Feb. 10, 1925. 1,525,650

A. L. KOENIG

DRAFT ARM FOR DISPENSING BEVERAGES

Filed May 14, 1923 4 Sheets-Sheet 1

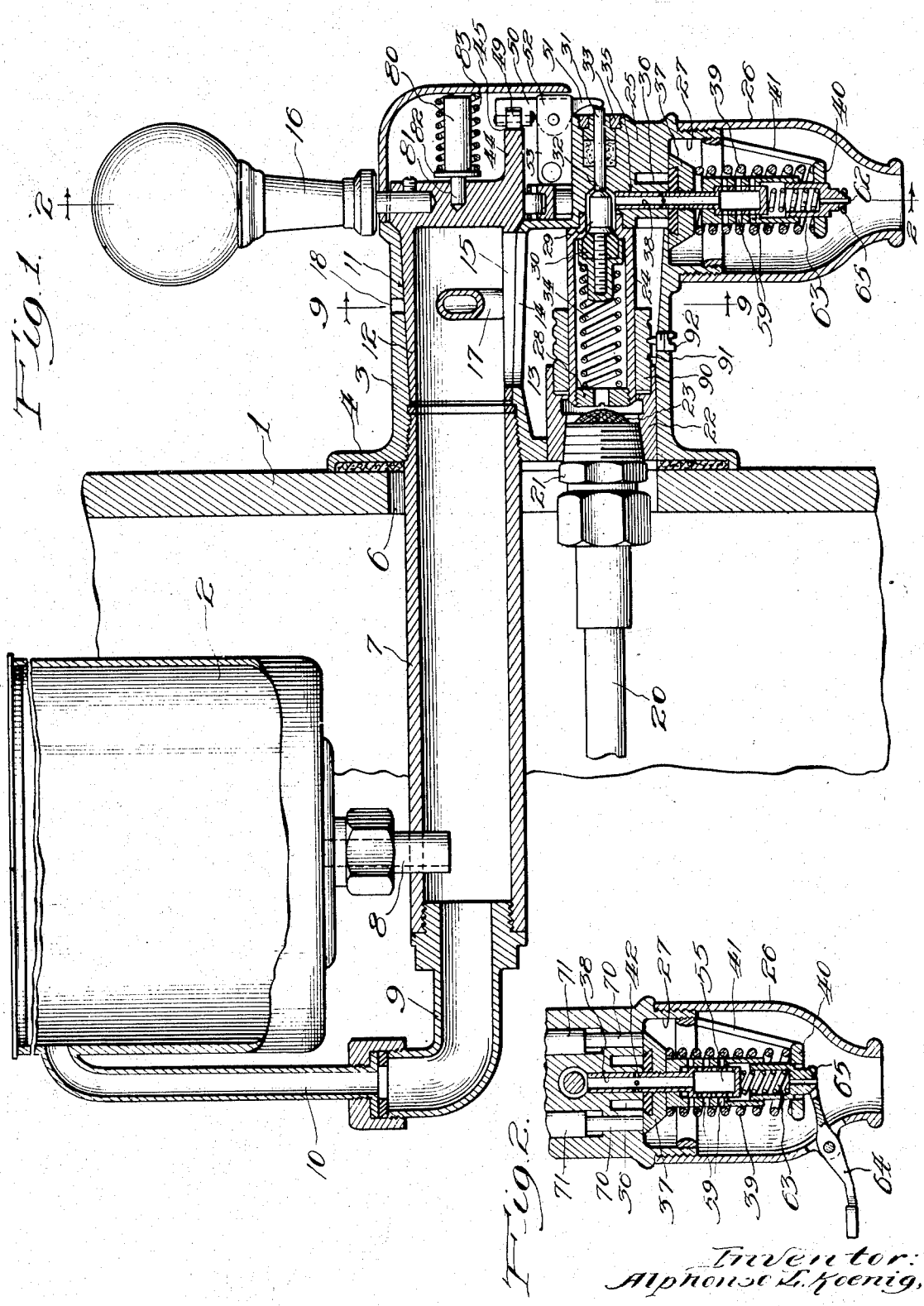


Fig. 1.

Fig. 2.

Inventor:
Alphonse L. Koenig.

by Wm. F. Freudenreich
Atty.

Feb. 10, 1925. 1,525,650

A. L. KOENIG

DRAFT ARM FOR DISPENSING BEVERAGES

Filed May 14, 1923 4 Sheets-Sheet 2

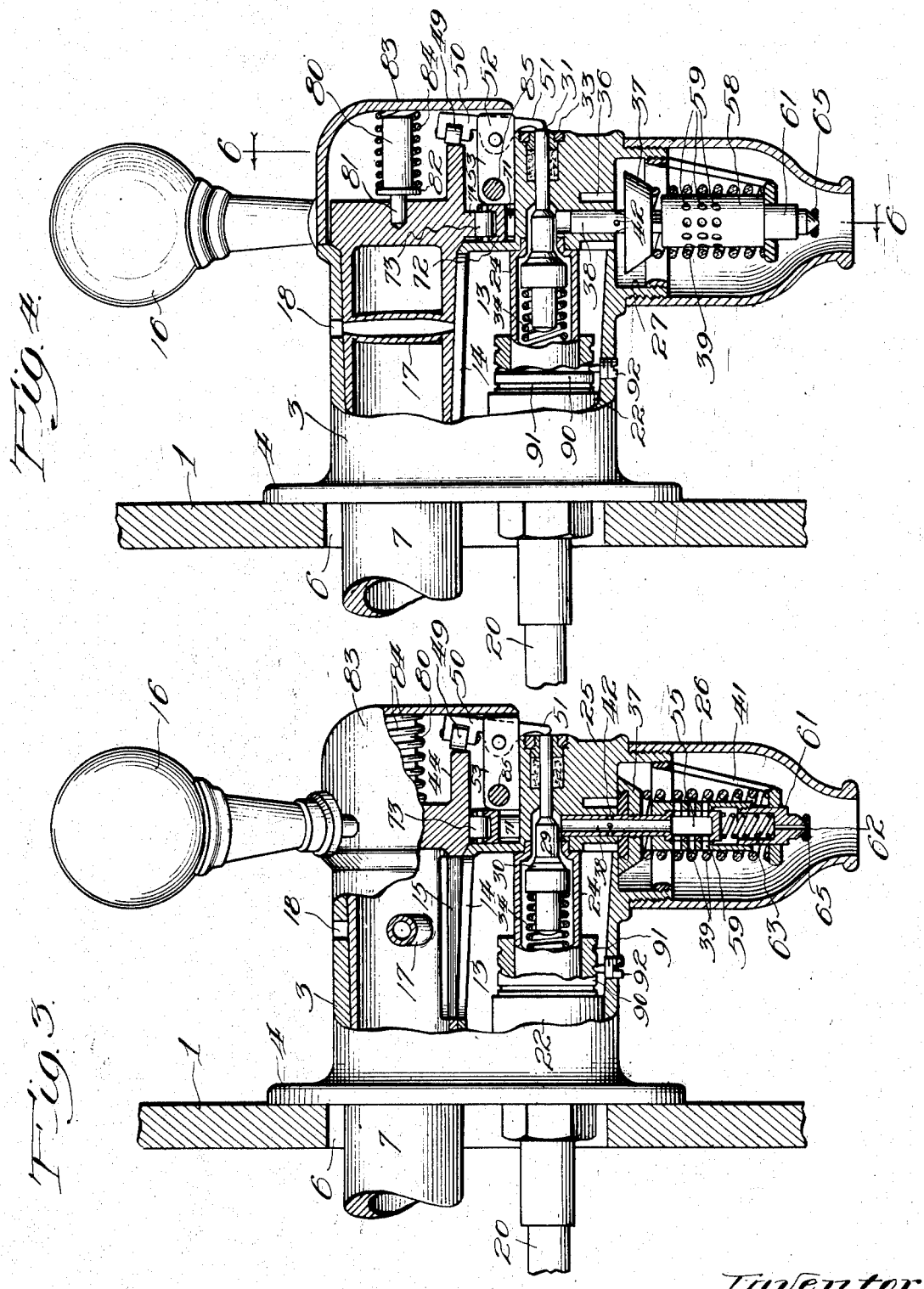


Fig. 4.

