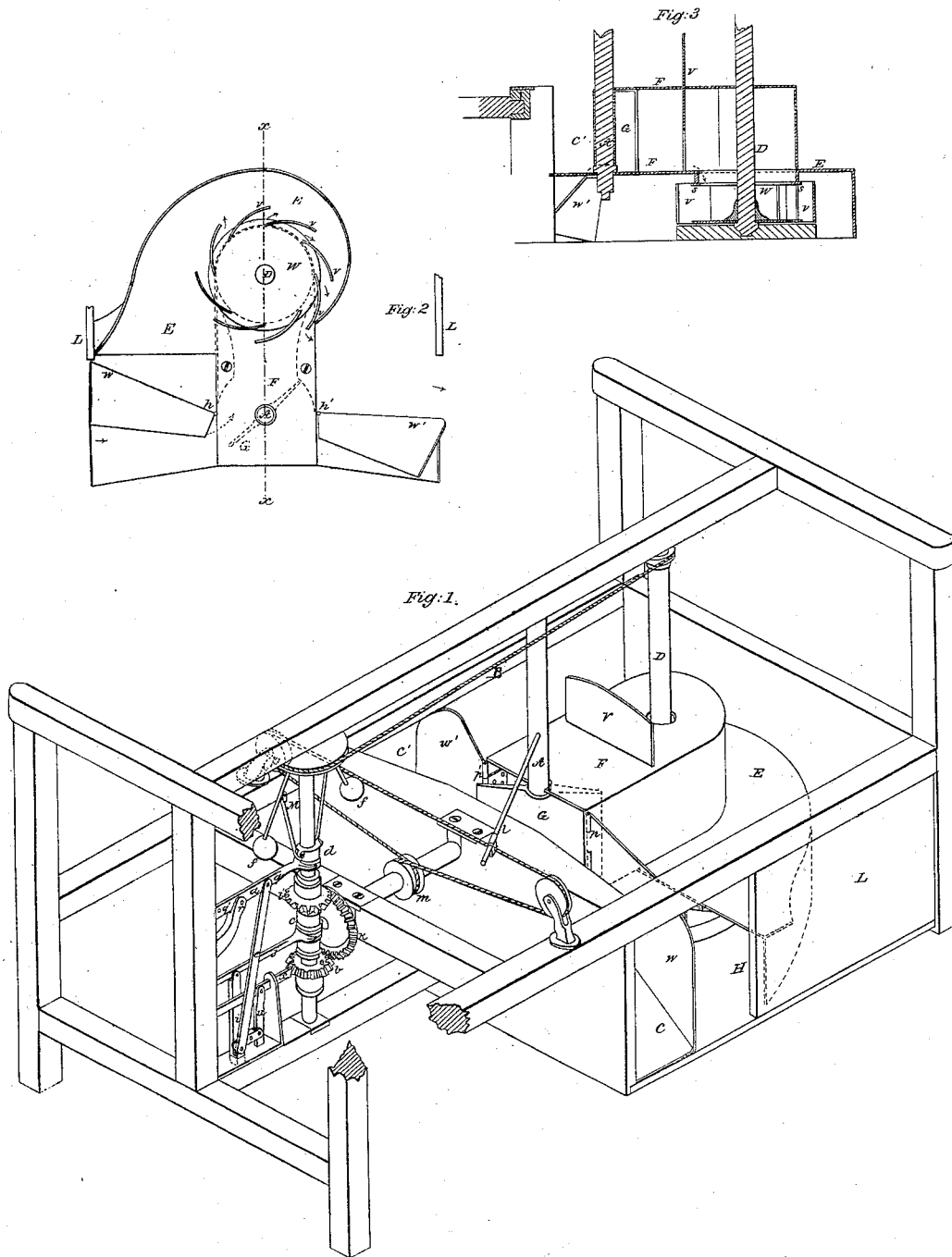


J. Secor,

Water Wheel,

N^o 6,132.

Patented Feb. 20, 1849.



UNITED STATES PATENT OFFICE.

JAMES SECOR, OF ST. LOUIS, MISSOURI.

APPARATUS FOR CURRENT-WHEELS.

Specification of Letters Patent No. 6,132, dated February 20, 1849.

To all whom it may concern:

Be it known that I, JAMES SECOR, of the city and county of St. Louis and State of Missouri, have invented a new and Improved Current-Mill; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings.

The nature of my invention consists in forming on a disk a reaction wheel W, Figure 2, (which is a horizontal view as seen from below) with buckets *v, v, v, v*, attached by their inner extremities to the disk aforesaid. The radius of curvature of the buckets increases toward their outer extremities but their general position is such that a straight line drawn from the outer to the inner extremity of a bucket, is nearly at right angles to the radius from the center of the axle to the inner point of the bucket. At the inner extremities of the buckets and on the side opposite to the disk is a flat ring to which they are connected and beyond the outer periphery of which they project to the same distance as they do beyond that of the disk.

The section Fig. 3 shows the manner in which the disk of the wheel W is connected with the shaft D, and *s, s*, show the position of the flat ring above described.

