Nov. 17, 1959 F. WELTY 2,913,003

MIXING AND DISPENSING APPARATUS FOR CARBONATED BEVERAGES

Filed Nov. 3, 1955

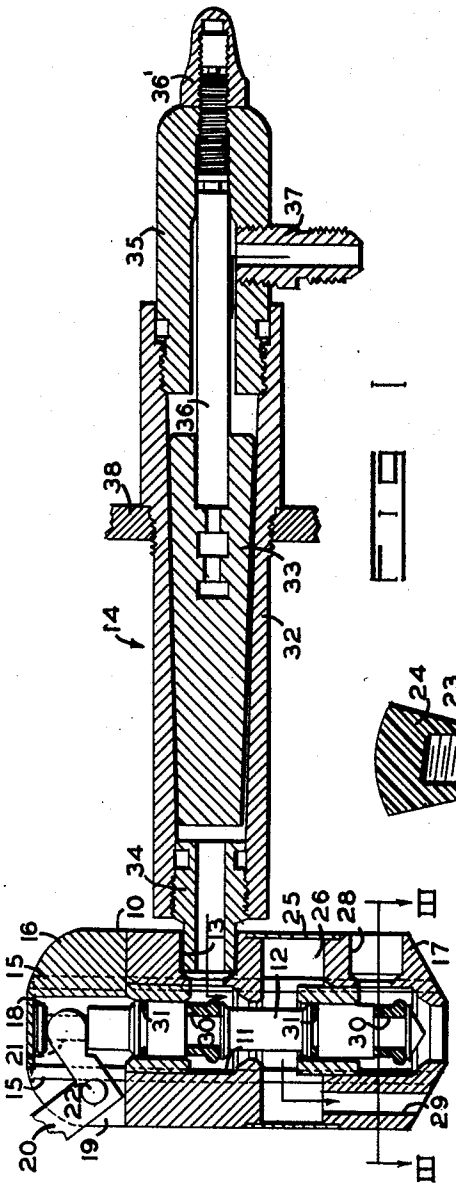


FIG. 1

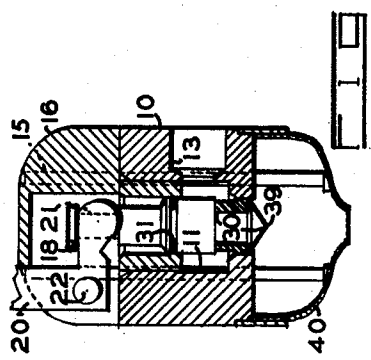


FIG. 2

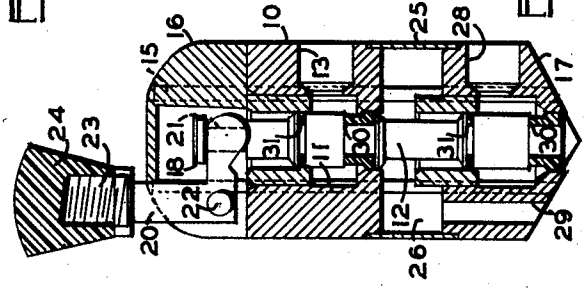


FIG. 4

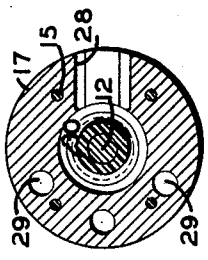


FIG. 3

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United States Patent Office 2,913,003 Patented Nov. 17, 1959

2,913,003

MIXING AND DISPENSING APPARATUS FOR CARBONATED BEVERAGES

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Application November 3, 1955, Serial No. 544,725

7 Claims. (Cl. 137—595)

This invention relates to faucets and valves and more particularly to means for accurately and effectively controlling the dispensing and mixing of carbonated liquids under high pressure.

An object of this invention is to provide a dispensing valve for mixing a liquid syrup with carbonated water under high pressures and dispensing the same in a suitable glass or container that is ready for selling and consumption.