Fig. 3.

Inventor:
Alphonso L. Koenig,
by Wm. F. Freudenreich,
Atty.

Feb. 10, 1925. 1,525,650

A. L. KOENIG

DRAFT ARM FOR DISPENSING BEVERAGES

Filed May 14, 1923 4 Sheets-Sheet 3

Fig. 6.

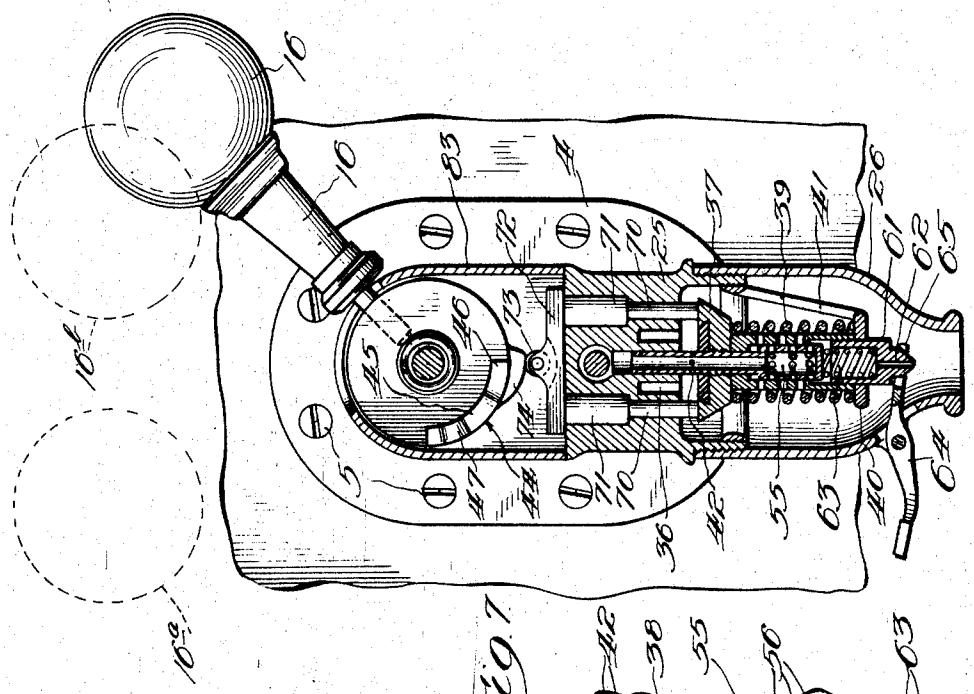


Fig. 7.

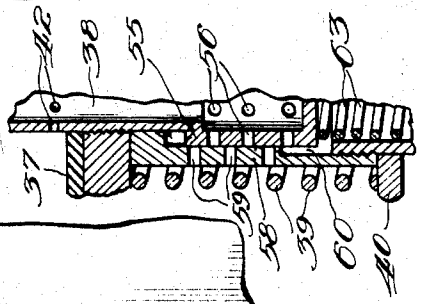
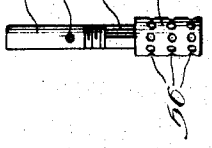


Fig. 5.

Fig. 8.



Inventor:
Alphonso L. Koenig,
by Wm. F. Trendewich
Atty:

Feb. 10, 1925. 1,525,650

A. L. KOENIG

DRAFT ARM FOR DISPENSING BEVERAGES

Filed May 14, 1923 4 Sheets-Sheet 4

Fig. 9.

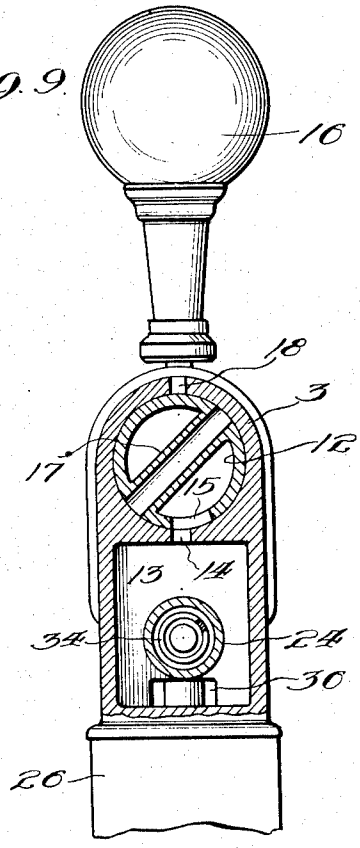


Fig. 10.

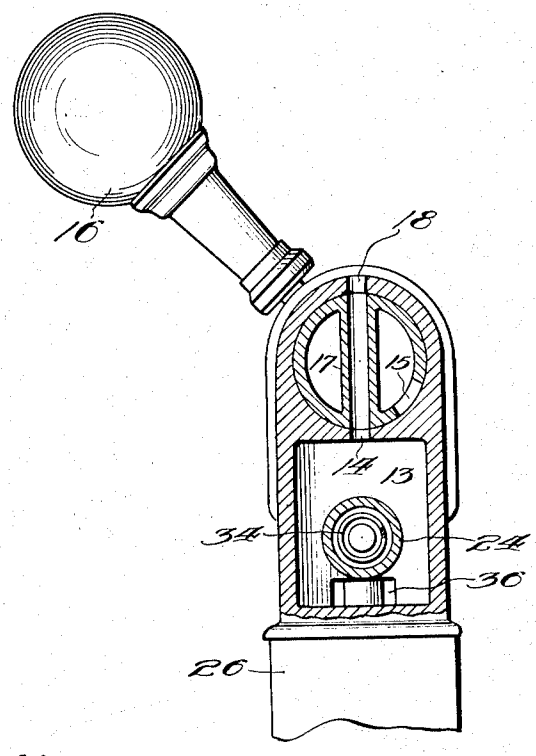


Fig. 11.

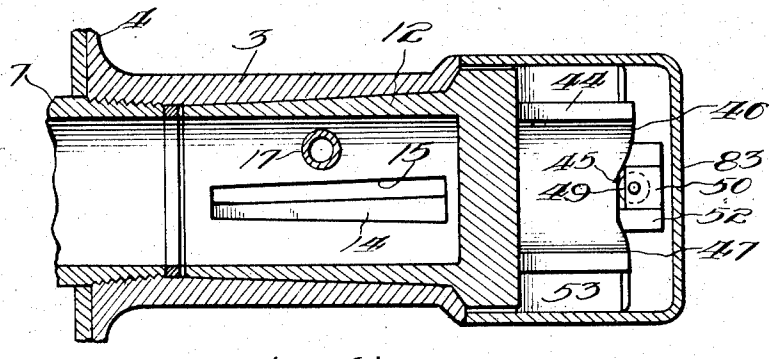
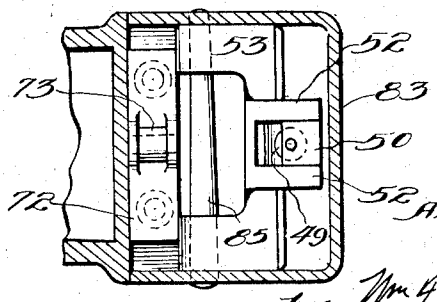


Fig. 12.



Inventor.
Alphonso L. Koenig
by Wm. G. Trendewick Atty.

Patented Feb. 10, 1925.

1,525,650

UNITED STATES PATENT OFFICE.

ALPHONSO L. KOENIG, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE KOENIG CARBONATORS (INC.), A CORPORATION OF ILLINOIS.

DRAFT ARM FOR DISPENSING BEVERAGES.

Application filed May 14, 1923. Serial No. 638,690.

To all whom it may concern:

Be it known that I, ALPHONSO L. KOENIG, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Draft Arms for Dispensing Beverages, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates particularly to so-called fountains from which either a beverage from a single source or a mixture of liquids from two different sources is dispensed, and has for its object to simplify and improve the construction of the same.

