C. W. ENOS & J. M. WEST.

PUMP.

APPLICATION FILED MAY 3, 1905.

910,802.

Patented Jan. 26, 1909.

2 SHEETS—SHEET 1.

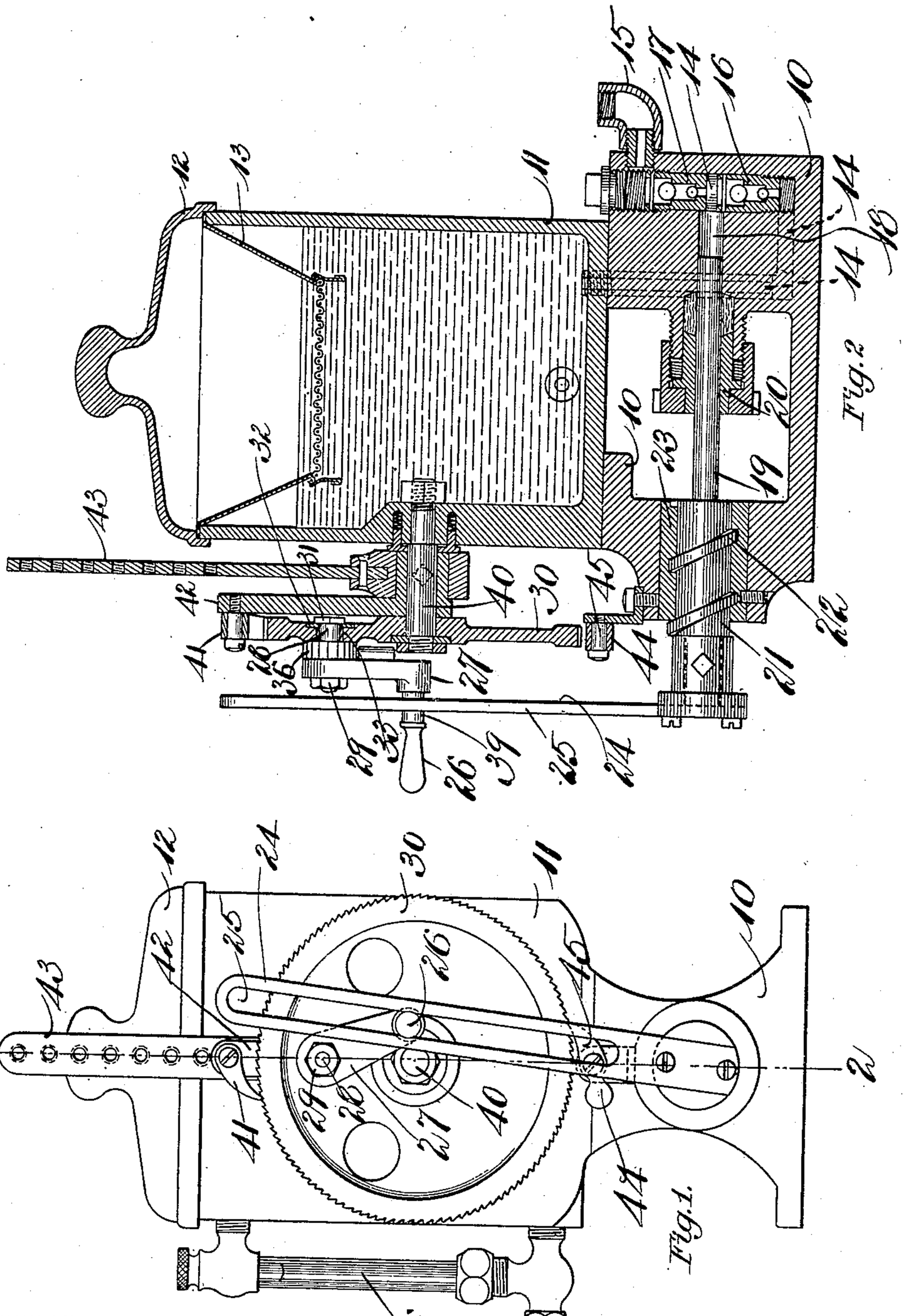

Fig. 2.

Fig. 1.