A more specific object of this invention is to provide a mixing and dispensing valve of the type wherein a novel arrangement of parts is utilized to form a compact unit of utmost simplicity, yet which is operative to accurately control the mixing and flow of carbonated beverages with a minimum loss of carbonation.

Another object of this invention is to provide a novel arrangement of component parts that facilitates assembly and disassembly for inspection and cleaning. It should be readily understood that the syrup and mixed carbonated beverages are sticky in nature and as a result may necessitate cleaning of the faucet. The valve is accordingly constructed so that an attendant, not particularly skilled in the art of mechanics, can quickly and easily clean the apparatus without the use of special tools or equipment.

Yet another object of the invention is to provide a dispensing valve that is composed of parts that may be readily manufactured with standard machinery and is of utmost simplicity in design to provide ease of assembly while remaining compact and pleasing to the eye.

A more specific object is to provide apparatus that is flexible in nature so that with elementary changes the valve may be used to dispense pre-mixed carbonated liquids and also may be used in different types of installations where the demand may vary as to the amount of beverage dispensed in any given time interval.

It is yet another object to provide a valve of the type commonly known as "drip proof" whereby when the valve is in the closed position it is insured there will be no unsanitary and wasteful drippings.

A further object of the invention is the disclosure of a new and novel carbonator flow control assembly that is used in conjunction and combination with the dispensing faucet. It should be understood that the carbonated water is under relatively high pressures and that if care is not exercised in dispensing operations the sudden transition to atmospheric pressures will agitate the carbonated liquid to such an extent that the carbonization will be lost resulting in an inferior drink or beverage.

A more detailed object of the invention is the provision for automatic washing of the syrup outlets by the carbonated water after each dispensing operation to preclude the possibility of any syrup sticking to the outside of the faucet causing an unsightly and an unsanitary condition. This is a desirable feature since most syrups have a high viscosity and contain ingredients such as sugar that tend to stick and adhere to anything they come in contact with. It is also noted that with sticky substances the problem of proper sanitation, especially in foodstuffs, is of paramount importance and in many instances is regulated by state and city ordinances.

The improved faucet is also constructed in such a way that close tolerances are avoided thus facilitating manufacture and assembly. The end result of this construction is an improved dispensing valve at a much lower cost. This is accomplished by the use of a plurality of O-rings to provide the seals and wearing surfaces for opening and closing the paths in the valve casing to permit the mixing and dispensing of the carbonated beverages. The arrangement of the O-rings is such that the valve is "blow-off" free and it is almost impossible for the faucet to accidentally become open or stuck in the open position.

These and other objects and advantages of the invention will become apparent upon consideration of the full detailed specification and accompanying drawing wherein is disclosed a certain preferred embodiment of the invention.

In the drawing:

Figure 1 is a side sectional view of the faucet and carbonator control assembly in the dispensing position constructed in accordance with the teachings of my invention;

Figure 2 is a side sectional view of the dispensing faucet in the closed position;

Figure 3 is a plan sectional view taken along the section line III—III of Figure 1; and

Figure 4 is a side sectional view of an alternative arrangement of the dispensing valve for dispensing premixed carbonated beverages.

Referring now to the drawing and initially to Figure 1 thereof the numeral **10** designates a tubular casing or body member that has an axial aperture **11** therein to receive the elongated valve member **12** and certain other parts appurtenant thereto. A transverse opening or inlet port **13** is also provided and is adapted to communicate with the axial aperture **12** for the inlet of carbonated water through a flow control assembly indicated generally by the numeral **14** which will be hereinafter more fully disclosed.

Attached to the casing **10** by means of a plurality of axially extending rods **15** are top and bottom cover members **16** and **17**. The upper body member **16** is also apertured and is adapted to receive a valve member **18**. On one side of the upper casing **16** has an enlarged opening **19** that allows an operating lever **20** to protrude through the casing as shown in the drawing. The lever **20** is right angular in shape with one leg being much shorter than the other and having a cam portion **21** formed thereon adapted to cooperate with the valve stem **18**. The lever **20** is pivotally mounted by a rod or some other means at **22** to provide, in effect, a bellcrank and the longer leg thereof is threaded at **23** to receive the handle or knob **24** which facilitates manipulation of the lever **20**.

