SYRUP DISPENSING PUMP

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This invention relates to liquid dispensing apparatus and more particularly to liquid dispensing apparatus of the type adapted to dispense measured amounts of fluid responsive to strokes of a pumping means. The invention has special application to confectioner's syrup dispensing pumps and will be described as such, the apparatus being hereinafter referred to as a syrup dispensing pump, dispensing pump or simply as a pump.

The common types of syrup dispensing pumps used by confectioners and at soda fountains in the preparation of soft drinks are used with a container or can, which holds a quart or so of a flavored syrup. This can is closed by a snug-fitting lid which carries the dispensing pump. A plunger and a spout upstand from the top of the lid and a pumping mechanism depends from the underside of the lid to reach to the bottom of the container to be submerged in the syrup within the container. The pumping mechanism will usually include a piston, a cylinder and a check valve arrangement. The operation of such dispensing pumps is well known, for the plunger is merely manually depressed to eject a measured amount of syrup from the spout.

In the present invention, an improved dispensing pump construction, the basic arrangement is substantially the same, and operates in essentially the same manner as does the above described conventional arrangement. However, in the present invention the mechanisms, and especially the check valve means are modified and simplified from conventional and known arrangements to operate in an improved manner and with fewer maintenance problems, all as will hereinafter be apparent.

Accordingly, an object of the invention is to provide a novel and improved syrup dispensing pump wherein the several operative components are arranged in a unique and simplified manner and with a minimum of individual parts.

Another object of the invention is to provide a novel and improved dispensing pump which is especially adapted to be permanently mounted on the lid of a syrup container in an operative, foot-proof manner and with a simple, easily set adjusting means to permit a selected amount of syrup to be ejected with each stroke of the pump.

Another object of the invention is to provide a novel and improved dispensing pump for dispensing syrup from a container which forms an easily-cleaned, maintenance-free arrangement.

Another object of the invention is to provide, in a dispenser pump, a novel and improved check valve that permits a material and substantial simplification of the entire construction of the unit and at the same time produce a more reliable and quicker acting flow and checking operation when the pump is in use.

Other objects of the invention are to provide a novel and improved syrup dispensing pump which is a neat, low-cost, easily-manufactured, rugged and durable unit.

With the foregoing and other objects in view, all of which more fully hereinafter appear, my invention comprises certain constructions, combinations and arrangements of parts and elements as now described in detail, defined in the appended claims and illustrated in the accompanying drawing in which:

FIGURE 1 is a small scale side elevation view of a syrup container having a lid thereon and with the improved dispenser pump mounted on the lid thereof.

FIGURE 2 is a plan view of the arrangement illustrated at FIG. 1 on a slightly enlarged scale.

FIGURE 3 is an elevation view, partially in section, illustrating a fragment of the container lid in section and the dispenser pump partially in section, all as taken substantially from the indicated line 3—3 at FIG. 2 but on a greatly enlarged scale.

FIGURE 4 is a sectional view of a portion of the pump as taken from the indicated line 4—4 at FIG. 3.

FIGURE 5 is a sectional view of a portion of the pump as taken from the indicated line 5—5 at FIG. 3.

FIGURE 6 is a sectional view of the lower portion of the pump, as taken from the indicated line 6—6 at FIG. 4, being similar to the showing at FIG. 3, but with the piston elements being partially depressed as in a pumping stroke, the arrows indicating generally the pumping stroke movement and the direction of flow of liquid.

FIGURE 7 is a fragmentary sectional detail as taken from the indicated line 7—7 at FIG. 6 but on an enlarged scale.

FIGURE 8 is a sectional view of the lower portion of the pump, similar to the showing at FIG. 6, and with the piston and other elements being displaced as during an intake stroke, the arrows indicating generally the movement of elements and flow of liquid.

FIGURE 9 is a fragmentary sectional detail as taken from the indicated line 9—9 at FIG. 8 but on an enlarged scale.

Referring more particularly to the drawing, a syrup container 10 of a common type is formed generally as a comparatively deep, open-mouthed jar adapted to hold approximately a quart of syrup. A lid 11 having a downward-turned rim 12 is fitted to fit upon the container with a moderately snug fit and to stay in position when the container is in use. Suitable orifices 13 and 14 are formed in the lid to permit the pump elements to pass through the lid, as now described.

The dispensing pump 20 is mounted in this lid with portions upstanding from the upper surface of the lid and with other portions extending downward from the underside of the lid. The pump includes a cylindrical cup 21 at its base which is attached to and supported by an axially centered discharge pipe 22. This pipe extends upwardly from the cup 21, through the orifice 13 in the lid 11 and thence to turn laterally to form an inclined spout 23 at the upper side of the lid which preferably overhangs the edge of the lid to facilitate positioning a receiving dish or the like under the discharge end 24 of the spout. The orifice 13 is suitably flared to provide a broader gripping surface against the discharge pipe, and the pipe 22 is secured and affixed to the lid as by a weld 15 or solder bead.

