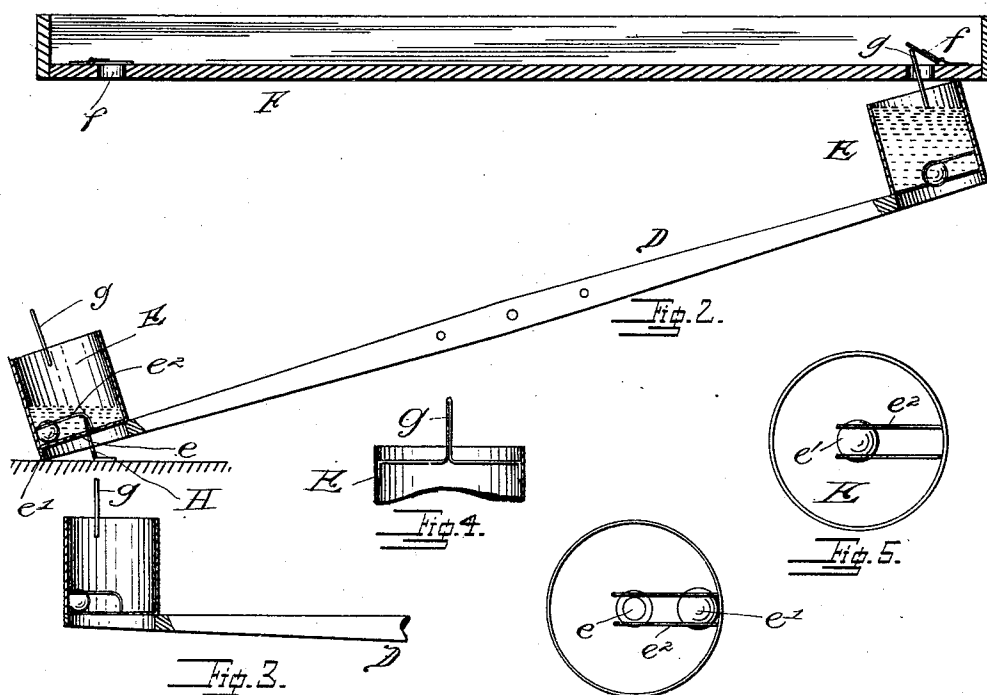
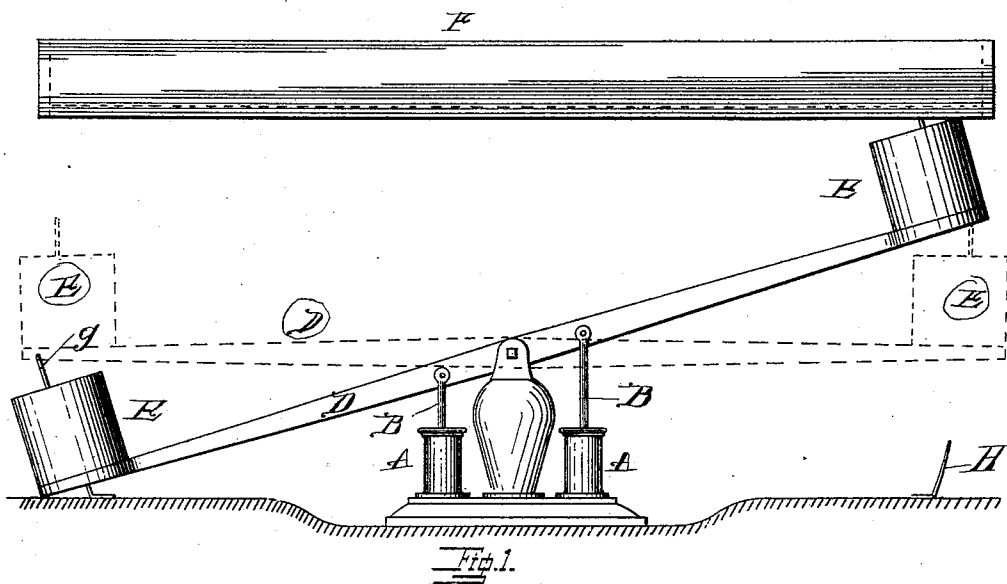


(No Model.)

S. S. MARSH.
HYDRAULIC MOTOR.

No. 479,291.

Patented July 19, 1892.



Witnesses

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SPENCER S. MARSH, OF ATLANTA, GEORGIA.

HYDRAULIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 479,291, dated July 19, 1892.

Application filed November 24, 1891. Serial No. 413,019. (No model.)

To all whom it may concern:

Be it known that I, SPENCER S. MARSH, of Atlanta, in the county of Fulton and State of Georgia, have invented certain new and useful Improvements in Hydraulic Motors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which said drawings form a part of this specification.

The invention is shown and will be described as being attached to reciprocating pumps, in which connection it is at present intended to be principally used, the object being to simplify the construction and to use water more economically than heretofore.

To this end my invention consists of a centrally-pivoted lever having a bucket at each end, a flume or other means of water-supply provided with valve connection with the buckets on the ends of the lever, and valves in the bottom of said buckets and means for operating them, the valve-openings in buckets being smaller than those in the flume, all of which are shown in the accompanying drawings and will be fully described in this specification, together with their operation and effect.

