

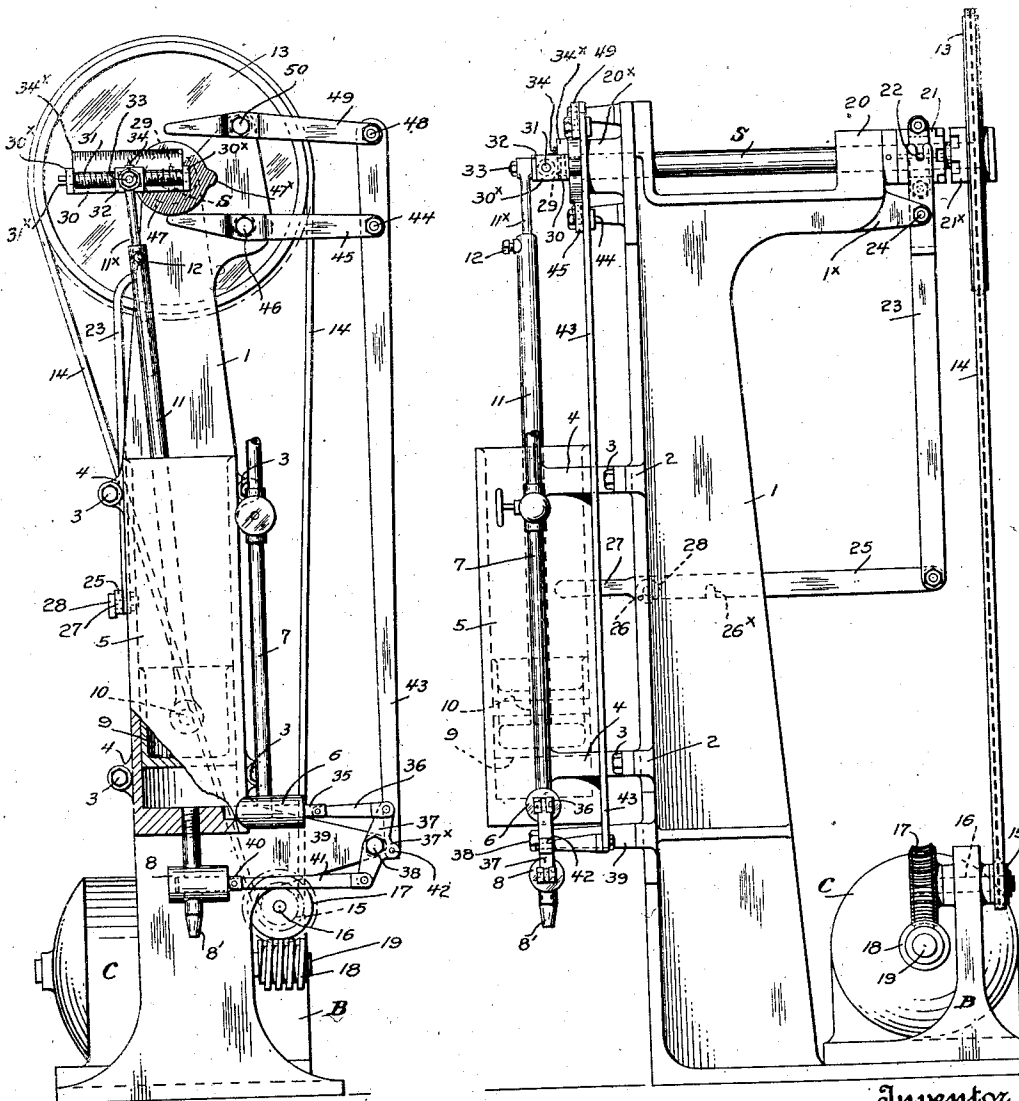
E. EGER.
LIQUID MEASURING PUMP.
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Patented Aug. 30, 1921.

1,389,547.

Fig. 1.

Fig. 2.



Inventor,
Ernst Eger,

By his Attorney.

Ernest Hopkinson

UNITED STATES PATENT OFFICE.

