Sept. 6, 1927. 1,641,280

C. T. JOSLIN ET AL

SIRUP PUMP

Filed July 14, 1926 2 Sheets-Sheet 1

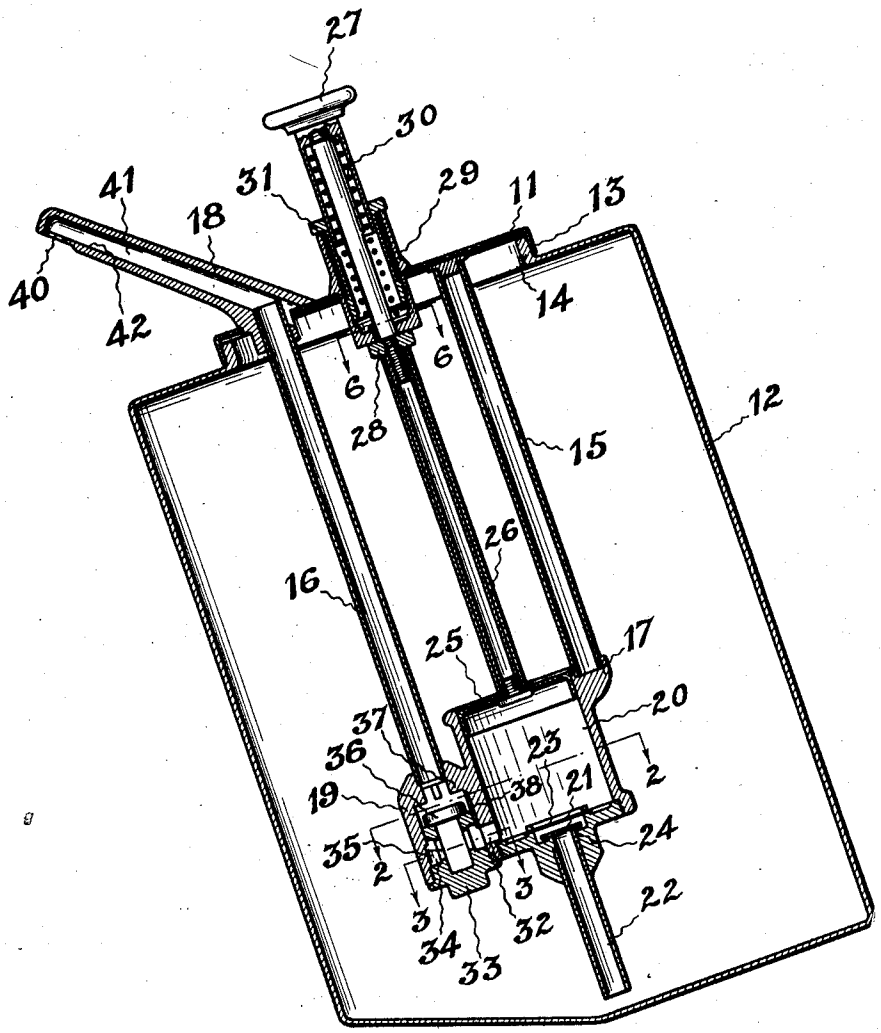


FIG. 1

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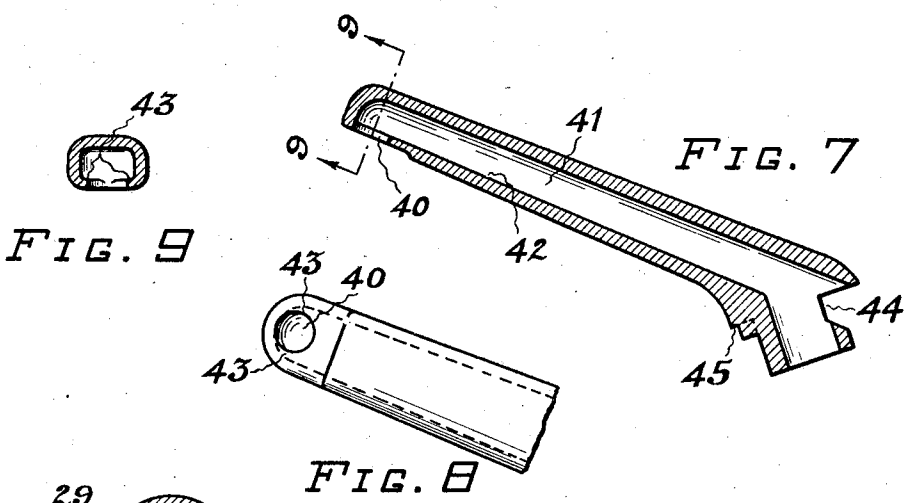