In the accompanying drawings, Figure 1 is a side elevation of the device, showing same at the beginning of a stroke, and, by the use of broken lines, also at mid-stroke. Fig. 2 is a section of the flume and buckets on the lever, showing the valves in each and the manner and means of opening them, also showing the size of the bucket valve-opening relative to the openings in the flume over which the flume-valves are seated. Fig. 3 is a section of one of the buckets in a horizontal position, being at the time of elevation just before the ball-valve automatically closes. Fig. 4 is a detail in transverse section of the bucket, showing the means for opening the valve in the bottom of the flume. Figs. 5 and 6 show, respectively, the ball-valve closed and open, the wire guides being also shown.

In the drawings like reference characters are employed in the designation of corre-

sponding elements of construction in all the views.

A are reciprocating pumps of any approved construction, having suitable inlet and outlet connections, and B are pump piston-rods, which may, if desired, have pitman connection with the double-ended lever D, with which they are in any suitable manner necessarily connected. These pumps should be located and connected to the lever D at a distance from its fulcrum, according to the stroke of the pumps and to the length and degree of oscillation of the lever. The buckets E should be of a size to contain a sufficient quantity of water to overcome by gravity the resistance of the pumps A, and should have at their bottoms holes *e*, which should be closed by valves of any form so long as they perform the functions desired. The preferable form of valve is, however, as follows: The ball *e'* is used to stop the opening *e*, and it is desirable that the said ball shall roll away from the opening in one direction and that its motion in all other directions may be limited. In the specific construction shown this end is arrived at by the use of wire guides *e''*, which are secured to the bottom of the bucket on the inner side of the hole *e* and extend parallel and at a slight distance apart to the opposite side of the said bucket, leaving a space under and between sufficiently wide and high to retain the ball, as clearly shown in several figures of the drawings.

The bottom of the flume F is provided with upwardly-opening valves and holes thereunder, that coincide with the top ends of the buckets E when said buckets are at their point of highest elevation. The buckets E are provided with upwardly-projecting pins *g*, that on the rising of one of the buckets to its point of ultimate elevation will open the valve *f* and allow water from the flume F to flow into the said bucket. The valves E are opened by coming into contact with the stationary pins H as the bucket descends, or in case the valve-seat is shallow the said balls may roll from their seat in the openings *e*.

It is obvious that the filling of one of the buckets E from the flume F will, on the weight of water becoming sufficient, depress that end of the lever D and give the two pumps a

stroke—one up and the other down—and that on the bucket descending the valve *e'* will come into contact with a pin *H*, which will open said valve and allow the water to escape, and
 5 that while one of the operations just described is going on at one end of the lever the other operation is going on at the other end and that an automatic reciprocating movement of the lever will be the result. It is also
 10 obvious that the downward movement of the bucket will commence as soon as the weight of water within it shall overcome in the slightest degree the resistance of the pump. Therefore to cause a preponderance of weight in
 15 the descending bucket a portion of the water is allowed to remain in the bucket at the other end of the lever from the one being filled and is discharged after the valve *f* shall have been closed. To accomplish this, it is
 20 best to make the openings *e* smaller than the valve-openings *f*, so that the water will not discharge as rapidly through them as through the said valves *f*, and as the valve *e'* closes by gravity only after the lifting of the lever
 25 D above a horizontal position said water will all escape, by reason of which a considerable quantity of water will be discharged from one bucket after the other shall have filled sufficiently to overcome the resistance
 30 of the pump and the weight of said small quantity of water and shall have started on its downward course, thus lessening the resistance to the downwardly-moving bucket and giving it a considerable preponderance.
 35 The peculiar arrangement of the ball-valves in the buckets have the advantage over other forms of valves of exposing the entire valve-opening until the bucket shall have ascended to a point that will cause the ball to roll back
 40 and close the opening. This construction and making the aperture in the bucket of less capacity than the opening in the flume-valve, from which the bucket at the opposite end of the lever is being filled, preventing too
 45 rapid discharge, renders this device very satis-

factorily operative with the utmost practicable economy.

While it is the intention to gain for the descending bucket a considerable preponderance and to construct the device substantially as herein described, I do not confine myself to the specific construction herein described, as the same ends may be accomplished in other ways equivalent thereto.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a device of the class specified, a lever pivoted at its center and movable in a vertical plane on said pivotal point carrying a bucket on each of its ends, each bucket having an aperture in its bottom and a ball seated over said aperture when the bottom of said bucket is substantially horizontal and adapted to roll from or over said aperture upon the departure of said bucket from said horizontal position, and means for guiding said ball in its movements, in combination with a water-supply adapted to fill said buckets on their elevation, for the purpose specified.

2. In a device of the class specified, a lever pivoted near its middle and movable in a vertical plane on its pivot and carrying a bucket on each end, each bucket having an aperture in its bottom, a ball normally seated over said aperture and adapted to roll from or over said aperture on the tilting of the lever, and guides for said ball in its movements, consisting of wires inclosing the same, in combination with a water-supply adapted to fill said buckets on their elevation, substantially as and for the purpose specified.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

SPENCER S. MARSH.

Witnesses:

A. P. WOOD,
EDWARD P. WOOD.