrupt or excessive changes in the velocity of the latter, and whereby said pressure liquid is kept in substantially calm liquid condition, with its activating gases retained therein, and

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so that the ultimately formed beverage mixture may be discharged from the faucet spout and into a glass without undue gas releasing agitation, spurting and splashing.

Other objects of the invention, not at this time more particularly enumerated, will be understood from the following detailed description of the same.

Illustrative embodiments of this invention are shown in the accompanying drawings, in which—

Fig. 1 is a longitudinal sectional view of one form of the dispensing faucet according to this invention, showing the same in closed condition; Fig. 2 is a similar view, showing the faucet as actuated to open one liquid intake means thereof for the sole discharge of a body liquid; and Fig. 3 is a similar view, showing the faucet as actuated to open both liquid intake means for the mixture and discharge of both liquids.

Fig. 4 is a horizontal sectional view, taken on line 4—4 in Fig. 1; and Fig. 5 is a transverse vertical sectional view, taken on line 5—5 in Fig. 1.

Fig. 6 is a longitudinal sectional view of a modified form of the dispensing faucet according to this invention, showing the same in closed condition; and Fig. 7 is a horizontal sectional view of the same, taken on line 7—7 in Fig. 6.

Similar characters of reference are employed in the above described views, to indicate corresponding parts.

Referring to the drawings, the novel dispensing faucet comprises a faucet body 10 having an internal chamber 11 from which leads a discharge spout 12 with which the faucet body is provided. In its inner end portion, said faucet body 10 is provided with an enlarged valve chamber 13, said valve chamber being provided with a valve seat 14 at the juncture thereof with the faucet chamber 11. Said valve chamber 13 forms the intake for the body liquid desired to be dispensed through the faucet. In its outer end portion, said faucet body 10 is provided with an outwardly closed slideway 15 which is inwardly open toward the faucet chamber 11. Mounted to slidably reciprocate in said slideway 15 is a valve piece 16, the same being provided at its inner end portion with a slide valve section 17 of reduced thickness which is shaped to provide at its upper side a flat horizontal face 18. Extending axially from the end of said slide valve section 17 and into the valve chamber 13 is a stem of reduced diameter, to the free end portion of which is suitably affixed a valve head 19 for cooperation with the valve seat 14.

Connected with the wall of the faucet body 10

is an intake means for admission of the flavoring liquid to the faucet. Said intake means comprises a housing boss 20 having an axial bore 21 in opposition to the slide valve section 17 of the valve piece 16; said bore having an internally screw threaded portion 22 at its outer end. Slidably mounted in the bore 21 of said housing boss 20 is a thrust piece 23 having an axially disposed intake port 24. At the lower end thereof, which opposes the slide valve section 17 of the valve piece 16, said thrust piece 23 is provided with an annular countersunk seat 25 disposed concentric to said intake port 24. Supported in said seat 25 is a resilient sealing washer 26 which engages and bears upon the face 18 of said slide valve section 17. Said thrust piece 23 and its sealing washer 26 is yieldably urged toward the face 18 of said slide valve section 17 by a compression spring 27 which is disposed between the upper end of said thrust piece and a gland member 28 which is threaded into the outer end portion of said housing boss 20. Connected with said thrust piece 23 to communicate with the intake port 24 is a supply conduit 29 which extends outwardly therefrom through the gland member 28. Provided in the slide valve section 17 of the valve piece 16 is a valve port 30 for cooperation with said intake port 24.

The valve piece 16, with its described associated parts, is adapted to be axially reciprocated by an external hand lever 31 which is pivotally mounted by suitable means on and in connection with the outer end portion of the faucet body 10. Said hand lever 31 is provided at its inner end with an inner lever arm 32 which engages in a slot 33 with which the outer end portion of the valve piece 16 is provided, whereby movements of the hand lever produce operative movements of the valve piece and its associated parts.