Where a mixture of two liquids is made during the dispensing process, one of the liquids is usually a liquid under pressure and the other a syrup intended to be supplied in comparatively small accurately measured quantities; an example being the beverage dispensed in the form of root beer and consisting of a mixture of soda water and a syrup in definite proportions. Difficulty has heretofore been experienced in accurately measuring and delivering the syrup, because air must be expelled from the measuring chamber while the chamber is being filled and must be introduced into the chamber to replace the syrup while the latter is being discharged; and, so far as I know, no apparatus has heretofore been devised which permits accurate measurement and delivery of the syrup by mechanism controlled by the same handle which controls the discharge of liquid from a single source or a mixture thereof and syrup from a second source.

I overcome this difficulty by placing between a syrup-measuring chamber and a conduit leading from the syrup container, a valve device actuated by the dispensing handle and so constructed that air from the measuring chamber is passed to and temporarily trapped in the syrup supply conduit as syrup enters the measuring chamber and that the measuring chamber is shut off from the said syrup supply conduit and opened to atmosphere when the syrup is flowing out of the measuring chamber, whereby the measuring chamber will be filled with air at atmospheric pressure exactly equal in volume to the syrup discharged; the syrup supply conduit having associated therewith a standpipe open at the top and so placed that during each cycle, comprising the filling and the emptying of the measuring chamber, a measuring-chamber full of air, at atmospheric pressure, is allowed to escape through the standpipe.

It is desirable, not only to be able to discharge a single liquid or a mixture of two liquids by manipulating a single handle, but also, in either case, to be able to control the volume and pressure of the stream that is being discharged, and to vary the discharge between a large stream of low velocity and a fine needle-like stream of high velocity, or a combination of the two; and one of the objects of the present invention is to produce such a draft arm.

The various features of novelty whereby my invention is characterized will hereinafter be pointed out with particularity in the claims; but for a full understanding of my invention and of its objects and advantages, reference may be had to the following detailed description taken in connection with the accompanying drawings, wherein:

Figure 1 is a vertical section through one of my improved draft arms, the container for a syrup, and a barrel or other receptacle to which the draft arm is applied and in which the container for the syrup is located, only a fragment of said barrel receptacle being shown; Fig. 2 is a section taken approximately on line 2—2 of Fig. 1, only the lower half of the device being shown, and one of the valve devices being in a different position from the same device in Fig. 1; Figs. 3 and 4 are views similar to Fig. 1, only those parts outside of the barrel being shown, and the valves being shown in two positions differing from those in Fig. 1; Fig. 5 is an end or front view of the draft arm, looking at the right hand end in Fig. 1; Fig. 6 is a section taken approximately on the irregular line 6—6 of Fig. 4, the parts occupying somewhat different positions than in Fig. 4; Fig. 7 is a view on an enlarged scale of a fragment of the lowermost valve mechanism; the parts occupying the same positions as in Fig. 6; Fig. 8 is a side view of the stem for supporting the valve mechanism in the

lower end of the nozzle; Fig. 9 is a section taken approximately on line 9—9 of Fig. 1, the lower end of the nozzle being broken away; Fig. 10 is a view similar to Fig. 9, the controlling handle being in the same position as in Fig. 6; Fig. 11 is a section taken approximately on line 11—11 of Fig. 5; and Fig. 12 is a section taken approximately on line 12—12 of Fig. 5, only a fragment of the device being shown.

Referring to the drawings, 1 represents a barrel or other receptacle within which is placed a closed syrup container 2. On the outside of the barrel is the valve mechanism and controlling handle of the draft arm assembled in and upon a chambered body 3 having at the inner end a flange 4 resting against the outer side of the receptacle 1 and fastened thereto by screws 5 or otherwise. The member 1 has a large opening 6 through the same, this opening registering with the inner end of the member 3. A conduit 7 of comparatively large diameter lies horizontally within the barrel, projects through the opening 6 in the latter, and is screw-threaded at its outer end into the member 3. A tube 8, much smaller in diameter than the conduit 7, extends downwardly from the bottom of the syrup container, preferably at the middle thereof, through the upper wall of the conduit 7 and downwardly into the latter; the members 7 and 8 being secured together in any suitable way. At the extreme inner end of the conduit 7 is located an elbow 9, the internal diameter of which is greater than the internal diameter of the tube 8 and considerably less than the internal diameter of the conduit 7; the arm of the elbow adjoining the conduit being horizontal and the other arm being vertical. From the upper end of the vertical arm of the elbow a small pipe 10 extends upwardly and opens into the side of the syrup container at a point above the high level of the liquid in the latter. The outer end of the conduit registers with the inner end of a valve chamber 11 in the member 3. In this chamber is located a plug valve 12 in the form of a deep cup open at the inner end so as, in effect, to form a rotatable continuation of the conduit 7. The plug valve and the chamber in which it lies are slightly tapered so as to insure a tight fit between the same. In the member 3, directly below the valve chamber 11, is a measuring chamber 13 having in the top wall thereof an elongated slot 14 extending parallel with the longitudinal axis of the plug valve. This slot preferably increases gradually in width from the inner to the outer end. In the bottom wall of the plug valve is a slot 15 similar to but wider than the slot 14. When the slots 14 and 15 register with each other, syrup may drop down from within the plug valve into the measuring chamber; communication with the outside air being entirely shut off. In order for the measuring chamber to empty itself, after the plug valve has been turned to shut off communication between the measuring chamber and the interior of the plug valve by means of the actuating handle 16, air must be allowed to enter the measuring chamber as the liquid contents flow out of the same. This is accomplished by providing the plug valve with a tubular cross piece 17 which forms a passage way extending transversely through the valve. When the controlling handle is in its neutral or upright position, as shown in Figs. 1 and 9, one end of the tubular member 17 lies at one side of but not far from the slot 14 in the top of the measuring chamber. The other end of this tube lies at some distance from a port 18 extending through the top wall of the member 3. The parts are so proportioned that when the actuating handle is swung in one direction from its neutral position far enough to bring the slot or port 15 fully out of registration with the slot or port 14, the ends of the tube 17 register respectively with the slot or port 14 and with the port 18, as shown in Fig. 10. In other words, after communication between the source of supply for the syrup and the measuring chamber has been completely cut off, the measuring chamber is placed in communication with the outside air, so that air may enter the measuring chamber as the syrup flows out of the same. When the measuring chamber has been emptied, as will hereinafter be described, it will be full of air at atmospheric pressure. Therefore, when the controlling handle is returned to its neutral position, bringing the slots or ports 14 and 15 into registration with each other, syrup may flow by gravity from the interior of the plug valve into the measuring chamber, the air in this chamber finding an outlet in the upward direction into the interior of the plug valve. Thus it will be seen that whenever a charge of syrup is drawn from a supply conduit into the measuring chamber, it will be replaced by an equal volume of air at atmospheric pressure.

The parts heretofore described form a complete system for quickly transferring syrup from the container 2 into the supply conduit 7 and thence into the measuring chamber and insuring the filling of such chamber, regardless of the height of the liquid level in the container, and without the necessity of employing any pressure other than atmospheric pressure therein. Assuming that the apparatus is empty, as shown in Fig. 1: then upon filling the container 2 with syrup to a level somewhat below the point at which the upper end of the pipe 10