The lower end of the discharge pipe 22 terminates as a cylindrical pilot head 25, having a diameter somewhat greater than the pipe diameter. This head is formed by a short cylindrical member having concentric portions at each end. The upper portion forms a stub 26 which snugly fits into the bottom of the discharge pipe 22 and is held therein in a fixed position as by a transversely disposed pin 27 extending through the pipe 3 and the stub 26, as in the manner best illustrated at FIGS. 7 and 9. The lower portion forms a small-diameter boss 28 and a flat, disc-shaped base 29 which is tightly affixed to the bottom of the pilot head 25 with the boss 28 extending through a suitable centered close-fitting orifice 30 in the base 29, the boss being upset or riveted therein for a tight permanent fit.

The cylinder cup 21 includes a cylindrical sidewall 31, an open top and a flat bottom 32 having a centered orifice 33 therein. This cup is axially centered upon the
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discharge pipe 22 with the pilot head 25 extending through orifice 33 and with the bottom of the cup resting upon the base disc 29. A plurality of orifices 34 are formed in the bottom of this cup in an array about the central orifice 33, and these orifices 34 are normally closed off by the base disc 29. It follows that the base disc 29 and orifices 34 combine to form an intake valve which is normally closed but which opens when the cup is lifted from the base disc with the orifice 33 slidably shifting along the pilot head 25, as clearly indicated at FIG. 8.

The upward movement of the cylinder cup is restricted by a flat disc-shaped abutment 35 which is affixed to the discharge pipe in a transverse plane approximately one-eighth inch above the upper rim of the cup when in its normal closed position. This abutment disc 35 is formed with a central orifice 36 snugly fitting the discharge pipe 22 and being permanently affixed thereto as by a weld 37.

A downwardly directed piston 38 is slidably mounted within this cylindrical cup 21 for downward pumping action to pump syrup into a sidewall orifice 39 in the wall of the discharge pipe 22 near the base of the unit as hereinafter described. This piston is formed with a suitable downturned flange 40 and a centered orifice 41 which snugly but sidewardly fits upon the discharge pipe 22. A compression spring 42 fits about the pipe 22 between a top ledge 43 on the pilot head 25 and the underside of the piston 38. The spring thereby urges the piston to a normal upward or return position at the top of the cylinder cup and against the underside of the abutment disc 35.

The piston is moved downwardly by a plunger arrangement which includes a shiftable plunger rod 44. The rod lies in spaced parallelism with the discharge pipe 22 and extends through a guide means in the lid 11, at the orifice 14, and thence through an orifice 45 in the abutment 35 to connect with the piston 38. The lower end of this rod is securely affixed to the piston as by a boss 46 at the base of the rod extending through a snugly fitting orifice 47 in the piston and being upset or riveted thereon.

The upper end of the plunger rod 44 is threaded at 48 and connects with an enlarged, adjustable plunger head 49. This plunger head includes an upper solid portion 50 having an axially-centered tapped passageway 51 which may be turned upon the threaded end of the rod 44 to set the head at any selected position. The top outer edge of this head is also threaded at 52 to hold a narrow nut 53 which, in turn, holds a suitable index plate 54 thereon.

A lower portion 55 of the head 48 is formed generally as an inverted cup or sleeve with a centered tapped passageway 56. This passageway is turned upon the threads 48 at the end of the rod 44 to hold the sleeve in a threading position and against the head portion 49 as clearly illustrated at FIG. 3. The cylindrical skirt 57 of the sleeve 55 depends concentrically about the rod 44 and about a short cylindrical guide tube 58 which upstands from the lid surface 11. The guide tube 58 fits into the orifice 14 with the orifice being snugly fitted about a boss 59 at the base of the tube 58 and secured thereto as by a weld 60.

It is apparent that by selectively positioning the plunger head 48 on the guide rod 44 by the turning adjustment of the head 49 and sleeve 55 upon the threads 48, it is possible to manipulate the stroke of the plunger and the amount of syrup which may be pumped with each stroke.

A downward manual pumping stroke will force syrup within the cup 21 into the discharge tube through the side wall orifice 39, and a return stroke, urged by spring 42, will lift the plunger and at the same time reduce the pressure within the cup 21 to the point where it will lift the cup from its seat upon the base 29 to permit the intake valve, formed by base 29 and the orifices 34, to open to permit the cup to fill for a subsequent discharge stroke.

A check valve is necessarily mounted in the discharge tube and the improved check valve 61 is located in the base of the discharge tube 22 adjacent to the sidewall intake orifice 39. The discharge tube 22 includes an enlarged inner portion 62 which extends upwardly into the tube a short distance above the intake orifice 39 to form a cylindrical valve compartment 62 having an annular shoulder 63 at its top and having the top surface of the pilot head stub 26 as its base 64, the orifice 37 is immediately above this base 64.

