F. A. BISHOP.

CUT-OFF VALVE.

No. 190,408. Patented May 8, 1877.

Fig. 1.

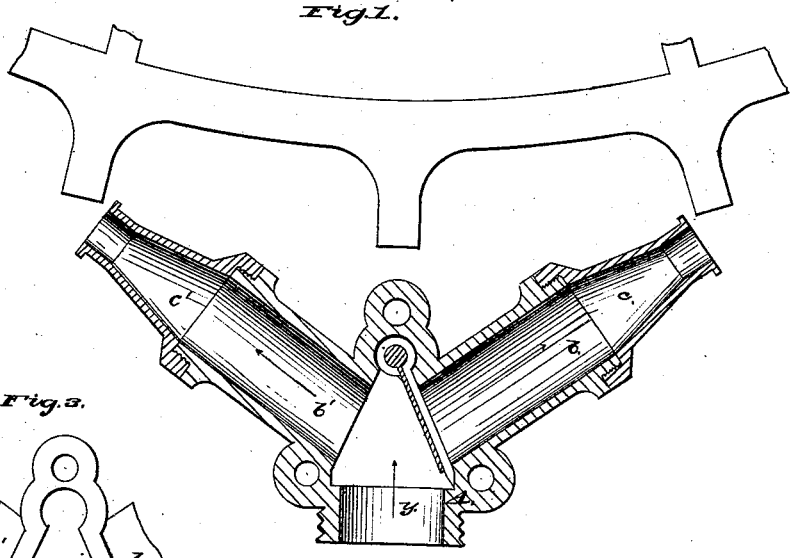



Fig. 3.

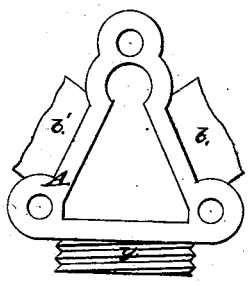



Fig. 2

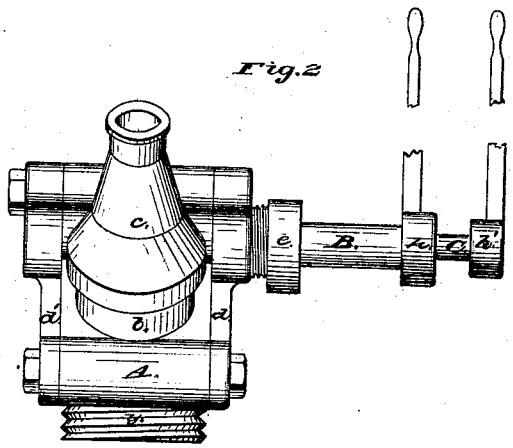



Fig. 4.

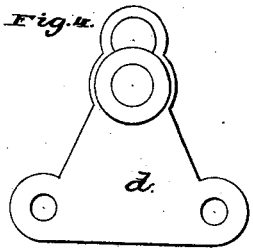



Fig. 8.

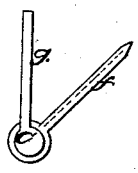



Fig. 7.


Fig. 6.

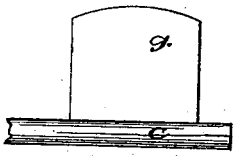
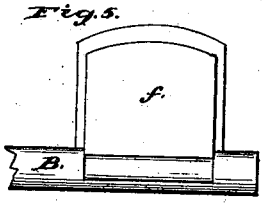



Fig. 5.

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# UNITED STATES PATENT OFFICE.

FRANCIS A. BISHOP, OF PLACERVILLE, CALIFORNIA.

## IMPROVEMENT IN CUT-OFF VALVES.

Specification forming part of Letters Patent No. **190,408**, dated May 8, 1877; application filed June 14, 1876.

*To all whom it may concern:*

Be it known that I, F. A. BISHOP, of Placerville, State of California, have invented an Improved Two-Way Cut-Off Valve for Hydraulic Purposes; and do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention without further invention or experiment.

In operating a percussion water-wheel for hoisting or other purposes, a stream of water is conducted through pipes under a high pressure to the buckets thereof, and discharged through a nozzle suitably adjusted and directed. The impact of the water upon the wheel-buckets causes the wheel to rotate with velocity proportionate to the pressure and the load to overcome.

