S. Hopper,

Water Wheel,

No. 3,011. Patented Mar. 21, 1843.

Fig. 1.

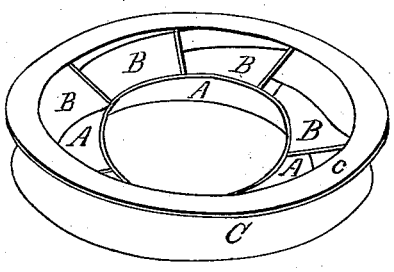
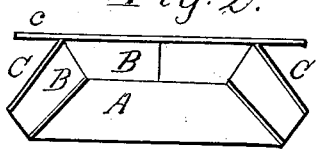


Fig. 2.



N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

SAMUEL HOPPER, OF LEWISTOWN, PENNSYLVANIA.

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. **3,011**, dated March 21, 1843.

To all whom it may concern:

Be it known that I, SAMUEL HOPPER, of Lewistown, in the county of Mifflin and State of Pennsylvania, have invented a new and useful Improvement in Reaction Water-Wheels; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of the wheel; Fig. 2, a section of the wheel; Fig. 3, a pattern and mold of core.

The nature of my invention consists in forming a conical water-wheel with spiral buckets made with the rim which surrounds the rim which surrounds the buckets having a flange on its upper edge.

This wheel can be constructed of any suitable material; but I prefer making it of cast-iron. The inner rim A is the frustum of a cone having an inclination of about forty-five degrees. From this rim spiral buckets B project, which stand out at right angles to the surface of the cone A. These project out a little farther at the top than at the base, gradually tapering from one end to the other. These buckets are inclosed on their outside by a rim C, made as much less obtuse than the inner rim A as the buckets taper. This rim is wide enough to extend from the upper outside corner of the bucket to the lower outside corner. Around the upper edge of the rim C there is a flange *c*, which extends outward at right angles to the shaft and projects out nearly as far as the base of the outside rim.

This wheel is attached to the shaft in the usual way and is placed in the bottom of the forebay where segment-pieces are fitted in around it under the flange, so as to keep it from leaking. The forebay and other fixtures are similar to those in common use.

When the wheel is put in operation, the water has its full effect upon it, there being no projections on the wheel to retard its motion, and as the vent is but slightly contracted the water finds a free egress from the wheel, having expended its entire and unimpeded force upon it.

In preparing the mold for casting this wheel patterns are formed of the outer and inner rims. On these are scribed the places for the buckets, which is done by a pattern-curve, which is marked out by a spiral line. Two buckets are then made to fit the scribes on the rims, and they are all put in place. A piece of wood is then fitted into the space between the lower edges of the buckets and one into the space between the upper edge of the buckets. These project above and below the rim and form patterns for the prints of the core. A box is made to fit onto the lower one and a rim is put around the upper one, which rest on the edge of the rims and buckets. The print-patterns are then removed and gypsum is poured into the space bounded by the buckets and rims at the sides and the print-box below. The plaster when set is then taken out and represents the exact form the core is to be. A box is then fitted to this core-pattern, and in that the sand cores are all made. The rest of the mold is formed in the usual way and the cores are placed in their proper positions and the casting made.

Having thus fully described the construction and operation of my wheel, I wish to have it understood that I do not claim the conical wheel, nor do I claim the spiral bucket separately; but

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

The combination of the conical wheel and spiral buckets, in the manner and for the purpose herein set forth.

SAMUEL HOPPER.

Witnesses:

J. J. GREENOUGH,

GEO. T. MELLEN.