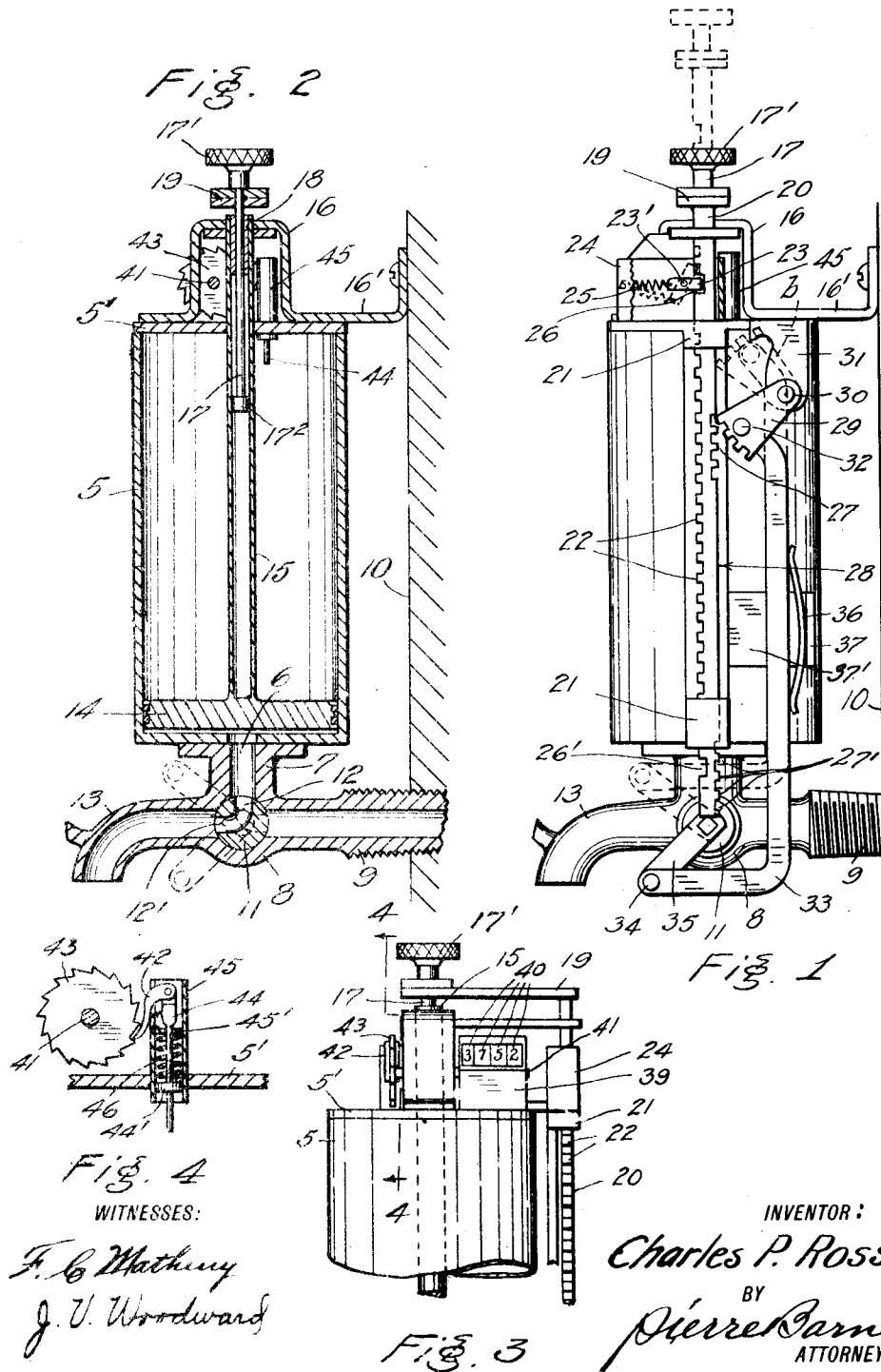


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LIQUID MEASURING APPARATUS.
APPLICATION FILED JULY 13, 1912.

1,066,660.

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LIQUID-MEASURING APPARATUS.

1,066,660.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHARLES P. ROSS, citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Liquid-Measuring Apparatus, of which the following is a specification.

This invention relates to liquid measuring pump apparatus, and its object is the perfecting of devices of this character whereby the number of parts is reduced, its operation simplified and rendered more positive, and in the provision of improved appliances whereby the valve which controls the filling and emptying of the pump cylinder is in operation interlocked with the mechanism employed in actuating the pump piston.

The various features of my invention are illustrated in the accompanying drawings, in which:—

Figure 1 is a side elevation and Fig. 2 is a longitudinal vertical section of a liquid measurer embodying the present invention. Fig. 3 is a fragmentary front elevation of the same. Fig. 4 is a detail sectional view taken through 4—4 of Fig. 3.

The reference numeral 5 designates a pump cylinder having an opening in its lower end which connects with a passage 6 provided in a branch 7 of a valve body 8. The tubular shank 9 of said body extends through the wall, indicated by 10, of a cask, barrel, or other vessel from which liquid is to be drawn. The body 8 is bored to accommodate a rotary plug valve 11 provided with a passage composed of two radially disposed parts 12 and 12' which are arranged to afford communication between the passage 6 and either the intake or discharge portions of the duct which extend respectively through the shank 9 or the bibb 13 of the valve body. Fitted within the pump cylinder is a piston 14 having a tubular stem 15 which extends through the upper head 5' of the cylinder and through a frame 16 which is rigidly secured to the top of the latter. The frame 16, as shown, is formed with a bracket arm 16' which is apertured to receive a screw which engages in the wall 10 and serves with the shank of the valve body for securing the apparatus rigidly thereto. Extending into the upper end of the piston-stem 15 is a rod 17 provided at its top with a head 17' whereby the rod is grasped in hand of the operator for reciprocating the

same to actuate the apparatus. At its lower end, said rod is provided with a collar 17² which, upon being pulled upwardly with the rod, first encounters the bushing 18 secured in the upper end of the stem 15 and then causes the stem and piston to be elevated with the further upward movement of the rod. Rigidly secured to said rod is a transversely arranged bar 19 which is secured to or formed integral with an upright rack-bar 20 extending through guides, such as 21, rigidly connected with the cylinder 5. Along the front edge of the bar 20 it is provided with teeth 22 which are successively engaged by a pawl 23 as the bar is moved up or down through the medium of the rod 17. The pawl 23 is housed in a casing 24 connected to said cylinder and is fulcrumed intermediate its length to a pivotal pin 23'. 60