ERNST EGER, OF DETROIT, MICHIGAN, ASSIGNOR TO MORGAN & WRIGHT, A CORPORATION OF MICHIGAN.

LIQUID-MEASURING PUMP.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ERNST EGER, a citizen of Austria, residing at Detroit, county of Wayne, and State of Michigan, have invented certain new and useful Improvements in Liquid-Measuring Pumps, of which the following is a full, clear, and exact description.

The invention has for its object the provision of positive and accurate means, in apparatus of the present character, for measuring a desired quantity of liquid, the apparatus including means whereby the measurement may be changed at the will of the operator.

The invention will be understood by the accompanying drawings, in which:

Figure 1 is a front elevation, partly in section, of an apparatus embodying the invention; and

Fig. 2 is a side elevation of the same.

The embodiment of the invention illustrated in the drawing consists of a standard 1 provided with laterally extending lugs 2, the latter being apertured to receive bolts 3 which pass through apertured lugs 4 formed on a pump cylinder 5, the bolts thus serving to secure the pump cylinder to the standard.

The pump cylinder at its lower end is provided with an inlet valve, the valve casing 6 of which communicates with a pipe 7 leading to a source of supply for the liquid. The pump cylinder is also provided with an outlet valve, the outlet valve casing 8 communicating with a nozzle 8' through which the liquid is discharged from the pump. The pump piston 9 is pivotally connected at 10 to a piston rod 11, 11', the member 11' telescoping into an axial bore formed in the member 11, the two members being rigidly connected in the desired adjusted position by means of a set screw 12.

The piston rod is driven, through certain connections hereinafter described, by means of a rotary shaft S journaled in bearing bosses 20, 20', rising from the standard 1, said shaft having keyed thereon a sliding clutch member 21 adapted for engagement with a similar clutch member 21' formed on the hub of a drive wheel 13 loosely mounted on the drive shaft. Drive wheel 13, in this instance a sprocket, is constantly driven by means of chains 14, the chain being led around a small sprocket 15 on a shaft 16

journaled in suitable bearings provided by a short standard B. The shaft 16 carries a worm wheel 17 in mesh with a worm 18 on shaft 19, the latter being driven by a motor C.

Clutch member 21 carries a projecting stud 22 engaged by the yoked end of a clutch operating-lever 23, fulcrumed at 24 upon an extension 1' of standard 1. And the said operating lever 23 at its lower end is pivotally connected to an arm 25 formed with notches 26, 26', the said arm being provided with a handle 27. A stud 28 is secured to the standard, and is of a size to be received within either of the said notches. When the arm is disposed as shown in Fig. 2, with the notch 26 in register with stud 28, the clutch is held disengaged by lever 23. By moving arm 25 to the left of the figure, so that notch 26' will be placed in register with the stud 28, lever 23 will be operated to throw the clutch members into engagement, so that the drive shaft will be rotated to operate the pump.

The adjustable connections intermediate the pump piston and drive shaft S are as follows: Secured to the shaft S, by means of the tapered pin 29, or otherwise, is an arm 30 formed at its opposite ends with the angular extensions 30' which serve as bearing members for a screw 31 the latter being formed with a squared end 31' to receive a wrench or other adjusting member. Threaded upon screw 31 is a block 32, the said block being pivotally connected at 33 with the upper member 11' of the piston rod.

The block 32 carries a pointer 34 so that the exact position of the block with respect to the arm may be indicated by the pointer upon a plate 34' carried by the arm and marked with a graduated scale.

It will be understood by reference to Fig. 1 that as the block 32 is moved to the left and hence away from the axis of movement of the arm, a correspondingly longer stroke will be given to the piston rod 11 and piston 9, and hence a correspondingly greater quantity of liquid will be forced into the pump chamber. The graduations on plate 34' may indicate either volume or weight of the liquid, as will be understood without further explanation.