The valve 65 in this compartment is formed as a short, cylindrical tubular head having an upper segment 66 slidably fitting within the inner portion 62 with the upper end being adapted to abut against the shoulder 63, and having a reduced-diameter segment 67 which is normally adapted to set upon the base. A shoulder 68, or its equivalent, is formed between the segments 66 and 67; and the length of the lower segment is such that when it sets upon the base 64 the shoulder 68 is above the sidewall intake orifice 39. A central passageway 69 extends through the valve 65 and it follows that in the normal position, with the lower segment 67 setting upon the base 64, flow from the cup 21 through the orifice 39 into the cylindrical tube 22 and from the spout nozzle is effectively cut off.

Operation of the unit is now manifest. In the normal position, with the cup 21 full of syrup, the plunger 44 in the up position and the valve 65 closed, the pump is ready for use. Manual depression of the plunger increases the pressure in the cup, which, in turn, acts against the shoulder 68 to lift the valve 65 from its seat and force flow into the discharge tube and through the valve passageway 69. This pumping movement and flow is clearly illustrated at FIGS. 6 and 7.

When fully depressed, the plunger is released and the return, urged by spring 42, changes the pressure pattern to close the valve 65, lift the cup and open the valve formed by base 29 and orifices 34 for intake of syrup as hereinbefore described. This is clearly illustrated at FIGS. 8 and 9. The operation is then ready to be repeated.

I have now described my invention in considerable detail, and since it is obvious that others can devise and build alternate and equivalent constructions which are within the spirit and scope of my invention hence, I desire that my protection be limited not by the constructions illustrated and described but only by the proper scope of the appended claims.

I claim:
1. In a syrup dispensing pump assembly, having a discharge pipe extending through and being affixed to the lid of a syrup container with the upper portion forming a discharge spout and with the lower portion carrying a cup-like pump body and being adapted to be submerged into the contents of a container when in place, a discharge pipe affixed to the bottom of the discharge pipe adapted to support the bottom of the pump body with the pipe extending through an orifice in the bottom of the body and a sidewall intake in the pipe in the portion immediately above the base and within the body; a check valve within the discharge pipe adjacent to the sidewall intake and comprising:
   (a) a cylindrical compartment formed by the walls of the pipe with the floor thereof being formed by the top surface of the base and with a shoulder defining the top edge thereof and the floor thereof being engaged into the passageway of the discharge pipe, and
   (b) a slidable valve body within this compartment having a cylindrical upper segment adapted to slidably fit within the compartment with a substantially leak-proof fit, a lower segment having a reduced diameter, a flat bottom adapted to set upon the floor of the compartment when the valve is closed and a passage-
way extending through the body having its intake at the bottom of the lower segment and its discharge above the upper segment; wherein said sidewall intake is below the upper segment and the cylindrical walls of the compartment extend above the upper segment, whereby with operation of the pump fluid pressure within the cup forces fluid into the discharge pipe and raises the valve body to a position substantially at the top of the compartment to permit flow of fluid through the passageway and into the discharge pipe.

2. In a syrup dispensing pump assembly adapted to be mounted about the lower end of a discharge pipe and upon a disc-shaped base affixed to the bottom of the discharge pipe, wherein the pump includes a cup-like body having an orifice through its bottom through which the discharge pipe extends to permit the cup bottom to set upon the base, a short cylindrical pilot head about the discharge pipe at the upper side of the base whereabouts the cup orifice slidably fits, a sidewall intake in the side of the pipe immediately above the pilot head and piston means within the cup adapted to reciprocate to force fluid into the sidewall intake of the discharge pipe; a check valve within the discharge pipe adjacent to the sidewall intake and comprising:

(a) a cylindrical enlargement at the base of the discharge pipe forming a compartment with the top surface of the pilot head forming the floor of the compartment and with a shoulder defining the top of the compartment where it merges into the passageway of the discharge pipe, and

(b) a cylindrical valve body slidably mounted within the compartment having an upper segment slidably fitting the wall of the compartment with a snug, substantially leak-proof fit, a lower, reduced-diameter segment having its bottom adapted to fit upon the compartment floor with a substantially leak-proof fit and a passageway through the segments with the entrance being at the lower segment bottom; wherein said sidewall intake is adjacent to the lower segment when the valve body is seated upon the compartment floor and the compartment extends beyond the upper segment when the valve body is so seated, whereby to permit fluid pressure at the sidewall intake to shift the valve body to permit flow through the body and into the pipe and to permit fluid pressure in the pipe, when greater than the pressure at the intake, to return the valve body to the seating position against the floor.

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