Feb. 26, 1952 V. P. STEELE 2,587,241

ADJUSTABLE STROKE SIRUP PUMP

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Fig. 1.

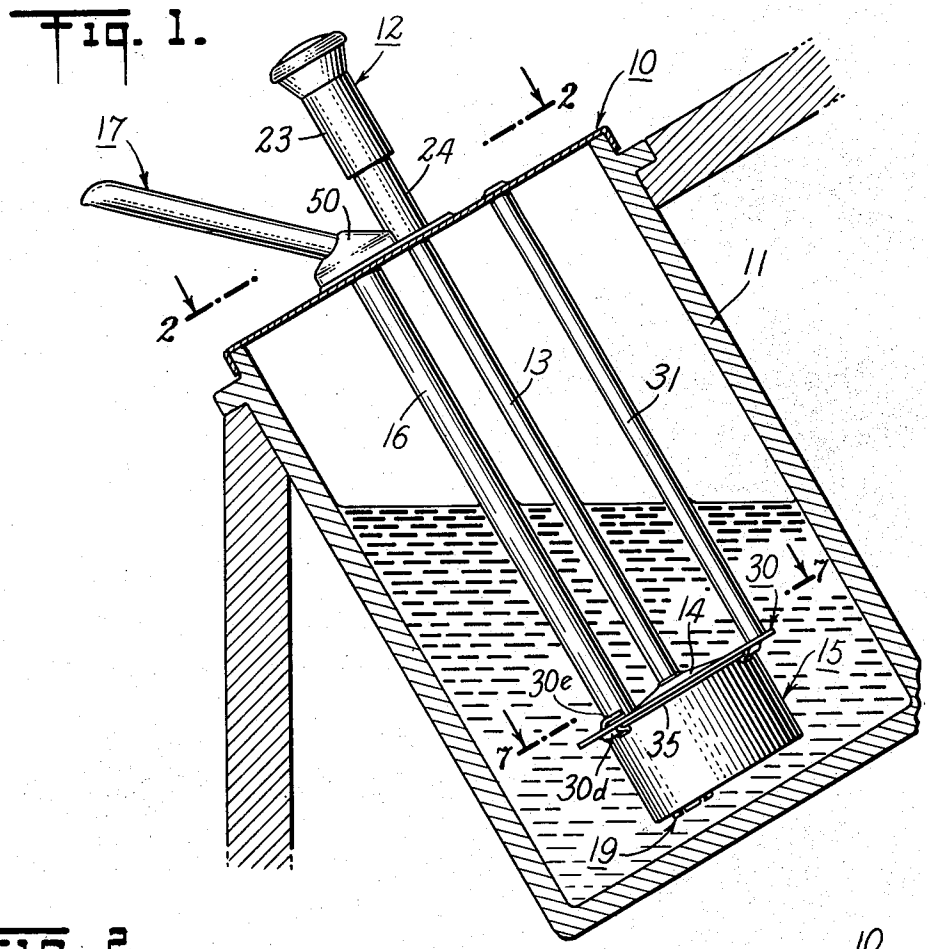
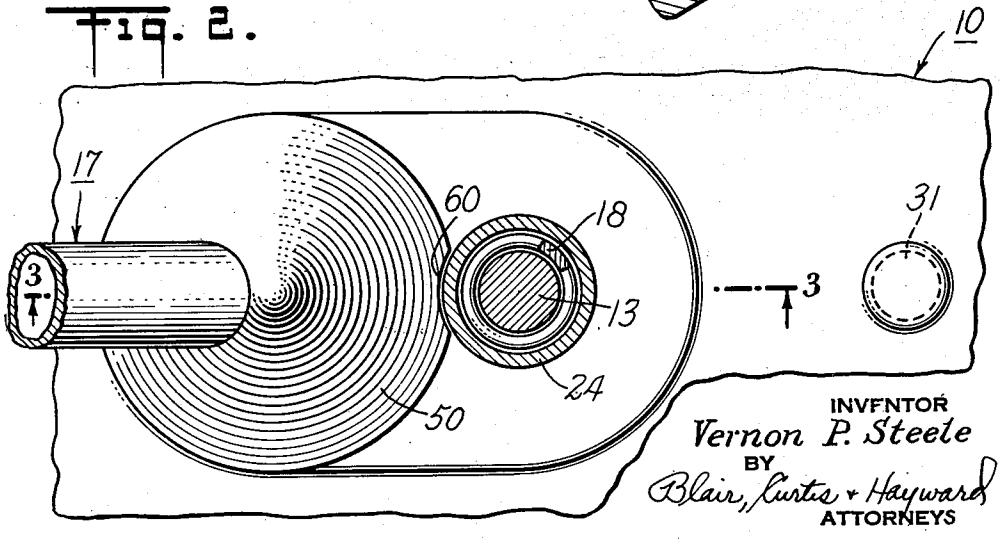


Fig. 2.