FIG. 9

FIG. 7

FIG. 8

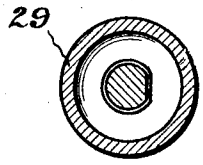


FIG. 6

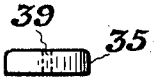


FIG. 4

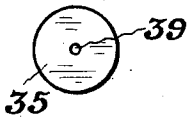


FIG. 5

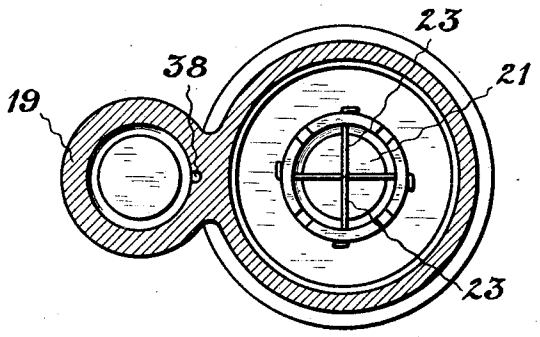


FIG. 2

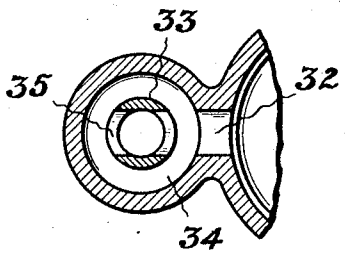


FIG. 3

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Patented Sept. 6, 1927. 1,641,280

UNITED STATES PATENT OFFICE.

CHARLES T. JOSLIN, OF CLEVELAND, AND CARL W. KLOTZ, OF PARMA VILLAGE, OHIO, ASSIGNORS TO THE RUSS MANUFACTURING COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

SIRUP PUMP.

Application filed July 14, 1926. Serial No. 122,304.

This invention relates to pumps for dispensing sirup and similar liquids from jars and it particularly relates to pumps used in connection with soda fountains.

The primary object of this invention is to provide a dripless sirup pump that will dispense a measured quantity of sirup at each stroke of the pump.

Another object of the invention is to so design the elements of the pump as to provide a device that can be made of die cast parts with a minimum amount of finishing and fitting.

An additional object of the invention is to provide a simplified mechanism for regulating the quantity of sirup that is dispensed at each stroke of the plunger.

Another object of the invention is to provide an improved form of dripless delivery spout adapted to be used in connection with sirup pumps.

An additional object of the invention is to provide a pump of the above designated character that has no valve parts or drain tubes that are so exposed to the air as to have sugar crystals formed therein.

Pumps for dispensing sirup have previously been proposed in which the sirup is drained back into the sirup jar from the delivery spout of the pump through a supplemental passage, and pumps also have been proposed which regulate the quantity of sirup dispensed at each stroke of the pump. Such pumps have generally embodied exposed valve parts or supplemental drain passages that were exposed to the air. Sugar deposits soon formed on such parts and rendered them partially or wholly inoperative.

The present invention differs from the previously proposed devices in that a relatively small quantity of sirup from the delivery spout is drawn back into the pump through the delivery passage of the pump after each stroke, there being no auxiliary flap valve or other device that establishes connection with a supplemental drainage tube to drain sirup from the delivery spout of the pump. The valve parts of the proposed pump are also completely submerged in the sirup at all times during operation.

Adjustable sleeves for regulating the stroke of the pump have also previously been proposed. The regulating sleeve herein described is, however, of greatly simplified structure that materially reduces the bulkiness of the dispensing plunger housing and also provides a minimum number of movable parts that are necessary for the proper regulating of the quantity of sirup that is dispensed with each stroke of the pump.