In the wheel as represented in Fig. 2 eight buckets only are placed but this number may be varied to suit the requirements of each case, and the proportional length of buckets may be increased or diminished so as to give the best action under any assigned velocity of the current intended to be employed.

Two or more wheels of the above description may be used on the same shaft, with their flat rings or their disks turned toward each other, and the shaft may be placed either vertical as represented in the drawings, or in a horizontal or inclined position according to the greater or less facility which each position affords for establishing the mill in its proper situation.

I place the wheel above described in an inclosing case E, to which the water finds admittance through the channel or flume F. This flume receives its water through the wicker gate G placed on one side of the channel C', C, through which the current passes. When the wicker stands with its wings parallel with the central line of the channel C' C the passage F is entirely closed

and no effective current finds its way to the wheel W, but when it stands obliquely across the channel as seen in Figs. 1 and 2 the current is directed to and passes through the wheel.

When placed in a current having a constant direction the water which has passed through and acted upon the wheel makes its escape on the opposite side of the mill from that on which it entered, and by a passage constantly open. Thus if the current enter at C' it escapes at H. But if placed in a current liable to reverse its direction as in the case of tide channels, there will be required in addition to the wicker gate above described, the two wings *w* and *w'* revolving about vertical hinges *h, h'*, and having an inclined flanch passing under the floor of the channel C', C. In Fig. 1, the wing *w* is seen to be open leaving the passage H open between the edge of the wall or planking of the mill L and the vertical edge of that wing, while the wing *w'* is closed against the edge of the opposite wall or planking. In the inverted horizontal plan Fig. 2, *w* is closed and *w'* open.

V is a gate sliding vertically in grooves by which, when necessary the passage of water through the channel F may be entirely prevented.

When a changeable current which has been passing from C' toward C reverses its motion the current setting into C by its own action closes the wing gate *w*, but while doing so opens the wing *w'*. While this inversion of the current is taking place, the lever arm *l* by which the wicker gate G is made to revolve is carried from its position near the pulley *p* to a position near *p'* by which a passage is opened for the water to pass toward the wheel.

In order to regulate the flow of water to the wheel, the shaft D is connected by the band R or other suitable machinery with a mill governor M, constructed in the usual manner and operating to keep the wicker gate G open to the required medium extent. The action of the balls *f f* on the lever *a* and through the connecting rod *e* upon the vertical sliding bar *i* causes *j* to elevate or depress the coupling box *c* causing it to take hold of either *b* or *b'* according as the speed is to be increased or diminished. On a change of the current the connecting rod *e* has its upper end disconnected from *q* and transferred to *q'*, when the same power to

regulate the breadth of opening will be possessed by the governor. Connected with the rod *e* and the upright *i* is the bar *o* which, while in a horizontal position forces the lever *u* to a maximum distance from *i* and in that position of *u* the stop *x* is brought into contact with the bevel wheel *b*. This position of the check bar *x* can only have place when the coupling box *c* has been brought out of contact with both the bevel wheels *b* and *b'*, that is, when the balls of the governor have that expansion which is indicative of the due medium speed. The effect of the check *x* is then to hold stationary the lever *l* of the wicker gate. But when a speed either too fast or too slow is given to the wheel *W*, the action of the governor raises or depresses that end of the bar *o* which is connected with *e*, and in either case draws back the check bar *x*, allowing the governor to act, and either open or close the wicker as required.

The above is my most usual arrangement for effecting the purpose of holding stationary the wicker gate at the point required; but I do not limit myself to the exact mechanical arrangements above described, as several of the parts may be varied, without essentially affecting the principle of my invention.

My current mill is so constructed as to be used either as a floating structure anchored in an open channel, or attached directly to the shore in which cases floating wing walls in the nature of booms may be used to guide the current to the channel in which the gate *G* is situated; or it may be sunk in the bed of a stream, suitably screened from drifting materials, and may thus be out of the reach of ice and may leave free the surface for the purposes of navigation.

I am aware that reaction wheels have

heretofore been constructed with buckets extending inward to the center, and having flat rings connecting their outer peripheries but from these my wheel differs, inasmuch as the buckets do not come to the center but are joined to a disk or to arms on one side and to a flat ring on the other near their inner extremities, and as they are left wholly free at their outer extremities as seen at *v, v, v, v*, Figs. 2 and 3. I am also aware that tide wheels have been made to float as well as to remain stationary at the same level, but from these my current mill differs in being either altogether a floating structure or at will convertible into one capable of running when entirely submerged.

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

1. The manner of regulating the action of my reaction current wheel, by combining it with a wicker gate, of which the opening is regulated, held stationary, or inverted with an inversion of current, in the way and for the purposes herein set forth.

2. I also claim the combination of vertical wings having inclined flanges passing under the floor of the channel leading to my mill, with the reversible wicker gate above described, substantially in the manner and for the purposes herein set forth.

3. I also claim the combination of machinery by which I hold stationary the wheels of the governing apparatus of my wicker gate, not confining myself to the exact arrangement of parts herein set forth while I effect the same purposes by means substantially the same.

JAMES SECOR.

Witnesses:

WALTER R. JOHNSON,
L. WILLIAMS.