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Fig. 4.

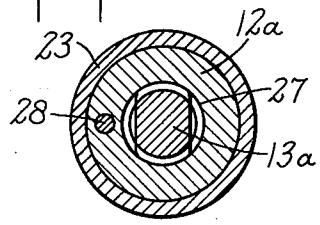


Fig. 5.

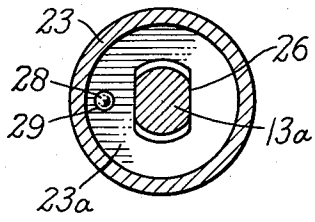
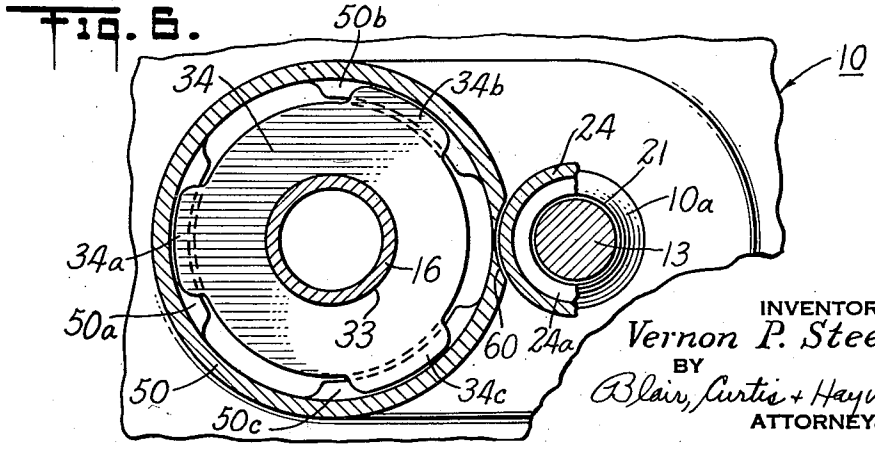


Fig. 3.

Fig. 6.



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Fig. 7.

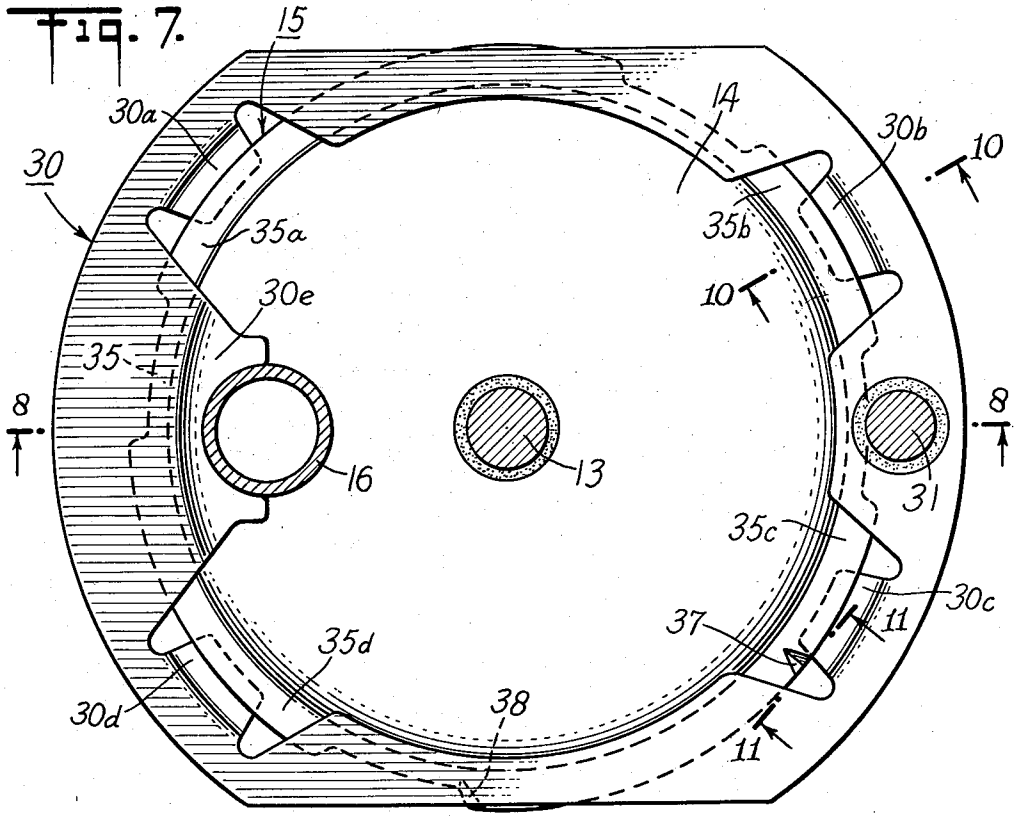
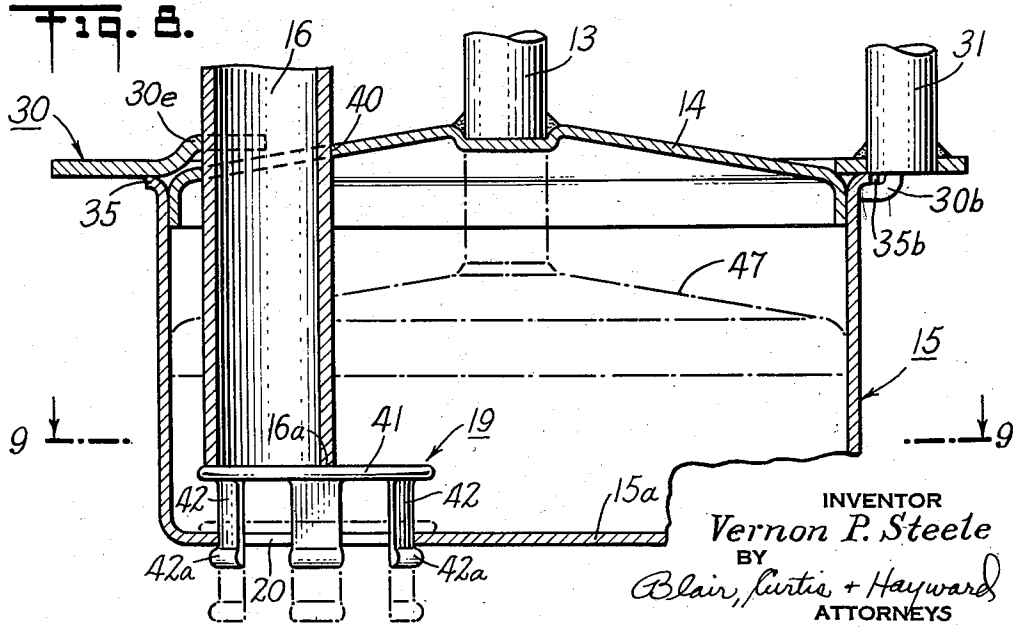


