June 6, 1933. H. T. WHEELER 1,913,062

CALIBRATED NONREVERSIBLE PUMP

Filed Jan. 14, 1930 2 Sheets-Sheet 1

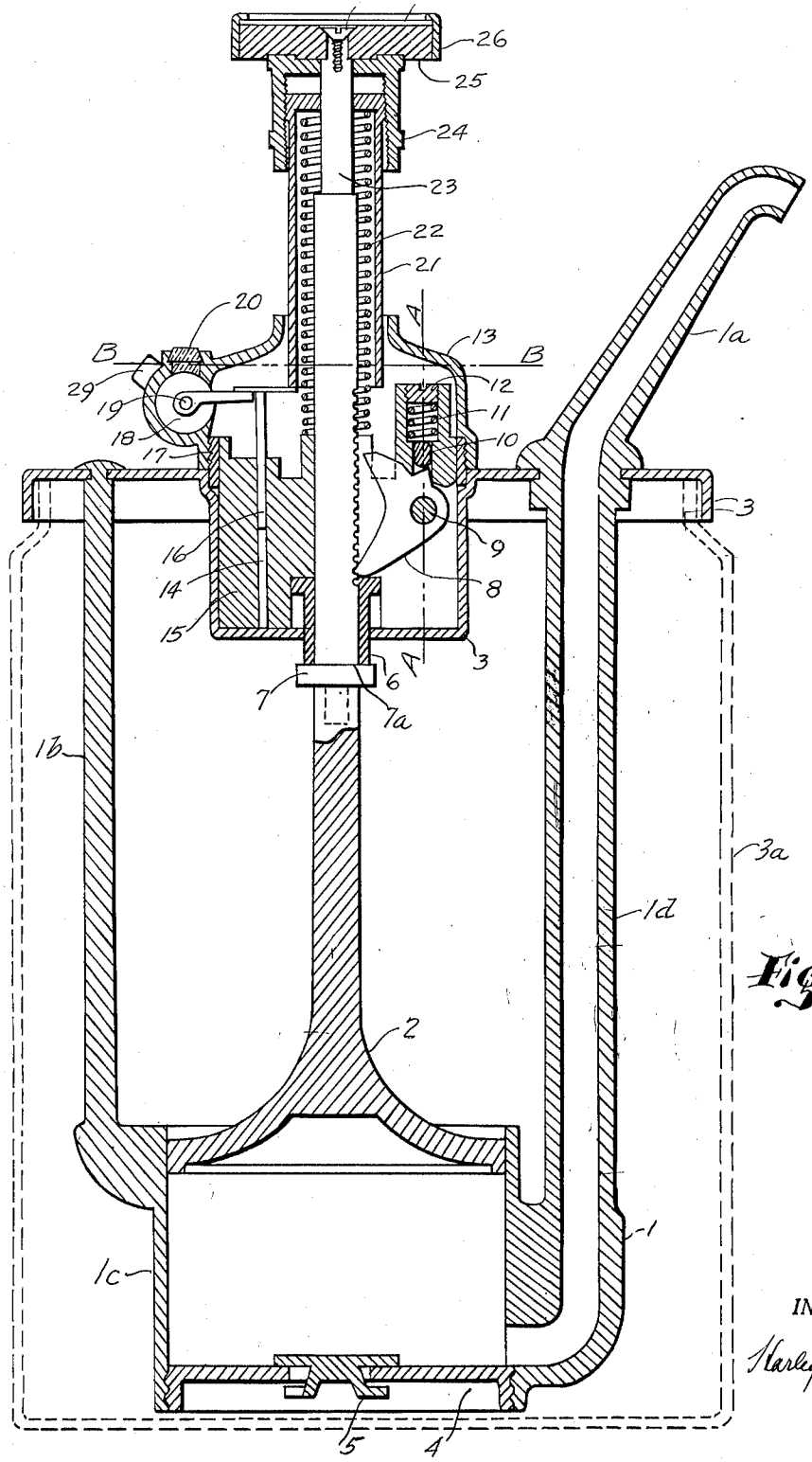


Fig 1

INVENTOR.

