

(12) **United States Patent**  
**McConnel**

(10) **Patent No.:**

**X7326**

(45) **Date of Patent:**

**Dec. 13, 1832**

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(54) **WATER WHEEL**

(76) Inventor: **James McConnel**

James M. Connel  
 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 M. Connel himself of his improvement in the Water Wheel.

To all people to whom these presents shall come.

Be it known that James M. Connel 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 velocity & 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 proportions 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 two feet water; let the wheel be five feet in diameter, within the rim of the wheel & four inches deep. The buckets or floats may be two or three inches broad. That is occupy a space in the diameter 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 inch at the 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 center, leaving the under side of the back part of that part of the upper side of the forward part perfect, or as they were when the block was

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in the form of a wedge, so that the wooden blocks will just fit in 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 curving 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 immediately before it, & to make the issues for the water on the under surface three & one half inches wide, & on the upper surface of the wheel, the buckets form spaces or openings for the reception of the water to pass in & thus 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 thus issuing from the bottom of the wheel, propels it upon the principles of reaction; the same axis with speed 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 end of the blocks when forming the buckets, by making them <sup>of a</sup> 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 building the wheel. Above & below the wheel should be placed two inch planking made circular & firmly pinned or bolted, to the wheel, so as to make it strong. The circumference of this circular planking being placed just within the inside of the buckets to the wheel. The wheel thus constituted is placed upon a shaft of suitable size to carry the proposed machinery & should be hung so as to have no projecting parts to meet the resistance of dead water & may be hung like the M'Combs or reaction wheel & fastened at the bottom

by a flat bar of iron passing thro' the shaft under the wheel, for the wheel to rest upon. The shaft stands perpendicular & has a metal step let into the bottom, with a hole or cup in the lower end of the step 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 circumference 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 2 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 chute in the common manner of capping horizontal percussion wheels. The wheel within the penstock should be placed within about 13 inches of the forebay & a gateway opened in the forebay of two & one half feet wide, & sufficiently high to draw the quantity of water necessary to supply the wheel. The left hand side of the chute should run nearly square from the forebay to the inner side of the buckets & nearly a pipe or lining the circular block or curb placed on the upper surface of the wheel so as to conduct the water round the wheel. The planking of the right hand side of the chute 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 chute connects with a circular curb extending around the wheel & regularly approaching

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 worn at the bottom, with the inner side of the wheel & falling two or two & half inches below the upper ends of them. The floor of the penstock should be four inches thick circled out & 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 curving around the wheel, to receive on the top of it a four inch plank 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 gateway to the wheel.

What I claim as new & of my own invention in the above described wheel is the particular combination, by which the three principles of propulsion, gravity & reaction are used at one & 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, when there is back, or dead water, or where there is no back water.

Witnesses

James M. Connel

Ed. John Mitchell }  
 Wm. Frank H. } 11/21

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