J. H. Fairchild,

Water Wheel.

No. 22,282. Patented Dec. 14, 1858.

Fig. 1.

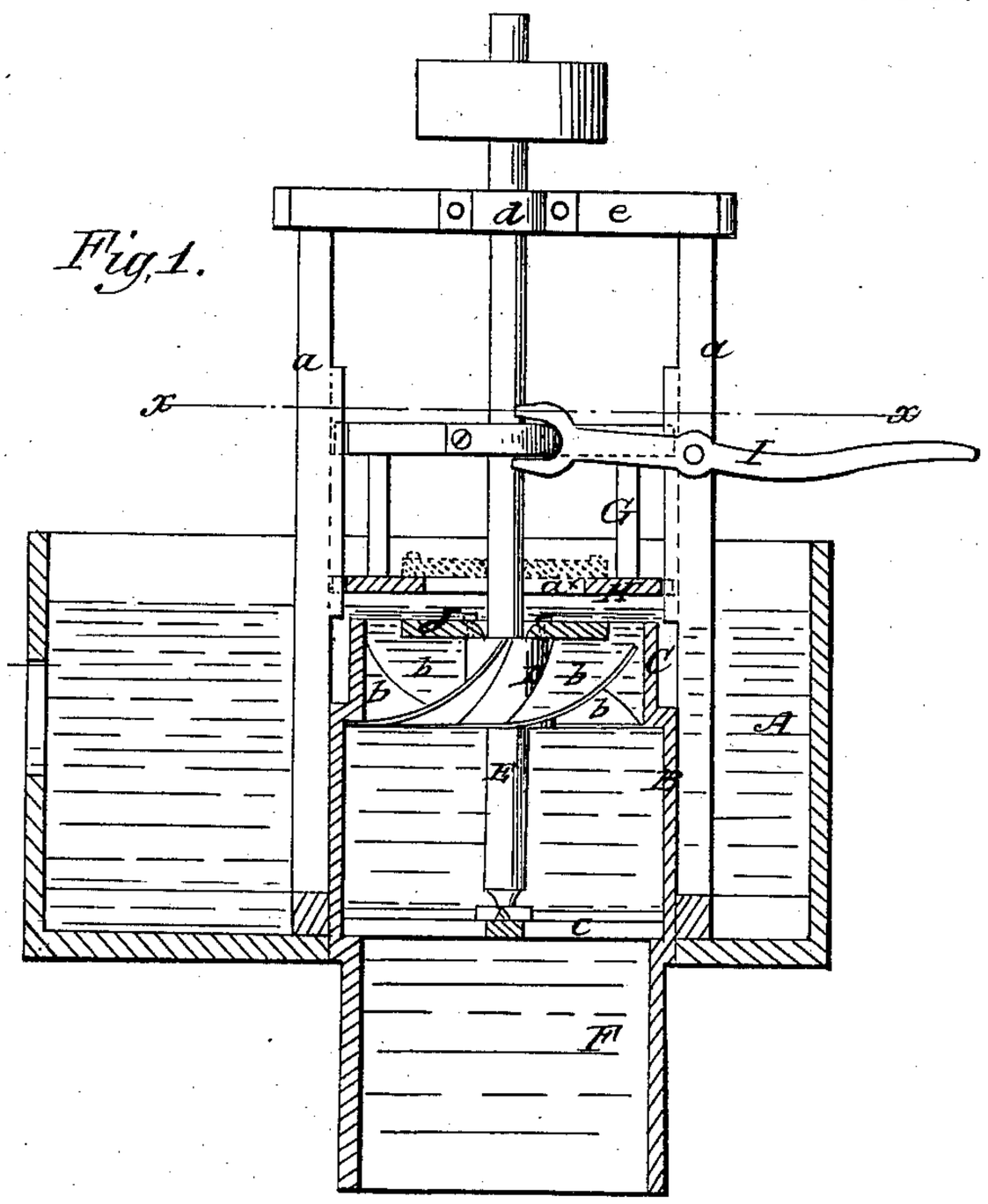
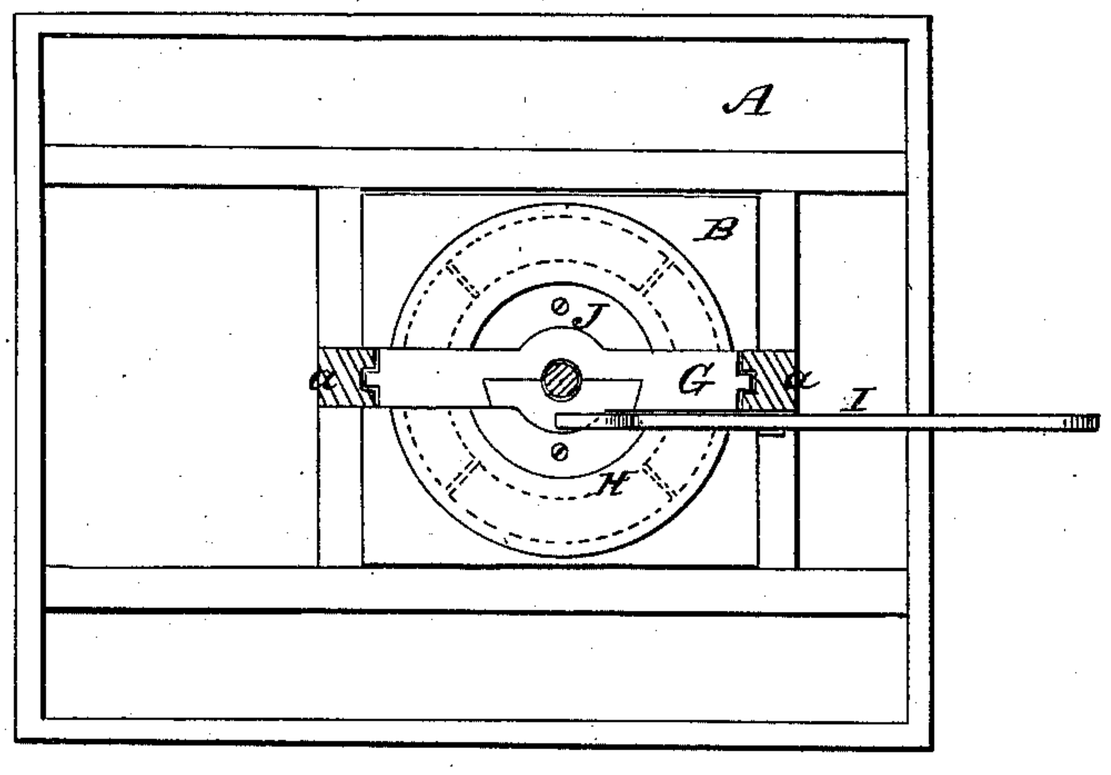