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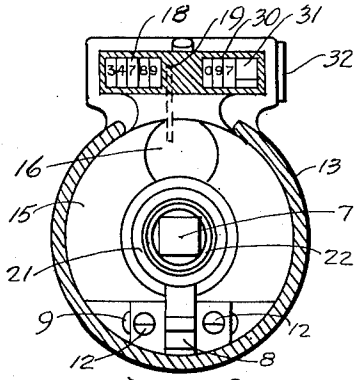


Fig 2

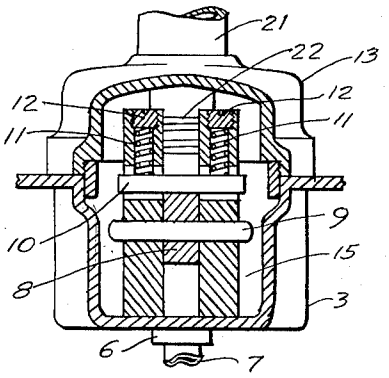


Fig 3

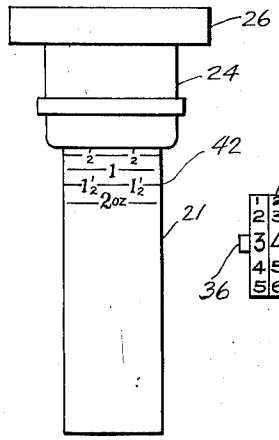


Fig 4

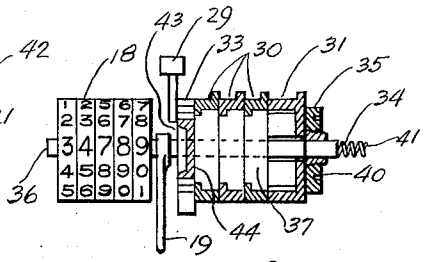


Fig 6

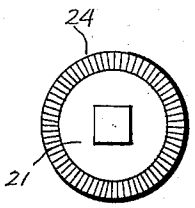


Fig 5

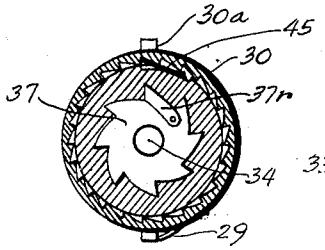


Fig 7

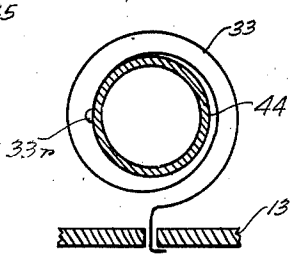


Fig 8

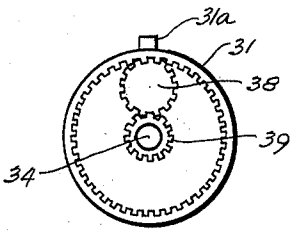


Fig 9

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Patented June 6, 1933 1,913,062

UNITED STATES PATENT OFFICE

HARLEY T. WHEELER, OF DALLAS, TEXAS, ASSIGNOR TO ELIZABETH WHEELER, OF DALLAS, TEXAS

CALIBRATED NONREVERSIBLE PUMP

Application filed January 14, 1930. Serial No. 420,699.

This invention relates to vacuum pumps, more particularly to certain new and useful improvements in liquid beverage pumps adapted especially for use in soda fountain dispensing jars and its principal object lies in its capability of predetermining the quantity of liquid dispensed at each operation, thus insuring the correctness of the mixture that is dispensed by means of this pump.

Another object of this invention is the registering of each operation by totalizing meters which are accurate means of gauging the quantity of the commodity which the pump dispenses.

Another object of the pump is to warn the operator by visible means when the liquid in the dispensing jar is nearly exhausted so that it may be replenished before unproductive strokes are tallied on the totalizing meter.

Another and important object resides in the novelty of structure which makes it necessary for the operator to produce a full stroke in any one direction before the reverse stroke may be started, thus assuring that the amount of liquid predetermined by setting of the pump parts will be dispensed.

Still another and important object is the visible calibration which indicates to the operator the exact amount of liquid the pump is dispensing during one complete operation.

With these objects and advantages in view other objects as well as certain features of construction will become apparent as the description proceeds with the accompanying drawings, wherein;

Figure 1 represents an elevation in cross section of a pump constructed according to this invention.

Figure 2 is a plan view of the meters and reversing device on the cross sectional line BB of Figure 1.

