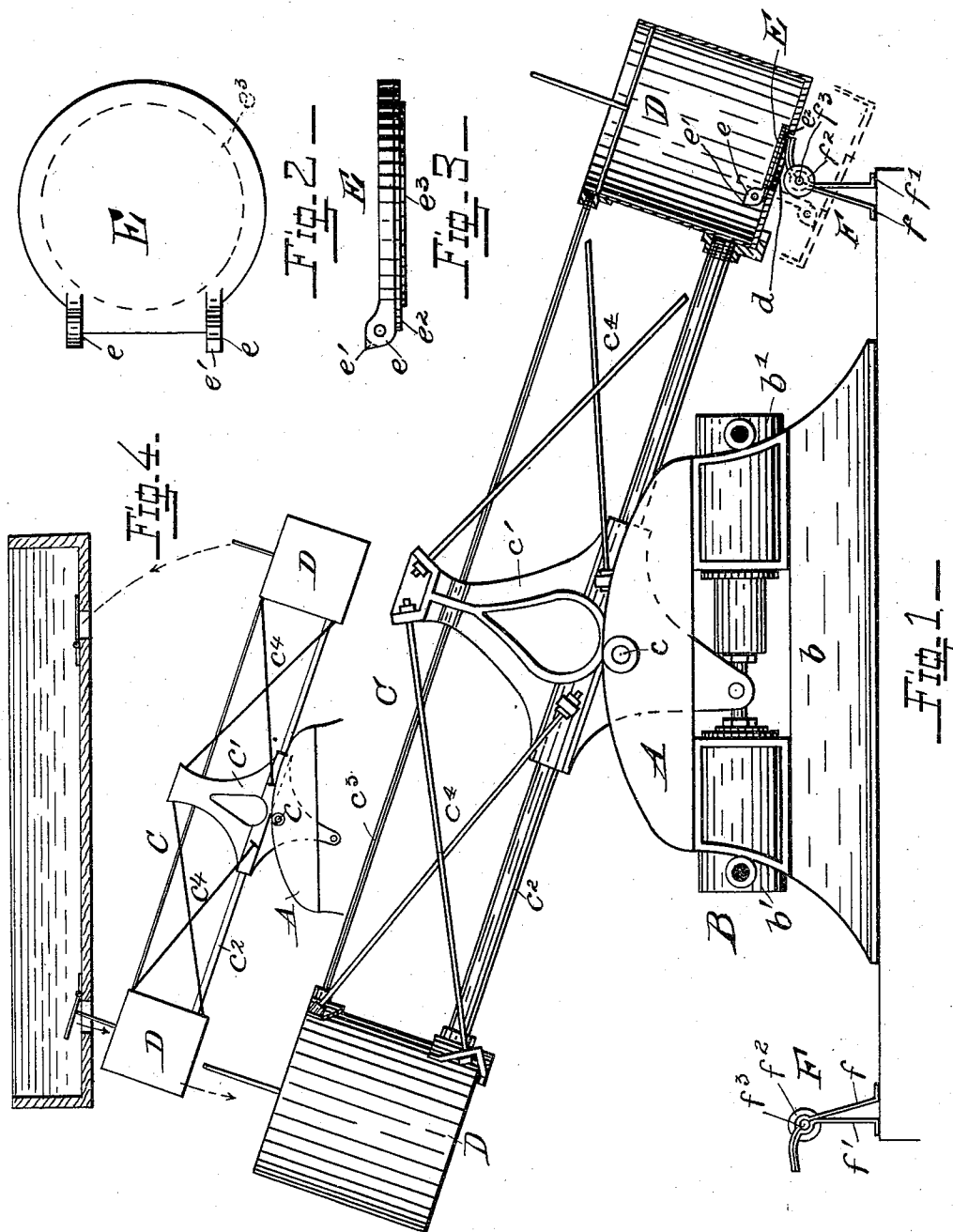


(No Model.)

A. A. WOOD.  
HYDRAULIC MOTOR.

No. 556,391.

Patented Mar. 17, 1896.



WITNESSES:  
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# UNITED STATES PATENT OFFICE.

ALBERT A. WOOD, OF ATLANTA, GEORGIA.

## HYDRAULIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 556,391, dated March 17, 1896.

Application filed February 21, 1895. Serial No. 539,308. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT A. WOOD, a citizen of the United States of America, and a resident of Atlanta, in the county of Fulton and State of Georgia, have made a certain new and useful Improvement 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 form a part of this specification.

The invention is shown in the accompanying drawings, as follows:

Figure 1 is a side elevation of the device, showing one of the valves by cutting through the bucket, said valve being shown in its open position by broken lines. Fig. 2 is a plan of the valve; and Fig. 3 is an edge view thereof, showing its peculiar construction. Fig. 4 is a detail side view in operative position, with the filling-tank in section.

In the figures like reference characters indicate corresponding parts in all the views.

