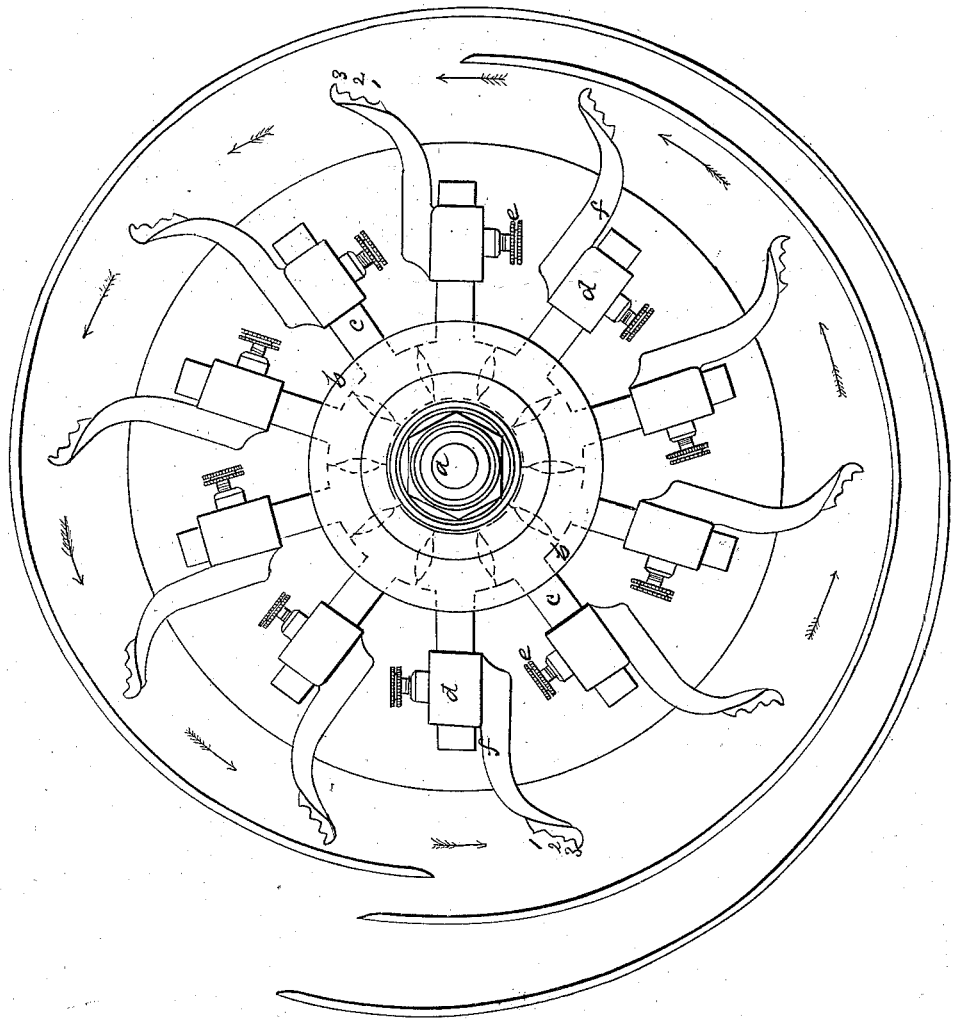
T. R. Timby,

Water Wheel.

No. 7,464. Patented June 25, 1850.



UNITED STATES PATENT OFFICE.

THEODORE R. TIMBY, OF CATO FOUR CORNERS, NEW YORK.

IMPROVEMENT IN WATER-WHEELS FOR INCREASING OR DIMINISHING THEIR DIAMETERS.

Specification forming part of Letters Patent No. **7,464**, dated June 25, 1850.

To all whom it may concern:

Be it known that I, THEODORE R. TIMBY, of Cato Four Corners, in the county of Cayuga and State of New York, have invented a new and useful Direct-Action Water-Wheel, which I denominate "Timby's Transit Water-Wheel;" and I do hereby declare that the following is a full, clear, and exact description of the principle or character which distinguishes it from all other things before known, and of the usual manner of making, modifying, and using the same, reference being had to the accompanying drawing, making a part of the same, in which—

The figure is an isometrical view.