Witnesses:

Louis A. Jones

Sydney E. Taft.

Inventors:

Charles W. Enos

and James M. West.

by their attorney, Charles S. Fowler

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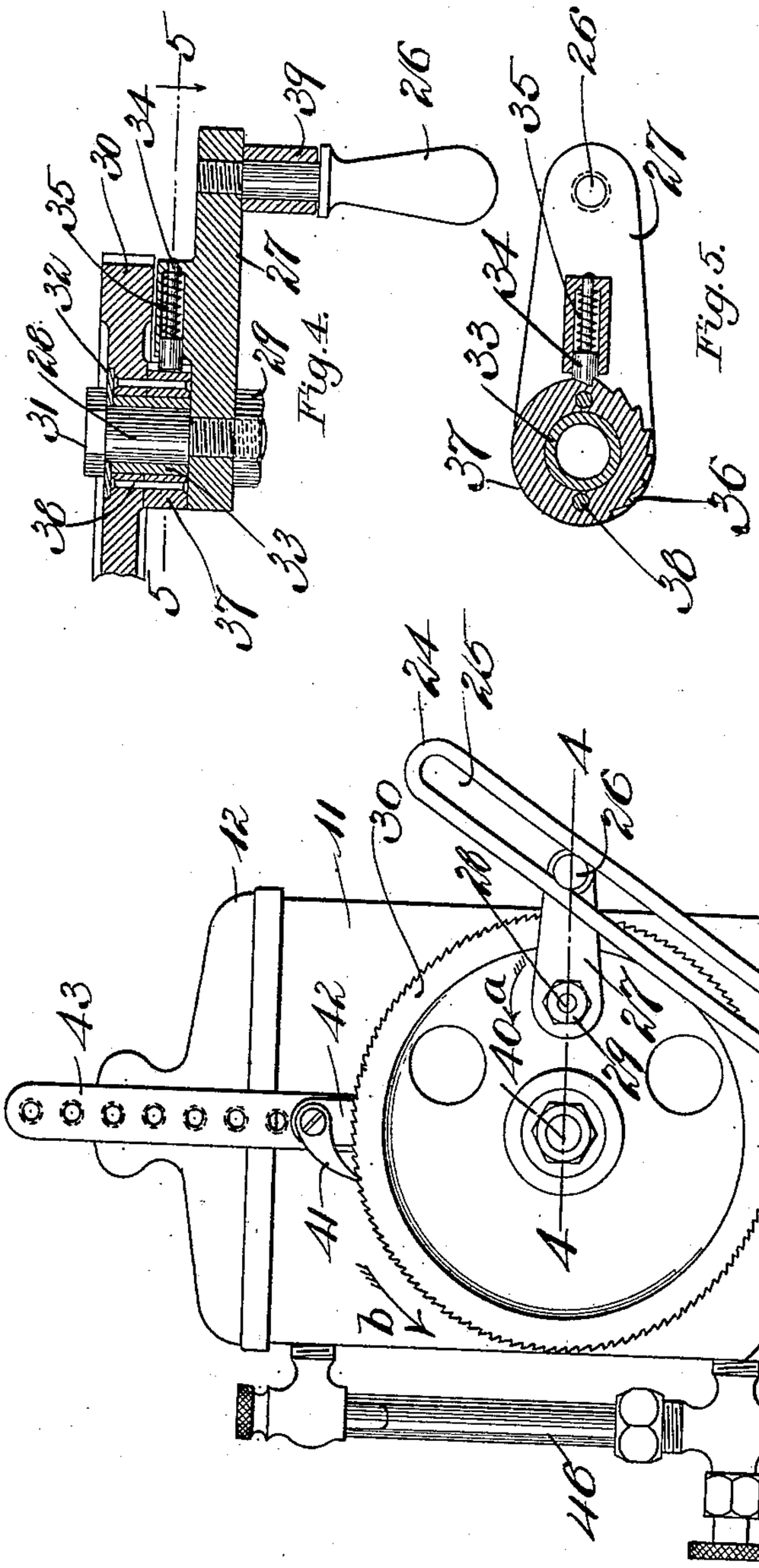

Fig. 4.

Fig. 5.