Figure 3 is an end view in cross section of the reversing device, on line AA of Figure 1.

Figure 4 is an elevation of the calibrated sleeve.

Figure 5 is a plan view of the notched clutch for changing stroke.

Figure 6 is a cross section in part of assembled metering device.

Figure 7 is a cross section of a single meter section.

Figure 8 is a cross section of the releasing meter spring.

Figure 9 is an elevation of warning drum driving gears.

Continuing more in detail with the drawings it will be observed in Figure 1 that the cylinder frame 1 is moulded to attach the cover 3 so that nozzle 1*a*, support 1*b* and cylinder housing 1*c* are incorporated in a unit. The piston 2 is moulded over rod 7 and is a complete unit which may be withdrawn from the frame 1 by removing cylinder head 4, unscrewing shield 26 from nut 25 and removing lock screw 28. It is apparent that the cylinder interior, piston and cylinder head may be removed for sterilizing without disturbing the reversing and metering devices. After this has been done the upper section may be dipped in suitable solvents to remove dirt and grit.

The pump is designed to be built on to the conventional cover forming part of the equipment of standard soda fountains without altering any of the overall dimensions and practices as now established and may be adjusted as will be presently apparent to dispense any quantity of liquid desired within the capacity of the piston displacement and in uniform measures. The top 3 is designed to fit the neck 3*a* and rest on the rim of a standard fountain jar, the pump assembly being held in place by its weight. The pump assembly is pulled up or removed from the jar while liquids are replenished and then lowered to place.

Referring to Figure 1, the cylinder 1*c*, while it may be of any capacity is generally constructed to contain three ounces for maximum stroke and has operating therein piston 2 situated on rod 7 which extends upwardly thru the base of 3, thru the bearing 15 and is attached to nut 25 by the locking screw 28. The sleeve 21 acts as a housing for spring 22 and as will later be shown a trip for the reversing device. Sleeve 21 is threaded into adjusting nut 24, which in turn rests in a guiding groove of nut 25, both of these contacting faces being notched to form a

clutch as shown in Figure 5. The section of rod 7 from the shoulder 7*a* to and including top section 23, are usually made square to definitely hold the parts in position. The top of sleeve 21 is a sliding fit to the square shank 23 of rod 7, so that it maintains a fixed position when set by adjusting nut 24 and held by the clutch between nuts 24 and 25, and also provides a hand hold so that nut 24 can be turned to adjust the length of downward stroke. Spring 22 rests on a raised boss of the bearing 15 and pushes upwardly against the closed end of sleeve 21, changing length as the sleeve 21 is raised or lowered with respect to rod 7. The nut 25 and locking screw 28 are covered by suitably designed cover-piece 27, held in place by threaded sleeve 26. It is thus apparent that the downward stroke of the pump is controlled externally without disturbing any other relation of parts and that this adjustment is always locked by the clutch in contact under spring pressure.

On the upward stroke of piston 2 liquid is drawn thru flap valve 5 into cylinder 1*c*, and on the down stroke valve 5 closes forcing the liquid to go upward in delivery tube 1*d* and be discharged thru nozzle 1*a*.

Referring now especially to the means for restraining the piston against reverse motion in incomplete stages of operation; attention is now directed particularly to Figures 1, 2 and 3, showing the vertical piston rod 7 square in cross section, held in alignment by the square hole in bearing 15, also to detent 8 situated in slot of bearing 15, said slot perpendicular to a face of the rod 7. Detent 8 is located and pivoted by pin 9 to operate in extreme downward position as determined by contact with the open end of sleeve 21, and on the extreme upward position as determined by contact of the sliding stop 6 as it is operated by shoulder 7*a* of rod 7. When forced to either extreme position detent 8 is held against rod 7 by pressure from pin 10 to either side of the rocking point formed on the upper side of detent 8. The equalizing bar 10 is held in maximum lower position at all times by two compression springs 11, 11, held in place by lock screws 13, 13. On the downward stroke sliding stop 6 falls to its lowest position determined by the base of 3 thus clearing detent 8 and permitting the latter to vibrate against the teeth on rod 7. Should sleeve 6 stick from gum or foreign matter it will be forced downward as sleeve 21 at its lowest position reverses detent 8.

