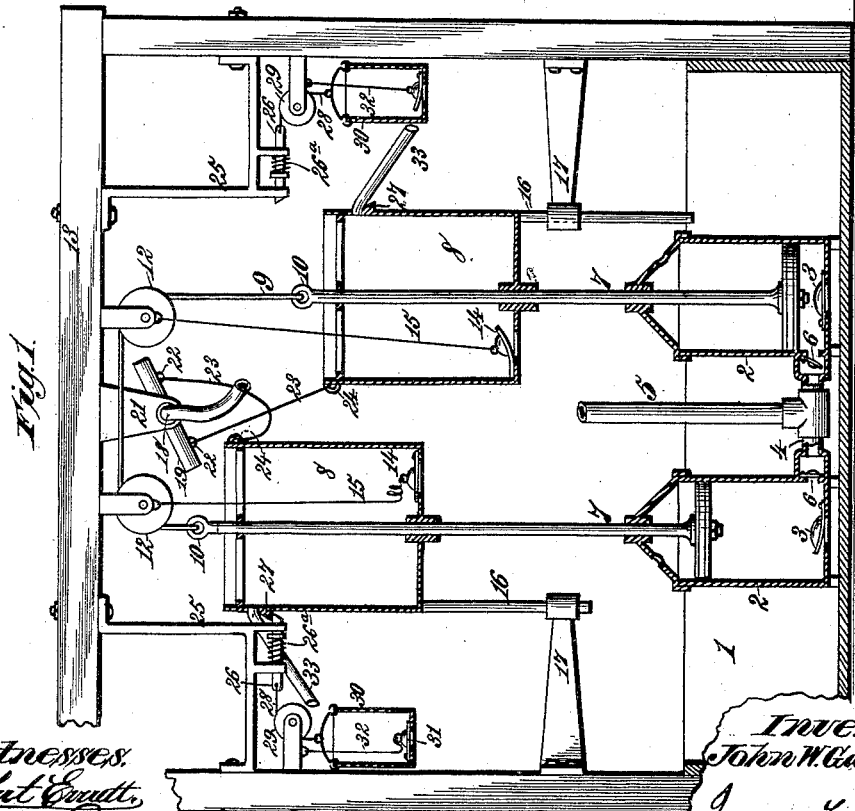
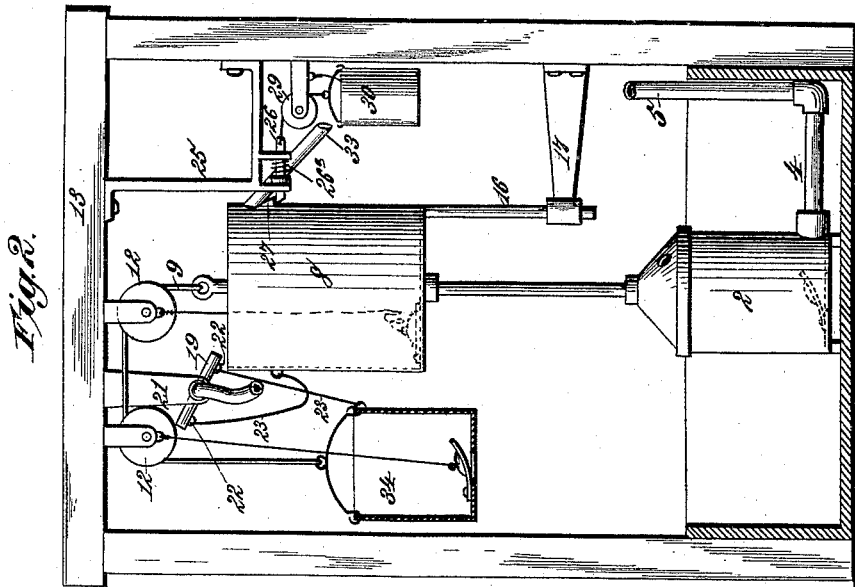


(No Model.)

J. W. GARRETT, Jr.  
HYDRAULIC MOTOR.

No. 416,033.

Patented Nov. 26, 1889.



Witnesses:  
*Robert Emmett,*  
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Inventor:  
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*James L. Norris*

# UNITED STATES PATENT OFFICE.

JOHN W. GARRETT, JR., OF SPARTANBURG, SOUTH CAROLINA.

## HYDRAULIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 416,033, dated November 26, 1889.

Application filed May 9, 1889. Serial No. 310,191. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN W. GARRETT, JR., a citizen of the United States, residing at Spartanburg, in the county of Spartanburg and State of South Carolina, have invented new and useful Improvements in Hydraulic Motors, of which the following is a specification.

My invention relates to hydraulic motors, and the purpose thereof is to provide a simple and comparatively inexpensive apparatus whereby spring-water may be driven from a lower to a higher level, in order to obtain a head or pressure for the supply of the service-pipes.

It is my purpose also to provide means whereby a hydraulic motor may be operated from a stream giving a limited flow of water, or from a supply-tank filled by means of mains wherein the flow is gaged by a meter, and in which the consumption must be economized to avoid expense, and to this end I propose to so organize the motor that a given percentage of the water actuating the same may be used more than once.

It is my purpose, finally, to so arrange the forcing mechanism that no power shall be required to fill the cylinder or pump-barrel as the piston-head rises therein; and to the several ends thus specified the invention consists in the novel features of construction and combination of devices hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a sectional elevation illustrating my invention. Fig. 2 is a similar view showing a modified construction. Fig. 3 is a detail perspective showing the supplying cross-head.

In the said drawings, the reference-numeral 1 designates a tank or other suitable receptacle, to which water from a spring or other source is supplied by any known means. Within this tank, and resting upon the bottom or upon supports below the normal water-level, I arrange two pump-cylinders 2, each having a flap-valve 3 in the bottom, through which the water of the tank enters by its own natural tendency to seek its level. The two cylinders are connected by a pipe 4, from which rises a vertical pipe 5, check-valves 6 being placed in the ends of the pipe 4, and so arranged as to open in one end and close

in the other as the piston-head descends in either cylinder to allow the water below the piston to be forced through the pipe 5. Mounted upon the piston-rods 7, which rise above the cylinders, are buckets 8, of a suitable size, the piston-rods passing through the bottoms of the buckets and rising above their open tops. The ends of these rods are connected by a cord, chain, or wire 9, attached to eyes 10, and passing over pulleys 12, which are suspended from a supporting-frame 13, rising to a suitable distance above the tank 1. In the bottom of each bucket is a valve 14, of any suitable form, which is opened by a cord or chain 15, attached to the valve and at the other end to the hangers carrying the pulleys 12, or to any other part of the frame 13, the length of said cords or chains being such that as the piston-head and bucket sink to the lowest limit of the stroke the cord will be drawn taut and will open the valve, permitting the contents of the bucket to escape. Upon each bucket is mounted a guide-rod 16, running in a bracket 17 on the frame 13 to prevent rotary displacement.

The buckets 8 are filled alternately by a pipe 18, which derives its supply from any desired or convenient source having a sufficient head to bring the water to a point just above the highest points reached by the buckets upon their upward stroke. Upon the end of the pipe 18 is mounted a T-head supply-pipe 19, the arms whereof have free communication with the pipe. This head is so connected that it may have rotary movement upon the pipe 18, to raise or lower either arm alternately. A pivot 20 projects from the center of the T-head supply-pipe, and is seated in any suitable support 21, attached to the frame 13.

Connected to each arm of the T-head supply-pipe 19 by means of an eye 22 is a cord or chain 23, the other end whereof is attached to a similar eye 24 on the bucket, which lies beneath the opposite arm of the T-head supply-pipe. The length of these cords or chains is such that as the buckets approach the lowest limit of their stroke said cords will tighten and rock the T-head supply-pipe, as shown in Fig. 1. By this movement the stream is diverted from the descended bucket to the empty bucket, which

lies directly beneath the lower end of the T-head supply-pipe.

Upon a bracket 25, closely adjacent to each bucket, is mounted a spring-actuated slide-bar 26, the end of which lies beneath a lug or shoulder 27 on the outer face of the bucket. To the other end of the slide-bar is attached one end of a cord or chain 28, running over a pulley 29, and having at its other end a bucket 30. This bucket is provided with an outlet-valve 31 in its bottom, operated by a cord or chain 32, attached to the bracket supporting the pulley 29. At or near the top of the bucket is a discharge-pipe 33, which is so inclined that when the bucket is locked by the slide-bar 26 the discharge end of the pipe will overhang the bucket 30.