Fig. 8.



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Fig. 9.

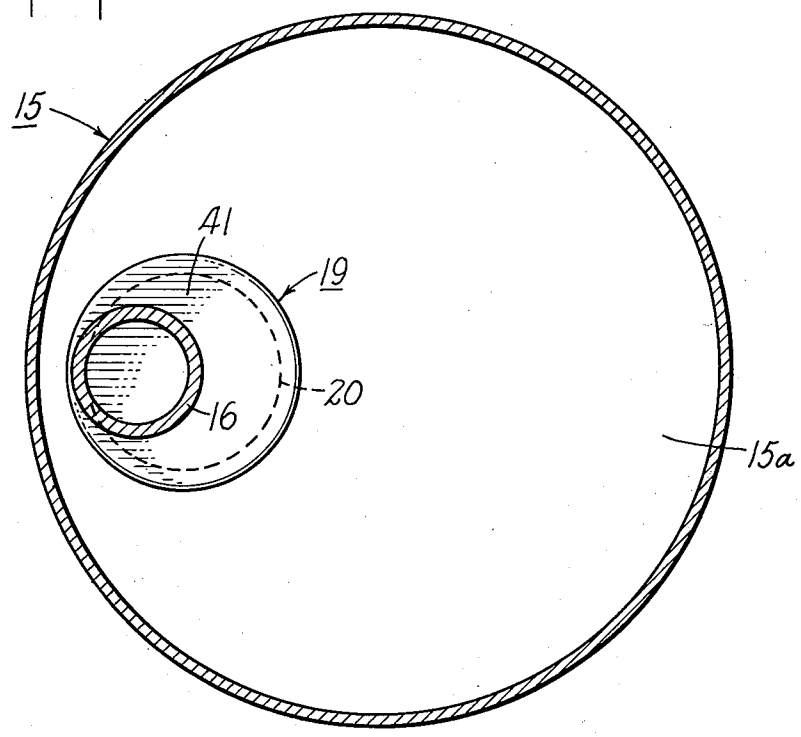


Fig. 10.