Fig. 2.



UNITED STATES PATENT OFFICE.

JOHN H. FAIRCHILD, OF JERICHO, VERMONT.

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. **22,282**, dated December 14, 1858.

To all whom it may concern:

Be it known that I, JOHN H. FAIRCHILD, of Jericho, in the county of Chittenden and State of Vermont, have invented a new and useful Improvement in Water-Wheels; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a vertical central section of my invention. Fig. 2 is a horizontal section of same, taken in the line *x x*, Fig. 1.

Similar letters of reference indicate corresponding parts in the two figures.

This invention relates to an improvement in a water-wheel for which Letters Patent were granted to me bearing date May 11, 1858.

The object of the within-described invention is to simplify the patented wheel above mentioned without departing from the principle of its operation or in the least degree detracting from its efficacy, and at the same time regulate in a more perfect manner the supply of water thereto, so that the speed of the wheel may be made uniform or constant with a varying supply of water.

To enable those skilled in the art to fully understand and construct my invention, I will proceed to describe it.

A represents a penstock, in which two vertical posts *a a* are placed, and between which a rectangular box B is fitted, said box having a cylindrical case C on its upper end, in which case the wheel D is placed. This wheel is constructed with spiral or screw flanges *b*, which form the buckets of the wheel, (see Fig. 1,) and the shaft E of the wheel is stepped at its lower end in a cross-bar *c* at the bottom of the box B, the upper part of said shaft being fitted in a bearing *d* in a traverse bar *e*, which connects the upper ends of the posts *a a*.

To the lower end of the box B the draft-tube F is attached, said tube extending down below the surface of the "tail-race," the lower end of said tube being immersed in the tail-race at all times.

Between the two posts *a a* a sliding frame G is placed, and to the lower end of said frame an annular plate H is secured. This plate forms the gate of the wheel, and it is equal in diameter to the case C. The frame G may be moved or adjusted by a lever I, attached to one of the posts *a*, or any other suitable device may be employed.

J is a circular plate, which may be attached centrally to the upper surface of the wheel D, as shown in blue in Fig. 1 and in black outline in Fig. 2; or said plate may be attached to the gate H, so as to cover its central opening $a^{\times}$, as shown in red, Fig. 1.

The operation is as follows: Suppose, for instance, that there is a sufficiency of water to drive the wheel so as to obtain its maximum power. In this case the plate J is detached from the wheel D and attached to the gate H, so as to cover its central opening $a^{\times}$, as shown in red, Fig. 1. The gate H being raised, the water passes vertically down through the wheel D into the draft-tube F, and in this invention, as in the patented wheel previously alluded to, a partial vacuum will be formed in the tube and the water in the penstock A will enter the wheel D with a pressure due, not only to its own gravity, but also to atmospheric pressure, caused by the vacuum in F. It will be seen, therefore, that the water does not actuate the wheel by impact or a force due to velocity, but by its gravity in connection with atmospheric pressure, the water being drawn with a steady or uniform force through the wheel.

It will be understood that the wheel D is always submerged, it being placed below the low-water point in the penstock.

In case the supply of water in the reservoir is insufficient to run the wheel so as to obtain its maximum power, the plate J is detached from the gate and secured to the center of the upper part of the wheel D. This attachment of the plate J to the wheel serves to debar the entrance of the water, and by disconnecting a requisite portion of the machinery connected with the wheel the latter may be driven at its maximum speed, but with a diminution of power commensurate with the decrease of the supply of water. This gate is an important feature of the invention, for in almost all kinds of machinery a certain speed is necessary in order to insure the best or certain results. By my improvement this end may be attained with a variable supply of water, and it cannot be attained by other means than herein shown and described, to

wit, the reducing of the orifices of the buckets or the entrances thereto, so as to reduce the volume of water passing through it, the speed being maintained by disconnecting portions of the machinery.

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

1. The single wheel D, in combination with the draft-tube F, said wheel being placed within the penstock A and arranged either horizontally or vertically with said tube, substantially as and for the purpose set forth.

2. The annular gate H, placed within the sliding frame G, in connection with the adjustable plate J, arranged substantially as shown, to operate as described.

JOHN H. FAIRCHILD.

Witnesses:

HIRAM R. NOBLE,

OLIVER EGERTON.