W. Greenwell,

Water Wheel.

NO. 104,579. Patented June 21. 1870.

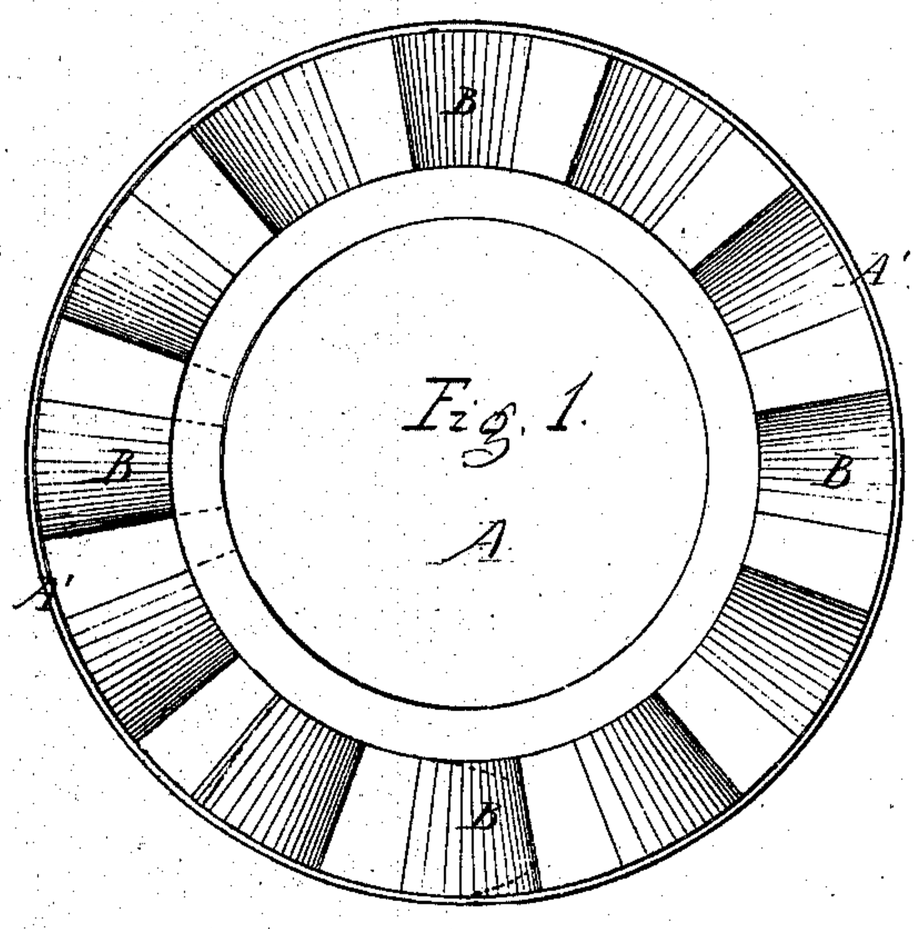

Fig. 1.