The bottom cover member **17** is tapered and pointed on the lower side and is separated from the casing **10** by an annular sleeve **25** thereby defining a chamber **26** whose function will become more apparent upon consideration of the operation of the faucet. The body member **17** has an axial aperture that is aligned with the bore **11** and receives the valve member **12**. A transversely extending opening or inlet port **28** communicates with this aperture and is adapted to be connected by suitable means, not shown, to a source of syrup for delivering the same to the faucet.

A plurality of spaced through-bores **29** are tapped through the bottom cover member **17** and communicate with the chamber **26** as indicated in Figure 3 of the drawing. The valve member **12** extends substantially

the entire length of the dispensing valve and is circumscribed at spaced points along its axis with gaskets **30** and O-rings **31** which are made of some resilient material, rubber or polyethylene for example, and form the actual valving and sealing means, respectively, adapted to cooperate with various circular sealing and valving lands provided in the dispensing faucet.

As indicated in previous discussion, the problem of transferring the carbonated water from the high pressure reservoir to atmospheric pressure of the dispensing valve is accomplished by the flow control assembly **14**. This consists of the main housing member **32** which has a tapered bore in which the cooperating tapered plug **33** is adapted to be moved as desired so that a small opening is provided between the housing **32** and the tapered plug **33**. The housing **32** is internally threaded on both ends to receive fittings **34** and **35** with the fitting **34** constructed to extend in sealing relation into the aperture **13** of the casing **10** as shown in Figure 1. The larger fitting **35** is bored throughout its length and contains a plunger member **36** that is joined to the tapered plug **33** on one end and its other end is threadably received in the fitting **35**. A cap **36'** is provided to cover the protruding thread portion of the plunger **36** thereby providing protection from damage and allowing easy access for adjustment. The fitting **35** also mounts an inlet connection **37** through which the carbonated water under high pressure enters the carbonator control assembly.

The carbonator control assembly **14** also serves to support and hold the dispensing and mixing valve in the manner desired so that other supports are unnecessary. To accomplish this the main housing **32** is threaded on its outer surface about halfway along its length so that the same may be mounted in a supporting wall **38**. It will be understood that the wall **38** might be the front portion of a cooling tank that surrounds the carbonator and syrup containers which are not shown. It should be understood that appropriate conduit means, not shown, are provided for bringing the syrup to the opening **28** in the lower casing member **17** and to the carbonated water inlet connection **37**.

In the contemplated operation of the dispensing valve the lever **20** is initially in the upright position as indicated in Figure 2 with the resilient gaskets **30** having enlarged portions on one end thereof sealing the carbonated water from the chamber **26** and the syrup from the large outlet opening in the bottom of the pointed cover member **17**. The valve member **12** is in the most downward position and the O-rings **31** prohibit the carbonated water and syrup from mixing or escaping upward through the opening for the lever **20**. It is noted that the pressure acts directly downwardly on the gaskets **30** to firmly seat them in blocking position and the gaskets cooperate with the sides of the axial apertures to close the possible passages for the carbonated water and syrup. The arrangement is such that the gaskets cannot be blown out of closing contact with the aperture by increased pressures but in such a case are more firmly seated and held in position. The pressure is always tending to close the valve or faucet so that the valve will not become stuck in the open position and very little effort is needed to close the valve.