The same letters refer to like parts in the drawing.

My improvements are, first, adjustable arms, by which the "buckets" or "hands," as I denominate them, are expanded from or contracted toward the water, by means of which I can with the same elements form a wheel of any desired diameter to suit the head of water, the machinery or gearing to be driven, and the amount of labor required to be performed; secondly, the buckets are formed on a novel principle of construction for direct-acting water-wheels by which I obtain the greatest effect from the impinging of the water thereupon.

My wheel is composed of the following elements: A large hub *a* has an annular recess formed in it on one face between its outer periphery and the part that surrounds the axis. Through the outer periphery *b* holes are made from which arms *c* project radially. These arms are enlarged within the periphery *b* of the hub to touch each other all around, the surfaces of each adjoining arm being concave, so as only to bear at the two extremes within the recess. By this construction they are more easily fitted up. A plate covers the recess in the hub and holds all the arms firmly together. The arms beyond the hub are square or rectangular in their cross-section, and have a collar *d* fitted to them to slide in and out with a set-screw *e* or other suitable fastening to fix them at any distance on the arm from the center. These collars *d* are affixed to and form a part of the forearms *f*, which also project outward radially, their ends being curved forward in the direction of the motion, and their front edge being beveled, so as to make the cross-section of the arm triangular, prevents the reaction of the water from affecting the force of the wheel in any great degree. The inclination of the end of the arm when it expands into a bucket or hand *h* is about fifteen degrees (more or less) from the curve of the circuit of revolution, and the forward face is smooth, so as readily to glance the water, and presenting little surface of resistance on the face against which the water first impinges. This hand is cut into steps, as clearly shown on the drawing, the riser being at right angles to the line of motion and propulsion. These steps or recesses may be of any convenient number, and they may be curved, as represented at 1, or at angle 2 3, differing from a perpendicular to the line of motion in some degree without materially affecting the object I have in view. The wheel thus substantially constructed in its details is surrounded by a spiral curb or parts of curbs in any of the well-known forms, one of which is shown in the drawing, through which the water is admitted to the wheel. An open center serves for the discharge of the tail-water in which the parts, from their peculiar formation, run freely, the hand being contracted at once from its full width down to a narrow wrist just sufficient to sustain it, the hand itself going through water edgewise from its inclination and the arm being reduced to an edge.

An inspection of the drawing will show that when the water is made to impinge upon one of the buckets or hands it cannot escape inward or glance off, being prevented by the shape of the parts; but it must be deflected directly backward till it is clear of the hand. In this way the full force of the direct action of the water is insured upon the line of motion, and I have found by investigation that the water discharges no faster from the wheel when the wheel runs at two-thirds the velocity of the natural discharge than the velocity of the wheel. In other words, if the water under a given head discharges with a velocity of twelve feet per second and the wheel is made to have a velocity of eight feet per second the discharge will be only eighty feet per second. The adjustable arms enable me to expand and contract the hands or buckets

and thereby the size of the wheel some three feet, (more or less,) according to the proportion of the parts. The adjustment can also be resorted to for the purpose of keeping the hand or bucket running close to the curb, as the parts are worn away by setting them out, and in case of breakage any one of the broken parts can be removed and replaced without disturbing the rest of the wheel.

I do not claim moving floats, as they have before been used on paddle-wheels to move out and in on their arms; but,

Having thus fully described my wheel, what I claim therein as new, and desire to secure by Letters Patent, is—

The double adjustable arm constructed as above described for expanding or contracting the size of the wheel for the above specific purpose, so that the absolute diameter of the wheel and arms shall be reduced or expanded to go within a suitable curve.

T. R. TIMBY.

Witnesses:
D. KIRKPATRICK,
WM. GREENOUGH.