

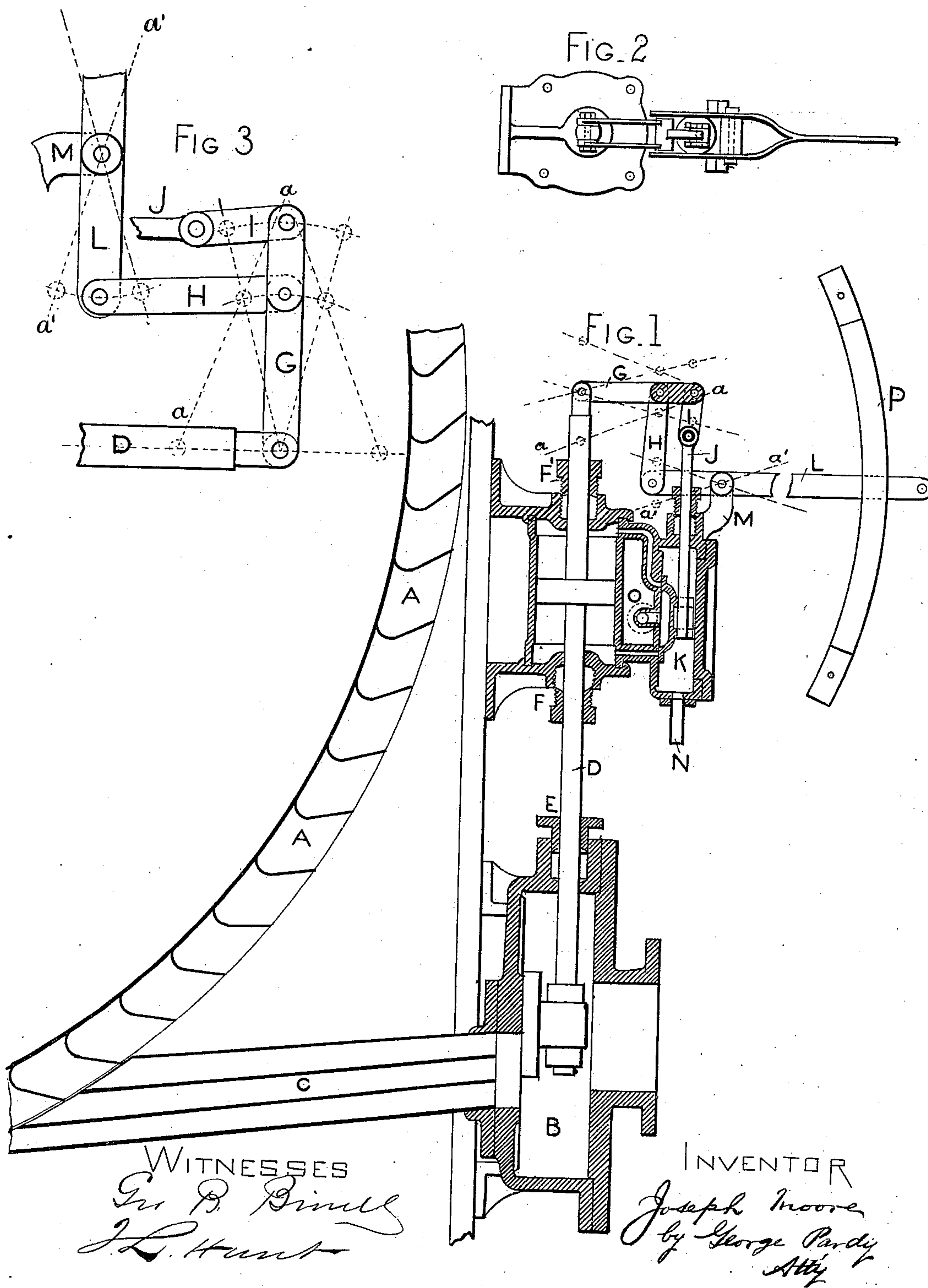
(No Model.)

J. MOORE.

HYDRAULIC GATE AND VALVE.

No. 309,865.

Patented Dec. 30, 1884.



WITNESSES
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HYDRAULIC GATE AND VALVE.

SPECIFICATION forming part of Letters Patent No. 309,865, dated December 30, 1884.

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To all whom it may concern:

Be it known that I, JOSEPH MOORE, a citizen of the United States, and a resident of San Francisco, State of California, have invented a new and Improved Mode of Operating Hydraulic Valves and Gates, of which the following is a specification.

My invention relates to those larger and heavier gates and valves which require the application of more than manual effort to raise and lower them expeditiously; and it consists in the application to or combination with such valves or gates of a hydraulic cylinder having a piston operating therein, the rod of which is connected with the stem of the gate or valve to be operated, and which piston is controlled as to the exact distance or direction of its movement by a peculiar system of valve-gearing connected therewith, as will be hereinafter more fully described.