is connected to the container, the syrup will flow down through the tube 8 into the conduit 7, travel toward the right, as viewed in Fig. 1, until it begins to flow down into the measuring chamber. After the measuring chamber has been filled, the syrup will rise in the conduit and in the elbow 9 until the extreme lower end of the tube 8 is submerged and a level in the plane of the highest point in the opening at the right hand end of the elbow is reached. Up to this time the air which was displaced by the syrup has passed freely through the elbow and pipe 10 into the top of the syrup container. Now, however, the air remaining in the conduit and the interior of the plug valve is trapped above the syrup in these parts and offers resistance to a further rise of the liquid level in the conduit and plug valve. However, there is still a static head tending to force the syrup up through the elbow 9 into the pipe 10; the result being that a condition of equilibrium will be established in which the syrup in the pipe 10 has the same surface level as that in the container. The port leading downwardly into the measuring chamber may now be opened and closed without producing any effect on the syrup; but, after the measuring chamber has been emptied and the controlling handle returned to the neutral position, the measuring chamber will be quickly refilled and the air that was contained in the empty measuring chamber will pass up through the syrup until it mingles with the air previously pocketed in the conduit and plug valve above the syrup. The outlet tube 8 from the syrup container is smaller in diameter than the elbow 9. The surface tension of the syrup tends to retard the starting of a downward flow through said outlet tube, and therefore a large part of the syrup needed to fill the measuring chamber flows out of the elbow. Consequently, since the pipe 10 is much smaller in diameter than the elbow, the liquid level in the pipe 10 will drop far below that in the syrup container. The amount of air in the conduit has been increased by a volume exactly equal, at atmospheric pressure, to the volume of the syrup that has entered the measuring chamber, and therefore this additional amount of air must escape from the conduit before the original condition of equilibrium is obtained. As soon as the level in the pipe 10 drops below the liquid level in the syrup container, the differential pressure is sufficient to start a down flow of syrup through the tube 8. The extra air in the conduit takes the easiest way out, and therefore passes laterally into the elbow 9 and thence up through the pipe 10 into the syrup container. I have found that in actual practice the air rushes up into the pipe 10 with such force that it does not pass through the liquid in this pipe, if any remain, but blows the latter up, ahead of it, into the syrup container. After the extra air has entered the syrup container, syrup continues to flow out of the latter until there is established a condition of equilibrium in which the liquid level is the same in the container as in the pipe 10. Therefore, at the end of a cycle, the measured quantity of air that is drawn from the atmosphere into the measuring chamber to replace an equal volume of discharged syrup, will be found in the syrup container, where it serves to replace an equal volume of syrup that has been discharged from the container to refill the measuring chamber. The cycle of operations, just described, is repeated with respect to each charge of syrup dispensed.

The soda water is delivered to the draft arm through a pipe 20, a valve-controlled extension of which extends horizontally through the measuring chamber. In the arrangement shown, the pipe 20 terminates in a hollow plug or nipple 21 screwed into one end of a shell 22 secured within the inner end of the measuring chamber; the open end of the member 21 being covered by a suitable screen 23. A tube 24 extends from the shell to the front wall of the measuring chamber to which it is secured. The shell 22 therefore forms a stationary coupling between the plug or nipple and the tube 24. The lower portion of the front or outer wall of the measuring chamber is thickened to form a block 25. The discharge nozzle 26 for the device is screwed on a short tubular part 27 integral with the body member 3 and arranged in part underneath the block 25. The tube 24 is of comparatively large diameter, the inner end being closed by a plug 28 having a comparatively small opening through the same. The outer end of this tube, where it joins the front wall of the measuring chamber, is reduced in diameter and registers with a small chamber 29 in the block 25. Lying within the tube 24 is a valve 30 controlling communication between the source of supply of the soda water and the chamber 29. Connected to the valve 30 is a stem 31 extending through the chamber 29 and through a hole in the block 25 to the exterior of the latter; the part 32 of the valve stem in the chamber 29 being enlarged to give it increased strength. In order to prevent leakage around the valve stem 32, the block 25 is provided with a suitable stuffing box 33 surrounding the outer end of the valve stem. A spring 34 within the tube 24 tends constantly to hold the valve 30 against its seat. A passage 35 opens down through the bottom of the block 25 from the chamber 29 at the vertical axis of the nozzle; this passage being intended for the discharge of the soda water. Into the

bottom of the block 25, coaxial with the passage 35, is cut an annular groove 36, a portion of which is in open communication with the measuring chamber, so that when the measuring chamber is full of syrup, the latter extends into and fills the annular groove. The floor of the measuring chamber preferably inclines downwardly as the annular groove is approached, so as to permit the measuring chamber completely to empty itself when the syrup is permitted to flow out of the annular groove.

The open bottom of the annular groove is adapted to be closed by an upwardly-seating valve 37 fixed upon a tubular stem 38 fitted slidably into the discharge passage 35. The valve is normally held closed by means of a spring 39 arranged between the under side thereof and the bottom 40 of a cage 41 screwed into the nozzle-supporting member 27. If the valves 30 and 37 are opened, assuming the measuring chamber to be filled with syrup, syrup will flow out of the measuring chamber through the groove 36 and past the valve 37, while soda water will flow down through the tubular valve stem 38, both liquids entering the discharge nozzle. The syrup is not under pressure, simply flowing out of the measuring chamber under the action of gravity, as heretofore explained. Therefore, in order to assist the discharge of the syrup, I form perforations 42 in the wall of the tubular valve stem 38, just above the valve 37, so that, when all the valves are open, the soda water will be discharged in the radial direction from the tubular valve stem across the top of the valve 37, producing an injector-like effect and assisting gravity in withdrawing the syrup from the measuring chamber.

All of the valves heretofore described are controlled directly by the handle 16. The outer end of the plug valve 12 is provided with an arc-shaped cam flange 44 which, as best shown in Figs. 1, 6 and 11, has a cam-shaped end edge comprising a central section 45 at right angles to the axis of rotation of the valve and cam end sections 46 and 47 separated from each other by the section 45. The section 46 forms a higher cam than the section 47 and is longer than the latter. The cam 44 is engaged by a cam roll 49 carried by the upper end of an actuating lever 50, whose lower end 51 engages the outer end of the valve stem 32; the actuating lever being pivotally supported in a jaw 52 forming part of an upward extension 53 of the block 25. When the controlling handle 16 stands upright, the cam roll is engaged with the low flat section of the cam. When the handle is moved toward the left, as viewed in Figs. 5 and 6, to the position indicated by dotted circle 16^a, the cam section 47 rides past the cam roll, forcing the upper end of the actuating lever 50 outwardly and causing the valve stem 32 to be pressed inwardly so as to open the valve 30 and permit soda water to flow down through the tubular valve stem 38.

The lower end of the tubular valve stem 38 is enlarged, as indicated at 55, to form an elongated hollow cylindrical head closed at the bottom. The enlargement or head is provided with several rows of perforations 56 through the cylindrical wall. The upper end of the head 55 lies a considerable distance below the bottom of the valve 37, and that portion of the stem located between the bottom of the valve 37 and the upwardly-facing surface of the head 55 is preferably made square, as best shown at 57 in Fig. 8. The head 55 fits slidably into a sleeve 58 in the form of an inverted cylindrical cup having in the middle of the bottom thereof a square hole to fit the squared portion 57 of the tubular valve stem; the top of the cup being of a thickness less than the shortest distance between the valve 37 and the head 55, so as to permit the sleeve to slide up and down on the valve stem for a limited distance. The sleeve 58 is provided with several rows of perforations 59 adapted to register fully with the perforations 56 when the sleeve is moved down on the valve stem as far as it will go and to be wholly out of registration with the perforations 56 when the sleeve is moved up on the valve stem as far as the valve 37 will permit, as best shown in Fig. 7. The internal diameter of the lower portion of the sleeve 58 is made greater than the external diameter of the head 55 for a distance such that when the sleeve is moved up as far as it will go on the stem, as shown in Fig. 7, the lowermost row of the holes in the head will lie opposite and in communication with a surrounding annular space 60 between the outer wall of the head and the inner wall of the sleeve. The parts are furthermore preferably so proportioned that the portion of enlarged internal diameter of the sleeve approaches the lowermost row of perforations 59 to within a distance equal to about one half the diameter of the perforations 56; thus making it possible to have the perforations 56 and 59 partially in registration with each other and at the same time have the lowermost row of perforations 56 registering partially with the surrounding annular passage or chamber 60. Into the lower end of the sleeve 58 is screwed a nozzle 61 having a very small discharge passage 62. Therefore, when the ports 56 and 59 are wholly in registration with each other, as shown in Fig. 1, liquid flowing down through the tubular valve stem and into the enlarged head thereon, can escape only through the perforations 56 and 59 into the surrounding chamber in the nozzle 26; when

