April 8, 1924. 1,489,779

R. MOHR

PUMP

Filed Oct. 30, 1922 2 Sheets-Sheet 1

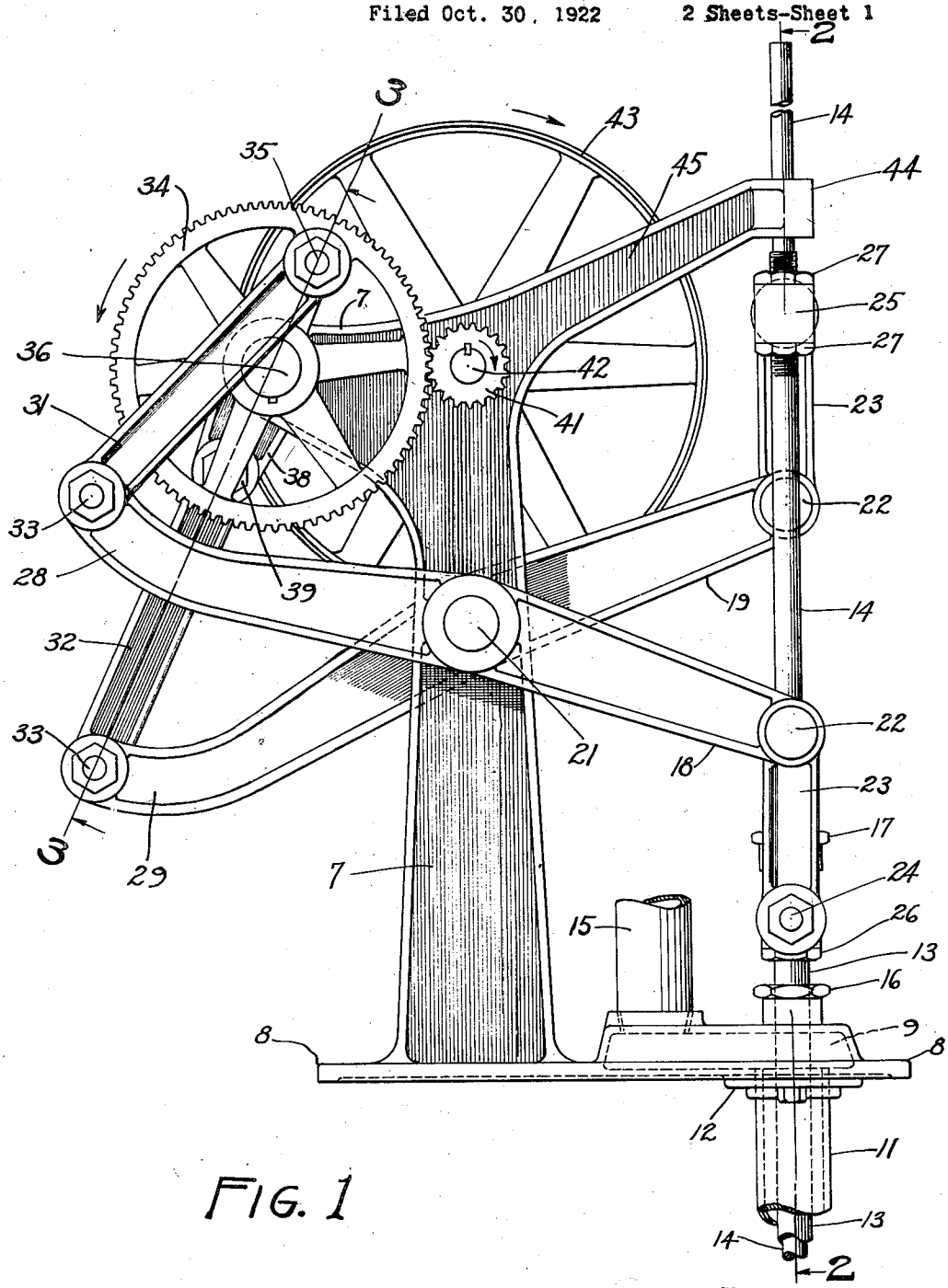



FIG. 1

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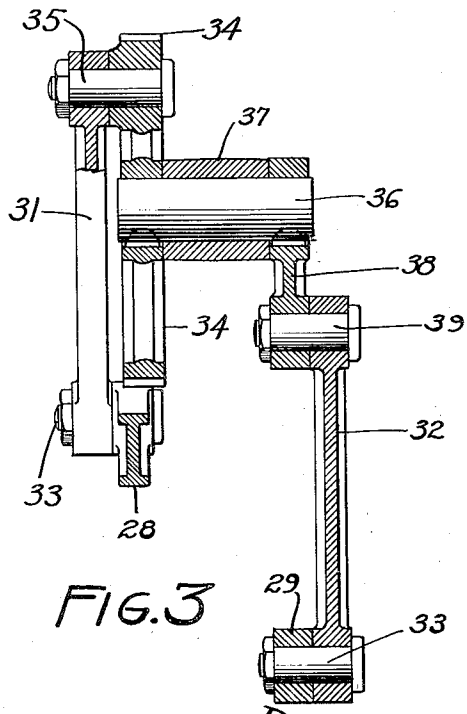



FIG. 3

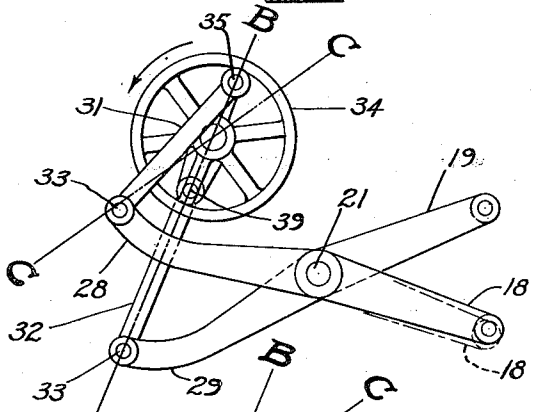