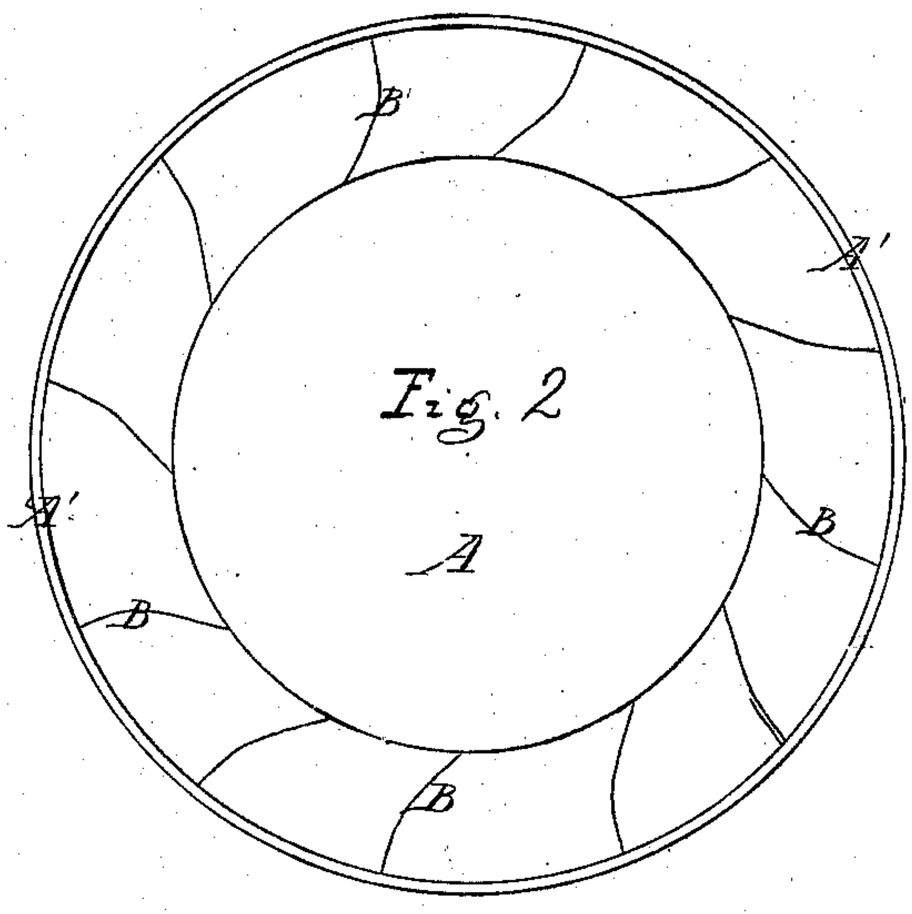

Fig. 2

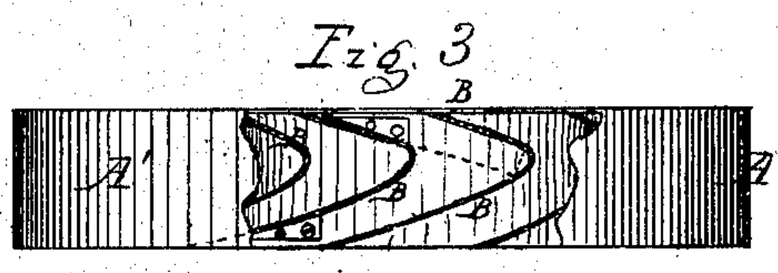

Fig. 3

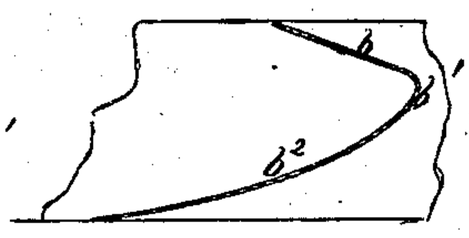

Fig. 4.

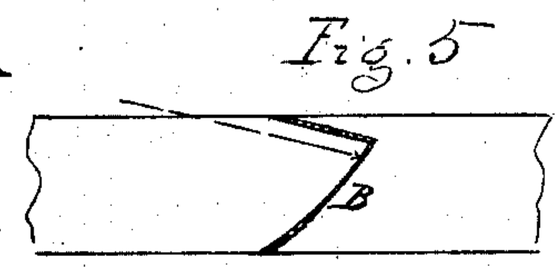

Fig. 5

Attest
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WILLIAM GREENWELL, OF RIPLEY, ILLINOIS.

Letters Patent No. 104,579, *dated June* 21, 1870.

IMPROVEMENT IN WATER-WHEELS.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, WILLIAM GREENWELL, of Ripley, in the county of Brown and State of Illinois, have invented certain Improvements in Water-Wheels; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the annexed drawing making part of this specification, in which—

Figure 1 is a plan or top view of my improved wheel, showing the hub or center, the upper flat surface of the buckets, and the rim or band which encircles said buckets.

Figure 2 is a bottom view, showing the same parts, except that the lower ends of the buckets are shown, instead of the upper ends, as in the other figure.

Figure 3 is a vertical elevation, with a portion of the rim or band broken away to show the form of the buckets, and, in dotted lines, the angle and about the point at which the water strikes the bucket.

Figure 4 is a sectional elevation of a portion of the wheel, showing an end view of one of the buckets and the straight upper surface thereof, the whole being upon a somewhat enlarged scale.

Corresponding letters refer to corresponding parts in the several figures.

