R. DANIELS.
WATER WHEEL.

No. 17,426. Patented June 2, 1857.

Fig. 1

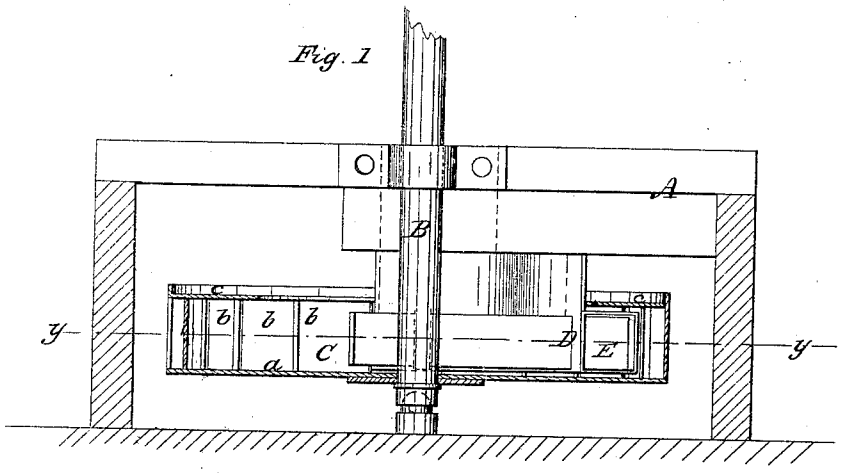
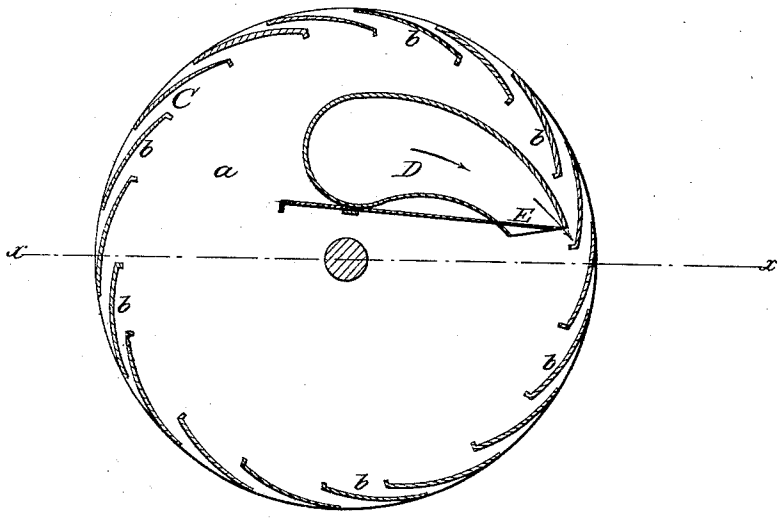


Fig. 2



UNITED STATES PATENT OFFICE.

REUBEN DANIELS, OF WOODSTOCK, VERMONT.

WATER-WHEEL.

Specification of Letters Patent No. 17,426, dated June 2, 1857.

To all whom it may concern:

Be it known that I, REUBEN DANIELS, of Woodstock, in the county of Windsor and State of Vermont, have invented a new and useful Improvement in Horizontal Water-Wheels; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1, is a vertical section of my improvement, the plane of section is through the center, as indicated by the line x, x, Fig. 2. Fig. 2, is a horizontal section of the ditto, y, y, Fig. 1, showing the plane of section.

Similar letters of reference indicate corresponding parts in the two figures.

To enable those skilled in the art to fully understand and construct my invention, I will proceed to describe it.

This invention consists in the employment of a wide flanch, placed above the upper ends of the buckets, for the purposes and in the manner hereinafter described.

A, Fig. 1, represents a proper framing, in which a vertical shaft, B, is secured, and C is the wheel attached to the lower part of said shaft.

The bottom, a, of the wheel is formed of a solid circular plate, and the buckets, b, are attached to the edge of said plate and to a flanch, c, which forms the upper part of the wheel,—the flanch, c, projecting over the plate a, a distance equal to the width of the orifice, through which the water escapes, to act upon the buckets. This will be understood by referring to Fig. 1, in which D represents the flume suspended within the wheel, and E the gate at the end, or orifice, of the flume, the orifice of the flume being at the inner side of the buckets. Or any other contrivance may be applied—whether stationary, and extending around the wheel, or so far in the direction of the motion of the water as the water shall pass within the wheel, before escaping therefrom,—or attached to the buckets and revolving with the wheel,—by which the space, or nearly the entire space, above the buckets, from the outer edge of the buckets to the inner edge of the orifice through which the water escapes from the flume D within the wheel, when opened to its full extent, shall be covered, and thereby the water guided and controlled in its forward motion, so as to act directly upon the buckets, until it shall all escape through the wheel by its centrifugal force:—although the mode above described is believed to be the best for accomplishing this purpose.

