Sheet 1 - 2 Sheets.

# H. K. Annis,

## Water Wheel,

No. 45,114, Patented Nov. 15, 1864.

Fig. 1.

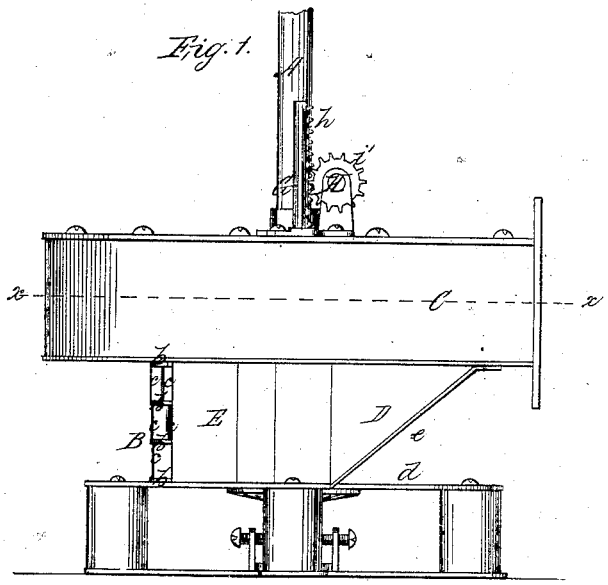
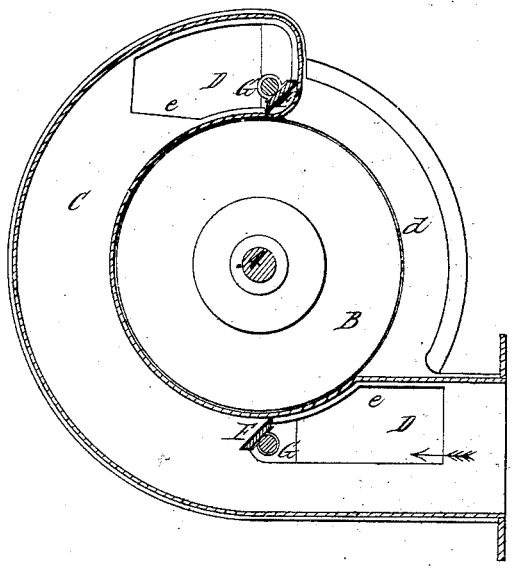



Fig. 2.




Witnesses.

M. M. Livingston

Theo. Tusch

Inventor.

H K Annis

per Munn & Co

attys

Sheet 2-2 Sheets.

# H. K. Annis,

# Water Wheel,

No. 45,114, Patented Nov. 15, 1864.

Fig. 3.

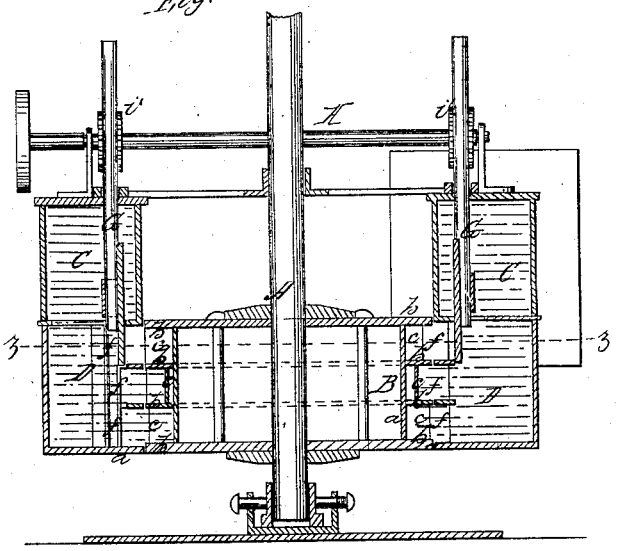
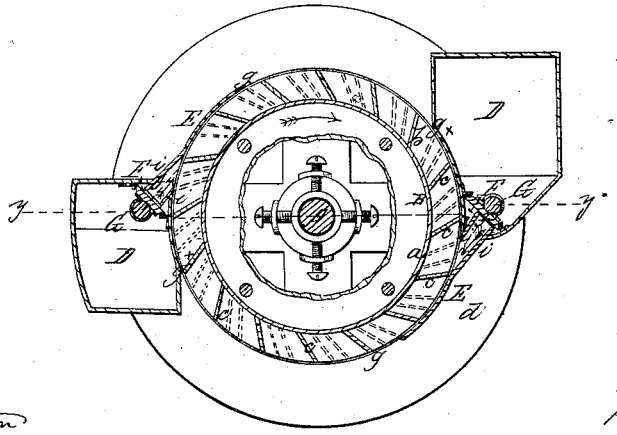


Fig. 4.