A helical spring 25 is connected to the pawl as shown in Fig. 1 and tends to maintain the same in a horizontal position. Adjacent the upper and lower ends of the rack-bar are recesses 26 and 26' wherein the pawl enters near the termination of the downward and upward strokes of the rack bars to enable the pawl to be first brought by the spring 25 into a horizontal position in the respective recesses and then be tilted by the rack bar in the subsequent strokes of the bar so as to engage the successive teeth thereof and prevent any reverse movement of the rack bar during a stroke of the same, or until the pawl enters one or the other of said recesses. At the rear of said rack bar are groups of teeth 27 and 27' with an intervening straight edge 28 therebetween. These groups of teeth are disposed to be engaged by the teeth of a sector gear 29 during early and ultimate portions of the up and down strokes of the rack-bar. That is to say, during the early part of its upward stroke the teeth 27' of the lower group engage the teeth of the sector gear to cause the latter to be swung upwardly from the position in which it is represented by full lines in Fig. 1 to that indicated by broken lines *b* in the view. The gear remains in such position until it is engaged by teeth 27 and restored to its full line position in the early portion of the following downstroke of the rack-bar. 75

30 represents the pin by which the sector gear is pivotally connected to a stationary support 31. Between the pin 30 and the outer end of the sector gear is a stud 32 whereby the gear is connected to the upper 80

end of a link 33 whose lower end is connected by a pin 34 provided on a crank arm 35 which is rigidly secured to the valve 11. A spring 36 interposed between the link 33 and the lug 37 of a bracket 37' tends to push the upper end of the link forward to present the gear 29 in position to be engaged by the aforesaid groups of teeth.

The cylinder 5 is constructed to contain a predetermined quantity of liquid, as a half pint for example, and each time the rod 17 is pulled up to its extreme height, that quantity of the liquid will be drawn into the cylinder through the office of the piston 14. Devices are provided upon the cylinder for recording the number of times the cylinder has been thus utilized. To which end, 39 represents the casing of a meter (Fig. 3) having a plurality of wheels 40 severally marked with numerals which are progressively presented at a sight hole in the casing. These wheels are actuated from a shaft 41 which receives intermittent rotary motion from a vertically reciprocating pawl 42 engaging the teeth of a ratchet wheel 43 mounted on the shaft. The pawl 42 is pivotally connected to the upper end of a rod 44 whose lower end protrudes into the cylinder as shown in Figs. 2 and 4.

The rod 44 is desirably inclosed in a tube 45 secured to and extending through the cylinder end 5'. A spring 46 acting between a partition 45' of the tube and a collar 44' provided on the rod serves to restore the rod and the attached pawl to their lowermost, or normal, positions and subsequent to their being elevated by the piston when pulled against the rod 44.

In the operation of the invention, when the rod 17 is raised or lowered it primarily is moved independently of the stem 15 and the piston 14 and in being thus moved it regulates the valve 11 so as to allow the liquid to be drawn into the cylinder 5 by the piston when raised or discharged from the cylinder by the piston when the same is pushed down. The valve is always operated when the piston is motionless, or vice versa.

What I claim, is:—

1. In apparatus of the class described, a pump cylinder open at its lower end, a two-way valve at the open end of the cylinder, a piston for said cylinder, a hollow piston rod carried by said piston, a rod extending

downwardly in the upper end of the piston rod for elevating the same, and mechanism arranged intermediate the rod and valve for operating the latter when the piston is at rest.

2. In apparatus of the class described, a pump cylinder having an opening therein, a valve for said opening, a piston within said cylinder, a rod for operating the piston, a rack-bar secured to said rod, a sector gear engageable with the rack-bar near the ends of the strokes of the same, a link connecting the sector-gear with said valve, and means whereby the rack-bar is prevented from being moved in reverse direction before the termination of successive strokes.

3. In apparatus of the class described, a cylinder having an opening, a valve, a body for the valve and provided with inlet and discharge passages and a branch passage connecting with the cylinder opening, means whereby said valve is operated to admit the liquid into the cylinder through said inlet and branch passages, said means also serving to regulate the valve for the discharge of liquid through said branch and discharge passages, and being inoperative with respect to the valve while the liquid is being drawn into or expelled from the cylinder.

4. In apparatus of the class described, the combination of a pump cylinder, an inlet and outlet valve therefor, a piston for said cylinder, a tubular stem for the piston, a rod extending into said stem and engageable therewith for reciprocating said piston operative connections between said rod and the valve whereby the latter may be operated independently of the piston while the latter is motionless.

5. In apparatus of the class described, the combination of a pump cylinder, an inlet and outlet valve therefor, a piston for said cylinder, a tubular stem for the piston, a rod extending into said stem and engageable therewith for reciprocating said piston, and operative connections between said rod and the valve whereby the latter may be operated independently of the piston.

Signed at Seattle, Washington, this 1st day of July 1912.

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Witnesses:

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