It will be noted that on one face of rod 7 are cut teeth to contact with points of detent 8 and both are made of suitably hardened materials. The present arrangement of a dentent in a stationary position, the rack teeth cut on the traveling piston rod is a considerable improvement over reversing detents now in use on traveling crossheads. No extra carrier is required, the detent being located in the frame of the pump. The greatest advantage lies in using the detent as a stop for limiting the stroke of the piston rod itself and thus eliminating superfluous levers actuated by springs. This arrangement also makes possible the use of a permanent shoulder on the piston rod to limit the travel one way of the stroke, thus eliminating one adjusting stop with the consequent adjustment necessary. On the opposite stroke the same advantage resides in using the sleeve as a stop, the sleeve also housing the actuating spring and by being extended below the resting point of the spring can reach and trip the detent. It is apparent that this improved construction makes possible the concealment of all parts away from grit, dirt and gum, and practically eliminates the necessity of lubrication of the reversing parts.

Still another advantage to the sleeve for adjustment may be seen in Figure 4. As the adjusting nut 24 is screwed upward, the trip sleeve 21 is advanced downwardly and the stroke is correspondingly shortened. The outside surface of sleeve 21 as it is thus exposed from inside nut 24 is used as a visible indicator to calibrate the volume of delivery. On the lines 42 are stamped terms of liquid measurement, being directly proportional to the volumetric displacement of piston 2 on its downward stroke, the figures in Figure 4 representing in this example, ounces. Thus the amount which the pump dispenses may be verified or changed without the arduous method of measuring the liquid delivered in a standard graduate.

Referring now especially to the recording meter which tallies the amount of liquid actually dispensed thru the pump built according to this invention, in Figure 2 a plan view shows a standard totalizing meter 18, and on the same shaft center line a standard trip meter 30, to one side is drum 31, a space on its circumference colored to serve as a warning signal when the syrup jar is nearly empty. Door 32 provides access to the meter equipment. On each downward stroke sleeve 21 contacts with piston 16 which in turn rotates arm 19 sufficiently to advance the totalizing meter one unit, as well as meter 30 and warning drum according to its gearing. As desired the meter 30 and drum 31 may be instantly returned to a zero setting by pressing button 29. It is apparent that meter 18 preserves the total of all complete reversed operations of the pump while meter 30 is useful for visualizing the dispensations made each time the jar is replenished with syrup and that drum 31 is the warning to refill the jar, for otherwise when the liquid goes too low the pump priming fails, the operations then registered on the meter 18 do not represent actual syrup dispensations.

Referring now to Figures 6 and 7 to 9, the

details in particular of the meter construction are shown in cross sections. The actuating motion for both meters is obtained by rocking motion of arm 19 as shown in Figure 6. Meter 18 is a standard ratchet type with a central shaft on one end of which is a male friction clutch 43. On shaft 34 is situated a corresponding female clutch 44, the latter held against clutch 43 by the compressed spring 41, housed in the body of door 32 of Figure 2. Thus, as shaft 36 is rotated, so is shaft 34. Cores 37 represent standard ratchet meter sections as are now manufactured, on the circumference of which is constructed the present instantaneous release cylinders 30. Drum 31 is attached to shaft 34 by screwing up spanner nut 35 thus compressing the split sleeve extension of drum 31 against shaft 34. Pressure on button 29 separates clutch face 44 from 43 and permits spiral spring 33 to rotate shaft 34 independently of the fixed position of shaft 36 and meter 18. Thus after a period of operation in which meters 18 and 30 have progressed in step with each other, meter 30 may be disengaged and returns to a previously determined setting by energy stored up in spiral spring 33, released by pressure on button 29 which opens the clutch face, 44, 43, disconnecting shafts 34 and 36.

Referring now in detail to Figure 7, shaft 34, core 37 and ratchet 37*r* represent a standard manufactured meter section. To this is added the present instantaneous release consisting of outer shell 30 on which numerals are etched or stamped and driving spring 45 attached to core 37 in a recess of the surface of the same. On the inner surface of shell 30 are formed pawl sockets into which spring 45 fits successively according to rotation. If core 37 is rotated anti-clockwise shell 30 conforms to this direction by fit of spring 45 into the nearest pawl socket. Lug 30*a* is an integral part of shell 30; should shaft 34 be rotated clock wise, the shell 30 will do likewise until lug 30*a* contacts with a projection of button 29 which moves into line with lug 30*a* on point of release, thus bringing the numerals stamped on the outer face of shell 30 to a predetermined stop, which for practical purposes would be a zero visible setting.

