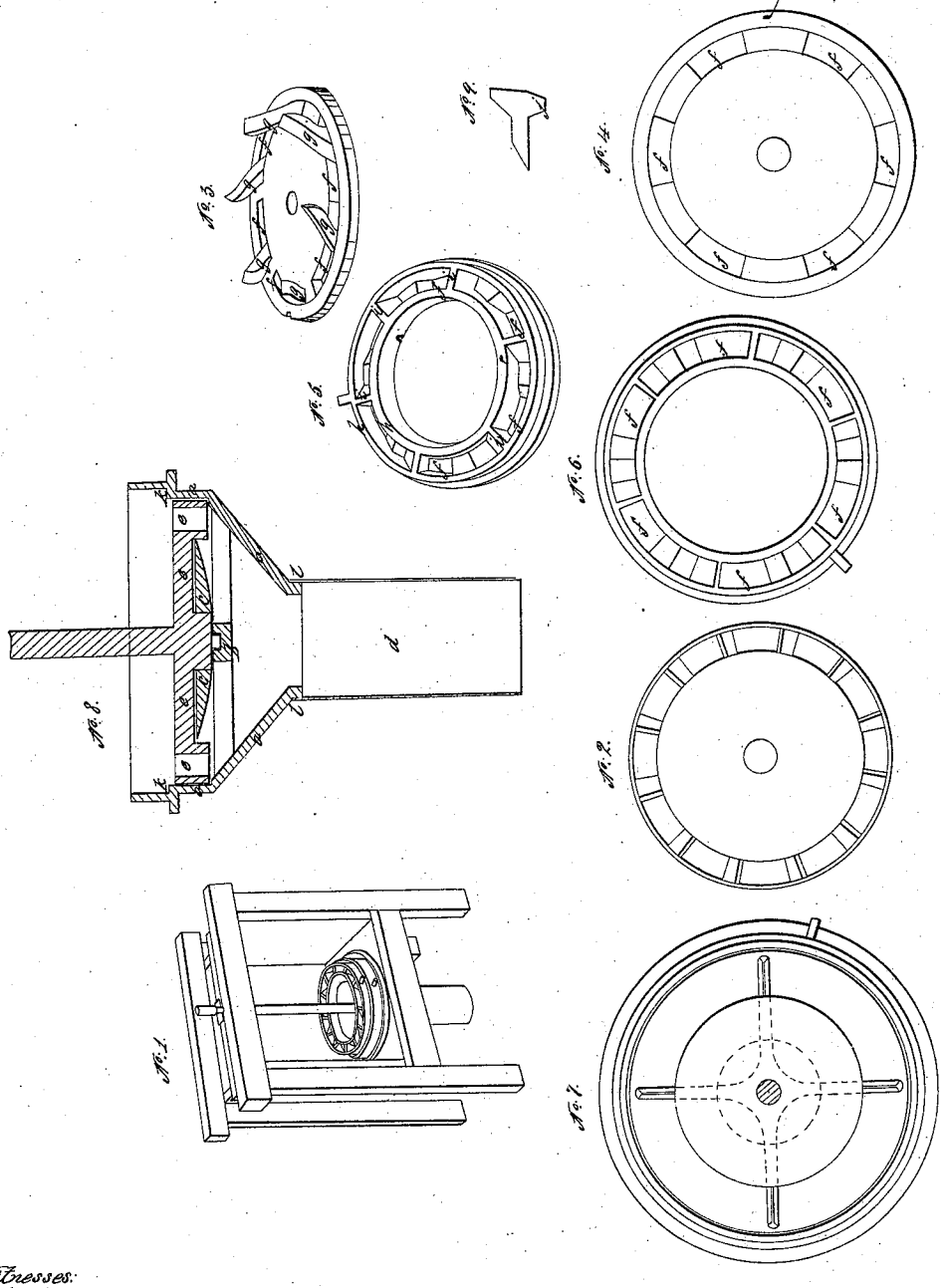
S. Richardson,

Water Wheel.

No. 23,945. Patented May 10, 1859.



Witnesses:

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UNITED STATES PATENT OFFICE.

SYLVANUS RICHARDSON, OF JERICHO, VERMONT.

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. **23,945**, dated May 10, 1859.

To all whom it may concern:

Be it known that I, SYLVANUS RICHARDSON, of Jericho, in the county of Chittenden and State of Vermont, have invented a new and Improved Mode of Constructing a Direct-Action Water-Wheel; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in so constructing a water-wheel that I am not under the necessity of placing the wheel at the bottom of the water privilege; but by placing it as low as may be convenient and by attaching a draft-tube below the wheel, and through which tube the water passes into the tail-race, I receive the full benefit of the head and fall of the water.