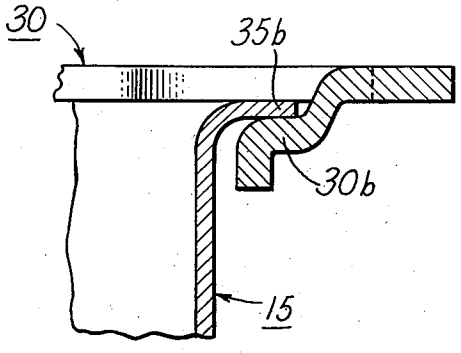
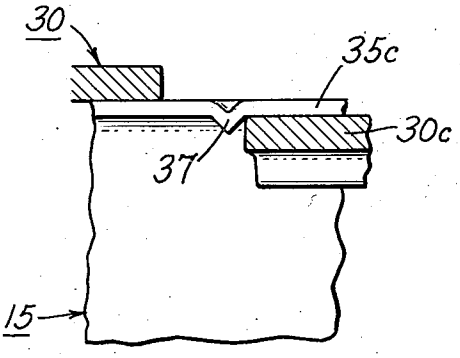


Fig. 11.



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UNITED STATES PATENT OFFICE

2,587,241

ADJUSTABLE STROKE SIRUP PUMP

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Application February 14, 1948, Serial No. 8,331

10 Claims. (Cl. 222—309)

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This invention relates to a syrup pump.

One of the objects of this invention is to provide a syrup pump which is simple, thoroughly practical and durable in use. Another object is to provide a construction of the above character whose manufacture will be economical both from the standpoint of labor and materials used. Another object is to provide a construction of the above character which will be strong and well able to withstand continuous hard usage. Another object is to provide a construction of the above character which has a minimum of individual parts. Another object is to provide a construction of the above character which may be disassembled for purposes of cleaning and then reassembled by the user with extreme ease. Still another object is to provide a construction of the above character in which pockets, grooves, cracks and inaccessible corners have been eliminated so that all parts of the pump may be readily cleaned. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts as will be exemplified in the structure to be hereinafter described and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which is shown one of the various possible embodiments of this pump,

Figure 1 is a side view of the pump partly in elevation and partly in section mounted on a syrup receptacle;

Figure 2 is a horizontal section taken on the line 2—2 of Figure 1;

Figure 3 is a vertical section of certain parts of the pump taken on the line 3—3 of Figure 2;

Figure 4 is a horizontal section taken on the line 4—4 of Figure 3;

Figure 5 is a horizontal section taken on the line 5—5 of Figure 3;

Figure 6 is a horizontal section taken on the line 6—6 of Figure 3;

Figure 7 is a horizontal section taken on the line 7—7 of Figure 1;

Figure 8 is a vertical section of the lower portion of the pump taken on the line 8—8 of Figure 7;

Figure 9 is a horizontal section taken on the line 9—9 of Figure 8;

Figure 10 is a vertical section taken on the line 10—10 of Figure 7; and

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Figure 11 is a vertical section taken on the line 11—11 of Figure 7.

Similar reference characters refer to similar parts throughout the several views of the drawings.

As conducive to a clearer understanding of certain features of this invention, it might here be pointed out that most syrup pumps now in use are unsatisfactory. The main reason these pumps are unsatisfactory lies in the fact that they are extremely difficult to properly clean, and thus are unsanitary. Many of the pumps now in use have "blind spots" in their delivery tubes or other parts which cannot be reached directly during cleaning and in which syrup accumulates. These places then form breeding spots for bacteria, producing a highly unsanitary condition. Another difficulty with pumps now in use lies in the fact that they are extremely difficult to disassemble and then reassemble. This has to be done to thoroughly clean any pump, and in a majority of cases, the persons operating the pump will not bother to disassemble them because of the amount of work this entails. Accordingly, one of the major objects of this invention is to provide a pump which is sanitary, in that all of its parts may be readily cleaned, and which may be disassembled and assembled with a maximum of ease in a minimum of time.

In general, the pump includes a supporting plate, generally indicated at 10 (Figure 1), which supports all of the parts of the pump and which forms the cover for a syrup receptacle 11. A knob, generally indicated at 12, is operatively connected to a plunger rod 13 (Figures 1 and 8) which in turn is connected to a plunger 14. Plunger 14 acts as a piston within a cup, generally indicated at 15, to force syrup during a discharge stroke upwardly through a delivery tube 16, and thence out through a removable spout, generally indicated at 17. Syrup is discharged when knob 12 (Figure 1) moves downwardly, and after this stroke is completed, spring 18 moves knob 12 and plunger 14 (Figure 8) upwardly. During upward movement of plunger 14, the valve, generally indicated at 19, opens and syrup flows into and fills cup 15 through port 20.

Specifically, plunger rod 13 (Figure 4) extends upwardly through a hole 21 in supporting member 10. The portion 10a of member 10 surrounding member 10 is struck upwardly to form a water guard to prevent water from flowing across the top of member 10 and thence downwardly

into receptacle 11 (Figure 1) through hole 21 (Figure 3). Supporting member 10 is preferably reinforced beneath water guard 10a in any suitable manner, such as by reinforcing ring 22. Reinforcing ring 22, in addition to strengthening water guard 10a, forms a bearing for rod 13.