This invention relates to that type of water-wheels known as turbine wheels; and

It consists in an improved bucket for such wheels, as will be more fully described hereinafter.

In water-wheels of this type, as heretofore constructed, no adequate provision has been made for relieving the point upon which the wheel rests from the weight of the body of the water which acts upon such wheel, the consequence of which omission is, that the weight which such point has to support is so great as to cause a large amount of friction and a rapid wearing away of such point.

The principal object of this invention is to provide a bucket which, in consequence of its form, shall cause a portion of the water which enters it to have a direct upward tendency, and thus release the downward pressure to a considerable extent, and, at the same time, utilize a greater percentage of the power of the water than has heretofore been done.

To enable those skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A in the drawing refers to the hub or center of the wheel, which may be of wood or of metal, and may be solid, or it may have a small hub in the center, in which there shall be an aperture for the reception of the shaft, and arms projecting from such hub to and connected with the interior rim, to which the buckets are fastened.

A′ refers to the outer rim or band of the wheel, which is to be of such a diameter as to leave a space between it and the hub, or interior rim, equal to the length which it is desired to make the buckets. This rim I prefer to make of metal, but it may be made of wood, and have hoops of iron placed upon it, in the usual way.

The above plan of construction of the parts above referred to may be adopted, or any other approved form may be used, such parts forming no part of my present invention.

B B refer to the buckets of a water-wheel, they forming the subject-matter of this invention.

The form of these buckets is clearly shown in the drawing, and it is substantially as follows:

The upper portions, represented at *b*, are to be straight from the point of their commencement, which is about flush with the upper edge of the rim of the wheel, to the upper portion of the curve b^1, as clearly shown in fig. 4 of the drawing, at which point a short bend or curve is formed, and the lower portion of the bucket is extended downward and backward to a point just beyond the curved portion of the next succeeding bucket.

The lower portion of the buckets may be curved, as shown in fig. 4, or it may have the straight form and angular position shown in fig. 5.

Whatever form is adopted for the lower portion of the bucket, it is important that the straight upper surface should be preserved, and that its angle or inclination should be such that the water from the chute which directs it upon such bucket shall strike its lower portion at about the point indicated in dotted lines in figs. 3 and 5, in order that a portion thereof may be deflected upward and impinge against the under surface of such upper portion, and thus cause an upward pressure, which shall, to a great extent, counterbalance the downward pressure and the weight of the wheel.

Another and an important function of this straight upper portion of the bucket is, to utilize the force of the water after its percussive force has been spent upon the lower portion, b^2, and the curved portion, b^1, by providing a surface upon which it may react with greater effect than it can upon such curved surfaces as are usually provided.

I also contemplate to use upon the inside of the buckets straight or slightly-curved surfaces, as shown in dotted lines in fig. 1, in order that, as the water strikes the bucket and is deflected in different directions, those portions which pass out horizontally shall have a surface to react upon, which shall utilize the force of such portions, as well as those portions which are deflected vertically, which is not and cannot be done when the water impinges directly against the outer and inner rims of the wheel.

When the wheel is made of cast-iron, it may be made in one piece, or the central portion may be of iron, and

the buckets have flanges upon their upper and lower surfaces, as indicated in fig. 3, and be bolted or riveted to such hub or center, after which the rim may be slipped upon their outer surfaces, and bolted or riveted to them; or, the same form of construction may be adopted when the center and outer portions are made of wood and the buckets of cast or wrought metal.

I am aware that a great variety of water-wheel buckets have been made having curved surfaces against which the water from the chute has been caused to strike, and, also, that they have been made with curved surfaces against which the water has been made to impinge; but mine differs from all such, in that the upper portion of the bucket has a straight inner and outer surface, arranged at the same angle as the chute which conveys the water thereto, as a consequence of which that portion thereof which is deflected upward is made to relieve the step upon which the wheel rests from a considerable portion of its load, and, at the same time, the water is confined in a pocket or recess until its reactive force has been utilized, all the surfaces against which it impinges being so arranged as to give the greatest effect to such force.

Having thus described my invention,

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

The within-described water-wheel bucket, its upper surface being straight from its upper or outer end to the point where it is curved downward, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WM. GREENWELL.

Witnesses:

EDM. F. BROWN,

B. EDW. J. EILS.