Nearly all water wheels are furnished with narrow flanches for supporting the ends of the buckets. These flanches or rims are usually merely of the width of the buckets, extending from the outer ends of the same, as indicated by the red lines in Fig. 2. But in no wheel is the flanch extended so as to have a width sufficient to cover the mouth of the flume as in my improvement. The space between the red and blue lines indicates the increased extension of my flanch (c) over the common flanch.

The buckets, b, are of curved form, similar to those commonly employed for turbine wheels. The water passes through the flume D, and acts upon the inner sides of the buckets and passes between them and escapes at the outer side of the wheel. The flanch c confines the water sufficiently, so that it is all made to act against the buckets, as it passes out of the flume.

The ordinary wheels are placed within a special scroll, which confines the water around the wheel, the water acting upon the buckets at the outer side of the wheel and passing into the wheel and out at its center. It will be seen, that in these wheels the water produces a resistance, which must be overcome by the wheel, and therefore a certain amount of power is lost, when the wheel is working under the full force of the water; but when the gate is partially closed, the loss is proportionally much greater,—for the scroll being filled at all times, and the wheel being subjected to the same resistance with a decreased supply or pressure of water, it follows, as a matter of course, that the maximum power obtained will be proportionally much less, than the corresponding diminution of the supply of water to the wheel. There are some wheels in which the water is admitted within the wheel and confined therein by a cover, or top; but these wheels, also, are liable to the same objection as the former. The wheel carries around the water within it, and, consequently, is subjected to considerable resistance. In my improvement the water acts upon the buckets, and is discharged as soon as its effective power is expended upon them. The water does not

"drag" upon the wheel, or is not carried around by it. The water forms a scroll by its own action, or by centrifugal force.

It is well known that, if rapid rotary motion be given to an open bucket which is partially filled with water, the liquid will, by centrifugal force, be thrown out from the center of the vessel, and will rise, climb, and distribute itself evenly over the entire inner surface of the vessel, and escape over the edge thereof. The vacuum formed in the center, by the discharge of the water, is freely filled by the air. If the top of the said vessel is provided with a cover, with an opening in its center for the admittance of air, the liquid will be prevented from escaping. It will be thrown or distributed in a solid, even column against the sides of the bucket. If openings are made in the sides of the bucket, the water will be discharged through them, but the same even distribution of the water against the sides of the wheel will continue; the sheet or column of water will become gradually reduced in thickness until it is all discharged. My wheel may be regarded as a vessel having openings at the sides for the discharge of the water; the flanch (*c*) being the top or cover, with an air entrance in the center; the flanch serving to prevent the water from escaping over the top of the wheel and compelling it to be thrown against the sides of the wheel, and discharged through the buckets. When thus thrown against or confined to the sides of the wheels, it is distributed in an even sheet. The air enters through the open center and fills the vacuum formed by the discharge of the water; the air thus forms a sort of negative back to the water. The water is thus compelled to act with its fullest effect against the buckets. If a bucket or vessel be filled partially by water, and sealed up tight, save an opening in the side, and submitted to rotary motion, the water will not readily escape through said opening, because the tendency of such discharge will be to form a vacuum in the center, and as there will be no central supply of air to fill said vacuum, the air will seek to enter through the discharge orifice. Thus the discharge of the water would be resisted by a counter inward pressure of air through the same orifice. The ordinary center supply wheels are sealed up like the vessel just described. But the filling of the required vacuum in the center is done by the supply of water. The wheel must therefore be so fed as to be kept full of water, or it cannot operate. In the common center vent wheels, the scroll must be kept full of water, or the wheel will not operate. Neither of these defects exist in my wheel; for the water is evenly distributed over the inner periphery of the wheel, in a solid column or sheet, and the movement of the wheel is not dependent upon keeping the wheel full of water, nor upon keeping the scroll or flume filled. My wheel will therefore work advantageously under a supply of water that would be too small to drive the other class wheels just mentioned.

I am aware that it is common in all wheels to bind or hold the ends of the buckets by means of narrow rims which cover the ends of the buckets, and therefore I do not claim such rims.

I also disclaim broadly confining the stream of water to its effective course. An example of this is seen in E. Parker's patent, dated July 24, 1847.

I also disclaim broadly the admitting of water within the wheel and discharging from its periphery, as such wheels are in general use.

I also disclaim any special form of the buckets.

I also disclaim every feature of the within-described invention which is seen in any other water wheel of this class. But, to the best of my belief, no wheel has ever been made, of the class now shown, in which a flanch (*c*) was employed in the manner and for the purpose herein described. The use of such a flanch causes the wheel to present new virtues of a great and important character.

Therefore what I claim as new in water wheels, and desire to secure by Letters Patent, is:

The use of a flanch (*c*), or its equivalent, in the manner and for the purposes herein substantially described.

REUBEN DANIELS.

Witnesses:

PETER J. WASHBURN,

JAMES J. NOBLE.