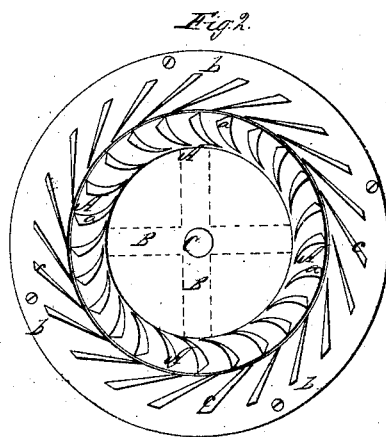
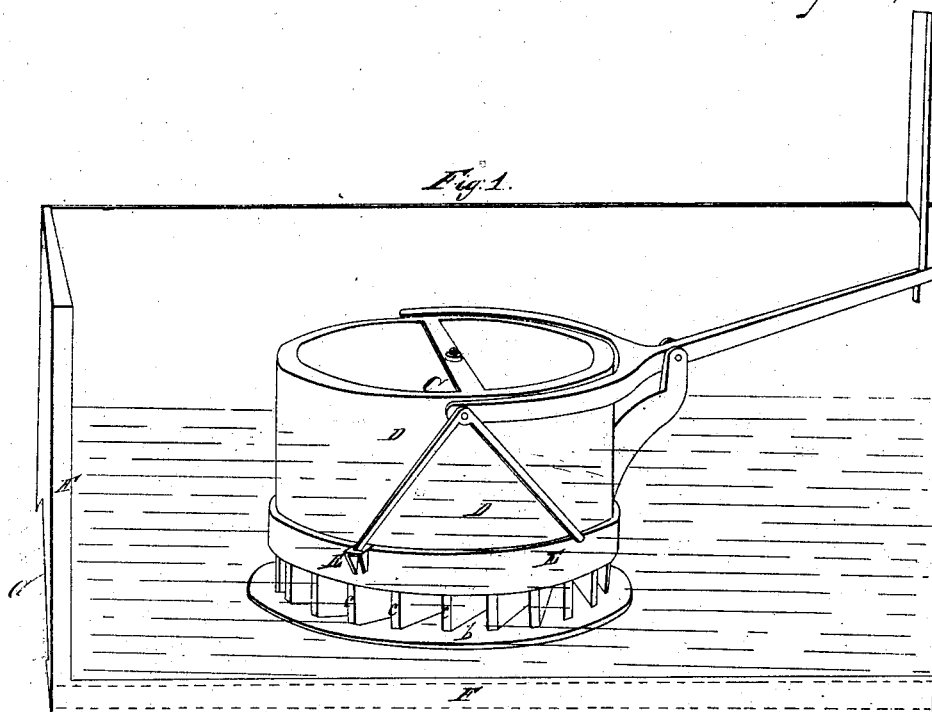


S. B. Howd,

Water Wheel,

N^o 861.

Patented July 28, 1838.



UNITED STATES PATENT OFFICE.

SAMUEL B. HOWD, OF GENEVA, NEW YORK.

IMPROVED WATER-WHEEL.

Specification forming part of Letters Patent No. 861, dated July 26, 1893.

To all whom it may concern:

Be it known that I, SAMUEL B. HOWD, of Geneva, in the county of Ontario and State of New York, have invented a new and useful Improvement on Water-Wheels; and I do hereby declare that the following is full and exact description thereof.

My said wheel is so constructed as to take the direct action of the water in part, but is principally driven by what is commonly called "the reaction of water," and is constructed in the following manner. Between two flat rims of cast-iron or other fit material (the upper rim, if the wheel be horizontal, being attached to the shaft by arms) are inserted curved buckets, the form of which are hereinafter shown by reference to the drawings hereunto annexed. These buckets have their inner points directed backward, contrary to the motion of the wheel, and the water is received from the outer side of the wheel around its whole periphery or around such portion of it as may be required, said water being discharged inwardly, nearly in the direction of a tangent of the circle coinciding with the inner points of the buckets. Spouts or chutes are placed around the outer side of the wheel in the plane of the buckets, so as to give the water a direction corresponding with the motion of the wheel. These spouts are placed with one edge resting upon the bottom of the flume or cistern, and the upper edges of the spouts are covered by a circular cap or flat rim, having an opening therein equal to or a little larger than the size of the wheel, so as to allow the wheel to have a free motion within the stationary rims. Upon the cap or rim covering the spouts is placed a circular curb, extending upward above the bulkhead of the water in the cistern. The wheel is set in the cistern with its lower rim on a level with the bottom of the cistern, and is supported by a pivot or step in the usual manner, and the water after passing through between the buckets is discharged off under the cistern through an opening in the bottom thereof.

Figure 1 in the accompanying drawings is a perspective view of the apparatus, one side of the flume or cistern being omitted to show the construction of the parts more perfectly. Fig. 2 is a top view of the wheel, and the

surrounding chutes, the cap or rim which covers these chutes and the upper rim of the wheel also being removed to exhibit the position and direction of the spouts or chutes and buckets.

A A A is the lower rim of the wheel, attached by arms B B (represented by dotted lines) to the shaft C.

a a a are the buckets standing between the two rims of the wheel, and c c c are the spouts or chutes standing upon b b b, a part of the bottom of the cistern.

D D is a circular curb, which stands upon the outer edge of the upper rim covering the chutes.

E E is a cylindrical gate surrounding and capable of closing the chutes. This may be constructed in the manner shown in the drawings, or it may be in segments, which may be separately raised and lowered by any appropriate means.

F F is the flume or cistern, the bottom of which may be double, the water being discharged at one side, as at G.

The relative dimensions of the parts may be considerably varied without essentially affecting the power of the wheel; but I give the following proportions as having answered well in practical trials. Suppose the wheel to be five feet in diameter, the width of the rims may be five inches. There may be twenty-four buckets and eighteen spouts. The length of the buckets or distance of the rims asunder may be six inches; but this part in particular may be very much increased or diminished according to the quantity of water at command and the consequent power of the wheel. The sum total of the areas of the cross-sections of all the spouts should be somewhat more—say, from one-fourth to one-third—than the sum total of all the areas of the cross-sections of the discharging-orifices between the buckets, so that the water shall enter the wheel with a velocity somewhat greater than or at least equal to that of the wheel.

My said improvement being above described as applied to a horizontal wheel, I hereby declare that the same is not intended to be limited to that position of the wheel, but is applicable to vertical and inclined wheels.

I claim as my invention—

The application of the water upon the out-

side of the wheel and operating upon the principle of reaction by discharging inwardly on a wheel constructed and combined so as to operate, as above described, with the spouts or chutes, giving the water a direction with the motion of the wheel, applied to a reacting wheel, as aforesaid.

In witness whereof I have hereunto subscribed my name the 15th day of September, 1837.

SAMUEL B. HOWD.

Witnesses:

JOHN MAYNARD,
JAMES H. WOODS.