FIG. 4

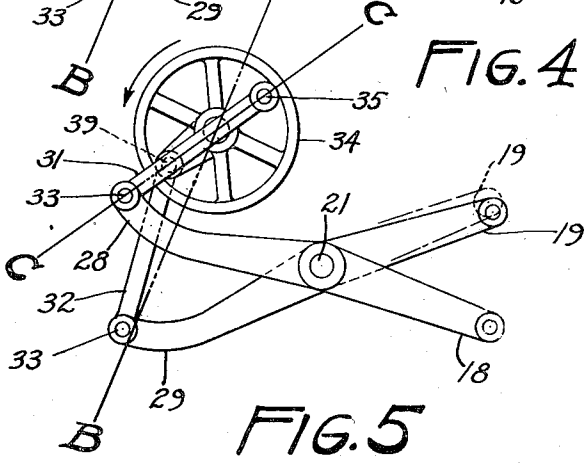



FIG. 5

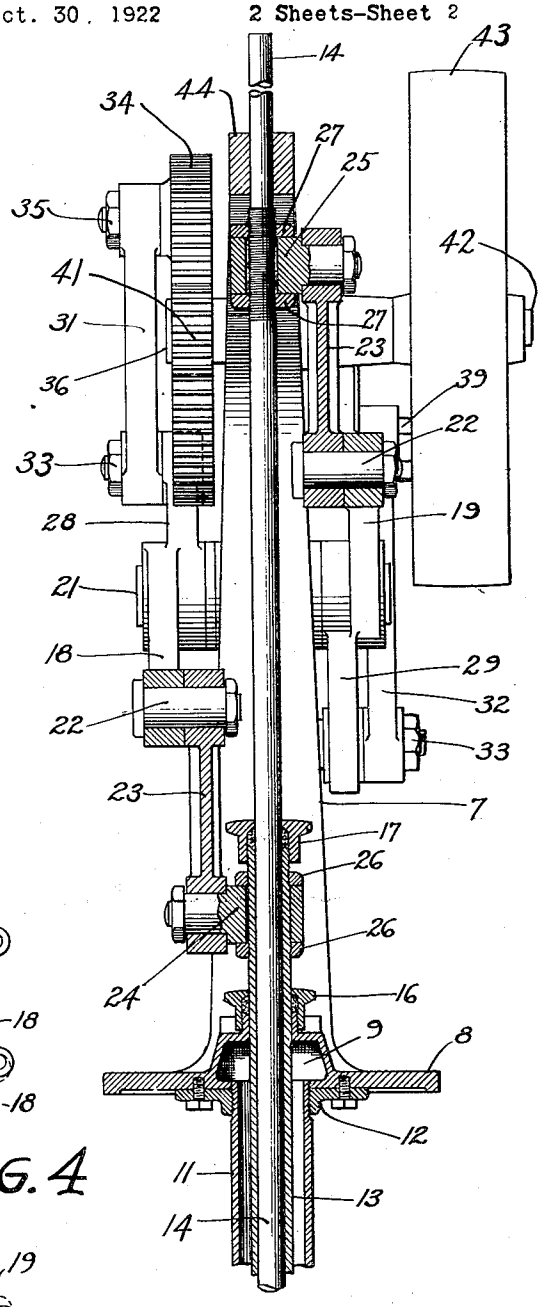



FIG. 2

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Patented Apr. 8, 1924. 1,489,779

# UNITED STATES PATENT OFFICE.

RICHARD MOHR, OF MINNEAPOLIS, MINNESOTA.

