V. KROMER.

Improvement in Hydraulic Motors

No. 115,869. Patented June 13, 1871.

Fig: 1.

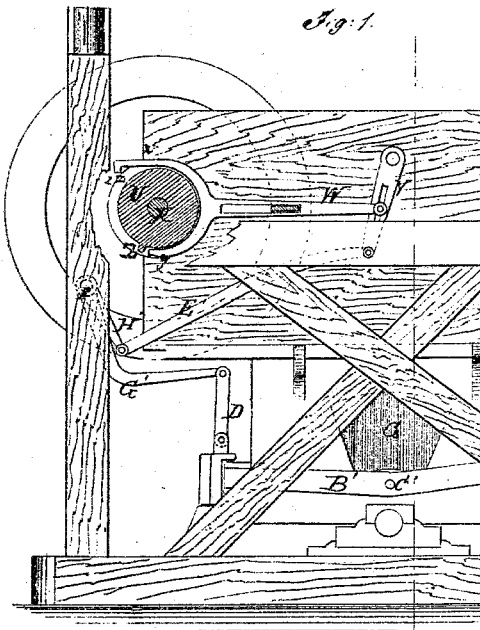


Fig: 2.

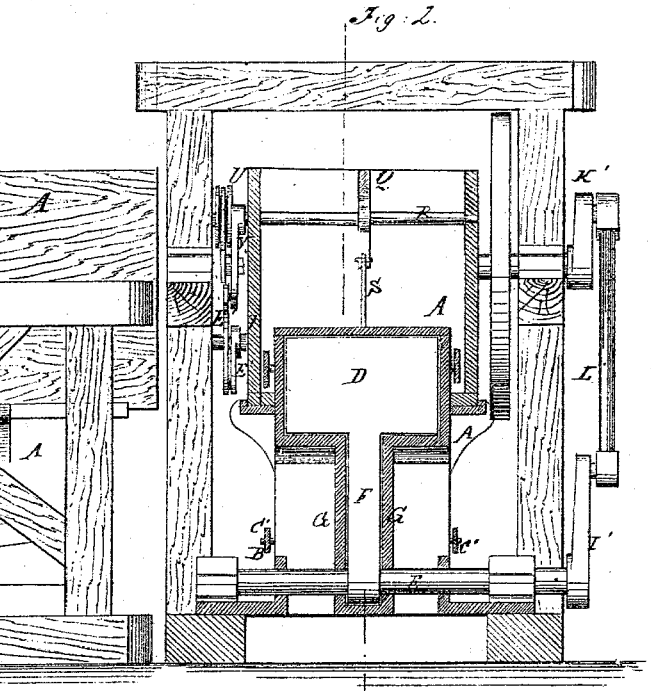
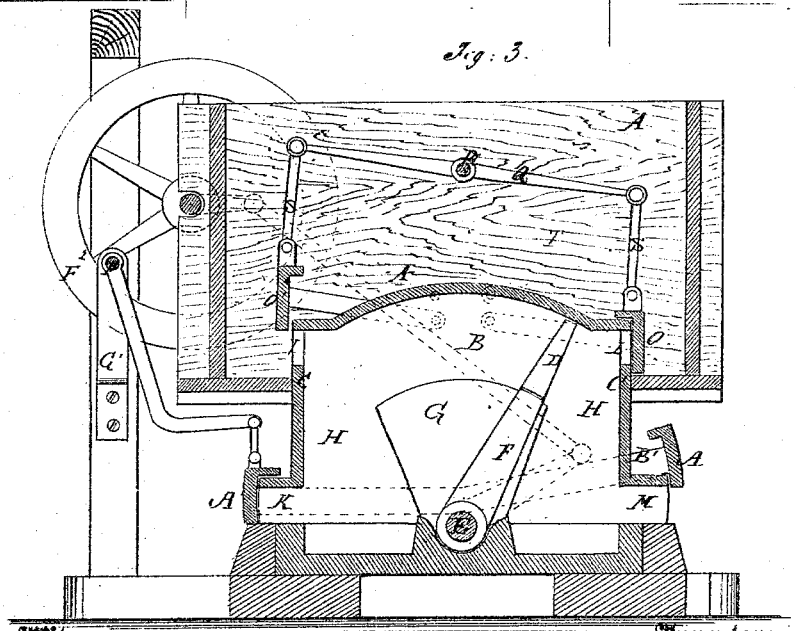


Fig: 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

VOLNEY KROMER, OF GRAND RAPIDS, WISCONSIN, ASSIGNOR TO HIMSELF AND WARREN T. REASER, OF SAME PLACE.