Witnesses.
M. M. Livingston
Theo. Tusch

Inventor.
H. K. Annis
per Munn & Co
attys

# UNITED STATES PATENT OFFICE.

H. K. ANNIS, OF ENFIELD, NEW HAMPSHIRE, ASSIGNOR TO JASON KIDDER AND HIRAM C. BAKER, OF SAME PLACE.

## IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. 45,114, dated November 15, 1864.

*To all whom it may concern:*

Be it known that I, H. K. ANNIS, of Enfield, in the county of Grafton and State of New Hampshire, have invented a new and Improved Water-Wheel; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, Sheet No. 1, is a side view of my invention; Fig. 2, same sheet, a horizontal section of the same, taken in the line *x x*, Fig. 1; Fig. 3, Sheet No. 2, a vertical section of the same, taken in the line *y y*, Fig. 4, on same sheet; Fig. 4, a horizontal section of Fig. 3, taken in the line *z z*.

Similar letters of reference indicate like parts.

This invention relates to a new and improved water-wheel, of that class which are placed on a vertical shaft and are commonly termed "horizontal water-wheels."

The object of the invention is to obtain a wheel of the class specified which may be made to yield or give out a power less than its maximum, proportionate to the amount of water which passes through it—that is to say, if a wheel of my invention be constructed of a size capable of giving ten-horse power as a maximum, the same wheel will, with one-half the quantity of power, be capable of giving out or yielding five-horse power. All wheels, of course, are capable of being run and giving out a less power than their maximum, but in the latter case they consume or require more water in proportion than when running at their maximum; hence in those mills where machinery is being constantly attached and detached so as to render the work of the wheel very variable a great loss of water is the result, a contingency which my improvement fully obviates.

In order to accomplish this desirable end I construct the wheel in sections, so arranged with a chute and aprons as to insure the most favorable action of the water upon it.

A represents the shaft of the wheel, and B the wheel, the latter being composed of a cylinder, *a*, divided circumferentially into a series of sections by horizontal flanges *b*, placed at equal distances apart, between which are the buckets *c*, the buckets of one section being in line with the center of the spaces between the buckets of the adjoining sections. These buckets *c* have a tangential position with a circle, the periphery of which bisects a radius of the wheel—that is, divides it into two equal parts, or nearly so. (See Fig. 4.) The wheel B is fitted and works within a framing composed of two annular plates, *d d*, one of which is at the bottom and the other at the top of the wheel. On the upper plate, *d*, there is a semiannular chute, C, which has a water-eduction passage, D, depending from it at each end, said passage having inclined bottoms *e*. These passages D extend down the whole depth of the wheel, and are provided with openings which are divided into a series of outlets or issues, *f*, corresponding to the number of sections of the wheel, an issue, *f*, corresponding with each section. (See Fig. 3.) The issues *f* have nearly a tangential position relatively with the wheel, and are slightly taper, so that if each side *i i* were prolonged they would meet at a point, *g*, on the periphery of the wheel at a distance from them about equal to twice the width of a space between two buckets. (See Fig. 4.)

E E are two aprons, which are between the inner edges of the upper and lower plates, *d d*, and extend from the issues *f* to the point *g*. The aprons retain the water in the buckets until the latter pass them.

The points $g^{\times}$, from which the aprons extend, are back of the issues a distance equal to the width of a space between two buckets.

The issues *f* of each passage D is provided with a gate, F. These gates are attached to vertical rods G G, which extend upward through the chute C, and have racks *h h* at their upper parts, into which pinions $i^{\times}$ $i^{\times}$ on a shaft, H, gears. By turning this shaft H the gates F F may be raised and lowered to admit the water onto one or more sections of the wheel, as may be desired.

From the above description it will be seen that when the gates F F are fully raised, water will be admitted on all the sections of the wheel at the two opposite points and the maximum power of the same attained, and when a less power is required the gates are closed so as to cut off one or more sections. Each section constitutes a wheel of itself,

and hence in order to obtain a less power than the maximum, the result is not attained by simply diminishing the supply of water to a large wheel, but also in reducing the capacity of the wheel to suit the diminished supply, hence a great saving in the use of the water is effected.

By means of the aprons E E, the water cannot escape before it has acted upon the wheel, and hence no power is lost from that cause.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The aprons E E, in combination with the sectional wheel and issues, arranged to operate substantially as and for the purpose herein set forth.

2. The semi-annular chute C, in combination with the water-passages D D, aprons E E, and sectional wheel B, all constructed and arranged to operate in the manner substantially as and for the purpose specified.

H. K. ANNIS.

Witnesses:

CONVERSE GOODHUE,

I. M. GOODHUE.