When the stroke of the piston is increased, it may be necessary to correspondingly change its position to a point more remote

from the bottom wall of the chamber. To this end the piston rod is made sectional for adjustment as to length. Thus when it is desired to measure a greater volume
 5 of liquid, the block 32 is adjusted accordingly, the nut 12 loosened, and the length of the piston shortened by moving the member 11 upwardly in proportion with the increase of the stroke of the piston, the effect of these
 10 combined adjustments being to increase the stroke of the piston and the quantity of liquid forced into the pump chamber.

The inlet and outlet valves of the pump are automatically operated by means of the following instrumentalities: The inlet valve
 15 casing 6 is provided with a slide valve member 35 connected by link 36 with an operating lever 37 fulcrumed at 38 upon a bracket 39 extending from standard 1; and the outlet valve casing is provided with a sliding
 20 valve member 40 connected by link 41 with the opposite end of lever 37. Operating lever 37 is provided with a short arm 37* pivotally connected at 42 with a link 43
 25 connected at 44 with a lever 45 fulcrumed at 46 upon the standard 1, the lever 45 being in register with a cam 47 on drive shaft S. Link 43 at its upper end is also pivotally
 30 connected by stud 48 with a lever 49 fulcrumed at 50 upon the said standard 1 and in register with the said cam 47. The cam 47 is provided with a peripheral projection 47* which is adapted to operate the levers
 35 alternately in opposite directions, serving thereby to operate lever 37 and, through the latter, the inlet and outlet valves.

In the operation of the apparatus (assuming the piston 9 to be in its lowermost position after the conclusion of a discharge
 40 stroke) the movement of clutch arm 25 to the left from its position in Fig. 2 will swing link 23 in a direction to engage the clutch members. Thereupon the rotation
 45 of drive wheel 13 will effect a corresponding rotation of the main drive shaft, and arm 30 connected with the piston rod will be moved upwardly, a corresponding movement being given to the piston. Preliminary to
 50 the upward stroke of the piston, the raised portion 47* of cam 47 will engage and impart a "kick" to the inner end of lever 49, thus moving link 43 downwardly and swinging valve operating lever 37 in a direction
 55 to open the inlet valve and close the outlet valve. The upward or suction stroke of the piston will continue until it reaches its final position, at which point the raised peripheral portion of cam 47 will engage

and impart a "kick" to lever 45, thereby
 60 moving link 43 upwardly and reversing the position of lever 37, this movement of lever 37 closing the inlet valve and opening the outlet valve for the discharge of the liquid
 65 from the pump cylinder. The continued rotation of the shaft will, through arm 30, move the piston rod and piston downwardly, the liquid being forced through nozzle 8'.

The telescopic construction of the piston rod permits the piston in its stroke to start
 70 from the bottom of the cylinder, and thus the cylinder may be cleared of liquid at the end of each downward stroke when desired.

Having thus described my invention, what I claim and desire to protect by Letters
 75 Patent is:

1. A pump comprising a cylinder and a piston therein, adjustable means for reciprocating the piston to vary the stroke of the piston, and adjustable connections between the piston and the means for reciprocating the piston.

2. A pump comprising a cylinder and a piston therein, a crank shaft, an adjustable crank connected to the shaft, and an adjustable connecting rod connected to the crank and the piston.

3. A pump comprising a cylinder and a piston therein, means for reciprocating the piston, means for adjusting said means for varying the stroke of the piston, and other means for adjusting the position of the piston for maintaining it at a predetermined distance from one end of the cylinder at one end of its stroke, regardless of the stroke of the piston.

4. A liquid measuring pump comprising a cylinder and a piston therein, means for reciprocating the piston, means for adjusting said means for varying the stroke of the piston, means controlled by the said adjusting means for measuring the quantity of liquid, and other means for adjusting the position of the piston from one end of the cylinder at one end of the stroke regardless of the stroke of the piston.

5. A liquid measuring pump comprising a cylinder and a piston therein, a crank shaft, an adjustable crank connected to the shaft, means adjustable with the crank for measuring the quantity of liquid, and an adjustable connecting rod connected to the crank and the piston.

Signed at Detroit, county of Wayne, and State of Michigan, this 12th day of June, 1919.

ERNST EGER.