The advantages of incorporating this invention in pumps used in connection with soda fountains will be apparent from a consideration of the specification and the accompanying drawings wherein:

Figure 1 is a longitudinal cross sectional view of a dispensing pump constructed in accordance with this invention;

Fig. 2 is an enlarged view of the pump mechanism and associated valve housing taken substantially on line 2—2 of Fig. 1, looking in the direction of the arrows;

Fig. 3 is an enlarged sectional view of the valve housing with the remaining parts of the pump broken away, this section being taken substantially on line 3—3 of Fig. 1;

Fig. 4 is an enlarged side elevational view of a valve adapted to be used in connection with the pump shown in Fig. 1;

Fig. 5 is a top plan view of the valve shown in Fig. 4;

Fig. 6 is an enlarged fragmentary view taken substantially on line 6—6 of Fig. 1, showing the form of guide for the upper end of the plunger shaft.

Fig. 7 is an enlarged sectional view of the delivery spout of the pump;

Fig. 8 is a bottom view of the delivery end of the spout shown in Fig. 7; and

Fig. 9 is a transverse sectional view taken substantially on line 9—9 of Fig. 7, showing the end portion of the delivery spout.

The pump structure shown in the drawing comprises a supporting cover plate 11 upon which the pump equipment is mounted and that also constitutes a cover for a sirup jar 12 such as those customarily used in soda cabinets. The cover plate 11 has a depending flange 13 formed around its edge portions that preferably extends over a suitable upstanding flange 14 formed on the sirup jar to seal the jar against dust or impurities entering the sirup container. The pump cylinder and valve mechanism is supported from the cover plate 11 by tubular members 15 and 16. One end of the member 15 is connected to the supporting plate 11 and the

other end is secured in a suitably recessed lug 17 of the pump mechanism. The tubular member 16 constitutes a delivery tube for conveying sirup from the chamber of the pump to a discharge spout 18 through which the sirup is dispensed. The upper end of the tubular member 16 is also secured to the cover plate 11 and to the discharge spout 18.

The lower end of the member 16 is connected to a valve housing 19 of the pump mechanism. The connecting members 15 and 16 provide a rigid support for connecting the pump mechanism with the cover plate 11.

The pumping unit comprises a cylinder portion 20 that has a disc valve 21 mounted in its base to control the flow of sirup from the intake tube 22 into the pump cylinder. The disc valve 21 is preferably of thin sheet metal that is held in place by a cage formed of a pair of crossed wires 23. The disc valve is adapted to normally rest on a valve seat 24 to prevent the return flow of sirup from the cylinder 20 through the intake pipe 22 into the sirup jar 12.

A plunger 25, that has a free working fit within the cylinder 20 is carried at the lower end of an operating shaft 26 that has a recessed knob 27 mounted on its upper end for the convenient use of the attendant. The upper portion of the operating shaft 26 has a stop 28 that engages the under face of a spring housing 29 that is rigidly connected to the cover plate. The partially closed lower end of the spring housing has an aperture formed therein that receives the plunger shaft 26 and that constitutes a guide for the upper end thereof. One side of the operating shaft and one side of the aperture in the spring housing are flattened to prevent rotation of the pump shaft.

A helical spring 30 that is partially housed within the recessed knob 27 and that seats on the partially closed lower end of the housing 29 serves to return the plunger to its uppermost position when released by the attendant.

The spring housing 29 is internally threaded to receive the stroke-adjusting sleeve 31 therein. The upper end of the sleeve 31 is provided with an enlarged head that engages the under face of the knob 27 to adjustably regulate the length of the stroke of the plunger 25. The sleeve may be adjusted to any desired elevation by turning it on the threads of the housing 29. This provides a simple and convenient mechanism for regulating the quantity of sirup that is dispensed at each stroke of the pump.

The cylinder 20 communicates directly with the valve housing 19 through an open port 32. The valve seat is formed by a hollow open ended removable plug 33 that has an annular groove 34 formed therearound which communicates with the hollow interior of the plug through apertures 35.

