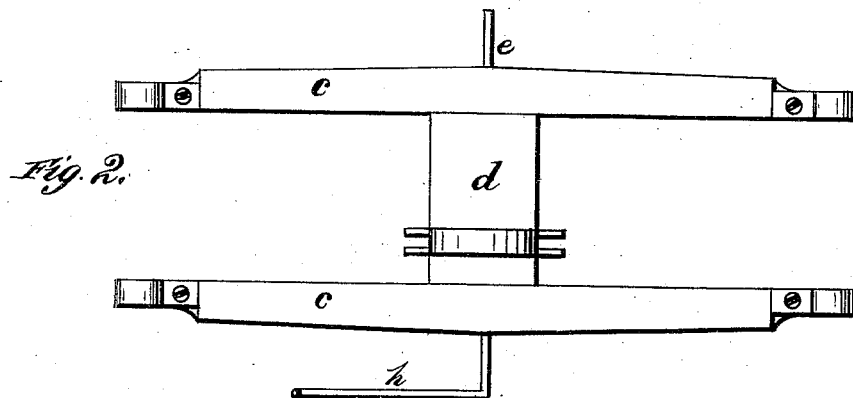
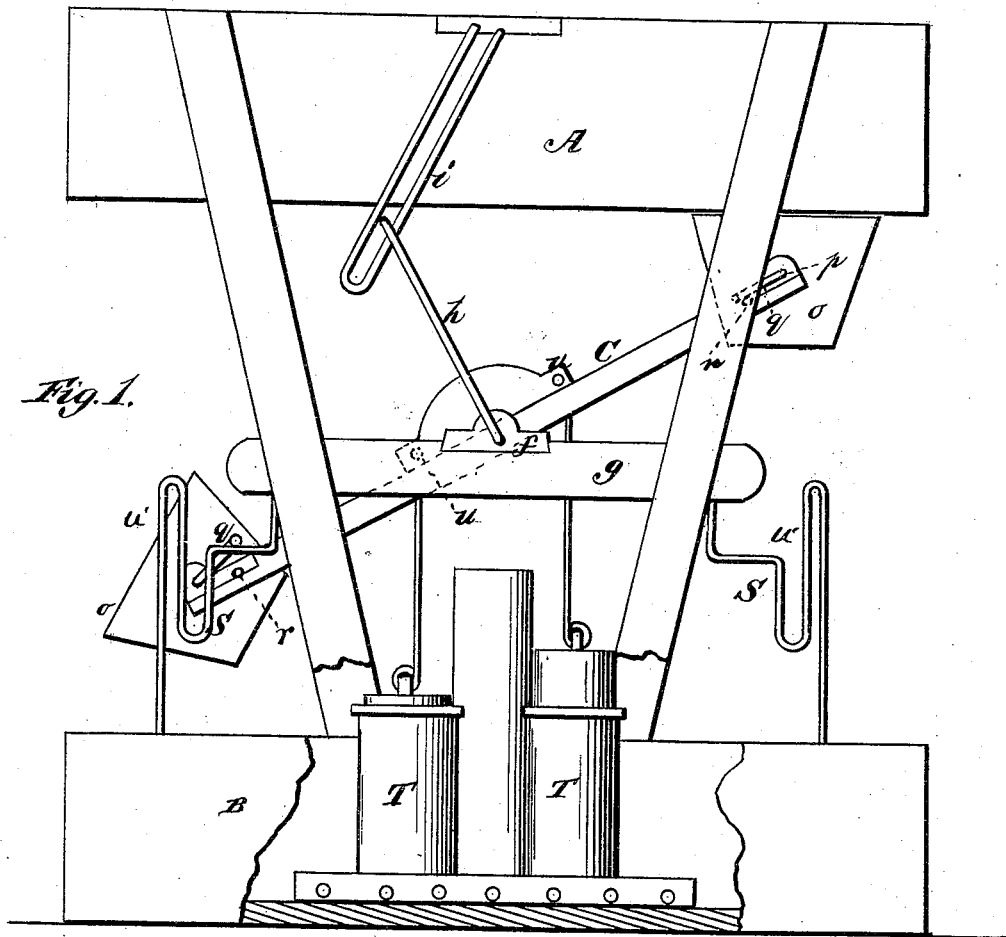


F. M. MORGAN.
Motor.

No. 221,340.