A is a frame which may also, if desired, be the frame or part of the frame of the driven machine, being in the present instance a pump B, of which *b* is the base and *b'* the cylinders. A lever C is pivoted on a pin *c* to the frame A, and is connected to the driven machine at the lower end of the central piece *c'*, which central piece consists of a casting adapted to receive the bars *c<sup>2</sup>* and *c<sup>3</sup>*, of which the lever is principally formed, truss-bars *c<sup>4</sup>* serving to brace said lever. On each end of the lever C and secured thereto in any suitable manner are buckets D, by the alternate filling with water and emptying of which buckets the lever C is caused to oscillate upon its fulcrum *c*.

I do not wish to be understood as in any manner limiting myself to the use of a lever such as herein briefly described, but have shown and described merely one form of lever which would be adapted to the purpose; nor do I wish to be understood as confining myself to the specific means and manner of

applying the power produced by the oscillation of the lever, inasmuch as this oscillation may be converted in many ways and by many devices to other purposes.

E is a flat valve of any desired form and is provided on one side with lugs *e* whereby said valve is pivoted to the bottom of the buckets D, over and adapted to close the opening *d* in the bottom thereof. The lugs *e* are provided with projections *e'* so situated thereon as to contact with the bottom of the bucket just before the said valve shall reach a vertical position in opening, whereby said valve will close by its own gravity as soon as permitted. On the under side of the valve E is a sheet of rubber *e<sup>2</sup>*, which is of sufficient size to cover the opening *d* when the valve is closed and to project, say, an inch beyond the edge thereof. On the under side of this sheet of rubber is a metallic plate *e<sup>3</sup>*, the said valve, rubber sheet and metallic plate being suitably bolted or otherwise secured together. The plate *e<sup>3</sup>* should not be larger than the opening *d*, into which it projects when the valve is closed.

F is a curved abutment, the upper end of which is so situated as to be contacted with by the free edge of the valve E—that is, by the edge distal from the pivotal point of said valve. Said abutment is curved in the plane of oscillation of the lever D and is set upon and secured to a suitable substructure. This abutment in the construction shown is formed of two flat bars *f* and *f'*, the upper part of each of which is correlatively curved and then they are secured together, their lower ends being projected downwardly, diverged and secured to the supporting substructure. The curvature of the upper part of this abutment is such that after the downward movement of the edge of the valve distal from the pivotal point is stopped by contacting therewith and as the opening of such valve progresses the contact between said valve and said abutment will be a rolling contact as far as possible from the point of the abutment, which will continue such rolling contact until the valve is about half open, after which undue friction is prevented and quick completion of the opening provided for by a roller

$f^2$  mounted upon a pin  $f^3$  held between the bars  $f$  and  $f'$ , said bars being at the proper point each bent outwardly into a small half-circle, which, when placed together, form an eye wherein the pin  $f^3$  may be set.

The sheet of rubber  $e^2$  interposed between the valve and the metallic plate  $e^3$  deadens the sound and lessens the jar of the impact of the valve against the abutment  $F$  in opening and against the bottom of the bucket in closing, incidentally perfecting the joint between the valve and the bottom of the bucket when said valve is closed.

The curvature of the abutment and its peculiar shape lends elasticity to the impact of the valve thereon and opens said valve by stopping the downward movement of its free edge, contacting therewith as near as possible to said free edge, and hence opening same with a minimum degree of resistance to the downward movement of the bucket and a minimum strain of the parts, with the least possible counteraction of the effective weight of the water in the buckets. The effect of the rolling contact between the valve and abutment throughout the entire opening and closing of the valve is obvious, the valve opening and closing slowly and without any considerable amount of friction or force of impact, the water above the valve also assisting the descent of the bucket, the valve acting as a lever fulcrumed on the pin.

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

1. In a hydraulic motor, a pivoted lever, a bucket on each end thereof provided with an aperture in its bottom, a flat valve pivoted over said aperture, pins set under each bucket projecting upwardly and curved in a direction that will cause the said valve to travel thereover in contact therewith tangentially, the point of said pin being so situated as to contact with said valve near its

edge opposite its pivotal point, and means for filling said buckets on their elevation.

2. In a hydraulic motor, a pivoted lever, a bucket on each end thereof having each an aperture in its bottom, valves mounted over said apertures said valves being hinged to the said buckets on the sides nearest the pivotal point of the lever, and a pin seated under each bucket its end being so located as to contact with the edge of said valve as it descends with the bucket and being so curved that the said valve contacts with its surface tangentially during its opening and downward movement, and means for filling said buckets.

3. In a hydraulic motor, a pivoted lever, a bucket on each end thereof apertured in its bottom, a valve pivotally secured to the said bucket over said aperture, a pin seated under each bucket and curved so that the said valve contacts with it tangentially in its opening and downward movement, and a roller journaled on said pin so as to contact with said valve during the latter part of said movement thereof, and means for filling said buckets.

4. In a hydraulic motor, a pivoted lever, a bucket on each end thereof apertured in its bottom, a flat valve pivotally mounted so as to govern said aperture, a pin under each bucket curved so that said valve will contact with the same tangentially on its descending and opening movements, said pin being composed of two bars curved and secured together at their upper ends, their lower ends being diverged and secured to the supporting structure, and means for filling said buckets on their elevation.

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

ALBERT A. WOOD.

Witnesses:

A. P. WOOD,  
HORACE S. KEITH.