A pair of telescoping sleeves 23 and 24 are mounted on rod 13 above supporting member 10. Sleeve 24 has an inwardly extending flange 24a on its lower end, the lower surface 25 of which is beveled inwardly to fit water guard 10a to thus form a seal at this point. The upper surface of flange 24a acts as a seat for the lower end of spring 18. Sleeve 23, within which sleeve 24 telescopes, has a flange member 23a mounted within the sleeve adjacent its upper end. The upper end 13a of rod 13 is threaded and is provided with flattened sides (Figure 4). Flange member 23a (Figure 5) is provided with a hole 26 of the same shape but slightly larger than end 13a of rod 13 so that sleeve 23 can be mounted on plunger rod 13.

The upper end of spring 18 acts against the under surface of member 23a, and knob 12 holds sleeves 23 and 24 and spring 18 in assembled relationship with respect to each other. Knob 12 is provided with a threaded hole 27 which extends upwardly into its lower end and is threaded with threads complementary to the threads on the upper end of rod 13. Knob 12 is also provided with a shank portion 12a which fits within the upper end of sleeve 23 and has a pin 28 thereon, the lower end of which, when the pump is assembled, fits in a hole 29 in member 23a.

In assembly, sleeve 24 is placed on water guard 10a, spring 18 is placed on rod 13 and then sleeve 23 is mounted on sleeve 24 and the upper end of rod 13. Sleeve 23 is pressed downwardly and knob 12 is threaded upon the upper end of rod 13. The amount that knob 12 is threaded upon the upper end of rod 13 determines the stroke of the pump and thus the volume pumped. Thus, if a long stroke is desired, knob 12 is threaded onto rod 13 until end 13a is positioned well up in the hollow interior 12b of knob 12. If a short stroke is desired, knob 12 is threaded onto rod end 13a only a short distance. While knob 12 is being threaded on rod 13, sleeve 23 is held downwardly so that pin 28 cannot engage hole 29. When the knob has been threaded downwardly upon rod end 13a an amount that will give the desired pump stroke, sleeve 23 is released and knob 12 turned until pin 28 enters hole 29. Because of the shape of the upper end of rod 13, sleeve 23 cannot turn with respect to rod 13, and thus, when pin 28 enters hole 29, knob 12 cannot turn with respect to rod 13. When knob 12 is pressed downwardly, spring 18 is compressed, and thus, when the user releases pressure upon the knob, spring 18 returns knob 12 and thus rod 13 to a raised position. Because of the manner in which sleeves 23 and 24 are telescoped, and because of the coaction of sleeve 24 with water guard 10a, liquids cannot flow through hole 21 into the syrup being pumped when cover 10 is being cleaned, as is often done when a pump is in use.

The cup 15 (Figures 1 and 8) is detachably mounted on a supporting ring, generally indicated at 30 (Figure 1, 7 and 8). Supporting ring 30 is mounted upon cover 10 by a supporting rod 31 and delivery tube 16. The upper end of rod 31 is connected to cover 10 and supporting ring 30 in any suitable manner, such as by welding. Delivery tube 16, the lower end of which extends a substantial distance below supporting ring 30 (Figure 8), is welded to a flange 30e (Figure 7) extending inwardly from ring 30, and its upper end extends through a hole 32 in cover 10, and thence through a hole 33 in a base member 34 on which spout 17 (Figure 3) is mounted. Tube 16 is connected to base member 34 in any suitable manner, such as by welding. Tube 16 and rod 31 (Figures 1 and 8) rigidly support ring 30 and hold it in a plane parallel to cover member 10.

Cup 15 (Figures 7 and 8) is detachably mounted on ring 30 and is provided with a flange 35 on its upper edge having ear portions 35a, 35b, 35c and 35d extending outwardly therefrom. Ring support 30 is provided with a series of ears 30a, 30b, 30c and 30d which extend inwardly and downwardly from the plane of supporting ring 30. These ears are so shaped that when cup 15 is placed with flange 35 against ring 30 with ears 35a, 35b, 35c and 35d positioned between ears 30a, 30b, 30c and 30d, and cup 15 is turned counterclockwise as viewed in Figure 7, the ears 35a, 35b, 35c and 35d move into interlocking relationship with respect to ears 30a, 30b, 30c and 30d.

Limit stops 37 and 38 (Figures 7 and 11) are provided on ear 35c to limit the amount which cup 15 may be turned when it is being mounted upon or removed from the syrup pump. When the cup is being mounted on the syrup pump, stop 37 engages ear 30c to limit the cup's movement in a counterclockwise direction, and when the cup is being removed from the pump, stop 38 engages ear 30d when the cup is so positioned that the ears on the cup and supporting ring ears are disengaged. Thus, it will be seen that cup 15 is so mounted upon ring 30 that it may be quickly and easily attached or removed. Furthermore, by mounting it upon ears of the type described, all unsanitary cracks, pockets, or crevices are eliminated and all points on both the ring and cup are readily accessible for cleaning.

