

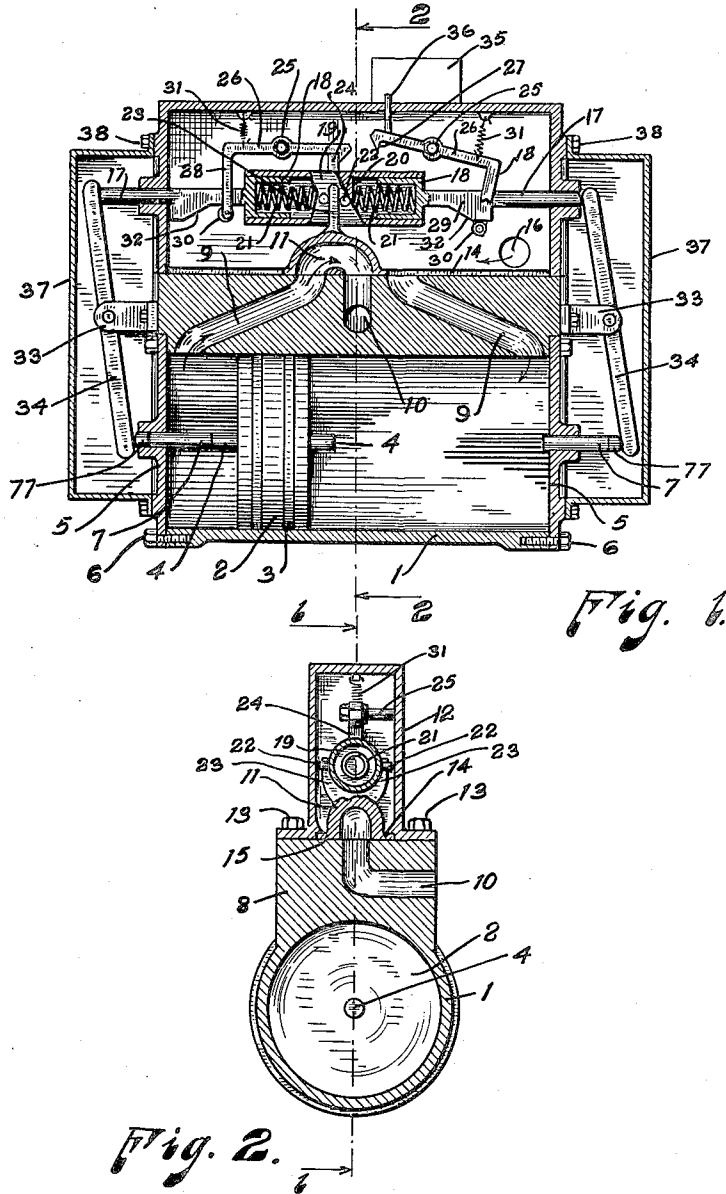
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LIQUID MEASURING DEVICE

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LIQUID-MEASURING DEVICE.

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To all whom it may concern:

Be it known that I, JAMES D. MERCER, a citizen of the United States, residing at Hugo, county of Lincoln, and State of Colorado, have invented certain new and useful Improvements in Liquid-Measuring Devices; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates to meters of the type employed in measuring liquids.

In many places and especially where large quantities of gasoline are sold, it often becomes necessary to provide meters that correctly measure the amount of liquid that flows through a certain pipe.

I am aware that meters of various types have been invented and I do not claim to be the first inventor of a liquid meter. I have, however, made certain valuable improvements in the construction of this type of meter, which it is my object to describe in detail and to claim.

My invention can be best described and will be most readily understood when reference is had to the accompanying drawing in which the present preferred embodiment thereof is shown, and in which:

Fig. 1 is a section taken on line 1—1, Fig. 2; and

Fig. 2 is a section taken on line 2—2, Fig. 1.

My improved meter comprises a cylinder 1 within which is movably connected the piston 2, which is provided with a plurality of piston rings 3. The piston is also provided with axially extending members 4. Secured to the ends of the cylinder are cylinder heads 5 which are held in place by bolts 6. Each cylinder head has a central opening, within which is reciprocally mounted a rod 7. The upper side of the cylinder, which I have designated by the numeral 8, is thicker than the other parts of the cylinder. The upper surface of the part 8 is flat, in the manner shown. Intake ports 9 extend from points adjacent the central portion of the part 8 to the inside of the cylinder near the ends of the same. An

exhaust port 10 opens between the intake ports 9. A D-slide valve 11 cooperates with the surface of the side 8 to alternately connect the intake ports with the exhaust port. The arrangement of the piston intake ports, exhaust port and the slide valve is the same as in an ordinary steam engine. The slide valve is enclosed in a housing 12, which corresponds to the steam chest of an ordinary steam engine. This housing is held in place by bolts 13. A groove 14 may be provided adjacent the surface of the part 8 for the reception of the flanges 15 of the slide valve. The housing 12 has an opening 16 in one side, which serves to admit the fluid from the supply source. It is now necessary to provide means for shifting the slide valve when the piston has reached the end of its stroke and for this purpose the following mechanism is provided:

I provide each end of the housing 12 with an opening for the reception of a bar 17, which extends inwardly and terminates in cupped ends 18. Ends 18 are slidably connected with the hollow tubular member 19. This member has a central transverse partition 20. Springs 21 extend between the partition 20 and the bottom of the cupped ends 18. The tubular member 19 is also provided with spaced, outwardly projecting lugs 22, between which the upwardly extending portion 23 of the slide valve extends, and which transmits motion from the former to the latter. The tubular member 19 is also provided with an upwardly projecting lug 24. Pivoted on the bolts 25 are detents having a straight body portion 26 provided at one end with a hook 27 adapted to cooperate with the lug 24 for the purpose of holding the member 19 against movement. The other end of part 26 is bent at right angles, as indicated by numeral 28. The portion 28 is forked and straddles the flattened part 29 of the bar 17. A roller 30 is pivoted between the ends of portion 28. Springs 31 are normally under tension and tend to move the rollers 30 against the edge of the part 29. Each part 29 has a cam surface 32 whose function will presently appear. At a point substantially equidistantly between bars 7 and 17 I secure brackets 33 to which I pivot the levers 34. These levers have their ends in contact with the ends of the bars 7 and 17, in the manner

shown in the drawing (Fig. 1). To the top of the housing 12 I secure a counter 35. A plunger 36 extends through the housing and into the path of the member 26. Each time the plunger 36 is moved outwardly, the counter adds one unit.

The levers 34 and associated parts are enclosed by the covers 37, which are secured to the cylinder head and to the end of the housing by means of bolts 38.

The operation of my meter is as follows:—The pipe from the source of supply is connected to the housing so as to communicate with the opening 16 and the exhaust port is connected to the delivery pipe. When the parts are in the position shown in Fig. 1, the liquid enters the housing through the opening 16 and flows into the cylinder through the intake port on the right, which is shown uncovered. As the liquid flows into the cylinder the piston moves toward the left. When it reaches the position shown in Fig. 1, the part 4 engages the inner end of the rod 7. Any further movement of the piston and the rod 7 will cause the lever 34 to rotate about its pivot and to move bar 17 inwardly. This causes the spring 21 to be compressed. When the cam 32 engages the roller 30, it causes the latter to be moved downwardly, thus moving the hook 27 upwardly and releasing the tubular member 19, which will move quickly to the right, carrying with it the slide valve 11 and thereby connecting the righthand intake port with the exhaust port and opening the lefthand intake port to the chamber within the housing. The liquid will now enter the cylinder in the left of the piston and the latter will then start moving toward the right. When the piston has moved a predetermined distance the slide valve will be moved into the position shown in Fig. 1.

It is my intention to have the parts of such size and so related that each stroke of the piston will displace one-half gallon so that each double stroke will mean one gallon. The counter is operated once for each two strokes and therefore registers gallons.

In the drawing the cams 32 and lug 24 have purposely been exaggerated in size so as to make them more clearly visible. It is my intention to make these parts as small as possible so that the shifting of the valve will always take place when the piston reaches the predetermined position.

I want to call particular attention to the valve-operating mechanism, as it is to this that my invention is directed.

Although I have stated that it is my intention to make the meter of such size that each double stroke of the piston will measure one gallon, I do not want to be limited as to size, as it will often happen that the requirements are such that a much larger capacity is necessary or a smaller capacity sufficient.

In the drawings the rods 7 have been designated in a more or less diagrammatic way. It is, however, my intention to provide each rod with an adjusting means such as is commonly employed in connection with the push rods of automobiles, so that the length of the rod can be adjusted and compensation made for wear.

In the drawing I have indicated this adjusting means by the numeral 77.

Having now described my invention, what I claim as new is:

1. In a fluid metering device, in combination, a cylinder, a piston mounted for reciprocation therein, cylinder heads attached to the ends of the cylinder, a housing attached to one side of the cylinder, the wall of the cylinder having intake ports extending from the interior of the housing to the ends of the cylinder, said wall being also provided with an exhaust port opening into the housing at a point intermediate the intake ports, a V-slide valve slidably connected with the side having the port openings, means for moving said slide valve at the end of each stroke of the piston, said means comprising a tubular member operatively connected to the slide valve, said member having a spring abutment intermediate its ends, a spring in each end of said tubular member, a rod slidably connected to the tubular member at each end thereof, said rods projecting through the end walls of the housing, a lug on the tubular member, a detent pivotally connected to the housing, said detent being adapted to engage said lug, resilient means for holding the detent in lug engaging position, means on the rods for moving the detents to a position away from said lug, and means for making said last-named means operative when the piston reaches the end of its stroke.

2. In a fluid metering device, in combination, a cylinder, a piston mounted for reciprocation therein, cylinder heads attached to the ends of the cylinder, a housing attached to one side of the cylinder, the wall of the cylinder having intake ports extending from the interior of the housing to the ends of the cylinder, said wall being also provided with an exhaust port opening into the housing at a point intermediate the intake ports, a D-slide valve slidably connected with the side having the port openings, means for moving said slide valve at the end of each stroke of the piston, said means comprising a tubular member operatively connected to the slide valve, said member having a transverse spring abutment intermediate its ends, a spring in each end of said tubular member, a rod slidably connected to the tubular member at each end thereof, said rods projecting through the end walls of the housing, a lug on the tubular member, a detent pivotally connected to the housing, said

detent being adapted to engage said lug, resilient means for holding the detent in lug engaging position, means on the rods for moving the detents to a position away from
5 said lug, said last-named means comprising cams on the bar for operatively engaging the detent, and means for rendering the de-

tent-moving means operative when the piston reaches the end of its stroke in either direction, whereby the tubular member and the 10 slide valve is moved.

In testimony whereof I affix my signature.

JAMES D. MERCER.