IMPROVEMENT IN HYDRAULIC MOTORS.

Specification forming part of Letters Patent No. 115,869, dated June 13, 1871.

To all whom it may concern:

Be it known that I, VOLNEY KROMER, of Grand Rapids, in the county of Wood and State of Wisconsin, have invented a new and Improved Water-Motor; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification.

This invention relates to improvements in machines for utilizing water as a motive-power; and it consists in a vibrating blade or piston in a closed case, an induction-port and exhaust-port on each of two opposite sides, with valves or gates, and automatic apparatus for working the valves from the crank-shaft, which is operated by the shaft of the vibrating blade, all as hereinafter described.

Figure 1 is a side elevation of my improved machine. Fig. 2 is a sectional elevation on the line *x x* of Fig. 1; and Fig. 3 is a longitudinal sectional elevation on the line *y y* of Fig. 2.

Similar letters of reference indicate corresponding parts.

A is a metallic or other case, in which is a curved chamber, B, in the upper part, between the two opposite sides, in which chamber is a vibrating blade or piston, D, connected to the shaft E by an arm, F, working between the parts G of the side walls of the case, which, in the triangular-shaped parts, are only sufficiently wide apart to provide room for the said arm while in the chamber B, and at the spaces H they are as wide apart as the required length of the blade D in the direction of the axis of shaft E. The said case is provided with an induction-port, I, and exhaust-port K, on one side of the blade, and an induction-port, L, and exhaust M on the opposite side. O and O′ represent valves or gates for the induction-ports; and A and A′ valves for the exhaust-ports. The valves O O′ are suspended from the vibrating arms Q by rods S, said arms being mounted in the water-supply chamber T, on the oscillating shaft R, extending through the wall of said chamber T, and connected with the tappet-disk U by the crank V and yoked and sliding connecting-rod W. This tappet-disk U is mounted on the driving-shaft X. One arm, Y, of the yoke is arranged under the disk, and so that the tappet Z will strike the end and move it to the right. The other arm, Z^1, is arranged over the disk, with a stud, Z^2, against which the tappet will strike after having moved the slide to the right, and move it back again. The gates A′ for the exhaust-ports are connected to the vibrating arms B′, arranged outside of the case A and pivoted at C′. These gates are also actuated by the sliding connecting-bar W, the oscillating bars B′ on which they are mounted being connected to the crank V by the links D′ E′, the rock-shaft F, and the arms G′ and H′ thereof; but the arrangement is such that when the gate for the induction-port of one side opens the gate of the exhaust-port of the same side closes, and vice versa.

The driving-shaft is worked by the oscillating shaft E, through the medium of the cranks I′ and K′ and the connecting-rod L′, arranged to impart rotary motion to the said driving-shaft, although the motion of shaft E is only oscillatory.

It will be seen from the foregoing description that the gates will have the proper action to cause the water to be applied alternately on the sides of the vibrating gate, so as to cause a continuous motion, which will be well adapted for slow-moving machines requiring great power.

The parts H of the chamber within the case A may be so modified in form as to lessen the spaces to be filled before any force is expended upon the piston.

Other arrangements of valve-operating gear may be employed, as is obvious, and I do not limit myself thereto, for I consider the essential part of my invention to be the arrangement of the case, blade, and valves.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The improved water-motor, consisting of the case A, piston-valves or gates A A′ and O O′, and the driving-shaft X and valve-operating gear, combined and operating substantially as specified.

2. The combination of case A, vibrating blade D, and the valves or gates A A′ and O O′, arranged substantially as specified.

VOLNEY KROMER.

Witnesses:

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