Referring to Figure 8, it will be noted that the delivery tube 16 extends through a hole 40 in plunger 14 and that its lower end 16a is positioned a short distance above the bottom 15a of cup 15. Referring to Figure 7, it will be noted that the ears on cup 15 are not equidistantly spaced from each other and that they are so positioned that the cup may be mounted on the syrup pump in only one position. This insures that flap valve 19 will always be positioned directly beneath the lower end of delivery tube 16 (Figure 8). Flap valve 19 includes a disc 41 having a plurality of legs 42 extending downwardly therefrom. Legs 42 are resilient, extend through port 20 in the bottom of cup 15, and are so positioned that valve 19 is free to move upwardly and downwardly with respect to port 20. The legs 42 are preferably provided with feet 42a to hold valve 19 on cup 15 when the cup is removed from the syrup pump. Because of the position of valve 19, its construction and the manner in which it is mounted in port 20, when spring 18 moves plunger 14 from the position indicated by the dotted line 47 to the position it occupies in Figure 8, syrup flows into cup 15 through port 20, raising valve 19 to cover the lower end of delivery tube 16. This prevents the fluid pumped into the delivery tube during the preceding pumping stroke from being drawn back into cup 15. During a pumping stroke, valve 19 moves downwardly to close port 20 and plunger 14 forces the syrup

within cup 15 upwardly through delivery tube 16 and thence out through spout 17.

Spout 17 (Figures 1 and 3) is mounted upon base member 34 which is secured to cover 10 in any suitable manner, such as by welding, and is provided with ears 34a, 34b and 34c (Figure 6) which coact with ears 50a, 50b and 50c extending inwardly from the lower edge of spout base 50 to detachably mount spout 17 on the syrup pump. The upper end 16b of tube 16 extends above member 34 and forms the lateral support for a rubber washer 51. The ears on base member 34 and spout base 50 are so formed that when base 50 is placed on member 34 with ears 34a, 34b and 34c in the spaces between ears 50a, 50b and 50c and the spout is turned, then base 50 is drawn toward base member 34 to compress washer 51 and thus form a tight connection between the spout and member 34. It will be noted that spout 17 is substantially straight and that its lower end 17a fits flush against the upper end of delivery tube 16. Delivery tube 16 is also straight and open at both ends. Thus, by removing spout 17 from the pump, both the spout and delivery tube may be easily and quickly cleaned.

To lock spout 17 in position upon cover 10, the base 50 of the spout is provided with a recess 60. When the spout is being mounted upon support 34, sleeve 24 is raised. After base 50 is mounted upon member 34, sleeve 24 is released and it slides down into recess 60. Thus, sleeve 24 prevents base 50 from being turned, so that if it is accidentally struck, it cannot become loose. When it is desired to remove the spout 17, sleeve 24 is again raised, and base 50 is turned until its ears 50a, 50b and 50c register with the open spaces between ears 34b, 34c and 34a, at which time it may be removed from the pump.

Thus, a syrup pump has been disclosed which is so constructed that it may be easily disassembled and then reassembled by the user, and is also constructed so that all parts may be readily cleaned. When the user desired to disassemble the pump, sleeve 23 is moved downwardly and knob 12 (Figure 3) is unscrewed from the upper end of rod 13. After cup 15 is removed, rod 13 drops downwardly (Figure 8) so that the user may readily clean all of the parts above cover 10, as well as plunger 14 and rod 13. Next, spout 17 can be removed, and because there are no "blind spots" in either spout 17 or delivery tube 16, these also may be readily cleaned. When it is desired to assemble the pump, spout 17 may be replaced, then plunger 14 mounted on tube 16 with rod 13 extending through hole 21 (Figure 3). Next, sleeves 23, 24, spring 18, and knob 12 are assembled as described hereinabove. During this assembly, the lower end of rod 13 is supported because delivery tube 16 (Figure 8) extends through plunger 14. This is of material aid to the user in assembling the upper portion of a syrup pump, as rod 13 is maintained in substantially a vertical position. After the parts are mounted on rod 13, cup 15 is mounted upon ring 30 (Figure 8) and the pump is ready to operate.

Thus, it will be seen that a thoroughly practical and efficient syrup pump has been disclosed. In this pump, because of the novel construction of the parts mounted on rod 13 above cover 10, leakage into the pump down the plunger rod is prevented. Furthermore, the cup is removable and is so constructed that all parts of the cup and the member on which it is mounted may be readily cleaned. Furthermore, the delivery tube

is straight and both ends are open when the pump is disassembled so that it may be readily cleaned. It also will be noted that the spout is removable, may be readily cleaned, and together with the delivery tube forms a syrup delivery conduit which is clean and in which pockets, corners, crevices and other places in which syrup or foreign material might collect have been eliminated.