To open the faucet and mix the carbonated water and syrup and dispense the drink the operator pulls the handle **24** down to the position shown in Figure 1 so that the valve **12** is lifted by the cam **21** to the position shown. This opens the passages for the carbonated water and syrup. The carbonated water flows into the chamber **26** via the control assembly **14**, the transverse aperture **13**, and the bore **11**, and then out the plurality of throughbores **29**. At the same time the syrup enters through the aperture **28** and flows through the opening in the bottom of the casing **17**. With both the syrup and the carbonated water flowing into a serving container the beverage is mixed as desired. It should be noted that different drinks require different proportions of carbonated water and syrup and the size of the discharge opening can be regulated by employing some type of stops or drilling different sized holes during construction. When the container or glass is full the handle is allowed to return to its original position thus blocking the passageways and stopping the flow of syrup and carbonated water.

In order to combat the problem of the pressure reduction of the carbonated beverage, the control unit is provided with a tapered plug **33** that loosely fits in the tapered housing **32** and is adjustable to open or close the opening for the carbonated water. In accordance with the principles disclosed in the related Patent No. 2,331,527 issued to Raymond D. Welty and myself and which is assigned to the assignee of the present invention, there is provided a slight clearance between the inner wall of the housing **32** and the periphery of the plug **33** through which the fluid must pass to be discharged. This clearance is in the order of 0.010 to 0.012 of an inch and is operative to substantially reduce the fluid pressure to atmospheric pressure as is required for effective operations.

The large chamber **26** is provided to further reduce the agitation and churning of the carbonated water when it has reached low pressures as undue turbulence at these pressures results in high loss of the carbon dioxide contained in the liquid. The chamber **26** also serves another and very important function in that it is full by the time the container is filled and when the handle is raised to disconnect the sources from the outlet passageways the water in the chamber **26** will flow through the throughbores **29** after the flow of syrup has ceased and due to the tapered end of the bottom casing **17** will clean any excess syrup from the end of the syrup discharge opening. This automatic rinsing action disposes of any syrup that has collected about the discharge openings and insures a sanitary and clean dispensing faucet.

One of the primary objects of this invention is to provide a dispensing apparatus that can be easily and completely disassembled, cleaned, and assembled by an attendant who is not necessarily familiar with the art and without the help of special tools or knowledge of mechanics. To this end the entire apparatus is held together by a plurality of longitudinally extending rods **15** which run the complete length of the dispensing unit. In the contemplated structure the bottom and top covers **17** and **16** are tapped to receive the ends of the rods **15** in order that they do not protrude for syrup to lodge on, etc. All that is needed is for the attendant to remove the plurality of rods **15** and the entire assembly will fall apart for inspection and cleaning. Since the housing is in four main parts, casing **10**, top and bottom cover members **16** and **17** and sleeve **25** there are no long bores to clean and the valve member **12** may be expediently removed. The process of assembly is also one of comparative ease as when the various parts are positioned the rods **15** are inserted and tightened to form the assembled dispensing valve.

In construction of the faucet the parts may be readily made on conventional machines at very high rates of production since they are of the utmost simplicity of design. The use of resilient gaskets and O-rings to form the valving and sealing means allows relatively large tolerances in manufacture, and since these parts receive all the wear, are the only ones that need be replaced or will be worn out. It is obviously much less expensive to replace a small O-ring or gasket than a corresponding bulky metal fixture.

Figure 4 in the drawing shows an alternative arrangement for the dispensing of pre-mixed carbonated beverages where there is no need for separate inlet and outlet openings and in fact only one such pair is needed. In order not to unnecessarily burden the application the same reference numerals are applied to like parts of the two disclosed species. Since there is no need for the

bottom inlet and outlet ports the casing member **17** has been removed and the valve member **12** replaced with a shorter member designated by the numeral **39** which has only half the effective valving length as the valve member **12**. The bottom cover **17** is replaced with a tapered funnel-like member **40** which is hollow and when the dispensing valve is energized the liquid flows out through opening in the bottom of the member **40** into any suitable glass or container.