The actuating release of meter 30 is energy stored up in spiral spring 33 as shown in Figure 8. With button 29, Figure 6, in outward or free position, shafts 34 and 36 rotate simultaneously, spiral spring 33, attached at inner end to female clutch 44 by rivet 33*r* and at outer end by attachment to case 13, is wound. Should rotation of meter 30 continue without occasional release, spring 33 will finally be wound tightly around clutch 44 causing the latter to slip around clutch 43, thus avoiding damage to the meter parts altho meter 30 will no longer advance while this condition exists. Referring back to Figure 6 it is apparent that when button 29 separates shafts 34 and 36, all sections of meter 30 and drum 31 will be returned to the original setting and spring 33 will unwind in so performing the operation.

In Figure 9 is shown the driving mechanism of drum 31, being a gear 39 attached to shaft 34, driving one or more gears 38 to connect with annular gear formed on inner surface of drum 31. On this housing is made the ratchet release shown in Figure 7, so that when rotated in reverse direction lug 31*a* will stop the drum 31 at a predetermined location. As it is necessary to have the warning signal become visible according to the number of operations of each individual pump, some pumps delivering larger quantities than others, spanner nut 35 connects drum 31 to shaft 34 at the desired point, as hereafter will be explained.

In operation of the pump and fittings built according to this invention: Sleeve 21 is set by the visible scale at the required dispensation, for example 1 ounce. With the jar full of syrup, for further example 128 ounces the pump is operated until the pump cylinder is nearly exposed and sufficient syrup remains to maintain priming for successive operations. Meter 30 is read at this point, which reads for example 101 ounces. Cover 32 is removed, spanner nut 35 is loosened and drum 31 rotated until the warning signal color fully occupies the space in the observation glass and cover 32 is replaced. Liquid in the jar is replenished, button 29 is pressed, returning meter 30 to zero and the warning signal moves out of sight. So are succeeding cycles of operation and replenishing performed, the total number of dispensations being recorded on meter 18, giving an accurate account of liquid producing operations. At intervals the pump is dipped in sterilizing solutions, the materials used being chosen to withstand detrimental chemical actions.

Manifestly, the construction illustrated and described is capable of considerable variation, and as such variation as is within the scope of the appended claims is considered within the spirit of the invention.

I claim:

1. In a pump, having a cylinder with a piston and a piston rod therein, a series of teeth cut on said rod, a sleeve housing having an internal shoulder and situated on the upper end of the rod, an actuating spring located around the piston rod and situated on the frame of the pump and reacting against the internal shoulder of said sleeve housing, a double pointed detent pivoted at a point fixed with relation to the pump frame, either point of said detent engageable with the series of teeth on the piston rod, a pointed projection on the detent contacting with a sliding spring actuated pawl to hold the de-

tent in either of its positions, a shoulder integral with the piston rod contacting with a movable sleeve, said movable sleeve contacting with one face of the detent to reverse it in one direction, an extension of the spring housing sleeve reaching beyond the spring resting point to contact with a face of the detent and reverse said detent in the opposite direction.

2. In a pump, a cylinder having a piston and piston rod therein, a series of teeth cut on said rod, a double-acting detent pivotally situated in a fixed position in the pump frame and engaging the teeth cut on the piston rod, a shoulder on the piston rod contacting with a movable sleeve, said sleeve in turn contacting with a face of the detent to reverse said detent in one direction and always at the same point of piston travel, a sleeve housing having an external shoulder which is a sliding fit to the upper section of the piston rod, said sleeve housing an actuating spring located around the piston rod and situated on the frame of the pump and reacting against the internal shoulder of said sleeve housing, a nut rotatably situated on the end of said rod and threaded to fit said sleeve housing, said sleeve housing visibly calibrated in terms of liquid measurement proportional to piston displacement as referred to a fixed point on the piston rod, the rotation of said nut positioning said sleeve with reference to said detent to reverse the latter in the opposite direction at that point of piston travel corresponding to the visible calibration of said sleeve in terms of liquid measurement, and means to hold the detent in either of its two positions.

In testimony whereof I have signed my name to this specification.

HARLEY T. WHEELER.