For hoisting purposes it is particularly desirable to change the direction of rotation either forward or backward at will, to increase or diminish the speed, or to stop the machine entirely.

My invention relates to an improved two-way cut-off valve for this purpose; and it consists of an arrangement by which I can cut off the stream of water from the wheel either in whole or in part, on one face or the other, or completely on both faces, or, by simple and rapid adjustment of the parts thereof, to balance the load in any position by the action of the water.

In order to more fully illustrate and describe my invention, reference is had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a longitudinal vertical section, in elevation, of my machine, showing, in addition, a segment of the water-wheel. Fig. 2 is an end elevation. Fig. 3 is a side elevation of the case. Fig. 4 is an elevation of a cap covering a side of the case. Fig. 5 is a plan of the main stem and recessed wing. Fig. 6 is a plan of the auxiliary stem and wing. Fig. 7 is a cross-section of the two stems and the wings closed. Fig. 8 is a cross-section of the stems and wings open.

Similar letters of reference indicate like parts.

Let A represent a triangular case with parallel sides, which is made of such material as will stand the strain to which it is to be subjected. On the bottom is the inlet *y*, which receives the water from the main pipe. On the opposite faces are the outlet-pipes *b b′*, connecting with the interior of the case. Attached to said outlet-pipes are the nozzles *c c′*, which regulate the diameter of the streams and direct the same to the buckets of the wheel. The sides of the case A are covered by the caps *d d′*, being firmly secured to it by bolts.

Passing transversely through the case A, and perpendicular to the sides thereof, is the hollow cylindrical stem or arbor B, the longer end of which goes through the cap *d*, and is made tight by suitable packing and the gland *e*. The shorter end of said stem is properly fitted into a recess in the opposite cap *d′*.

Attached to the stem B is the wing *f*, one side of which is a plane surface, and made to cover tightly, by aid of packing or otherwise, the interior end of the outlet-pipe *b*. The opposite side of the wing is recessed.

Through the hollow of the stem B is fitted an auxiliary stem, C, somewhat longer than B, and made to rotate a certain distance therein.

To the stem C is fixed the wing *g*, which fits into the recess in *f* to about half its thickness. Both sides of *g* are plane surfaces, and one of them is made to cover tightly, by aid of suitable packing or otherwise, the inner end of the outlet-pipe *b′*. A horizontal slot in the short end of the stem B permits the passage of the wing *g* to its place.

On the longer ends of the stems B and C are attached suitable levers *h h′*, by which the wings are rotated into their necessary positions.

When the wings *f* and *g* are folded together it will be seen that their angular positions may, by means of the lever *h*, be changed, covering the face of one outlet or the other at will, governing thereby the quantity of water discharged through either nozzle. In consequence thereof, the wheel may be rotated in either direction, or the discharge may be divided, so the wheel may be held stationary,

or its speed either increased or diminished, by changing the position of the folded wings through proper adjustments of the lever.

It will be further seen that the purpose of the auxiliary stem C and wing *g* is to complete the closing of the outlets *b b'*, which is effected by opening the said wings by agency of the lever *h'*, which rotates *g* into position desired. By closing both orifices the consumption of water is diminished to the time of actual use of the wheel.

I do not confine myself to the exact shape of the case A, as described, nor to the packing of the wings *f* and *g*, for the said packing may be attached either to said wings or to the faces of the outlet-pipes, if desirable, for economy of construction or other reasons.

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

1. A two-way cut-off valve for operating a percussion water-wheel in either direction on its axis, consisting of the triangular case A, with an inlet-opening, *y*, in the bottom, and outlet-openings *b b'*, directed toward the buckets on the periphery of the wheel, causing the water through the nozzles to strike the same bucket on either face agreeably to the direction required, the said openings *y* and *b b'* being in the same plane of the wheel, all arranged substantially and for the purpose as above described.

2. The hollow stem B and wing *f*, in combination with the case A, the stem C, and wing *g*, one or both stems arranged and operated by the levers *h h'*, substantially as above described.

3. The two stems B and C and wings *g* and *f* as a solid, in combination with the case, A, to be used singly for reversing purposes, without cutting off the entire stream, substantially and for the purpose as above set forth.

FRANCIS A. BISHOP.

Witnesses:
T. C. NUGENT,
ROBERT M. WELCH.