As has been noted throughout the disclosure, the dispensing valve of my invention has been constructed with a high degree of versatility. As it will be understood, there are many types of dispensing faucets which are in demand to suit the various requirements of taverns and soda fountains. For example an establishment which realizes a fairly constant demand upon its fountain equipment as compared to an establishment that caters to a rush-hour trade where the peak demand is very high for a short period of time. Yet another type of faucet in use today is the remotely controlled type for automatic dispensing machines and the like. The dispensing faucets disclosed herein can very easily be modified to a particular installation as taught in the patent issued to Raymond D. Welty and myself, No. 2,652,856.

It is therefore readily seen that my improved dispensing faucet may be utilized in many different types of installations with small changes but that the essential construction and parts are interchangeable which reduces manufacturing costs.

It should thus be apparent that I have accomplished the objects initially set forth by providing an improved dispensing faucet apparatus for accurately controlling and mixing carbonated water and syrup.

I have provided a dispensing faucet that may be easily constructed and assembled from parts that require no special manufacturing skill or machines and yet is of simple and pleasing design. In accordance with this invention the valving and sealing means are formed by resilient gaskets and O-rings thus allowing large tolerances and ease of replacement of the worn gaskets.

As the dispensing valve is primarily intended for use with carbonated beverages, sanitation is of the utmost importance, and I have provided a faucet that washes away most of the excess and collected syrup from the outlet ports by means of a chamber and the tapered construction of the bottom cover. The valve may also be easily cleaned and inspected by removing the rods which hold the apparatus together by anyone attending the fountain installation without great mechanical skill or knowledge of the art.

To insure proper carbonation I have taught the use of a carbonator control assembly that is used in conjunction with my new and improved faucet. This apparatus is operative to convey the carbonated water under high pressure to atmospheric pressure with a minimum loss of carbonation.

The dispensing valve is very versatile and may be used in many different installations requiring other methods of operation with a minority of changes. I have shown in particular how the mixing valve may be adapted to dispense pre-mixed carbonated beverages.

It should be understood, however, that the specific embodiments disclosed herein are intended to be illustrative only and many changes may be made therein without departing from the clear teachings of my invention. Reference should therefore be made to the following appended claims in determining the full scope of the invention.

I claim:

1. A mixing and dispensing faucet for beverages comprising a pair of aligned but spaced casing sections each having a principal bore, a cylindrical sealing land, a cylindrical valving land spaced from said sealing land, an inlet port communicating with said bore between said lands, an outlet opening communicating with said first mentioned bore, and said valving land being disposed between said outlet opening and said inlet port; a sleeve intermediate said casing sections to provide a chamber, one of said casing sections having a plurality of longitudinal through-bores positioned radially outward of said first mentioned bore therein to provide outlets for said chamber, said outlet opening in the other of said casing sections communicating with said chamber, a plurality of longitudinally extending rods positioned radially outwardly of said first mentioned bores and housed principally within the general mass of said sections and sleeve to clamp these parts together, a valve member slidable in said first mentioned bores of said casing sections and mounting a resilient sealing ring in each of said sealing lands and a resilient valving ring in each of said valving lands for cooperation therewith, and means to reciprocate said valve member.

2. A mixing and dispensing faucet for beverages comprising a pair of aligned but spaced casing sections each having a principal bore, a cylindrical sealing land, a cylindrical valving land spaced from said sealing land, an inlet port communicating with said bore in the section between said lands, an outlet opening communicating with said first mentioned bore, and said valving land being disposed between said outlet opening and said inlet port; a sleeve intermediate said casing sections to provide a chamber, one of said casing sections having a plurality of through-bores positioned radially outward of said first mentioned bore therein to provide outlet means for said chamber, said outlet opening in the other of said casing sections communicating with said chamber, a valve member slidable in said first mentioned bores of said casing sections and mounting a resilient sealing ring in each of said sealing lands and a resilient valving ring in each of said valving lands for cooperation therewith, a top cover casing member aligned with said tubular sections and adapted to receive the protruding end of said valve member, a bell-crank lever pivotally mounted in said top cover casing member and having a portion thereon operative to reciprocate said valve member upon pivotal movement, and a plurality of longitudinally extending rods positioned radially outwardly of said first mentioned bores and housed principally within the mass of said casing sections, sleeve, and top cover casing member to clamp these parts together.

