S. Curtis,

Water Wheel,

No. 518. Patented Dec. 15 1837.

Fig. 5. Fig. 6

Fig. 4

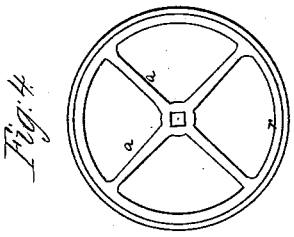


Fig. 1.

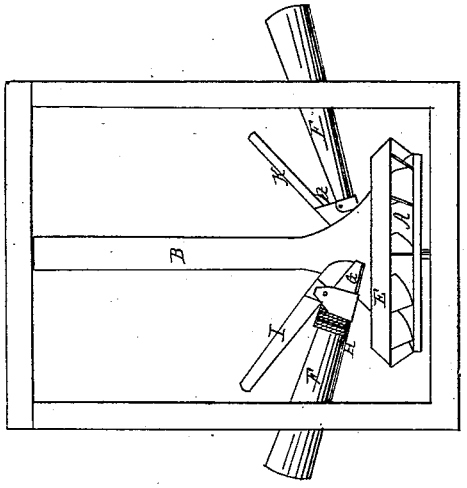


Fig. 2.

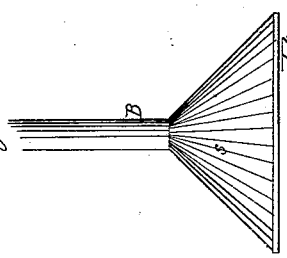
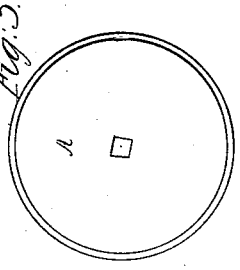


Fig. 3.



UNITED STATES PATENT OFFICE.

SAMUEL CURTIS, OF EAGLE, NEW YORK.

IMPROVEMENT IN HORIZONTAL WATER-WHEELS.

Specification forming part of Letters Patent No. **518**, dated December 15, 1837.

To all whom it may concern:

Be it known that I, SAMUEL CURTIS, of the town of Eagle, in the county of Allegany and State of New York, have invented a new and useful Improvement in Horizontal Water-Wheels, called "Curtis's Conical Water-Wheel," which is described as follows, reference being had to the annexed drawings of the same, making part of this specification.

Let a round head A, of any required diameter, be placed near the lower end of a perpendicular shaft B; or, instead of this, arms *a*, radiating from the shaft and supporting a rim *r*, of any required diameter, will answer the same purpose. The upper edge of the circumference of the head is cut down, so as to form a bevel or angle of about forty-five degrees. Let staves *s* (or other covering or shell) be prepared from one to two inches thick, or any thickness desired, and of suitable width at the bottom or lower end, projecting a little below the head or rim and sloping toward the center of the shaft at an angle of about forty-five degrees. The upper ends of said staves should be made fast to the shaft and the lower ends to the head or rim. There may be another head or rim placed on the shaft between the aforesaid ends for the purpose of supporting the staves or fastening them thereto. The staves should be all of the same taper. The upper side of the staves, when all are secured, may be turned off or made smooth and true, forming a hollow cone or true taper from the bottom extremity to the shaft.

This wheel may be made of sheet-iron, cast-iron, or other materials. Solid wood is preferable for small wheels.

The body of the wheel being formed as above described is ready to receive the floats. These are made similar to those described in my former application, thus, ⌙, (see Fig. 6,) the inner end being the segment of a curve and the outer end straight. The buckets are placed on the sloped side of the wheel with the straight ends in oblique lines downward, the lower corner being even with the extremity of the wheel in the manner represented in the drawing. A rim E, of sufficient width to cover them, should be placed on said buckets and made fast thereon, as represented in the drawing. The inner end or edge of the buckets should be sharp. The taper of the body of this wheel may be varied, according to the size of the wheel and the velocity of the water. The water should be let upon these wheels in several places equidistant apart at the same time.

To let the water upon this wheel, let a spout or tube F of considerable taper be so placed as to have a small pitch or descent toward the bucket of the wheel. The large and upper end is to be connected with the fountain-head or flume. Make a leather tube G of sole-leather—say from one and one-half to two feet long—and soak it well in tallow and beeswax. (An india-rubber preparation will answer.) It may be larger at one end than at the other. The larger end is to be fitted and secured on the small end of the spout or tube, projecting over it about six inches, and there secured. A plank H is then placed underneath the leather tube, and extends also under the spout, where it is made fast. Let a strap of iron be placed under the plank directly under the end of the wooden spout with its ends bent up the sides of the tube and a hole made through each end, so that a bolt will pass through snug on the top of the leather and parallel with the plank underneath. A lever I is then placed on the top, the lower end being even with the open end of the leather spout. A strap of iron passes over the lever and down each side with holes, so that a bolt will pass through the straps and under the lever, forming a hinge or joint, and by working the upper end of the lever the lower end serves as a gate or valve for regulating the column of water passing to the wheel; or, instead of the leather tube, as above described, let the two sides and the bottom part of the trunk project one foot or more beyond the upper part of the trunk, leaving one foot or more open of the top part of the lower end of said trunk. Place one end of a lever K therein, properly fitted to the inside of the trunk and resting or bearing upon the short end or top part of the trunk, the lower end of said lever when shut striking the bottom part of the trunk upon the inside one inch or more within the end of the trunk. Let a piece of sole-leather, well hammered and soaked in tallow and beeswax, be made fast to the under side of said lever and leading from the lower end thereof to some inches above, where said lever rests upon the upper

part of the trunk and be allowed to vibrate thereon and kept tight thereto by means of a joint or hinge formed with straps of iron bent round the lever and trunk, as described, of the other lever above, and connected togefher each side by a short bolt or rivet. Either of the above modes of letting the water upon the wheel and in any quantity required and opening so near the buckets in a smooth solid form, whereas in other modes of letting water on wheels that run above water which are attached to an upright shaft, the gate is placed at the upper end of the trunk within the flume,and the stream of water, before it strikes the buckets, becomes broken, and consequently cannot act with as much power as either of the modes before mentioned. Another important advantage in my gates is that when they are shut a few drops of water only can escape, thereby saving much water.

The conical shape of this wheel and placing the buckets on the sloping sides thereof, together with the gates or modes of letting the water thereon and the saving of water when not in operation, includes several improvements and advantages which are not found in any other water-wheel which runs above water and attached to an upright shaft. The upper ends of the buckets being square across and placed on the sloping sides of this wheel, it forms a cavity below the upper edge of the top rim sufficient to receive the stream of water let upon it, and when striking the buckets the water does not incline to dash over the top of the wheel, and thereby waste, (as it does in the use of other horizontal wheels that run above water,) and there being no curb or rim around the outside of the buckets to prevent the water from passing off in an opposite direction and bearing upon the whole length of the bucket, propelling it in the same direction that it strikes the bucket. This wheel is intended, as has been stated, for running above water.

The invention claimed by me, the said SAMUEL CURTIS, and which I desire to secure by Letters Patent, consists—

In making the horizontal conical water-wheel on a perpendicular shaft and placing the buckets on the sloped sides thereof, in the manner before described, also in the use of a leather tapering tube at the end of a tapering trunk, serving as a gate or valve for regulating the column of water passing to the wheel by means of a lever pressing on the same, in the manner before described, also the second-described gate or valve.

SAMUEL CURTIS.

Witnesses:

WILLIAM P. ELLIOT,

WM. HEWITT.