the perforations 56 and 59 are wholly out of registration with each other, as shown in Figs. 6 and 7, such liquid can escape only through the lowermost row of perforations 56 into the lower end of the sleeve 60 and thence through the small nozzle 61; and when the two series of perforations are only partly in registration with each other and the lowermost row of the perforations 56 registers partly with the annular chamber 60, the fluid in the enlarged head of the valve stem may be discharged both through the perforations 59 and through the nozzle 61. In other words, the liquid may be discharged in a gushing stream of comparatively large volume and low velocity, in a fine needle-like stream of high velocity, or in a large stream of slow velocity having at the center a very small stream of high velocity. During the dispensing of plain soda water, the valve 37 is not opened, and therefore the tubular valve stem 38 remains stationary. There is a light spring 63 arranged within the sleeve 58 and its nozzle 61 and engaging with the under side of the head of the tubular valve stem; thus causing the sleeve to be yieldingly held in its lowermost position relatively to the tubular valve stem, namely, the position in which the two sets of perforations, 56 and 59, register. When it is desired to change the nature of the stream which is being discharged by the device, the attendant need only press down on a small finger piece in the form of a lever 64 extending through the wall of the nozzle 26 and having at its inner end a fork 65 which engages with the under side of the small nozzle 61 without obstructing the discharge outlet therefrom; downward pressure on the finger piece forcing the perforated sleeve up and permitting the liquid to be discharged either in a fine needle-like stream of high velocity or as a combination of such a stream with a slowly-moving gushing stream.

When it is desired to dispense a mixture of soda water and syrup, the controlling handle is shifted from the neutral, upright position toward the right, as viewed in Figs. 5 and 6, causing the valve 30 and also the valve 37 to be opened. The controlling means for the valve 37 is best shown in Figs. 5 and 6. Resting loosely on top of the valve 37 along the outer marginal portion thereof, are two vertical pins 70 slidably mounted in the block 25. The upper ends of the passages in which the pins 70 are mounted are enlarged to receive pins 71 of larger diameter than the pins 70 and fixed to or forming part of a connecting piece 72 arranged above the block 25. The member 72 has at the middle thereof a cam roller 73 projecting above the same. The plug valve 12 has on the under side a cam 74 in position to engage the cam roller 73 when the controlling handle is moved out of its neutral position into a position for dispensing a mixture of liquids. In dispensing soda water alone, the valve 30 is not opened as far as it is when a mixture is being made and dispensed, because the cam section 46 which controls the main valve in the soda water pipe during the latter process, is higher than the cam 47. Therefore, in dispensing soda water, the pressure may be said to be controlled within the tubular member 24, whereas, when a mixture is being dispensed, the full pressure of the source may be transferred into the tubular valve stem and the control of the pressure be effected after the tubular valve stem has been reached. When the controlling handle reaches the position indicated in dotted lines at 16^b in Fig. 6, the port 15 in the plug valve will have been carried completely beyond the port of slot 14 in the top of the measuring chamber and, as the movement of the handle is continued toward the full line position shown in Fig. 6, the measuring chamber will be connected to the surrounding atmosphere as heretofore explained. The cams are so proportioned and so located that the valves 30 and 37 will not be opened until communication between the measuring chamber and the source of supply for the syrup has been interrupted; but, as soon as the port or slot 15 in the plug valve passes out of registration with the port or slot 14, the valves 30 and 37 begin to open, syrup flowing from the measuring chamber directly into the main nozzle chamber past the valve 37; fine streams of soda water being discharged laterally across the top of the valve 37, through the holes 42 in the tubular valve stem, as heretofore explained. The two sets of perforations 56 and 59 in the enlarged head of the tubular valve stem and in the surrounding sleeve are in registration with each other so that soda water flows down through the tubular valve stem and out through these perforations to meet the descending syrup, so that the syrup and soda water are mixed in the large nozzle and discharged in the form of a gushing stream of large volume and low velocity. As the downward movement of the valve 37 continues, the sleeve 58 with its small nozzle 61 travels down with it until the lower end of the sleeve strikes the stationary part 40, whereupon the sleeve comes to rest and the valve 37 continues its downward movement until it closes the gap between the same and the upper end of the sleeve; the final position of the parts being that shown in Figs. 6 and 7, namely, the position which causes all of the soda water that is being dispensed, to be discharged either through the small ports 42 above the valve 37, or through the small nozzle 61. In other words, except for the soda water that is discharged through

the small ports 42, it may be caused to be discharged laterally through the large number of registering holes 56 and 59, to be discharged in part laterally through these holes registering only partially with each other and partly through the small nozzle 61, or to be discharged wholly in the form of a fine stream of high velocity through the small nozzle 61. Consequently a large variety of conditions, not only as to the size and character of the stream or streams, but also as to the pressure thereof, may be obtained. It will be noted that the finger piece 64 is not needed for the purpose of dispensing a mixture of liquids, but forms a simple means for controlling the nature of the flow of soda water in order to secure the same effects with the valve 37 closed as when such valve is opened to mix syrup with the soda water.

Fig. 1 represents the parts in their neutral positions, while Fig. 3 shows the positions of the parts when plain soda water is being dispensed in the ordinary way; and Fig. 2 illustrates the positions of the parts when the finger piece 64 is actuated to cause the soda water to be delivered in a single fine stream. Fig. 4 shows the positions of the parts when a mixture is being dispensed in the form of a gushing large stream of low velocity, there being no discharge through the small nozzle 61, and Fig. 6 illustrates the positions of the parts assumed when the controlling handle has moved as far as it will go, causing all of the soda water except that which washes across the top of the valve 37, to be discharged in a single fine stream through the small nozzle 61.

In order yieldingly to hold the hollow plug valve against its seat and automatically take up wear therein, I make use of a small post 80 having a reduced inner end 81 fitting into a hole in the outer end of the plug valve; the plug valve and the post being co-axial and the fit between the two being such that while there is no looseness, the post and the valve may rotate relatively to each other and move lengthwise relatively to each other. Between a flange or collar 82 near the inner end of the post, and a cover 83 fastened to the body member 3 so as to conceal the cams, is a spring 84 which constantly presses the post and, therefore, the plug valve inwardly. There is less friction between the inner end of the post and the valve than there is between the spring and the collar or flange or between the spring and the cover 83, and therefore the post normally remains stationary when the plug valve is rotated. The cover may conveniently take the form of a substantial rectangular box open at the inner end and at the bottom, and of such a size that it may rest upon and form a harmonious upward continuation of the block 25. The projection or extension 53 on top of the block 25, as best shown in Fig. 12, is made shorter than the width of the block so that it will engage at its ends with the inner surfaces of the side walls of the cover. The cover may conveniently be fastened in place by means of a tapered pin 85 driven through the side walls of the cover and through the extension or projection 53 lengthwise of the latter. By making the pin tapered it may readily be removed to detach the cover.

It is desirable that some means be provided for permitting the size of individual charges of syrup to be varied. This can conveniently be accomplished by making the effective size of the measuring chamber adjustable. In the arrangement shown, the stationary shell 22 in the measuring chamber has a portion of enlarged internal diameter surrounding the tube 24. Slidable on the tube and fitting into the annular recess or chamber thus formed between the shell 22 and the tube 24 is a collar 90. When the collar is pushed into this annular recess or chamber as far as it will go, as indicated in Fig. 1, the capacity of the measuring chamber is at its maximum. If the collar be moved toward the right along the supporting tube, it will cause the effective capacity of the measuring chamber to be decreased by exactly the amount of the free space left behind the collar within the surrounding shell. In the arrangement shown, the member 90 is provided with superficial grooves 91 into any one of which may extend the pointed end of a set screw 92 screwed into the bottom wall of the measuring chamber. When it is desired to change the capacity of the measuring chamber, the set screw is removed, any small instrument is inserted through the hole for the set screw, and the collar moved along the supporting sleeve in the proper direction thereby; and the set screw is then put back to lock the sliding collar in its adjusted position.

While I have illustrated and described with particularity only a single preferred form of my invention, I do not desire to be limited to the exact structural details thus illustrated and described; but intend to cover all forms and arrangements which come within the terms employed in the definitions of my invention constituting the appended claims.