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

I construct a bucket-wheel about three feet in diameter, with a rim on the outside of the buckets or floats, as shown in the accompanying drawings, No. 2, which is a top view of the wheel. I attach the wheel to a perpendicular shaft and place it within an iron or wooden case sufficiently large to permit the wheel to revolve freely, (which case is shown at points *a a* in the accompanying drawings, No. 8, said drawing No. 8 being a vertical section showing said wheel-case and other portions of said improvement, hereinafter described, as it would appear by dividing the same perpendicularly, taking away one half thereof and leaving the other half standing.) The depth of this case below the wheel is sufficient to give ample room for a free discharge of the water and for a step for the lower end of the shaft to rest upon, as shown at point marked *b* in said drawing No. 8. Upon this step I place a circular plate, the diameter of which is the same as that of so much of said wheel as is contained inside of the buckets, which plate is shown in said drawing No. 8 at point marked *c c*. This plate prevents the suction from taking effect upon any part of said wheel, except the buckets, and the suction produced by the tube (marked *d* in said drawing No. 8) acts directly upon the buckets of the wheel. Below the step I contract the diameter of the case to about twenty inches, as shown at *l l* in said drawing No. 8, and at the bottom of the case I attach an air-tight draft-tube, which is represented and marked *d* in said drawing. The object of this tube is to obviate the difficulties arising from placing water-wheels as low down in the pits as is required for most of water-wheels, the draft of the tube when extended directly or obliquely into the water of the tail-race being such when operating my wheel that by placing the wheel at a higher and convenient point it will receive the full power of the privilege from water to water—*i. e.*, from the top of the water in the flume to the water in the tail-race. The water-wheel in said drawing No. 8 is represented and marked *e e e e*.

I construct a plate one inch larger than the water-wheel with a hole in the center thereof for a shaft, (which plate is shown in Figs. 3 and 4 in said drawings, Fig. 3 being a perspective view of said plate and Fig. 4 a view of the under side thereof.) In this plate directly over the buckets of the wheel I make a series of openings of the width of the buckets, as shown at points marked *f* in drawings Nos. 3 and 4. At one end of each of these openings I attach permanently a piece of iron about one foot in length and about half an inch in thickness, one end of which is elevated from four to five inches, as shown at points marked *g* in drawing No. 3, by means whereof it serves for the bottom or lower portion of a chute or pitch of the water onto the buckets of the wheel, the rims *h* in Fig. 5 forming the sides of the chutes. Upon plate shown in Fig. 3 I place another of the same diameter, but in width from the outside toward the center from seven to eight inches, with rims thereon, the distance between the rims, one being within the other, being the same as the width of the openings in Figs. 3 and 4, as shown in Fig. 5, wherein the said rims are marked *h*, and between these rims are openings corresponding with the openings in Figs. 3 and 4, and at one end of each of these openings in Fig. 5, at points marked *i*, I place another piece of iron about one foot in length and of suitable width and thickness, but in a more upright position than those marked *g* in Fig. 3, which projects downward through the opening in the plate shown in Fig. 3, as shown in Fig. 9 at point

marked *j*, said Fig. 9 being a section of chute shown in Fig. 5 at point marked *i*, which latter piece of iron forms the upper part of the chute. The plate shown in Fig. 5 thus arranged is placed upon the plate shown in Fig. 3, the irons marked *g* in Fig. 3 passing through the apertures or openings in plate shown in Fig. 5, said openings being long enough to allow sufficient play, so that by turning plate shown in Fig. 5 one way the water passes freely through the chutes thus formed, and by turning it the other way it shuts the openings and shuts off the water from the wheel, so that thus arranged plate shown in Fig. 5 serves the twofold purpose of forming part of the chute and a gate, plate shown in Fig. 3 being stationary. Plates shown in Figs. 3 and 5 thus connected together are placed within the case shown in Fig. 8 above the wheel and rest upon a recess in the upper part of said case at points marked *k* in said Fig. 8.

Fig. 6 in said drawings is a view of the under side of the plate represented in Fig. 5.

Fig. 7 is a top view of the wheel and several plates before described when put together, and Fig. 1 is a perspective view of said wheel and apparatus standing within the frame of a flume.

By the above arrangement of applying the water to the wheel the water is equally divided upon the wheel, runs smoothly through the chutes upon the buckets, and a steady motion is produced.

The wheel and apparatus can be placed and successfully used in a small flume connected with the main flume, as shown in drawing No. 1, or by placing it at the bottom of any flume where the draft-tube can be used.

I do not claim a patent for the bucket-wheel nor for the air-tight tube; but

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

The construction and arrangement of the chutes formed by irons *g* in Fig. 3 and irons *i* in Fig. 5, and the arrangement of openings in plate shown in Fig. 3 (marked *f*) and corresponding openings in plate shown in Fig. 5, (also marked *f*,) and the arrangement of plate *c c* and wheel *e e e e* and case *a a* and draft-tube *d* and the combination of the same, substantially in the manner and for the purposes above set forth.

SYLVANUS RICHARDSON.

Witnesses:
WM. WESTON,
EMILY HUTCHINSON.