## PUMP.

Application filed October 30, 1922. Serial No. 597,928.

*To all whom it may concern:*

Be it known that I, RICHARD MOHR, a citizen of the United States, resident of Minneapolis, county of Hennepin, and State of Minnesota, have invented certain new and useful Improvements in Pumps, of which the following is a specification.

This invention relates to improvements in pumps, and more particularly relates to such pumps commonly known as the double-acting type, having two pistons operating alternately in one pipe or cylinder.

The object of this invention is to provide a pump capable of producing a constant and even flow of water or liquid, such flow being substantially uniform in volume.

A further object is to provide a pump of very simple and inexpensive construction, so designed as to eliminate the strain on the operating means, usually caused in the ordinary pump construction, where it is necessary to start the water from rest at each stroke of the pistons or plungers.

Other objects of the invention will more fully appear from the following detailed description and the accompanying drawings and will be pointed out in the annexed claims.

In the drawings, there has been disclosed a structure designed to carry out the objects of the invention, but it is to be understood that the invention is not confined to the exact features shown, as various changes may be made within the scope of the claims which follow.

In the drawings:

Figure 1 is a view in side elevation of a pump embodying my invention;

Figure 2 is a sectional view on the line 2—2 of Figure 1;

Figure 3 is a view in cross-section on the line 3—3 of Figure 1;

Figure 4 is a diagrammatic view illustrating the operation of the operating arms;

Figure 5 is a view similar to Figure 4.

Broadly, the idea is to provide a pump having a pair of operating arms pivotally mounted upon an upright standard or bracket, one end of each arm being connected to one of the piston rods of the pump, while the other end of each arm is connected to a crank shaft by means of connecting links. The operation of these arms is such that when each piston reaches the bottom of its stroke and starts upwardly, the other piston will still be on its upward stroke, thus providing means whereby the two pistons will move upwardly simultaneously a certain distance of each stroke.

In the selected embodiment of the invention here shown, there is illustrated a pump comprising an upright standard or bracket 7, having a horizontal flange 8 and a water or fluid chamber 9, preferably integrally formed therewith. A drop pipe 11 is connected to the bottom of the chamber 9, preferably, by means of a plate 12 secured to the underside of the horizontal flange 8. (Figure 2.) The water or liquid is pumped through this pipe to the chamber 9 by means of the piston or pump rods 13 and 14, reciprocally mounted therein. These piston rods are of usual construction, the rod 13 being hollow to receive the rod 14 therein, and the lower ends of said rods being secured to the usual valve operated plungers or pistons, ordinarily employed in the construction of the usual reciprocating pumps. A discharge pipe 15 is secured to the top wall of the chamber 9 adapted to receive the liquid from the chamber. This pipe may be connected to a storage tank or any other suitable receiving means as desired.

A suitable stuffing box 16 is provided in the top wall of the water chamber to provide a water-tight guide bearing for the pump rod 13, slidably mounted therein. A similar stuffing box 17 is provided at the upper terminal end of the rod 13 to provide a similar bearing for the rod 14.

Opposed operating arms or levers 18 and 19 are pivotally mounted upon a short shaft 21, secured to the standard 7. The terminal ends of these arms are pivotally connected to the pump rods 13 and 14 by means of suitable pins 22, connecting links 23, and pivot blocks 24 and 25, adjustably mounted upon the rods 13 and 14 by means of suitable lock nuts 26 and 27 received in threaded engagement thereon. Suitable arms 28 and 29, integral with the hubs of the arms 18 and 19, are provided and have their ter-

minal ends pivotally connected to suitable connecting links 31 and 32, by means of pivot pins or bolts 33. I prefer to have the pivots 22 and 33 in alignment with the center of the shaft 21, as shown in Figures 1, 4, and 5.