I claim:

1. In combination, a container for syrup, a measuring chamber, a horizontal conduit lying below the container and extending into proximity to said measuring chamber, a valve device between said conduit and said chamber constructed and arranged alternately to shut off communication between the same and at the same time open the chamber to atmosphere and to shut off com-

munication between atmosphere and the chamber and at the same time open communication between the top of the latter and said conduit, a delivery tube extending from the bottom of said container into the conduit and terminating below the top of the latter, and a stand pipe connected to said conduit and having the highest point of its inlet end lying between the top of the conduit and the lower end of said tube.

2. In combination, a container for syrup, a measuring chamber, a horizontal conduit lying below the container and extending into proximity to said measuring chamber, a valve device between said conduit and said chamber constructed and arranged alternately to shut off communication between the same and at the same time open the chamber to atmosphere and to shut off communication between atmosphere and the chamber and at the same time open communication between the top of the latter and said conduit, a delivery tube extending from the bottom of said container into the conduit and terminating below the top of the latter, and a stand pipe connected to said conduit and having the highest point of its inlet end lying between the top of the conduit and the lower end of said tube, a section of the stand pipe at the lower end thereof being much larger than said tube and the remainder of the stand pipe being small compared with the enlarged portion.

3. In combination, a container for syrup, a measuring chamber, a horizontal conduit lying below the container and extending into proximity to said measuring chamber, a valve device between said conduit and said chamber constructed and arranged alternately to shut off communication between the same and at the same time open the chamber to atmosphere and to shut off communication between atmosphere and the chamber at the same time open communication between the top of the latter and said conduit, a delivery tube extending from the bottom of said container into the conduit and terminating below the top of the latter, a stand pipe in the form of a small pipe having at the lower end an elbow much larger than said tube, one member of said elbow being upright and the other being horizontal and being joined to the end of said conduit adjacent to said tube so that the highest point of the inlet end lies between the top of the conduit and the lower end of said tube.

4. In combination, a container for syrup, a measuring chamber, a horizontal conduit lying below the container and extending into proximity to said measuring chamber, a valve device between said conduit and said chamber constructed and arranged alternately to shut off communication between the same and at the same time open the chamber to atmosphere and to shut off communication between atmosphere and the chamber and at the same time open communication between the top of the latter and said conduit, a delivery tube extending from the bottom of said container into the conduit and terminating below the top of the latter, and a stand pipe connected to said conduit and constructed and arranged to permit syrup to flow out of the same rapidly enough to bring the level of the syrup therein far below the level in the container and establish the liquid level in the conduit above the lower end of said tube whenever the air in the otherwise empty measuring chamber is replaced by syrup from the conduit and then permit the surplus air in the conduit to escape through the stand pipe before the syrup again rises in the stand pipe to the level of the syrup in the container.

5. In combination, a container for syrup, a measuring chamber, a horizontal conduit lying below the container and extending into proximity to said measuring chamber, a valve device between said conduit and said chamber constructed and arranged alternately to shut off communication between the same and at the same time open the chamber to atmosphere and to shut off communication between atmosphere and the chamber and at the same time open communication between the top of the latter and said conduit, a delivery tube extending from the bottom of said container into the conduit and terminating below the top of the latter; and means for permitting the discharge from the conduit of an amount of air equal to that passing up out of the measuring chamber whenever the measuring chamber is filled with syrup after having been emptied, without requiring such air to rise through said tube.

6. In combination, a container for syrup, a measuring chamber, a conduit of large diameter lying horizontally below said container and above said chamber, a delivery tube extending from the bottom of the container into the conduit and terminating below the top thereof, a valve device for alternately connecting the top of said chamber with the bottom of the conduit and connecting the top of the chamber to atmosphere; and a standpipe device connected to said conduit constructed and arranged to cause a quantity of air to be pocketed in the conduit when the conduit is first filled with syrup, to permit a free flow of syrup out of the same into the conduit when the measuring chamber is being filled with syrup and establish a liquid level in the conduit above the lower end of said tube when said chamber is full, and permit the additional air which enters the conduit from the said chamber when syrup enters the latter to pass up through the stand pipe.

7. In combination, a draft arm casing having in the upper portion a large horizontal cup-shaped plug valve with its open end directed toward the rear of said casing, a horizontal conduit connected at one end to said casing and forming in effect a continuation of the plug valve, a stand pipe at the other end of the conduit, a syrup container located above said conduit, a connection between the conduit and the container, a measuring chamber in said casing below said valve, a handle for turning said valve, ports arranged respectively in the bottom side of the valve and in the top of said chamber and adapted to register with each other in one position of the valve, a port in the wall of the casing leading to atmosphere, and means associated with the valve for connecting the last-mentioned port to the port in the measuring chamber in another position of the valve.

8. In combination, a draft arm casing having in the upper portion a large horizontal cup-shaped plug valve with its open end directed toward the rear of said casing, a horizontal conduit connected at one end to said casing and forming in effect a continuation of the plug valve, a stand pipe at the other end of the conduit, a syrup container located above said conduit, a connection between the conduit and the container, a measuring chamber in said casing below said valve, a handle for turning said valve; ports arranged respectively in the bottom side of the valve and in the top of said chamber and adapted to register with each other in one position of the valve, a port in the wall of the casing leading to atmosphere, and means associated with the valve for connecting the last-mentioned port to the port in the measuring chamber in another position of the valve, said measuring chamber having an outlet at the bottom, a valve controlling said outlet, and means controlled by said handle for opening and closing the last-mentioned valve.

9. In combination, a draft arm casing, a large horizontal cup-shaped valve arranged in the upper portion of said chamber with its open end directed toward the rear, a syrup-delivering conduit connected to the rear end of the casing and forming in effect a continuation of the plug valve, a measuring chamber in the casing below the aforesaid valve, ports arranged respectively in the under side of the aforesaid valve and in the top wall of said chamber, means associated with said valve for connecting the port in the measuring chamber to atmosphere when the valve is turned to close communication between the interior of the valve and the said chamber, an outlet from the bottom of said chamber, a valve controlling said outlet, and a single handle for actuating both of said valves.

10. In combination, a draft arm casing, a large horizontal cup-shaped valve arranged in the upper portion of said chamber with its open end directed toward the rear, a syrup-delivering conduit connected to the rear end of the casing and forming in effect a continuation of the plug valve, a measuring chamber in the casing below the aforesaid valve, ports arranged respectively in the under side of the aforesaid valve and in the top wall of said chamber, means associated with said valve for connecting the port in the measuring chamber to atmosphere when the valve is turned to close communication between the interior of the valve and the said chamber, a discharge nozzle on said casing below said chamber, an outlet from the bottom of said chamber into said nozzle, a valve controlling said outlet, and a single handle for actuating said valves.

11. In combination, a draft arm casing, a large horizontal cup-shaped valve arranged in the upper portion of said chamber with its open end directed toward the rear, a syrup-delivering conduit connected to the rear end of the casing and forming in effect a continuation of the plug valve, a measuring chamber in the casing below the aforesaid valve, ports arranged respectively in the under side of the aforesaid valve and in the top wall of said chamber, means associated with said valve for connecting the port in the measuring chamber to atmosphere when the valve is turned to close communication between the interior of the valve and the said chamber, a discharge nozzle on said casing below said chamber, an outlet from the bottom of said chamber into said nozzle, a valve controlling said outlet, a fluid delivery device having an outlet into said nozzle, and a single handle for actuating the three valves.

12. In combination, a draft arm casing, a large horizontal cup-shaped valve arranged in said casing, a syrup-delivering conduit connected to the casing so as in effect to form a continuation of the interior of said valve, a measuring chamber in the casing below said valve, ports arranged respectively in the under side of the valve and in the top of said chamber, a nozzle on said casing below said chamber, an outlet from the chamber into said nozzle, a second valve controlling said outlet, a fluid delivery device having an outlet into said nozzle, a third valve controlling the last-mentioned outlet, a single actuating handle movable in two directions from a neutral position; and means controlled by said handle for closing communication between the interior of the plug valve and said chamber, placing said chamber in communication with atmosphere and opening both the second and the third valves when the handle is moved

in one direction from the neutral position, and for opening only the said third valve when the handle is moved in the other direction form said neutral position.