The faucet body is provided with yieldable detent means adapted to cooperate with said valve piece 16 for determining various positions of the latter. To this end, the valve piece 16 is provided with suitably located and spaced annular stop grooves, such, e. g., as the stop groove 34 and the stop groove 35. Extending laterally through the wall of the faucet body 10 is a chamber 36 terminating at its inner end in an annular ball seat 37 upon which is seated a spring pressed check-ball 38 which is opposed to the valve piece 16 so as to be selectively engaged by said stop grooves. The outer end of the chamber 36 is closed by a removable closure element 39. Illustratively as shown, when the valve piece 16 occupies closed position, said check-ball 38 engages the stop groove 34, thereby yieldably holding the valve piece in faucet closing position; when, however, the valve piece 16 is moved to a position adapted to open the valve head 19, for the admission of the body liquid to and through the faucet while still holding closed the intake port 24 of the flavoring liquid, said check-ball 38 engages the stop groove 35, thereby yieldably holding the valve piece in such position. It will be obvious that said detent means may be variously modified in both form and arrangement so long as its function of selectively holding the valve piece in various positions is provided for.

Formed in the wall of the faucet body is an air inlet passage or vacuum breaker port 40 which provides communication between the interior of the faucet and the atmosphere when the faucet is closed, whereby to assure prompt and complete evacuation of liquid from the faucet chamber and spout upon closing of the faucet, and thus avoiding tendency of prolonged dripping of liquid from the faucet spout.

In the operation of the faucet, if it is desired to dispense only the body liquid, the valve piece 16 is moved from closed position to a first stage open position as determined by the engagement of the check-ball 38 with the stop groove 35. When the valve piece is so disposed, the valve head 19 is displaced from its seat 14, thus permitting said body liquid to flow into and through the faucet. Such movement of the valve piece is not sufficient to carry its slide valve section 17 far enough to register the valve port 30 with the flavoring liquid intake port 24, and consequently the latter liquid remains shut off (see Fig. 2). If it is desired to mix and dispense both the main and flavoring liquids, the valve piece 16 is moved to its extreme open position, whereby the valve head 19 remains open and the valve port 30 of the slide valve section 17 is brought into registration with the intake port 24 so that the flavoring liquid flows into the faucet chamber to mingle with the body liquid to form a mixture of said liquids which is discharged from the faucet spout (see Fig. 3). By reason of such selective operation, the novel faucet is especially well adapted to serve as a dispensing means for such beverages as coffee for example, in such case being so attached to the coffee urn that its valve chamber 13 communicates with the interior of the urn to receive black coffee therefrom, while its intake port 24 is connected through the conduit 29 with a supply of milk or cream. It will be obvious that by selective manipulation, either black coffee or coffee with cream may be optionally dispensed through the faucet.

Proportional flow volume of the flavoring liquid relative to the flow volume of the body liquid may be suitably regulated. Preferably, the flavoring liquid supply conduit 29 is provided with a manipulatable regulating valve 41, by means of which the flow delivery of the flavoring liquid may be suitably modified according to a selected proportional ratio of volume of the same desired to be mixed with a given volume of the body liquid.

The novel faucet is also well adapted for dispensing a mixture of a flavoring syrup or liquid with a gas charged or pressure body liquid, such as carbonated water. When desired to be used for such purpose, the faucet structure is suitably modified to both control the pressure of the gas charged or pressure liquid, while at the same time utilizing the outflow thereof through the faucet to induce the flow of flavoring liquid into the faucet body for mixture with the body liquid. The faucet structure as so modified is shown in Figs. 6 and 7. As so modified, the underside of the inner end portion of the slide valve section 17 is cut away to provide a substantially inclined end portion 42 which is opposed to the bottom wall of the faucet spout so as to form therewith a restricted Venturi-like passage 43 divergent toward the spout outlet, whereby, when the slide valve section 17 is positioned to register its valve port 30 with the intake port 24, the flavoring liquid passage formed by said ports, communicates with the Venturi-like passage 43. The faucet chamber 11 is further provided with a tubular lining member 44, the bottom wall of which is provided with a tapered slot or port 45 tapering toward its forward end and disposed to intersect the Venturi-like passage 43. This slot or port 45 functions to retard somewhat the out-flow of the gas charged or pressure body liquid, whereby to prevent