Fig. 3.

Witnesses:
Louis A. Jones.
Sydney E. Taft.

Inventors:
Charles W. Enos,
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by their attorney, Charles S. Goodeve.

UNITED STATES PATENT OFFICE.

CHARLES W. ENOS, OF BOSTON, AND JAMES M. WEST, OF PEABODY, MASSACHUSETTS, ASSIGNORS TO CLIMAX LUBRICATOR COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

PUMP.

No. 910,802. Specification of Letters Patent. Patented Jan. 26, 1909.

Application filed May 3, 1905. Serial No. 258,702.

To all whom it may concern:

Be it known that we, CHARLES W. ENOS and JAMES M. WEST, citizens of the United States, residing, respectively, at Boston, in the county of Suffolk, and Peabody, in the county of Essex, both in the State of Massachusetts, have invented new and useful Improvements in Pumps, of which the following is a specification.

This invention relates to pumps and particularly to that class of pumps adapted to serve as oil pump lubricators for steam engines for the purpose of supplying oil to the interior of steam engine cylinders.

The object of the invention is to provide a simple, inexpensive and efficient device for the purpose hereinbefore set forth, which can be easily and conveniently attached to some moving part of an engine, and operated by said moving part in such a manner as to pump a small quantity of oil into the cylinder of the engine at each stroke of the piston.

It is the object of this invention further to provide a device which may be quickly and conveniently adjusted to vary the amount of oil pumped into the cylinder at each stroke of the piston.

The invention consists of a pump comprising in its construction a plunger, which is adapted to force oil from a receptacle into a pipe leading to any desired point, and mechanism for imparting a differential reciprocatory motion to said plunger—that is, said plunger is moved slowly in one direction in order to allow the oil plenty of time to pass from the oil receptacle to the chamber in which the plunger is reciprocated, and then upon its return stroke is moved quickly, forcing the oil from said chamber into the pipe connecting with the engine cylinder.

The invention further consists in the mechanism by which this reciprocatory motion is imparted to said plunger, all as hereinafter fully described and particularly pointed out in the claims.

Referring to the drawings: Figure 1 is a front elevation of our improved oil pump. Fig. 2 is a section, partly in elevation, taken on line 2—2 of Fig. 1. Fig. 3 is a front elevation, similar to Fig. 1, illustrating the crank, crank-pin, and plunger arm in different positions. Fig. 4 is a section, partly in elevation, taken on line 4—4 of Fig. 3, the same being partly broken away to save space in the drawings. Fig. 5 is a section taken on line 5—5 of Fig. 4, looking in the direction of the arrow in said figure.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, 10 is the base of the pump, to which is fastened an oil receptacle 11 provided with a top 12 and with a conical shaped strainer or sieve 13 into which the oil is poured when filling the receptacle. The base 10 is provided with an oil passage 14 which opens out of the bottom of the receptacle 11, passing downwardly therefrom, Fig. 2, then in a horizontal direction, and thence upwardly to connect with an outlet pipe 15, which, by suitable connections, is connected to the cylinder of a steam engine.

Two ball check valves 16 and 17 are inserted in the vertical portion of the oil passage 14 at the right of Fig. 2, and intermediate said check valves is provided a chamber 18 extending transversely of the vertical portion of the oil passage 14, and in this chamber is provided a reciprocatory plunger 19, to which a reciprocatory motion is imparted as hereinafter described, said plunger sliding in a suitable stuffing-box 20 which prevents the oil from leaking out of the chamber 18. A holder 21 is fastened to the plunger 19 and forms, in function and effect, a single piece therewith. Said holder is provided upon its periphery with helical convolutions or screw-threads 22 which engage a screw-threaded sleeve or nut 23 fast to the base 10.

