J. H. Fairchild,

Water Wheel.

No 20,200. Patented May 11, 1858.

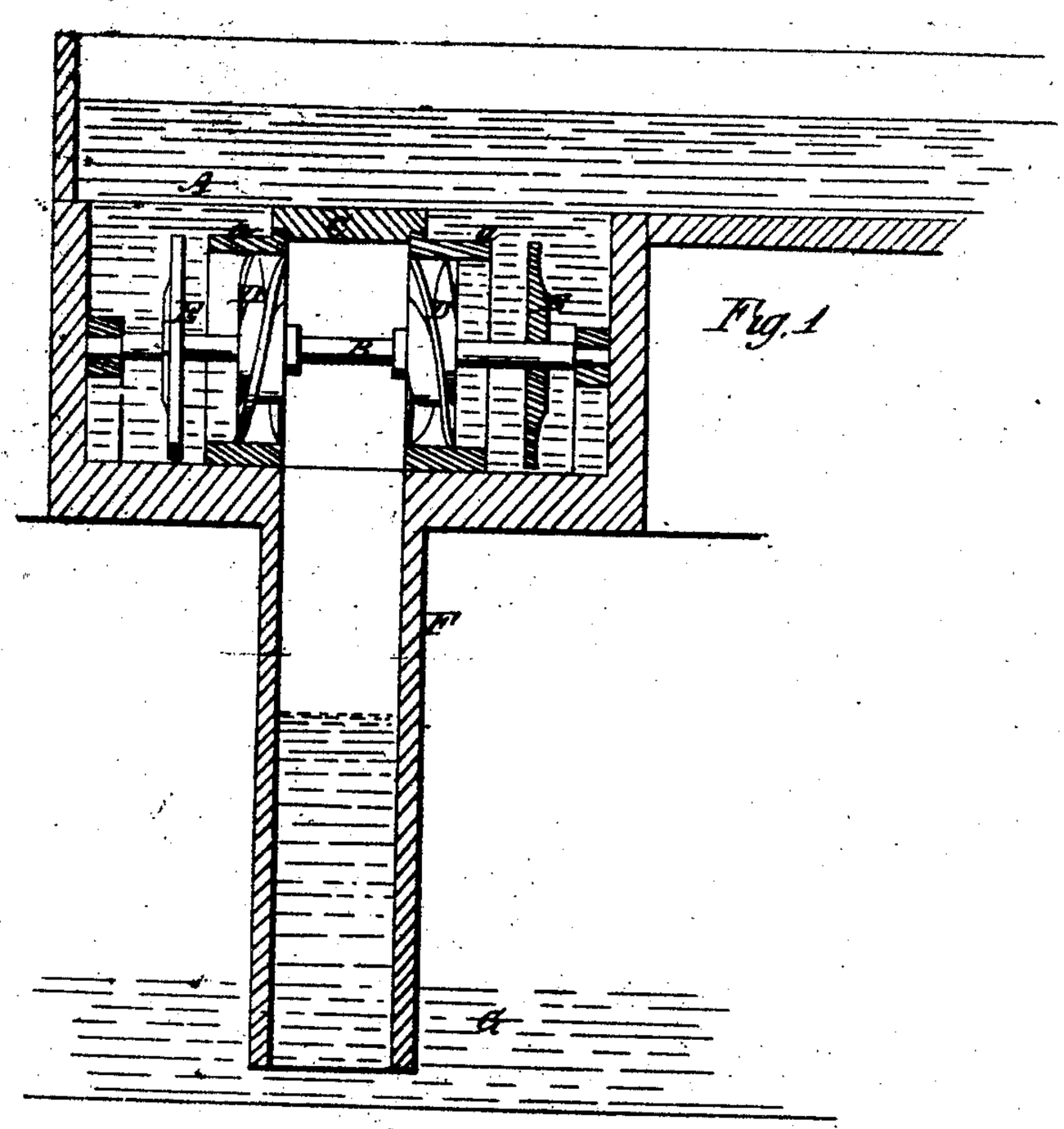
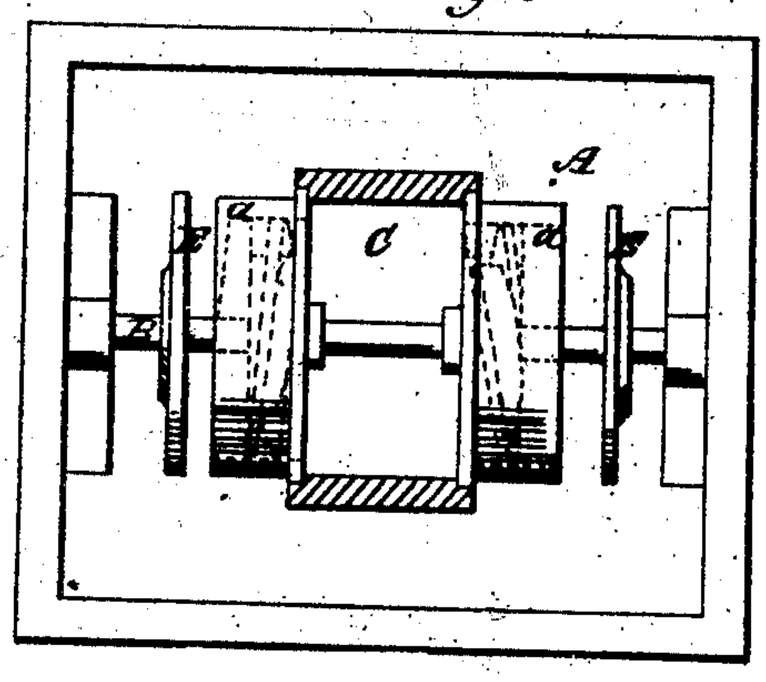