A disc valve 36 seats on the open end of the hollow plug 33 to substantially prevent return flow of sirup from the delivery tube 16 to the cylinder 20. The valve housing has a plurality of opposed lugs 37 that serve as a cage for the disc valve 36.

The feature of the valve housing 19 that is of particular importance is the provision of a by-pass 38 that may either be formed in the valve casing as shown in Fig. 1 or in the disc valve 36 as shown in Fig. 4 and Fig. 5. The function of this by-pass is to withdraw enough sirup from the spout 18 to prevent dripping after each pump stroke. The by-pass aperture 38 that is formed in the side wall of the valve housing preferably is so arranged as not to be covered by the valve in any position. This aperture may be formed by casting a shallow groove of the desired cross section in the interior side wall of the valve housing.

The by-pass aperture may also be formed in the valve head as shown in Fig. 4 and Fig. 5, it being preferable, however, to use only one aperture either in the valve head or in the valve housing. The size of the aperture 38 or of the aperture 39 that is formed in the disc valve, may best be determined by experiment. The aperture should be large enough to permit the withdrawal of a sufficient quantity of sirup from the delivery spout upon the return stroke of the plunger to prevent dripping of sirup from the pump. The aperture should, however, be small enough to prevent the complete draining of the delivery tube for the least viscous liquids that are to be used in the pump. It will be understood, however, that if the pump is primarily intended for use with milk or other liquids of low viscosity, the aperture is preferably reduced to the size best adapted for the particular liquid. The range of use of the pump is, however, relatively large and, for commercial sizes of pumps for use at soda fountains, a standard size of by-pass will be found to function satisfactorily for all liquids normally dispensed at such fountains.

An additional feature of particular importance is the form of the substantially dripless delivery spout that is shown in the drawings and that is particularly illustrated in detail in Fig. 7, Fig. 8, and Fig. 9. The particular feature of the spout is the delivery aperture 40 that is arranged substantially at one end of the longitudinal passage 41 and that communicates directly therewith. The passageway 41 has a side wall 42 that is relatively broad and flat and that is arranged to provide a pair of drain ledges 43 that are arranged at each side of the opening through the spout. By providing ledges in the manner indicated and by

making the side wall of the delivery aperture relatively thin, the stream of sirup that is forced through the delivery spout engages the curved end portion of the passage 41 and is discharged substantially at right angles to the general direction of the delivery spout. The drain ledges 43 that flank the delivery aperture 40 tend to draw back sirup from the delivery aperture to thereby prevent dripping of sirup from the end of the spout. In fact, the innermost side wall of the aperture 40 is seldom dampened by sirup, whereas the outer side wall of the aperture 40 directs the sirup through the delivery spout. As the sirup is drawn back into the delivery spout by the by-pass 38 or 39, the surface tension of the return flow of sirup along the inclined inner wall of the delivery spout tends to suck back any sirup that remains at the delivery aperture 40. The delivery spout is only slightly inclined toward the delivery aperture as indicated in Fig. 1.

The base of the discharge spout has an aperture 44 for the convenient removal of the core used in casting the spout. A lug 45 is formed on the base of the spout to engage a suitable slot in the cover plate to properly align the spout when it is mounted on the cover plate 11. The aperture 44 of the spout base is usually filled with solder when the spout is mounted on the cover plate.

The operation of the pump may best be explained by referring particularly to Fig. 1. If it is assumed that the pump cylinder 20 is filled with sirup, the down stroke of the knob 27 and plunger 25 forces the sirup from the cylinder 20 through the valve 19, the delivery tube 16, and out of the dispensing spout 18. The form of the dispensing spout or the delivery spout 18 is such that the liquid is ejected therefrom in a uniform stream that is substantially free from spurts and the first splattering rush of sirup that is generally found in pumps of this character. The curved outer end of the spout combined with the operation of the by-pass in the delivery line provides a substantially solid jet of liquid that is apparently free from the preliminary splashes of liquid that is characteristic of sirup pumps now in general use.