A rocker-arm 24 is fastened to the holder 21, said arm being provided with a slot 25 extending longitudinally thereof, and into said slot projects a crank-pin 26 fast to a crank 27. The crank 27 is fast to a stud 28 by means of a nut 29 (Fig. 4). Said stud 28 projects through a ratchet 30 and is provided upon the rear side of said ratchet with a head 31. Immediately adjacent to the head 31 is a washer 32 and extending from said washer 32 to the back face of the crank 27 is a bushing 33, the construction being such that when the nut 29 is screwed upon the stud 28, the head of said stud will clamp the washer 32 and bushing 33 firmly against each other, and the bushing 33 will be clamped against the rear face of the crank 27, so that said crank 27, stud 28, washer 32 and bushing 33 will form, in effect, a single piece rotatable upon the ratchet 30 and eccentric thereto. It is evident that if desired the stud 28 might be rigidly fastened to the ratchet 30 and the

crank 27 rotatable thereon without departing from the spirit or our invention. It will be seen and understood that the ratchet 30 acts as a carrier for the stud 28, the crank-arm 27 and the crank-pin 26.

A pin 34 is slidably mounted upon the rear face of the crank 27 and is held by a spring 35 in engagement with recesses or ratchet teeth 36 extending partly around the periphery of a disk 37 fastened by rivets 38 to the ratchet 30. A friction roll 39 is rotatably mounted upon the crank-pin, the periphery of said roll adapted to bear against the opposite sides of the slot 25.

The ratchet 30 is rotatably mounted upon a stud 40 fast to the side wall of the oil receptacle 11 and an intermittent motion is imparted thereto by a pawl 41 pivoted to a pawl-lever 42, pivoted to rock upon the stud 40, a rocking motion being imparted to the said pawl lever by an arm 43 fast thereto and connected by suitable connections, such as a link, to some movable portion of the engine.

A stop pawl 44 pivoted at 45 to the base 10 engages the ratchet 30 and prevents the same from moving backwardly or in the opposite direction to that imparted to it by the pawl 41. A gage 46 of well known construction is connected to the oil receptacle 11 for the purpose of indicating the amount of oil contained in said receptacle.

The general operation of the form of our invention hereinbefore specifically described, is as follows: Assuming a rocking motion to be imparted to the arm 43 by a link or other suitable connection which is connected to a moving portion of the engine, to the cylinder of which oil is to be supplied, it will be seen that the pawl 41 will impart an intermittent rotary motion to the ratchet 30 and as said ratchet is thus rotated, the crank-pin 26, which, in the operation of the device, is locked to the ratchet 30, will rock the arm 34 alternately in opposite directions and thus impart a rocking movement to the holder 21 and also to the plunger 19. As the nut 23 is stationary, it is evident that the rocking motion hereinbefore referred to imparted to the holder 21 will cause the same to move longitudinally thereof, and the plunger 19 will thus be reciprocated in the chamber 18 with the following result: As the plunger 19 moves toward the left, oil will enter the chamber 18, passing through the passage 14 from the receptacle 11 and through the lower check valve 16. Upon its return movement toward the right, the oil which has passed into the chamber 18 will be forced through the upper check valve 17, the lower check valve 16 closing during this portion of the movement of the plunger, and the oil will thus be forced from the chamber 18 into the outlet pipe 15, and by said outlet pipe conveyed to the interior of the cylinder of the engine. By reference to Figs. 1 and 3, it will be seen that the crank-pin 26 may be placed, as in Fig. 1, near the center of the ratchet 30, or it may be placed quite a distance therefrom, as shown in Fig. 3, where said crank-pin is located outside the periphery of said ratchet. This adjustment of the position of the crank-pin 26 to different distances from the axial line of the ratchet 30 is accomplished by rotating the crank 27 in the direction of the arrow *a* (Fig. 3), the pin 34 slipping over the different ratchet teeth 36 to allow of this rotation, it being understood that the ratchet disk 39 is fixed to the ratchet 30. During the rotation of the ratchet 30 any tendency of the crank 27 to rotate upon said ratchet, together with the stud 28, is counteracted by the locking pin 34 and the ratchet disk 37 with which said locking pin is in engagement, so that the distance between the centers of the crank-pin 26 and the stud 40 may be very quickly increased or diminished by rotating the crank 27 until the center of the crank-pin arrives at the desired distance from said stud 40.