In the accompanying drawings, forming part of this specification, Figure 1 is a sectional elevation of my invention in its application to an ordinary water-wheel. Fig. 2 is a front view of the hydraulic cylinder and its valve-operating levers. Fig. 3 is a diagrammatic view of the valve-gear of the hydraulic motor shown at a larger scale.

A is a portion of a common water-wheel, which may be either an undershot, overshot, breast, turbine, or other kind. B is the gate connected therewith, which regulates the quantity of water to be admitted to the wheel.

C is the conduit from the gate to the wheel, with shelves passing longitudinally to guide the water into the different buckets of the wheel.

The gate in the present instance is shown to be one of the ordinary sliding-plate kind; but any suitable kind may be used. The stem D, which is also the piston-rod of the hydraulic cylinder, passes through the stuffing-box of the gate at E and stuffing-box of the hydraulic cylinder at F F'. To the end of the piston-rod, which passes through the stuffing-box F', a lever, (of the first order,) G, is connected. This lever has its fulcrum on one end of the link H, and its extremity connects with another link, I, connecting between the lever G and the valve-stem J, which moves the valve K. The operating-lever L is one of the first order, and has

its fulcrum upon a lug or standard, M, its end connecting to the link H. The valve K is an ordinary O slide-valve, which alternately opens and closes a passage from the supply-pipe N and exhaust-pipe O to supply and discharge water, under pressure, to and from one or other end of the hydraulic cylinder in similar manner as steam is admitted and discharged from the cylinder in operating a steam-engine.

P is a quadrant to guide and steady the lever L as it is moved back and forth. The cylinder of the motor is secured to any convenient part of the timber frame-work of the water-wheel in true alignment with the gate B. In some cases a suitable cast-iron frame may be used to attach the gate and the motor together. There is often occasion to open the gate a precise and determined degree less than the full opening. If the valve controlling the admission of the water to the hydraulic motor is operated by hand entirely, great uncertainty attends the measurement of the precise degree of opening desired. In fact, it resolves itself largely into a matter of guess-work; but with the present arrangement the hand-lever has only to be set at such a degree of angularity with the horizontal as may correspond with the degree of opening of the gate required, and which is properly measured and marked on the quadrant when the device is made, to obtain the utmost precision of action.

In operating the device, let us suppose that the gate is closed, and that it is required it shall be moved to half its full opening. In this case the levers G and L will be found standing at rest on the oblique lines marked *a a'*, Fig. 3. First, the lever L is thrown to occupy a true horizontal position, (the cylinder being supposed to stand vertically,) which is just one-half its sweep. Here it rests, when it will be found that the lever G has assumed a still more oblique position, being pushed over through its connection with the lower end of the lever L, while its fulcrum on the piston-rod D has not yet moved. This movement has thrown the valve so as to give a full opening to the lower port. Now, a movement of the piston-rod commences as the cylinder fills with water, and, of course, as the fulcrum of the lever G is now changed from its long end to about the middle, where it connects with the link H,

the movement of the piston-rod will vibrate this lever, the end attached to the piston-rod going up, and the other end connected to the valve through the link I vibrating downward, thus closing the port which has just been suddenly opened. Since the parts are so proportioned, a half-stroke of the piston effects a half-stroke through the connections of the valve K. Therefore, inasmuch as the valve was only moved from its middle position in one direction, it follows that a half-stroke in the opposite direction must restore it to said position, which is the one which causes both ports to be covered, shutting off both supply and exhaust, and maintaining the motor immovable, so that when this position is reached the motor has moved the gate B just one-half its travel. If, now, it be required to open the gate full, the lever L is thrown the remainder of its sweep, the valve K, similarly as before, is again moved half its stroke to open the lower port, and a further advance of the piston occurs, which, in like manner as before, restores the valve K to its normal position and again shuts off both supply and exhaust. Now, if the gate is to be entirely closed, the lever L is swung to the opposite end of its path, which movement would communicate a full stroke to the valve K, if it were done quickly; but inasmuch as it is done

gently, the piston soon acquires a movement which counteracts that of the lever L, and the valve opens only sufficiently to continue the stroke until both the lever L and the piston reach the end, when it will be found that the valve has acquired its normal position and covers both ports.

Any degree of movement may be had with this device, from an inch to full opening of the gate, with no more effort than is required to move the little valve K of the motor.

The valve motion of the motor, *per se*, is not a novelty, having been used in connection with steam machinery in various forms and combinations; but I do not know of there being any motors of the kind herein shown used in connection with the valves and gates of hydraulic machinery before my invention thereof.

What I claim as my invention, and desire to secure by Letters Patent, is as follows:

The combination of a hydraulic motor having a hand-operated differential valve-gear, as herein described, and a hydraulic valve or gate connected therewith, substantially as and for the purpose set forth.

JOSEPH MOORE.

Witnesses:

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