3. A mixing and dispensing faucet for beverages comprising a pair of aligned but spaced casing sections each having a principal bore, a cylindrical sealing land, a cylindrical valving land spaced from said sealing land, an inlet port communicating with said bore in the section between said sealing and said valving lands, an outlet opening communicating with said first mentioned bore, and said valving land being disposed between said outlet opening and said inlet port; a sleeve intermediate said sections providing a chamber, one of said casing sections having a plurality of through-bores positioned radially outward of said first mentioned bore therein providing outlets for said chamber said outlet opening in the other of said casing sections communicating with said chamber, a valve member slidable in said first mentioned bores of said casing sections mounting a resilient sealing ring in each of said sealing lands and a resilient valving ring in each of said valving lands adapted to cooperate therewith, and means to reciprocate said valve member.

4. A mixing and dispensing faucet for beverages comprising a pair of aligned but spaced casing sections each having a principal bore, a cylindrical sealing land, a cylindrical valving land spaced from said sealing land, an inlet port communicating with said bore in the sections between said lands, an outlet opening communicating with said first mentioned bore, and said valving land being disposed between said outlet opening and said inlet port; a sleeve intermediate said casing sections to provide a chamber, one of said casing sections having a plurality of through-bores positioned radially outward of said first

mentioned bore therein to provide outlet means for said chamber said outlet opening in the other of said casing sections communicating with said chamber, conduit means for supplying fluid to said inlet port in the other of said casing sections, said conduit means including an elongated restricted passageway closely adjacent said inlet port, a valve member slidable in said first mentioned bores and mounting a resilient sealing ring in each of said sealing lands and a resilient valving ring in each of said valving lands for cooperation therewith, a top cover casing member aligned with said casing sections and adapted to receive the protruding end of said valve member, and a pivotally mounted bell-crank lever having a portion thereon operative to reciprocate said valve member upon pivotal movement of said lever.

5. Apparatus according to claim 4 further characterized in that said conduit means comprises an elongated housing, a tapered plug in said housing thereby providing said restricted passageway, means to rigidly attach said elongated housing to said faucet in said inlet port in said other of said casing sections, and means to support said housing intermediate its ends thereby supporting said faucet outwardly and in spaced relation to said means to support.

6. A beverage dispensing faucet comprising a casing section having a principal bore, a cylindrical sealing land, a cylindrical valving land, an inlet communicating with said bore between said lands, an outlet opening communicating with said bore, said valving land being disposed between said outlet opening and said inlet, a valve member longitudinally slidable in said bore and mounting a resilient sealing ring in said sealing land and a resilient valving ring in said valving land for cooperation therewith, means to reciprocate said valve member, said valve member being tapered at its lower end, and the bottom of said faucet being tapered whereby when said valve member is in one position a continuous tapered surface comprising said lower end of said valve member and said bottom of said faucet is formed for directing the flow of the beverage dispensed.

7. A beverage dispensing faucet comprising a casing section having a principal bore, a cylindrical sealing land, a cylindrical valving land, an inlet communicating with said bore in said casing section between said lands, an outlet opening communicating with said bore, said valving land being disposed between said inlet and outlet opening, a valve member longitudinally slidable in said bore and mounting a resilient sealing ring in said sealing land and a resilient valving ring in said valving land for cooperation therewith, means to move said valve member, said resilient valving ring having a solid generally circular flange portion on one end, said valve member having a tapered end portion adjacent said flange of said resilient valving ring, said casing section having a face slanting towards said valve member whereby when said member is in one position a continuous tapered surface is formed, said casing section having a plurality of through-bores positioned radially outward of said first mentioned bore, a chamber closely adjacent said casing section, inlet means for supplying fluid to said chamber, said through-bores providing outlet means for said chamber, and said continuous tapered surface directing the flow of and causing unagitated mixing of the fluids dispensed through said principal bore and said through-bores.

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