The operation of the devices is as follows: Water flowing through the T-head supply-pipe 19 into the upper bucket fills the same until the water rises to the mouth of the exit-pipe 33, whereupon the surplus runs through said pipe into the bucket 30. As the latter fills, its weight draws the slide-bar 26 and releases the bucket 8, which at once descends, forcing the water out of the pump-cylinder through the vertical pipe 5 and raising the other empty bucket. As the latter reaches the limit of its upward movement its shoulder or lug 27 engages the beveled end of the slide-bar 26, pushing it back to permit the shoulder to pass and then snapping under the same. At the same moment the descent of the other bucket draws taut the chain or cord 23 and rocks the T-head supply-pipe 19 into position to discharge into the empty bucket, while the chain 15, being simultaneously drawn tight, opens the valve 14 in the bottom of the descended bucket and discharges the contents of the latter. As the bucket 30, which actuates the slide-bar 26, drops downward its outlet-valve is opened by the cord or chain 28 until the bucket is sufficiently lightened to permit the spring 26<sup>a</sup> to raise it and shoot the slide-bar in its normal position.

Instead of the double-acting apparatus shown, I may employ the single device shown in Fig. 2. In this modification the cylinder 2, piston-rod 7, and the rising and falling bucket 8, mounted on the piston-rod, are the same as the corresponding parts already described, as also are the locking slide-bar 26 and its parts and the outlet-valve in the buckets 8 and 30. The sole alteration is that the piston-rod 7 is connected by the cord or chain 9 to a bucket 34, which has all the functions of the duplicate bucket 8 in Fig. 1, save that it does not actuate a piston or pump rod, but is used simply to raise the empty bucket 8.

This invention may be used advantageously to force spring-water to higher levels in localities where the supply is limited and where no sufficient head is found for a hydraulic ram. It will be seen, also, that a certain percentage of the water used in the buckets 8 may be pumped by the apparatus to

its normal level and used over and over again, thereby effecting a very considerable economy in the quantity of water consumed. It will be seen, also, that by placing the cylinders or pump-barrels in the tank and below the normal level of the water they will not only fill without the exertion of power, but will tend to slightly aid the pistons in rising.

The pump-cylinder may be placed in a tank of mineral water, and the apparatus may be operated by the water of a branch near by to force the mineral water to a hotel or other point desired.

What I claim as my invention is—

1. In a hydraulic motor, the combination, with a pump-cylinder having an inlet-valve in its bottom, of a piston-rod, a bucket mounted thereon and provided with an exit-valve in its bottom connected by a chain or cord to a support above the bucket, a counterbalancing-bucket having a similar valve, and a rocking T-head supply-pipe arranged above said buckets and connected by chains or cords to both, substantially as described.

2. In a hydraulic motor, the combination, with a pump-cylinder having an inlet-valve in its bottom, of a piston-rod, a bucket mounted thereon and provided with an outlet-valve in its bottom connected with a support above by a chain or cord, a counterbalancing-bucket connected to the first bucket by a cord or chain passing over pulleys and having a similar outlet-valve in its bottom, a water-supply pipe discharging above said buckets, and a T-head supply-pipe communicating with said pipe and rocking thereon, each end of said T-head supply-pipe being connected by a cord or chain to the bucket lying beneath the other end, substantially as described.

3. In a hydraulic motor, the combination, with a tank, of cylinders partly or wholly submerged therein and having inlet-valves in their bottoms, a service-pipe communicating with both cylinders, pistons rising and falling in the latter, buckets mounted on said rods and having outlet-valves in their bottoms connected by cords to a support above, said piston-rods being connected by a cord or chain passing over pulleys, a water-supply pipe having a rocking T-head supply-pipe connected by cords to said buckets and discharged therein alternately, spring-actuated slide-bars engaging lugs on the buckets as the latter rise, and buckets connected to said slide-bars by cords passing over guide-pulleys and having outlets actuated by cords, said buckets being filled by pipes opening from the piston-buckets at or near the top of the latter, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

JOHN W. GARRETT, JR.

Witnesses:

JAMES L. NORRIS,  
JAMES A. RUTHERFORD.