Upon release of the knob 27, the spring 30 returns the piston to its uppermost position as shown in Fig. 1 of the drawings. The return stroke of the piston creates a suction within the cylinder 20 that lifts the valve 21 and draws the sirup from the bottom of the jar through the supply tube 22. The suction created by the return of the piston also closes the disc valve 35 and draws a small amount of sirup through the by-pass aperture 38 or 39 into the pump cylinder. The quantity of sirup thus returned through the by-pass is substantially the same for different sirup levels in the sirup jar 12 and therefore substantially the same quantity of sirup is dispensed by the pump at each stroke. The differential suction produced by the spring 30 is substantially constant. As previously mentioned, the regulation of the sleeve 31 controls the length of piston stroke and thereby controls the quantity of sirup dispensed by the pump.

It is believed that the partial draining of the delivery spout through the by-pass upon the return stroke of the piston and the effect of the by-pass relief on gradually building up the velocity head of the ejected liquid, tends to absorb the preliminary splash of the liquid that is usually present in dispensing pumps of this character when not carefully operated. The end of the delivery spout 18 is so formed that when liquid emerges from the spout, it strikes only the outer wall of the delivery aperture and apparently does not materially dampen the inner side wall of the aperture where dripping usually occurs. As the liquid is drained back into the delivery spout by the action of the by-pass that is formed either in the valve housing 19 or the disc valve 35, the surface tension of the return flow of liquid tends to draw back the liquid from the delivery aperture to thus prevent the accumulation of drops of liquid at the delivery spout. In dispensing spouts that have heretofore been used with soda fountain equipment of this character, objectionable dripping from the end of the spout usually occurs.

The bottom wall 42 of the delivery spout is made substantially flat adjacent the open end of the delivery spout, as is particularly shown in Fig. 9, in order to facilitate the drawing back of all of the liquid into the interior of the pump after each operation thereof. The pump is inclined at substantially the angle shown during its operation. The ledge that is formed on each side of the dispensing aperture 40 of the delivery spout has a thin film of liquid formed thereon that assists in drawing back the sirup from the delivery aperture 40 into the pump.

Furthermore, it is to be understood that the particular forms of apparatus shown and described are presented for purposes of explanation and illustration and that various other modifications of said apparatus can be made without departing from our invention as defined in the appended claims.

What we claim is:

1. A liquid dispensing pump comprising a measuring cylinder, adapted to be submerged in the liquid to be pumped, a piston operating within the cylinder, a valve mounted in an inlet port for said cylinder adapted to substantially prevent return flow of liquid from said cylinder, a discharge spout, a connection from the cylinder to the

discharge spout having a valve therein adapted to substantially prevent return flow of liquid from the spout to the cylinder, and a by-pass permanently connecting the discharge spout with the cylinder to withdraw a predetermined relatively small quantity of liquid from the discharge spout into the cylinder upon return stroke of the piston.

2. A sirup dispensing pump comprising a pump unit having a measuring chamber, a discharge spout, a valve interposed between said spout and said chamber adapted to restrict the return flow of sirup from the spout and to permit relatively free flow from the chamber to the spout, and a permanently open aperture of relatively small size connecting the cylinder with the discharge spout.

3. A sirup pump comprising a cover plate, a pump unit supported solely therefrom having a body portion provided with a measuring chamber, a piston operating in the measuring chamber, an intake valve in the bottom of said chamber adapted to permit the flow of sirup into said chamber and to prevent the return flow of sirup therethrough, a discharge spout connected with said chamber, a valve interposed between said measuring chamber and said discharge spout adapted to prevent a substantial return flow of sirup therethrough, and an aperture formed in said valve adapted to permanently connect the measuring chamber with the delivery spout.

4. A pump unit comprising a cylinder formed of die cast metal, an open ended valve housing formed integrally therewith, a hollow plug adapted to close the open end of said housing and providing a valve seat on the upper open end thereof, a disc valve supported by said plug, an aperture through said plug adapted to permanently connect the open end of the plug with said cylinder, and a permanently open aperture by-passing said disc valve.