As is shown in Figure 3, the upper end of the link 31 is preferably connected to a gear wheel 34 by means of a suitable crank pin 35 secured thereto. This gear wheel is secured to a shaft 36, rotatably mounted in a suitable bearing 37, preferably integral with the upper portion of the standard 7. A suitable crank arm 38 is preferably secured to the other end of the shaft 36, and has mounted thereon, a crank pin 39, adapted to receive the upper end of the connecting link 32. The crank pins 35 and 39 are spaced 180 degrees apart or diametrically opposite.

A suitable pinion 41 is secured to one end of a drive shaft 42, rotatably mounted in a suitable bearing, provided in the standard 7 and is adapted to engage the teeth of the gear wheel 34, as shown in Figure 1. A suitable drive pulley 43 is secured to the opposite end of the shaft 42, adapted to receive a flexible belt by means of which the device may be operated. A guide bearing 44 is also provided to support the upper end of the pump rod 14, said bearing being secured to the standard 7 by means of an arm 45, preferably integrally formed therewith.

*Operation.*

The operation of this device may be explained in the following manner, with reference to the diagrammatic illustrations shown in Figures 4 and 5, wherein the operating arms and links are shown in their relative positions, assumed at each stroke of the pump rods 13 and 14.

In the above figures, the imaginary lines B—B and C—C represent the position assumed by the connecting links 31 and 32 when the pump rods are in their extreme upper and lowermost positions.

In Figure 4, the center line of the link 32 is shown coinciding with the imaginary line B—B, in which position the arm 19 will be in its uppermost position, shown in full lines. In this same figure, the pivot pin 35 is shown as having moved from the line C—C to the line B—B. As soon as the pin 35 leaves the line C—C, the arm 28 will commence to move downwardly, causing the arm 18 to move upwardly from the dotted to the full line position, as indicated, before the arm 19 commences its downstroke, thus causing both of the arms 18 and 19 to move upwardly simultaneously a certain distance of the stroke.

In Figure 5, the center line of the link 31 is shown coinciding with the imaginary line C—C, and the arm 18 is shown in its lowermost position. In this figure it will be noted that the pivot pin 39 is also positioned on the imaginary line C—C, and that the arm 19 is still in its upward movement, its extreme upper position being shown by dotted lines. As the crank pins 35 and 39 continue to rotate, the arm 18 will commence to move upwardly before the arm 19 reaches its uppermost position, thus causing the arms 18 and 19 to again move upwardly at the same time a predetermined distance of the stroke.

This simultaneous upward movement of the arms 18 and 19 and the pump rods 13 and 14, is sufficient to cause the water or other liquid being pumped, to flow from the pump in an unbroken and substantially uniform stream, thus eliminating the objectional pulsating torque frequent in pumps of ordinary construction.

I claim as my invention:

1. A pump operating mechanism comprising a standard having oppositely disposed arms, a journal bearing in one arm and a journal therein having on one end a gear wheel and on the other end a crank, levers pivoted on opposite sides of the standard with two ends connected respectively to said gear wheel and crank, the other two ends extending beyond the standard a distance approximately equal to the length of the other standard arm, said standard arm having a bearing, a pump rod passing through said bearing, a second pump rod in proximity to the first pump rod, and links connecting said pump rods with the ends of the levers.

2. Pump operating mechanism comprising a base, a standard on the base, said standard having oppositely disposed arms, a pinion near the top of the standard, a gear wheel journaled on one arm of the standard and in mesh with said pinion, a crank, levers pivoted on opposite sides of the standard, links connecting the ends of the levers with said gear wheel and crank respectively, the other ends of the levers extending on the other side of the standard and to approximately a vertical line from the end of the other arm of the standard, a pump rod bearing in said last mentioned standard arm, a pump rod extending therethrough, a second pump rod in proximity to the first and links connecting said pump rods with the ends of the levers.

3. Pump operating mechanism comprising a standard having oppositely disposed arms, a journal bearing in one arm, a journal in said bearing having attached thereto at one end a crank, and at the other end a gear wheel, said gear wheel having thereon a pivot, a link attached to the pivot, a second pivot on the crank arm, a link attached thereto, levers pivoted on opposite sides of the standard having their ends pivoted respectively to said links, said crank arm and its attached link when in alinement being in

advance of the link attached to the gear wheel, the other arm of the standard having a bearing therein, a pump rod passing through said bearing, a second pump rod surrounding the first mentioned pump rod, links connected to the pump rods and to the ends of the levers pivoted on said standards whereby when said operating mechanism is in operation both rods will move upwardly together for a short distance.

In witness whereof, I have hereunto set my hand this 26th day of October, 1922.

RICHARD MOHR.