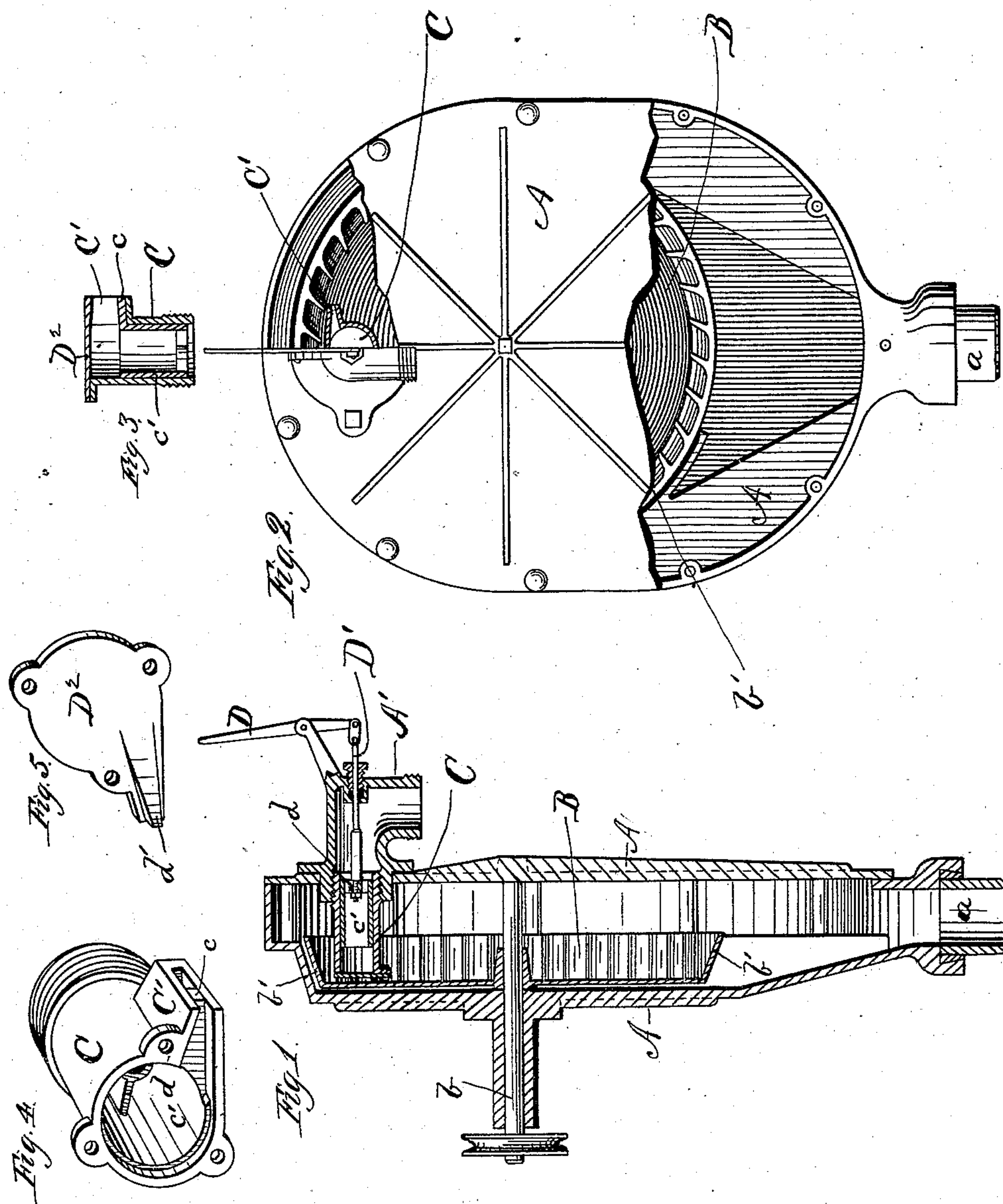


(No Model.)

L. I. TODD & A. ORME.
Water Motor.

No. 232,422.

Patented Sept. 21, 1880.



Witnesses.
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UNITED STATES PATENT OFFICE.

LYMAN I. TODD AND ALEXANDER ORME, OF CHICAGO, ILLINOIS.

WATER-MOTOR.

SPECIFICATION forming part of Letters Patent No. 232,422, dated September 21, 1880.

Application filed May 3, 1880. (No model.)