Fig. 1

Fig. 2



UNITED STATES PATENT OFFICE.

J. H. FAIRCHILD, OF JERICHO, VERMONT

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. **20,200**, dated May 11, 1858.

To all whom it may concern:

Be it known that I, J. 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 section of the stationary parts of my improvement. Fig. 2 is a plan or top view of the same.

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

This invention relates to an improvement in that class of water-wheels in which the water is made to act upon the wheel by means of atmospheric pressure or suction produced by a vacuum formed in a draft-tube below the wheel. The invention consists in the peculiar construction of the wheel and gates in connection with the draft-tube, as hereinafter fully shown and described, whereby the wheel is rendered exceedingly simple in construction and very efficacious.

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 a horizontal shaft B is placed; and C is a box, through which the shaft B passes transversely. This box C is provided at each side with a tubular projection *a*, in which screw-flanges D D are fitted, one in each, the screws being fitted snugly in the projections *a*, but still allowed to turn freely therein. The screws D D are permanently attached to the shaft B, and form the wheel. On the shaft B two circular disks E E are placed loosely. These disks are equal in diameter to the tubular projections *a a*, and form the gates of the wheel. These gates may be operated or adjusted by any proper means.

F represents a tube which is attached to the under side of the penstock A, said tube communicating with the box C. This tube F is made sufficiently large so that its lower end will at all times be immersed in the tail-race G.

The screws D D, gates E E, tubular projections *a a* may be of cast metal, and the shaft B of wrought metal. The penstock and draft-tube may be of wood. I do not, however, confine myself to any particular material, as the whole may be formed of metal, if desired.

The operation is as follows: The gates E E being opened the desired width, the water passes through the screws D D into the box C and down the tube F, and as the screws D D are always submerged, the bottom of the penstock A being as low as the reservoir of water; and as the lower end of the tube F is always submerged in the tail-race, it follows as a matter of course that a partial vacuum will be formed in tube F as the water passes through contracted spaces formed by the screws D into a larger space F, and consequently the water will be suspended therein to a height proportionate to that of perfect vacuum, and the velocity with which the water would otherwise fall from the wheel were the tube F not employed is communicated to the water above, which acts by motion or atmospheric pressure, no percussive force being employed. The gates E, in consequence of being constructed and arranged as shown, may be readily adjusted so as to admit any desired volume of water on the wheels.

The draft or motion tube F has been previously used, and I believe was first employed in what is known as the "Jonval turbine wheel," and has lately been employed in connection with other wheels; but so far as I am aware the ordinary tub or horizontal wheels have been used in connection with the draft-tube, and guide-orifices have been necessarily employed to cause the water to act in the proper direction upon the buckets, the guide-orifices being placed over the wheel. Other parts are also necessarily used in order to adapt the draft-tube to the ordinary tub or horizontal wheels. By my improvement the draft-tube is employed, its full benefit obtained by a very steady movement of the wheel with a maximum power fully equal if not greater than others, and at the same time the construction of the whole is rendered extremely simple. The screws D require no guide-orifices, as the

water will act upon them perfectly as it is drawn through them into the box C and tube F.

I do not claim separately the draft-tube F, for that has been previously used; but

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

1. The tube F, in combination with the wheel, formed of the screws D D, placed on a shaft B, and working within the tubular projections *a a*, the whole being arranged to operate as described.

2. In combination with the wheel and draft-tube, the gates E E, arranged as described.

J. H. FAIRCHILD.

Witnesses:

DAVID FISH,

S. M. BARNY.