5. A sirup dispensing pump comprising a pump having a measuring chamber, a discharge spout, a discharge aperture formed in the side wall of said spout adjacent its outer end and being free from drip flanges, a valve interposed between said spout and said chamber adapted to restrict the return flow of sirup from the spout to the chamber and to permit a relatively free flow of sirup from the chamber to the spout, and a permanently open aperture of relatively small size formed adjacent the seat for said valve.

6. The combination with a periodically operating liquid dispensing pump of an inclined delivery spout having a longitudinally extending passageway that communicates at its outer end with a delivery aperture formed in the side wall of the spout, the walls of the delivery aperture being relatively thin and substantially free from a drip ledge, the delivery aperture being of materially less width than the width of the longitudinal passageway connecting therewith.

7. The combination with a sirup dispensing pump of an inclined delivery spout having a longitudinal passageway, the bottom wall of which is substantially flat transversely, a laterally opening delivery aperture that is formed in the flattened side wall of less width than the flat face of the spout in direct communication with the longitudinal passageway, the side walls of the delivery aperture being of no greater thickness than the thickness of the adjacent walls of the spout.

8. The combination with a sirup dispensing pump, of a delivery spout having an aperture extending longitudinally thereof and terminating in a laterally opening aperture that is formed in the side wall of the spout, the wall of the passageway in which the aperture is formed being relatively flat adjacent the delivery aperture and being sufficiently wider than the delivery aperture to provide a return ledge on each side of the delivery aperture for drawing back sirup into the delivery spout, and a permanently open passageway between the pump and the spout that serves to withdraw sirup from said spout after each delivery stroke of said pump.

9. A sirup dispensing pump comprising a pump unit having a measuring chamber, a delivery spout, a valve interposed between the measuring chamber and the delivery spout that is adapted to restrict the return flow of liquid from the delivery spout to the measuring chamber, a permanently open aperture of relatively small size connecting the pump chamber with the delivery spout, said delivery spout having a longitudinal passageway that communicates directly with a lateral discharge opening of less lateral width.

10. A sirup dispensing pump comprising a pump unit having a measuring chamber, a piston, a delivery spout, a valve interposed between the measuring chamber and the delivery spout that is adapted to restrict the return flow of liquid from the delivery spout to the measuring chamber, a permanently open aperture of relatively small size connecting the measuring chamber with the delivery spout adapted to suck back sirup from said spout after each dispensing stroke.

11. A sirup pump comprising a pump unit having a measuring chamber and a piston operating therein, an intake valve in the bottom of said chamber adapted to permit the flow of sirup into said chamber and preventing the return flow of sirup therefrom, a discharge spout and a passageway

connecting said chamber with said discharge spout, a valve in said passageway adapted to restrict the return flow of fluid from the discharge spout to the chamber, a permanently open passageway by-passing said valve that is interposed between the chamber and the discharge spout adapted to withdraw a predetermined quantity of sirup from said discharge spout after each delivery of sirup therefrom, said discharge spout having a longitudinal passageway therethrough that communicates with a laterally opening discharge passageway formed in the side wall of said delivery spout and being substantially free from drip flanges, the laterally open passageway being of somewhat less lateral width than the lateral width of said longitudinal passageway at the point of connection therebetween to provide a drain ledge on each side of said delivery aperture that is adapted to withdraw sirup from the side walls of said delivery aperture when the sirup is drawn back into the longitudinal passageway of the discharge spout, said delivery spout being inclined less than 45° when in operating position.

12. A sirup dispensing pump comprising a pump unit having a measuring chamber, a piston, a delivery spout, a valve interposed between the measuring chamber and the delivery spout that is adapted to restrict the return flow of liquid from the delivery spout to the measuring chamber, a permanently open aperture of relatively small size connecting the measuring chamber with the delivery spout adapted to suck back sirup from said spout after each dispensing stroke, said delivery spout being inclined slightly and having a passageway extending longitudinally thereof that has a flattened inner wall at the outer end thereof and a delivery aperture formed in said flattened wall of less width than said flattened wall and having no drip flange formed thereon.

In testimony whereof we affix our signatures.

CHARLES T. JOSLIN.
CARL W. KLOTZ.