As many possible embodiments may be made of the above invention and as many changes might be made in the embodiment above set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. In a syrup pump, in combination, a cover member, a plunger rod, a plunger, a cup, supporting means detachably mounted on said cover member, means detachably mounting said cup on said supporting means, a delivery tube extending through said plunger and said cover member into said cup, said delivery tube being straight and open at both ends, a spout, base members mounted on said spout and cover member, ear means on said spout and cover base members for connecting said spout to said delivery tube, said ear means being engaged by turning said spout with its pivotal axis at right angles to said cover member, a sleeve mounted on said plunger rod, means resiliently holding said sleeve in engagement with said cover member, and means forming a recess in said spout base member, a portion of the lower end of said sleeve fitting into said recess to prevent said spout from being turned unless said sleeve is raised.

2. In a syrup pump, in combination, a cover member, a plunger rod, a cup, supporting means mounted on said cover member, means detachably mounting said cup on said supporting means, a delivery tube extending through said cover member and said plunger into said cup, spout means connected to the upper end of said delivery tube, said delivery tube being straight, open at both ends and having its lower end positioned a short distance above the bottom of said cup, and a flap valve mounted in the bottom of said cup, said flap valve including a disc portion having a plurality of legs thereon, said legs extending through the intake port of said cup, said valve being free to move upwardly and downwardly with respect to said intake port, said disc portion of said flap valve in its uppermost position covering the lower end of said delivery tube and when in its lower position covering said port whereby when liquid is being drawn into said cup said valve prevents liquid from being drawn from said tube and when syrup is being pumped out of said cup said valve covers said intake port.

3. In a syrup pump, in combination, a cover member, a plunger rod, a plunger, a cup, means connecting said cup to said cover member, a delivery tube, a spout, said delivery tube being connected to said spout and extending into said cup, base members mounted on said spout and cover member, ear means on said spout and cover base members for connecting said spout to said delivery tube, said ear means being engaged by turning said spout with its pivotal axis at right angles to said cover member, a sleeve member mounted on said plunger rod, means resiliently holding said sleeve member in engage-

ment with said cover member, and means forming a recess in said spout base member, a portion of the lower end of said sleeve fitting into said recess to prevent said spout from being turned unless said sleeve is raised.

4. In a pump, in combination, a cover member, a plunger rod, a plunger mounted on the lower end of said plunger rod, a cup having a cylindrically shaped sidewall, supporting means mounted on said cover member, means detachably mounting said cup on said supporting means, the inner diameter of said cup being slightly greater than the diameter of said plunger, said plunger being positioned in said cup, said delivery tube extending through and being connected to said cover member and extending through a hole in said plunger into said cup, said delivery tube having its lower end positioned a short distance above the bottom of said cup, means forming an intake port in the bottom of said cup beneath the lower end of said delivery tube, the lower end of said delivery tube lying in a plane substantially parallel to the bottom of said cup, a flat valve disc slightly greater in diameter than the diameter of said delivery tube, and means mounting said disc over said port for a vertical movement with respect thereto so that its flat upper surface can engage the lower end of said delivery tube, said disc being capable of closing said port when in its lower-most position, whereby, when said plunger is moved upwardly to draw liquid into said cup, the liquid flowing in through said port causes said disc to move upwardly and cover the lower end of said delivery tube to prevent liquid in the delivery tube from being drawn back into said cup.

5. In a pump, in combination, a cover, a supporting member, a delivery tube, a supporting rod, said delivery tube and said rod being connected to said cover and to said supporting member and holding said supporting member parallel to said cover, a plunger rod, means for actuating said plunger rod, a plunger mounted on the lower end of said plunger rod, said delivery tube passing through a hole in said plunger, a cup member, said plunger being positioned within said cup member, means forming slots on one of said members, means forming ear means on the other of said members, said slots and ear means being movable into and out of interlocking engagement with respect to each other by rotating said members with respect to each other, means forming an intake port in the bottom of said cup beneath the lower end of said delivery tube, said intake port being slightly greater in diameter than the diameter of said delivery tube, the edge of the lower end of said delivery tube being positioned adjacent the bottom of said cup and lying in a plane substantially parallel to the bottom of said cup, a valve disc mounted over said intake port, the diameter of said disc being slightly greater than the diameter of said intake port, means mounting said valve for vertical movement with respect to the bottom of said cup so that it can be moved upwardly into engagement with the edge at the lower end of the delivery tube, said flat valve being capable of closing the lower end of said delivery tube when liquid is being drawn into said cup, and closing said intake port when liquid is being pumped out of said cup by said plunger.

