(12) **United States Patent**
McConnel

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(54) **WATER WHEEL**

(76) Inventor: **James McConnel**

James McConnel

Letters Patent.

The Schedule referred to in these Letters Patent and making part of the same, containing a description in the words of the said James McConnel himself of his improvement in the Water Wheel.

To all people to whom these presents shall come.

Be it known that I James McConnel of Shenango Township in the County of Mercer & State of Pennsylvania have invented a new & useful improvement upon the Water Wheel for propelling Mills & other Machinery, & that the following is a full & exact description of the construction & operation of the said water wheel as invented or improved by me, viz. The wheel is a horizontal one & calculated to run in back water, with a celerity & power believed to be superior to that of any back water wheel now known or used. The wheel is constructed in the following manner. The proportion however, may be varied to suit the fancy or judgment of the operator, or to accommodate the head of water to be used; to wit. For a head & fall of five feet water; let the wheel be six feet in diameter, within the rim of the wheel & twelve inches deep. The buckets or floats may be twelve inches broad. That is occupy a space in the circumference of the wheel of twelve inches, & are eleven in number. The buckets are to be made of blocks of wood curved, a block for each bucket, the length of which is half the diameter of the wheel, or the radius of a circle of five feet diameter, the breadth of the block at the circumference to be six inches broader than one eleventh part of the circumference of the wheel, being in the form of a wedge, say the wheel for instance runs to the left or opposite to the course of the sun; let the blocks be curved in a regular winding manner, from the circumference of the wheel to the centre, leaving the underside of the back part of the block & the upper side of the forward part perfect, or as they are when the block was

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in the form of a wedge, so that the eleven blocks will just fit
together & fill the whole circumference of the wheel & make solid
work... The blocks are to be made in this Manner to accommodate
the form of the buckets which are formed of the outer parts of these
blocks... By sawing the blocks of a suitable thickness & of a regular
winding curve, so as to leave the upper & forward edge perfect
and about six inches lapped upon the back part of the bucket im-
mediately before it, & to make the issues for the water on the inside
surface three & one half inches wide, & on the upper surface of
the wheel, the buckets form recesses or openings for the reception of the
water to pass in & thro' the wheels of about fifteen inches by twelve. The buckets
should be two inches thick at the top & one and one fourth inch at the bottom
the water by these issuing from the bottom of the wheel, propels it upon the
principles of reaction; the same as is witnessed in the common reaction
wheel, with the water issuing at the side, & the water being let on to the
wheel at the upper side & running with the wheel & striking the buckets
at near a right angle in a tangent direction, propels the wheel upon
the principles of the percussion wheel, and the water in passing thro'
the wheel down the inclined surface or curve of the bucket, by reason
of its gravity also, gives a third impulse to the wheel. The rim of
the wheel is three inches thick... It may be curved on the outer ends of
the blocks when forming the buckets, by making them a length in addition
to what is above stated sufficient for the thickness of the rim. The blocks
when curved so as to form the buckets may be fastened together
by pins or bolts or otherwise to suit the judgment of the artist build-
ing the wheel. Above & below the wheel should be placed two
inch planking made circular & firmly pinned or bolted, to the whole,
so as to make it strong... The circumference of this circular plank-
ing being placed just within the insides of the buckets to the wheel.
The wheel thus constructed is placed upon a shaft of suitable
size to carry the proposed Machinery & should be strong so as to have
no projecting parts to encrease the resistance of dead water & may be
hung like the Undershot or reaction wheel & fastened at the bottom

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by a flat bar of iron passing thro' the shaft under the wheel, for the wheel to rest upon.— The shaft stands perpendicularly & has a metal step let into the bottom, with a hole or cup in the lower end of the shaft which rests on a pivot of hard metal placed in a piece of timber under the wheel. It is important that there should be a smooth hard surface under the wheel, on account of the wheel discharging the water at its bottom, & where there is no smooth rock, there should be thick plank or hewn timber placed about eight inches below the wheel for the water to discharge upon.— On the upper side of the wheel & round the shaft should be placed a block of wood as large in circumference as the circular planking of the wheel it should be sixteen or eighteen inches high above the wheel regularly rounded & tapering up to the shaft.— In case of high heads of water, this block should be raised 12 inches higher or more as may be required, nearly in a perpendicular manner & then rounded up regularly to the shaft. This blocking may also be supplied by a hollow curb in its place, to raise above the head of water in the forebay, & in case the head should be so high, as to destroy the percussion of the water on the buckets, then it may be capping over together with the shute in the common manner of capping horizontal percussion wheels.— The wheel within the penstock should be placed within about 9 inches of the forebay & a gate-way opened in the forebay of two & one half feet wide, & sufficiently high to draw the quantity of water necessary to set fully the wheel. The left hand side of the shute should turn nearly square from the forebay to the inner side of the buckets & nearly approaching the circular block or curb placed on the upper surface of the wheel so as to exclude the water round the wheel.— The planking of the right hand side of the shute should extend regularly, to a point opposite the shaft of the wheel, about fourteen inches, to the right hand of the outer side of the buckets, making a space of twenty six or seven inches broad.— Here the right hand side of the shute commences with a circular curb extending round the wheel & regularly approaching it

it connects with the left hand side of the chute directly over the outer ends of the buckets, on the inner side of the rim & which rim should be even at the bottom, with the under sides of the rim & falling two or two & half inches below the upper ends of them. The floor of the pen stock should be four inches thick circular cut & placed round the wheel within three quarters of an inch of the outer circumference of the wheel & be placed, just as high as the upper edge of the rim & then within the curbing around the wheel, to receive on the top of it a four inch planking to project over the top of the rim to the outer ends of the buckets, & to be regularly inclined from the entering to the buckets, as the strength of the timber will admit. The floor of the chute should also be regularly inclined from the gate way to the wheel.

5th. What I claim as new & of my own invention in the above described wheel is the particular combination by which the three principles of percussion, gravity & reaction are united in & the same time, & not either of them separately, and the peculiar adaptation of these principles thus combined & put in practice, by this method of applying the water, to a low head of water, where there is back, or head water, or where there is no back water.

Witnesses
Ed. Robin Mitchell
Wm. Pennock Jr.

James McConnel

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