Patented Nov. 4, 1879.



WITNESSES
Robert Smith
James J. Sheehy

INVENTOR.
Francis M. Morgan
Gibmore, Smith & Co.
ATTORNEYS

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Fig. 3.

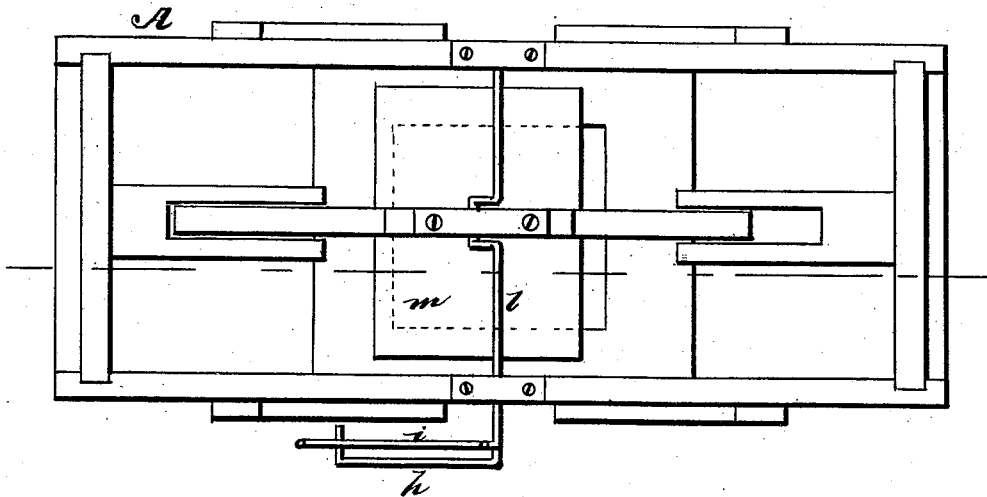
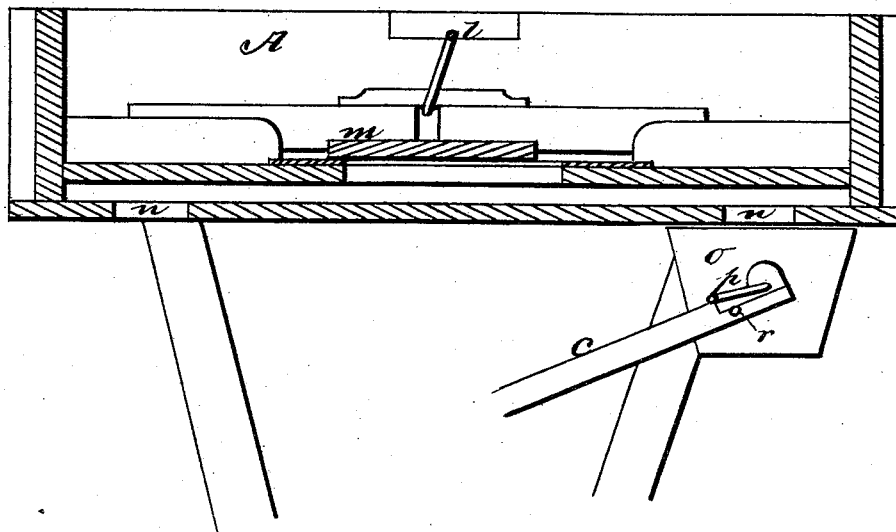


Fig. 4.



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UNITED STATES PATENT OFFICE.

FRANCIS M. MORGAN, OF WALHALLA, SOUTH CAROLINA.

IMPROVEMENT IN MOTORS.