6. In a pump, in combination, a cover, pump mechanism mounted on said cover, a delivery tube for said pump mechanism mounted on said cover, means forming a hole in said cover, a rod for actuating said pump mechanism, said rod extending upwardly through said hole, means limiting upward movement of said rod, means on said cover around said hole extending upwardly a short distance from said cover to form a water guard, a sleeve detachably mounted on said rod above said cover, said water guard extending upwardly into the lower end of said sleeve, a knob detachably mounted on the upper end of said rod, a second sleeve, the lower portion of said knob closing the upper end of said second sleeve, said first-mentioned sleeve telescoping into said second-mentioned sleeve, and spring means acting between said sleeves to resiliently urge them away from each other and thus hold said lower sleeve in covering position with respect to said water guard and said upper sleeve in engagement with said knob.

7. In a pump, in combination, a cover, pump mechanism mounted on said cover, a delivery tube for said pump mechanism mounted on said cover, means forming a hole in said cover, a rod for actuating said pump mechanism, said rod extending upwardly through said hole, means limiting upward movement of said rod, means on said cover around said hole extending upwardly a short distance from said cover to form a water guard, a sleeve detachably mounted on said rod above said cover, said water guard extending upwardly into the lower end of said sleeve, a knob detachably mounted on the upper end of said rod, a second sleeve, the lower portion of said knob closing the upper end of said second sleeve, said first-mentioned sleeve telescoping into said second-mentioned sleeve, a seat formed on said second-mentioned sleeve adjacent its upper end, a seat formed on said first-mentioned sleeve adjacent its lower end, and spring means acting between said seats to hold said lower sleeve in covering position with respect to said water guard and said upper sleeve in engagement with said knob, said sleeves and spring means being removable from said rod when said knob is detached.

8. In a syrup pump, in combination, a cover, pump mechanism mounted on said cover, a delivery tube connected to said pump mechanism, means forming a hole in said cover, a rod for actuating said pump mechanism, means limiting upward movement of said rod, said rod extending upwardly through said hole, means on said cover around said hole extending upwardly a short distance to form a water guard, a first sleeve detachably mounted on said rod above said cover, said water guard extending upwardly into the lower end of said sleeve, means limiting upward movement of said pump rod, a knob threaded onto the upper end of said rod, a second sleeve extending downwardly from said knob, the lower end of said second sleeve limiting downward movement of said rod when it engages the top of said cover, said knob closing the upper end of said last mentioned sleeve, said knob being adjustable longitudinally of said rod to move said last mentioned sleeve longitudinally of the rod and thus lengthen or shorten the stroke of said pump rod, spring means engaging and acting between said sleeves to resiliently urge said second sleeve and knob upwardly and said first sleeve downwardly, said first sleeve telescoping into said second sleeve and said spring means holding said first sleeve in covering position with respect to said water guard means.

9. In a syrup pump, in combination, a cover,

pump mechanism mounted on said cover, a delivery tube connected to said pump mechanism, means forming a hole in said cover, a rod for actuating said pump mechanism, means limiting upward movement of said rod, said rod extending upwardly through said hole, means on said cover around said hole extending upwardly a short distance to form a water guard, a sleeve detachably mounted on said rod above said cover, said water guard extending upwardly into the lower end of said sleeve, means limiting upward movement of said pump rod, a knob threaded onto the upper end of said rod, a sleeve extending downwardly from said knob, the lower end of said sleeve limiting downward movement of said rod when it engages the top of said cover, said knob closing the upper end of said last mentioned sleeve, said knob being adjustable longitudinally of said rod to move said last mentioned sleeve longitudinally of the rod and thus lengthen or shorten the stroke of said pump rod, and said second mentioned sleeve being movable downwardly with respect to said knob, means preventing rotation of said second mentioned sleeve with respect to said rod, and a locking connection between said second sleeve and said knob to prevent rotation of said knob with respect to said second mentioned sleeve, said locking connection being broken when said second mentioned sleeve is moved downwardly with respect to said knob at which time said knob may be adjusted longitudinally of said rod, said sleeves and spring means being removable from said rod when said knob is disconnected from said rod.

10. In a syrup pump, in combination, a cover member, a plunger rod, a plunger, a cup, supporting means detachably mounted on said cover member, means detachably mounting said cup on said supporting means, an integral delivery tube extending through said plunger and said cover member into said cup, said delivery tube being straight and open at both ends, a base member mounted on said cover on the upper end of said delivery tube, said tube extending through said base member, ear means formed on said base member, a tube forming a spout, a base member formed on said spout, said spout extending through said spout base member, and ear means formed on said last-mentioned base member, said ear means being so shaped and positioned that when said spout base member is mounted on said cover base member and turned, said ears interlock to connect said spout to said delivery tube, the lower end of said spout tube abutting against the upper end of said delivery tube.

VERNON P. STEELE.

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