In the operation of the machine the ratchet 30 is rotated intermittently by means of the pawl 41 and pawl lever 42 in the direction of the arrow *b* (Fig. 3) and the crank-pin 26 moves longitudinally of the arm 24 in the slot 25. It is evident that the greater the distance of the crank-pin 26 from the center of the stud 40, the greater will be the angle through which the arm 24 is rocked, and consequently the greater the distance that the holder 21 will be rocked and the greater the longitudinal movement imparted by said rocking holder to the plunger 19, so that by increasing the distance of the crank-pin 26 from the center of the stud 40 or from the center of the ratchet 30, the plunger 19 will be reciprocated to a greater extent and more oil will be pumped and vice versa. It will also be noted that as the crank-pin 26 is rotated, as hereinbefore described, the same sliding longitudinally in the slot 25 during the rocking movement of the arm 24; when said crank-pin is near the bottom of the slot 25 the angular velocity of the rocking movement of the arm 24 will be much greater for a given angle of rotation of the crank-pin of the ratchet 30 than would be the case when said crank-pin is near the outer end of the slot 25, so that as said crank-pin 26 moves through one portion of a rotation the rocking movement of the arm 24 will be much quicker than when said crank-pin is passing through the remainder of its rotation and thus a longitudinal differential movement of the plunger 19 is obtained, said plunger being moved backward or toward the left (Fig. 2) slowly, thus allowing time for the oil to pass into the chamber 18, as hereinbefore described, and forward or toward the right (Fig. 2) quickly when the oil is being forced through the valve 17 and into the outlet pipe 15. This differential movement is of great advantage in a device

of the character described, especially when the same is attached to a quick running engine, for the reason that it allows time enough for the oil to be drawn into the plunger chamber, and a continual supply of oil is thus supplied to the cylinder of the engine by the quick return stroke of said plunger.

Having thus described our invention, what we claim and desire by Letters Patent to secure is:

1. In a device of the character described, a plunger provided with a screw-thread, a nut engaging said screw-thread, one of said parts stationary, and means to impart a differential rocking movement to the other of said parts.

2. In a device of the character described, a plunger provided with a screw-thread, a stationary nut engaging said screw-thread, a rocker arm connected to said plunger, and a rotary crank-pin connected to said arm and slidable thereon toward and away from the axis of said plunger.

3. In a device of the character described, a plunger provided with a screw-thread, a stationary nut engaging said screw-thread, a rocker arm connected to said plunger, and a rotary crank-pin connected to said arm and slidable thereon toward and away from the axis of said plunger, and means to adjust said crank-pin relatively to its axis of rotation.

4. In a device of the character described, a plunger provided with a screw-thread, a stationary nut engaging said screw-thread, a rocker arm connected to said plunger, a rotary ratchet, and a crank-pin fast thereto and projecting into a slot provided in said rocker arm.

5. In a pump, a plunger provided with a screw-thread, a stationary nut engaging said screw-thread, a rocker arm connected to said plunger, a rotary ratchet and a crank-pin fast to said ratchet, adjustable toward and away from the center of said ratchet, said crank-pin projecting into a slot provided in said arm.

6. In a device of the character described, a rotary ratchet, a stud eccentrically mounted thereon, a disk provided with recesses in its periphery fast to said ratchet concentric with said stud, a crank mounted on said stud, a spring pin mounted on said crank adapted to project into said recesses, and a crank-pin fast to said crank.

7. In a device of the character described, a rotary ratchet, a stud eccentrically mounted thereon, a disk provided with recesses in its periphery fast to said ratchet concentric with said stud, a crank mounted on said stud, a spring pin mounted on said crank adapted to project into said recesses, a crank-pin fast to said crank, a pawl lever, and a pawl pivoted to said pawl lever adapted to engage the teeth of said ratchet.

8. In a device of the character described, a plunger provided with a screw-thread, a stationary nut engaging said screw-thread, a rocker arm fast to said plunger, a rotary carrier, a crank rotatably and eccentrically mounted thereon, a crank-pin fast to said crank and projecting into a slot provided in said rocker arm, and means to lock said crank to said carrier.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

CHARLES W. ENOS.
JAMES M. WEST.

Witnesses to the signature of Charles W. Enos:

JOHN W. CONVERSE,
WILLIAM C. GLASS.

Witnesses to the signature of James M. West:

CHARLES S. GOODING,
ANNIE J. DAILEY.