To all whom it may concern:

Be it known that we, LYMAN I. TODD and ALEXANDER ORME, of Chicago, Cook county, Illinois, have invented certain Improvements in Water-Motors, of which the following is a specification.

This invention relates to the construction of the penstock or water-delivering nozzle and of the wheel in water-motors; and the object thereof is to lessen the amount of water used without decreasing the efficiency of the wheel, and also to place it in the power of the user to regulate the flow of the water without diminishing its speed; and to this end the invention consists in certain novel features, which will be fully described below, and which are clearly illustrated in the accompanying drawings, wherein—

Figure 1 is a transverse vertical central section of our improved motor. Fig. 2 is a side elevation thereof, partly in section. Fig. 3 is a sectional view of the penstock. Figs. 4 and 5 are enlarged views of the penstock and the cap which closes one side thereof.

Referring to said drawings, A represents the inclosing-case of the motor, provided with an outlet, *a*, for the water, as usual. B is the wheel, mounted upon the shaft *b* passing through one side of the case, with an end bearing upon the interior surface of the other side. This wheel is composed of a solid disk and a projecting interiorly-bucketed flange or rim, *b'*. The latter feature—namely, the rim—differs from previous constructions in that it is made to flare outwardly, as shown in the drawings, thereby enabling the water to free itself more readily from the wheel than is possible in the case of wheels with rims projecting at right angles to the disk. It is, of course, a prime necessity that the water be not too easily discharged from the wheel, because power is thereby wasted; but, on the other hand, there is danger that it may cling to the wheel so long as to retard its motion and obstruct the inflow of fresh water.

In order to avoid both these extremes and obtain the best results we find the construction shown to be desirable.

In connection with this wheel, we employ a penstock, C, the orifice *C'* of which is provided with an adjustable side, whereby said

orifice is enlarged or diminished in size so as to gage the amount of water used to the demands made upon the motor for power. The adjustable side *c* slides back and forth in the orifice, and is attached to a sleeve, *c'*, which fits the interior of the cylinder of the penstock water-tight, and is moved therein by a crank, D, secured to the case A or the inlet-pipe A', and a pitman, D', joined to the sleeve *c'* by a cross-head, *d*, therein.

The inner side of the penstock and orifice are closed by a cap-piece, D², provided with an angling-rib, *d'*, upon the portion which closes the orifice, whereby to give the orifice a taper toward its point. The sleeve *c'* closes the orifice as it is moved inward toward the inner side thereof, while the sliding side *c* preserves the continuity of its sides to the very point of delivery, so that the stream remains solid until it issues to the wheel.

We are aware that ordinary faucets have been inserted in the inlet-pipes of water-motors in close proximity to the penstock; but such do not accomplish the desirable results brought about by this feature of our invention, because the orifice of the penstock remains the same whether much or little water is used, and whereby a loss of power is caused when the water is turned partly off. This is because the shutting off is done away from the wheel and the water is allowed to disperse itself in an undiminished passage-way between the faucet and the wheel, and consequently when it strikes the wheel it has lost its momentum in great part; and results like this follow in all cases where the water is given a chance to expand between its issuing through the regulating-faucet and its contact with the wheel. By our construction and by the location of the shutting-off device directly at the point of delivery these objections are wholly obviated.

We are also aware that a series of supply-pipes leading to the penstock, provided with a valve, whereby any portion of them may be closed while one or more of them are left open, is shown in a prior patent. This construction permits but a few changes in the amount of water, increases the expense of construction, the multiple-mouthed penstock requires unnecessary room, and the water from one passage may neutralize the water from the others,

It will be noticed that the penstock, as shown, delivers the water at all times upon the side of the orifice nearest the interior of the wheel. This is desirable, in combination with a flaring-rim wheel, and indeed not undesirable with a right-angled-rim wheel.

We claim—

1. The combination, with the case, the penstock, and the water-outlet, of the flaring-rimmed interiorly-bucketed motor-wheel, substantially as specified.

2. In a water-motor, the combination, with the flaring-rimmed interiorly-bucketed wheel, of a penstock the orifice whereof is provided with an adjustable side for shutting off the

water and moving toward the interior in so doing, whereby the open part of the orifice is always upon the inner side, substantially as specified.

3. The combination, with a water-motor, of a penstock the delivery-orifice whereof is located at the wheel, and is provided with a movable side, whereby it may be contracted when it is desired to partially shut off the water, substantially as specified.

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