abrupt or excessive acceleration of its flow velocity, so that said gas charged or pressure body liquid is kept in substantially calm liquid condition, with its activating gases retained therein, and so that the ultimately formed beverage mixture may be discharged from the faucet spout and into a glass without undue gas releasing agitation, spurting and splashing. As the gas charged or pressure body liquid flows through the Venturi-like passage 43, its passage exerts a suction effect upon the outlet of the registered ports 30 and 24, which induces flow of the flavoring liquid and so controls said flow that proportional volume thereof is drawn into and mingles with the outgoing stream of the body liquid. When the faucet is used to dispense a body liquid of the gas charged or pressure type, it is suitably connected with the outlet shank 46 of the body liquid supply, said shank 46 having a discharge passage 47 sufficiently limited in cross sectional area to effect reduction of pressure of the body liquid, and to maintain a substantial uniform small volume of flow per unit of length, whereby to prevent agitation and sudden expansion of said body liquid.

Having now described my invention, I claim:

1. A dispensing faucet comprising a faucet body having a longitudinal chamber and a discharge spout leading laterally therefrom, said chamber terminating at its inner end in a valve chamber defining a valve seat, a valve piece longitudinally movable in said faucet chamber having a valve head connected with its inner end to cooperate with said valve seat for the control of admission of one liquid longitudinally into said faucet chamber, said faucet chamber having a side entering intake means for a second liquid, said valve piece having a transverse port intermediate its ends adapted to cooperate with said side entering intake means for the control of admission of said second liquid, means for actuating said valve piece, yieldable detent means cooperative with said valve piece for determining various positions thereof, whereby said valve piece may be optionally positioned to open said valve head only for the sole discharge of said first mentioned liquid or to open both said valve head and said side entering intake means for the mixing and discharge of both said liquids, said detent means comprising a spring pressed check-ball housed in the faucet body and a plurality of longitudinally spaced check-ball engageable stop means with which said valve piece is provided, and said faucet body having a vacuum breaker port outwardly open to the atmosphere and disposed to communicate with said valve chamber when the faucet is closed.

2. A dispensing faucet comprising a faucet body having a longitudinal chamber and a discharge spout leading therefrom, said chamber terminating at its inner end in a valve chamber defining a valve seat, a valve piece longitudinally movable in said faucet chamber having a valve head connected with its inner end to cooperate with said valve seat for the control of admission of one liquid longitudinally into said faucet chamber, said faucet chamber having a side entering intake means for a second liquid, said valve piece having a slide valve section intermediate its ends, said slide valve section having a flat face opposed to said side entering intake means and a valve port extending therethrough from said flat face for cooperation with said side entering intake means, means for actuating said valve piece, said side entering intake means including a spring pressed thrust piece having an intake port, and said thrust piece having at its free end a resilient sealing means surrounding said intake port and adapted to engage the flat face of said slide valve section.

3. A dispensing faucet comprising a faucet body having a longitudinal chamber and a discharge spout leading therefrom, said chamber terminating at its inner end in a valve chamber defining a valve seat, a valve piece longitudinally movable in said faucet chamber having a valve head connected with its inner end to cooperate with said valve seat for the control of admission of one liquid longitudinally into said faucet chamber, said faucet chamber having a side entering intake means for a second liquid, said valve piece having a slide valve section intermediate its ends, said slide valve section having a flat face opposed to said side entering intake means and a valve port extending therethrough from said flat face for cooperation with said side entering intake means, means for actuating said valve piece, said side entering intake means including a spring pressed thrust piece having an intake port, said thrust piece having at its free end a resilient sealing means surrounding said intake port and adapted to engage the flat face of said slide valve section, and yieldable detent means cooperative with said valve piece for determining various positions thereof, whereby said valve piece may be optionally positioned to open said valve head only for the sole discharge of said first mentioned liquid or to open both said valve head and said side entering intake means for the mixing and discharge of both said liquids.