13. In combination, a draft arm casing including a measuring chamber, a syrup container, a valve controlling the filling of said chamber from said container, a nozzle on said casing, an outlet from said chamber to said nozzle, a fluid-supplying means having a discharge outlet to said nozzle, independent valves controlling said outlets, a dispensing handle; and means associated with said handle for actuating all of said valve devices to cause either a mixture of a measured quantity of syrup and fluid from said supplying means or simply fluid from said supplying means to be discharged by said nozzle.

14. In combination, a draft arm casing having a measuring chamber therein, a source of syrup supply, a valve constructed and arranged to open and close communication between said source of supply and said measuring chamber, said measuring chamber having a discharge outlet at the bottom, said casing having therein a passage closed at its inner end and terminating adjacent to said discharge outlet to form a fluid-outlet, a fluid-supplying device connected to the inner end of said passage, a valve controlling communication between said device and said passage, a tubular valve stem in said passage, a valve secured to said stem and adapted to open and close said discharge outlet for the syrup, said tubular stem having openings at the inner and outer ends, and a single handle for controlling all of said valves.

15. In combination, a draft arm casing having a measuring chamber therein, a source of syrup supply, a valve constructed and arranged to open and close communication between said source of supply and said measuring chamber, said measuring chamber having a discharge outlet at the bottom, said casing having therein a passage closed at its inner end and terminating adjacent to said discharge outlet to form a fluid-outlet, a fluid-supplying device connected to the inner end of said passage, a valve controlling communication between said device and said passage, a tubular valve stem in said passage, a valve secured to said stem and adapted to open and close said discharge outlet for the syrup, said tubular stem having openings at the inner and outer ends and small openings through the wall thereof just above the face of the valve thereon, and a single handle for controlling all of said valves.

16. In combination, a draft arm casing having a measuring chamber therein, a source of syrup supply, a valve constructed and arranged to open and close communication between said source and said chamber, a source of fluid-supply, valve mechanism constructed and arranged to cause the discharge from said casing of a mixture of syrup from said chamber and fluid from said source of fluid supply or simply such fluid, and a single handle for opreating said valve and said valve mechanism.

17. In combination, a draft arm casing having a measuring chamber for syrup and a discharge outlet at the bottom of said chamber, said casing also having a passage out of communication with said chamber and terminating adjacent to said discharge outlet, a conduit for supplying fluid connected to the upper end of said passage, a tubular stem slidable in said passage and extending outwardly beyond the same, a valve fixed on said stem in position to control said discharge outlet, said stem being open at its inner end and having an opening therein on the outer side of the aforesaid valve, a valve between said conduit and said passage, a single controlling handle, and means associated with the handle for causing only the last-mentioned valve to be opened when the handle is moved in one direction from a predetermined position and for causing both valves to be opened when the handle is moved in the opposite direction from said predetermined position.

18. In combination, a draft arm casing having therein a measuring chamber for syrup and an outlet from the bottom of said chamber, said casing having also a passage closed at its inner end and opening out of the casing adjacent to said outlet, a conduit connected to the inner end of said passage to supply fluid thereto, a valve between said conduit and said passage, a tubular valve stem slidably arranged in said passage, a valve mounted on said stem to control said discharge outlet, said stem being open at its inner end and closed at its outer end, a sleeve mounted on the lower end of said stem below the valve thereon so as to be slidable lengthwise thereof and terminating in a small nozzle, said stem and said sleeve having perforations therein registering with each other in one position of the sleeve on the stem and out of registration with each other in a second position of the sleeve on the stem, the interior of the sleeve being so shaped that in said second position of the sleeve the lower perforations in the stem are in communication with the space in the sleeve below the stem, a stop for arresting the movement of the sleeve when the stem is moved outwardly a predetermined distance so as to permit the stem to travel independently of the sleeve, and a single handle for actuating the first-mentioned valve and said stem.

19. In combination, a draft arm casing having therein a measuring chamber for

syrup and an outlet from the bottom of said chamber, said casing having also a passage closed at its inner end and opening out of the casing adjacent to said outlet, a conduit connected to the inner end of said passage to supply fluid thereto, a valve between said conduit and said passage, a tubular valve stem slidably arranged in said passage, a valve mounted on said stem to control said discharge outlet, said stem being open at its inner end and closed at its outer end, a sleeve mounted on the lower end of said stem below the valve thereon so as to be slidable lengthwise thereof and terminating in a small nozzle, said stem and said sleeve having perforations therein registering with each other in one position of the sleeve on the stem and out of registration with each other in a second position of the sleeve on the stem, the interior of the sleeve being so shaped that in said second position of the sleeve the lower perforations in the stem are in communication with the space in the sleeve below the stem, a stop for arresting the movement of the sleeve when the stem is moved outwardly a predetermined distance so as to permit the stem to travel independently of the sleeve, a controlling handle, and means associated with said controlling handle to open the valve between said conduit and said passage whenever said handle is moved in either of two directions from a neutral position and to move the tubular stem and the valve for the discharge outlet from the chamber only when the handle is moved in one of said directions.

20. In combination, a draft arm casing having therein a measuring chamber for syrup and an outlet from the bottom of said chamber, said casing having also a passage closed at its inner end and opening out of the casing adjacent to said outlet, a conduit connected to the inner end of said passage to supply fluid thereto, a valve between said conduit and said passage, a tubular valve stem slidably arranged in said passage, a valve mounted on said stem to control said discharge outlet, said stem being open at its inner end and closed at its outer end, a sleeve mounted on the lower end of said stem below the valve thereon so as to be slidable lengthwise thereof and terminating in a small nozzle, said stem and said sleeve having perforations therein registering with each other in one position of the sleeve on the stem and out of registration with each other in a second position of the sleeve on the stem, the interior of the sleeve being so shaped that in said second position of the sleeve the lower perforations in the stem are in communication with the space in the sleeve below the stem, a stop for arresting the movement of the sleeve when the stem is moved outwardly a predetermined distance so as to permit the stem to travel independently of the sleeve, a controlling handle, means associated with said controlling handle to open the valve between said conduit and said passage whenever said handle is moved in either of two directions from a neutral position and to move the tubular stem and the valve for the discharge outlet from the chamber only when the handle is moved in one of said directions, and a finger piece for moving said sleeve along the stem independently of any movement of the stem.

21. In combination, draft arm casing having therein a measuring chamber for syrup and an outlet from the bottom of said chamber, said casing having also a passage closed at its inner end and opening out of the casing adjacent to said outlet, a conduit connected to the inner end of said passage to supply fluid thereto, a valve between said conduit and said passage, a tubular valve stem slidably arranged in said passage, a valve mounted on said stem to control said discharge outlet, said stem being open at its inner end and closed at its outer end, a sleeve mounted on the lower end of said stem below the valve thereon so as to be slidable lengthwise thereof and terminating in a small nozzle, said stem and said sleeve having perforations therein registering with each other in one position of the sleeve on the stem and out of registration with each other in a second position of the sleeve on the stem; the interior of the sleeve being so shaped that in said second position of the sleeve the lower perforations in the stem are in communication with the space in the sleeve below the stem, while in an intermediate position some of the perforations in the stem register partially with perforations in the sleeve and the lower perforations in the stem are partly opened into the space in the sleeve below the stem; a stop for arresting the movement of the sleeve when the stem is moved outwardly a predetermined distance so as to permit the stem to travel independently of the sleeve; and a single handle for actuating the first-mentioned valve and said stem.

22. In combination, a draft arm casing having a measuring chamber for syrup and a discharge outlet at the bottom of said chamber, said casing also having a passage out of communication with said chamber and terminating adjacent to said discharge outlet, a conduit for supplying fluid connected to the upper end of said passage, a tubular stem slidable in said passage and extending outwardly beyond the same, a valve fixed on said stem in position to control said discharge outlet, said stem being open at its inner end, a valve between said conduit and said passage, a single controlling handle, means associated with the handle for causing only the last-mentioned

valve to be opened when the handle is moved in one direction from a predetermined position and for causing both valves to be opened when the handle is moved in the opposite direction from said predetermined position; and means co-operating with the outer end of said stem to permit fluid to be discharged in the form of a stream of large volume and low velocity, a fine needle-like stream of high velocity, or a combination of such streams.