Specification forming part of Letters Patent No. **221,340**, dated November 4, 1879; application filed August 30, 1879.

To all whom it may concern:

Be it known that I, FRANCIS M. MORGAN, of Walhalla, in the county of Oconee and State of South Carolina, have invented certain new and useful Improvements in Motors; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a side elevation of my motor. Fig. 2 is a detail view of the same. Fig. 3 is a plan view, and Fig. 4 is a sectional view, of the same.

The present invention relates to an improvement in that class of motors in which buckets are hung to an oscillating walking-beam, which operates levers for opening and closing valves in a flume or cistern above.

Its nature consists in the novel construction and arrangement of parts, as will be fully described in the following specification, and particularly pointed out in the claims.

In the annexed drawings, A designates an upper cistern, which contains the supply of water for actuating the motor, and B a lower cistern, from which water is pumped up by means of the pumps. C refers to the walking-beam, which is essentially composed of the two parallel bars *c* and a cross-bar or other suitable connecting-part, *d*.

The shaft *e* of the walking-beam is supported in the bearings *f*, which are secured to the side timbers of a frame composed of suitably-arranged bars or timbers *g*.

The shaft *e* has a crank-arm, *h*, which engages with a bent or slotted arm, *i*, of the shaft *l*, which actuates the valve *m*, so that the oscillatory movements of the walking-beam will cause the valve to alternately open and close the discharge-ports *n*.

At each end of the walking-beam is a bucket, *o*, mounted upon a shaft, *p*, journaled in the bars *c*. These shafts have each a crank-arm, *q*, which rests, when the bucket is in an upright position, upon a suitable stop, *r*.

S S are suitable frames or bars, which, in conjunction with the crank-arms *q*, serve to tilt the buckets, so as to empty them of water.

T T designate two pumps, which are ar-

ranged within the lower cistern, so as to be submerged by the water therein.

The piston-rods of these pumps connect with the walking-beam at *u u*, whereby the pumps will be alternately operated, for the purpose of forcing the water to any desired height.

As these pumps may be of any ordinary or desired construction, I have not deemed it necessary to illustrate the interior mechanisms thereof.

In arranging these pumps, however, I propose to admit water into their cylinders through openings under the bed-plate, and to submerge the pumps, so that there will be no power lost in first drawing up the water before forcing it to the height required.

In order to start the motor the walking-beam should be tilted so as to bring one bucket directly under a port in the upper cistern, and as this movement will cause the valve to open this port and close the remaining one water will be discharged into the bucket in sufficient quantity to cause a descent of the same until its crank-arm *q* strikes against the frame S and tilts the bucket, so as to empty it of water.

To prevent the bucket from becoming completely inverted, I provide guards *u'*, against which the crank-arm will strike, and hence be prevented from further rotation. While this bucket is being emptied the bucket upon the other end of the walking-beam will be elevated directly under a port of the cistern, and as this port will be opened while the other port is closed water will be discharged, so as to fill the said elevated bucket.

The buckets are so balanced as to right themselves after the water has been discharged therefrom, and it is evident that having been once started, as above described, the motor will continue its operation so long as there is a supply of water in the upper cistern.

What I claim is—

1. In a water-motor in which the walking-beam is adapted, by means of connecting mechanism, to operate a valve for opening and closing ports in an upper supply-cistern, and also to actuate the pistons of two or more pumps arranged in a cistern from which water is to be pumped up to any desired height, the buckets mounted upon shafts journaled in the walking-beam and adapted to tilt, so as

to discharge the water and to right themselves after being emptied, all as herein shown and set forth.

2. In combination with an upper cistern provided with discharge-ports, a valve for opening and closing the same, and a walking-beam with connecting mechanism for actuating the valve, the tilting buckets *o*, mounted upon shafts *p p*, provided with crank-arms *q q*, the frames *S*, and guards or checks *u'*, all construct-

ed and operating substantially as herein set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

FRANCIS MARION MORGAN.

Witnesses:

H. A. H. GILEREN,

J. W. HOLLEMAN.