4. A dispensing faucet comprising a faucet body having a longitudinal chamber and a discharge spout leading therefrom, said chamber terminating at its inner end in a valve chamber defining a valve seat, a valve piece longitudinally movable in said faucet chamber having a valve head connected with its inner end to cooperate with said valve seat for the control of admission of one liquid longitudinally into said faucet chamber, said faucet chamber having a side entering intake means for a second liquid, said valve piece having a slide valve section intermediate its ends, said slide valve section having a flat face opposed to said side entering intake means and a valve port extending therethrough from said flat face for cooperation with said side entering intake means, means for actuating said valve piece, said side entering intake means including a spring pressed thrust piece having an intake port, said thrust piece having at its free end a resilient sealing means surrounding said intake port and adapted to engage the flat face of said slide valve section, and yieldable detent means cooperative with said valve piece for determining various positions thereof, whereby said valve piece may be optionally positioned to open said valve head only for the sole discharge of said first mentioned liquid or to open both said valve head and said side entering intake means for the mixing and discharge of both said liquids, said detent means comprising a spring pressed check-ball housed in the faucet body and a plurality of spaced check-ball engageable stop means with which said valve piece is provided.

5. A dispensing faucet comprising a faucet body having a longitudinal chamber and a discharge spout the passage of which is divergent from said chamber, a lining sleeve within said chamber, said lining sleeve having a tapered slot tapering toward its forward end and opening into said spout passage, said chamber terminating at its

inner end in a valve chamber defining a valve seat, a valve piece longitudinally movable within the lining sleeve of said faucet chamber, a valve head at the inner end of said valve piece adapted to cooperate with said valve seat for the admission of a pressure liquid longitudinally into said faucet chamber, said lined faucet chamber having a side entering intake means for a flavoring liquid, said valve piece having a transverse port intermediate its ends adapted to cooperate with said side entering intake means, means for actuating said valve piece to control the flow of both liquids, and said valve piece being shaped to cooperate with said tapered slot and the inner portion of the divergent spout passage to provide a Venturi-like passage through which the pressure liquid discharges with induction effect upon said flavoring liquid.

6. A dispensing faucet comprising a faucet body having a longitudinal chamber and a discharge spout the passage of which is divergent from said chamber, a lining sleeve within said chamber, said lining sleeve having a tapered slot tapering toward its forward end and opening into said spout passage, said chamber terminating at its inner end in a valve chamber defining a valve seat, a valve piece longitudinally movable within the lining sleeve of said faucet chamber, a valve head at the inner end of said valve piece adapted to cooperate with said valve seat for the admission of a pressure liquid longitudinally into said faucet chamber, said lined faucet chamber having a side entering intake means for the flavoring liquid, said valve piece having a slide valve section intermediate its ends, said slide valve section having a flat face opposed to said side entering intake means and a valve port extending therethrough from said flat face for cooperation with said side entering intake means, means for actuating said valve piece, said side entering intake means including a spring pressed thrust piece having an intake port, said thrust piece having at its free end a resilient sealing means surrounding said intake port and adapted to engage the flat face of said slide valve section, means for actuating said valve piece to control the flow of both liquids, and said valve piece being shaped on its underside to cooperate with said tapered slot and the inner portion of the divergent spout passage to provide a Venturi-like passage through which the pressure liquid discharges with induction effect upon said flavoring liquid.

7. A dispensing faucet comprising a faucet body having a longitudinal chamber and a discharge spout the passage of which is divergent from said

chamber, a lining sleeve within said chamber, said lining sleeve having a tapered slot tapering toward its forward end and opening into said spout passage, said chamber terminating at its inner end in a valve chamber defining a valve seat, a valve piece longitudinally movable within the lining sleeve of said faucet chamber, a valve head at the inner end of said valve piece adapted to cooperate with said valve seat for the admission of a pressure liquid longitudinally into said faucet chamber, said lined faucet chamber having a side entering intake means for a flavoring liquid, said valve piece having a slide valve section intermediate its ends, said slide valve section having a flat face opposed to said side entering intake means and a valve port extending therethrough from said flat face for cooperation with said side entering intake means, means for actuating said valve piece, said side entering intake means including a spring pressed thrust piece having an intake port, said thrust piece having at its free end a resilient sealing means surrounding said intake port and adapted to engage said valve piece to control the flow of both liquids, said valve piece being shaped on its underside to cooperate with said tapered slot and the inner portion of the divergent spout passage to provide a Venturi-like passage through which the pressure liquid discharges with induction effect upon said flavoring liquid, and yieldable detent means cooperative with said valve piece for determining various positions thereof, whereby said valve piece may be optionally positioned to open said valve head only for the sole discharge of said pressure liquid or to open both said valve head and said side entering intake means for the mixing and discharge of both pressure and flavoring liquids.

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