23. In combination, a draft arm casing having a measuring chamber for syrup and a discharge outlet at the bottom of said chamber, said casing also having a passage out of communication with said chamber and terminating adjacent to said discharge outlet, a conduit for supplying fluid connected to the upper end of said passage, a tubular stem slidable in said passage and extending outwardly beyond the same, a valve fixed on said stem in position to control said discharge outlet, said stem being open at its inner end, a valve between said conduit and said passage, a single controlling handle, means associated with the handle for causing only the last-mentioned valve to be opened when the handle is moved in one direction from a predetermined position and for causing both valves to be opened when the handle is moved in the opposite direction from said predetermined position; and means co-operating with the outer end of said stem to permit fluid to be discharged in the form of a stream of large volume and low velocity, a fine needle-like stream of high velocity, or a combination of such streams when the handle is moved in the direction to open both of said valves.

24. In combination, a draft arm casing having a measuring chamber for syrup and a discharge outlet at the bottom of said chamber, said casing also having a passage out of communication with said chamber and terminating adjacent to said discharge outlet, a conduit for supplying fluid connected to the upper end of said passage, a tubular stem slidable in said passage and extending outwardly beyond the same, a valve fixed on said stem in position to control said discharge outlet, said stem being open at its inner end, a valve between said conduit and said passage, a single controlling handle, means associated with the handle for causing only the last-mentioned valve to be opened when the handle is moved in one direction from a predetermined position and for causing both valves to be opened when the handle is moved in the opposite direction from said predetermined position; a device co-operating with the outer end of said stem to permit fluid to be discharged in the form of a stream of large volume and low velocity when the stem is in its valve-closing position; and means co-operating with said device when said handle is moved to open both of said valves to cause the fluid to be discharged first in the form of a stream of large volume and low velocity combined with a needle-like stream of high velocity and then in the form of a single needle-like stream of high velocity.

25. In combination, a draft arm casing having a measuring chamber for syrup and a discharge outlet at the bottom of said chamber, said casing also having a passage out of communication with said chamber and terminating adjacent to said discharge outlet, a conduit for supplying fluid connected to the upper end of said passage, a tubular stem slidable in said passage and extending outwardly beyond the same, a valve fixed on said stem in position to control said discharge outlet, said stem being open at its inner end, a valve between said conduit and said passage, a single controlling handle, means associated with the handle for causing only the last-mentioned valve to be opened when the handle is moved in one direction from a predetermined position and for causing both valves to be opened when the handle is moved in the opposite direction from said predetermined position; a device co-operating with the outer end of said stem to permit fluid to be discharged in the form of a stream of large volume and low velocity when the stem is in its valve-closing position; means co-operating with said device when said handle is moved to open both of said valves to cause the fluid to be discharged first in the form of a stream of large volume and low velocity combined with a needle-like stream of high velocity and then in the form of a single needle-like stream of high velocity; and a finger piece in position to actuate said device when the said stem is in its valve-closing position, to alter the character of the discharge to a combination of a large stream of low velocity and a needle-like stream of high velocity, or to a single needle-like stream of high velocity.

26. A valve device for use in a draft arm, comprising a tubular stem open at one end, a valve surrounding and fixed to the stem between the ends of the latter, the other end of the stem being enlarged to form a hollow head closed at the outer end and having perforations in the sides, a hollow member considerably longer than said head fitted slidably on the latter and having a part lying between the head and the valve to limit the relative sliding movement between the said member and the stem, said member having a small nozzle at its outer end, a spring in said member and engaged with said head yieldingly to hold said member at the outer limit of its movement, said member having in the sides thereof perforations adapted to register with the per-

forations in the head when the head is at the outer limit of its movement and to be completely out of registration with such perforations when said member is at the inner limit of its movement; and the interior of said member being so shaped that when the said member is at the inner limit of its movement some of the perforations in the head open to the space within said member.

27. A valve device for use in a draft arm, comprising a tubular stem, open at one end, a valve surrounding and fixed to the stem between the ends of the latter, the other end of the stem being enlarged to form a hollow head closed at the outer end and having perforations in the sides, a hollow member considerably longer than said head fitted slidably on the latter and having a part lying between the head and the valve to limit the relative sliding movement between the said member and the stem, said member having a small nozzle at its outer end, a spring in said member and engaged with said head yieldingly to hold said member at the outer limit of its movement, said member having in the sides thereof perforations adapted to register with the perforations in the head when the head is at the outer limit of its movement and to be completely out of registration with such perforations when said member is at the inner limit of its movement; and the interior of said member being so shaped that when the said member is at the inner limit of its movement some of the perforations in the head open to the space within said member, while in an intermediate position of the said member some of the perforations in the head register partially with the perforations in said member and some are partially opened to the space within said member.

28. A valve device for use in a draft arm, comprising a tubular stem open at one end, a valve surrounding and fixed to the stem between the ends of the latter, said stem having perforations through the wall thereof just above the plane of the face of said valve, the other end of the stem being enlarged to form a hollow head closed at the outer end and having perforations in the sides, a hollow member considerably longer than said head fitted slidably on the latter and having a part lying between the head and the valve to limit the relative sliding movement between the said member and the stem, said member having a small nozzle at its outer end, a spring in said member and engaged with said head yieldingly to hold said member at the outer limit of its movement, said member having in the sides thereof perforations adapted to register with the perforations in the head when the head is at the outer limit of its movement and to be completely out of registration with such perforations when said member is at the inner limit of its movement; and the interior of said member being so shaped that when the said member is at the inner limit of its movement some of the perforations in the head open to the space within said member.

29. In combination, a draft arm casing having therein a measuring chamber for syrup, a source of supply for syrup, a plug valve in said casing controlling communication between said source of supply and said chamber, a fluid-supplying conduit, said casing having a discharge passage for fluid connected with said conduit, a discharge outlet in the bottom of said chamber, a valve between said conduit and said passage, a valve controlling said outlet, a handle for turning said plug valve, actuating devices for the other valves; and cams on said plug valve co-operating with said devices to cause both of the valves actuated thereby to be opened when said handle is turned in one direction from a neutral position and to cause only the valve between said conduit and said passage to be opened when the handle is turned in the other direction from said neutral position.

30. In combination, a draft arm casing having therein a measuring chamber for syrup and a valve chamber lying above the same, the valve chamber being in the form of a frustum of a cone of considerable diameter having its major axis arranged horizontally, a cup-shaped plug valve fitting in said valve chamber, the top of the measuring chamber and the plug valve having elongated ports therein adapted to register with each other in one angular position of the plug valve and to be out of registration with each other in another angular position, a handle for turning the aforesaid valve, a spring acting on the aforesaid valve to hold it against its seat, an outlet from the bottom of said measuring chamber, said draft arm having a passage for the discharge of fluid, a fluid-supplying conduit connected with the inner end of said passage, a valve controlling said outlet, a valve between said passage and said conduit, and means including cams on the plug valve for actuating the two last-mentioned valves.

31. In combination, a draft arm casing having therein a measuring chamber for syrup and a valve chamber lying above the same, the valve chamber being in the form of a frustum of a cone of considerable diameter having its major axis arranged horizontally, a cup-shaped plug valve fitting in said valve chamber, the top of the measuring chamber and the plug valve having elongated ports therein adapted to register with each other in one angular position of the plug valve and to be out of

registration with each other in another angular position, a handle for turning the aforesaid valve, a spring acting on the aforesaid valve to hold it against its seat, an outlet from the bottom of said measuring chamber, said draft arm having a passage for the discharge of fluid, a fluid-supplying conduit connected with the inner end of said passage, a vertically-movable valve controlling said outlet, a horizontally-movable valve between said passage and said conduit; and means, including a cam on the plug valve and points in whose working face are at different radial distances from the said axis of the plug valve and a second cam on the plug valve and points in whose working face lie at different distances from a plane at right angles to said axis and whose angular length is greater than the first cam for actuating the other two valves.

In testimony whereof, I sign this specification.

A. L. KOENIG.