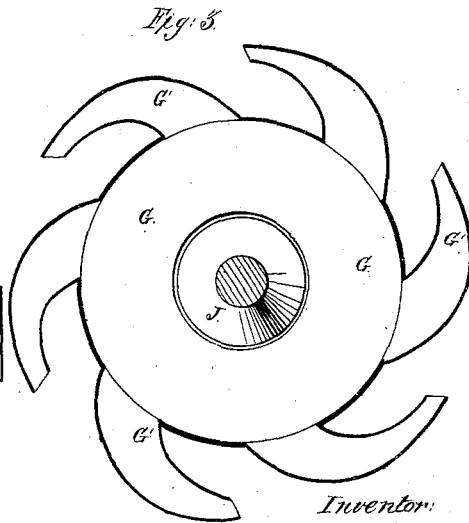
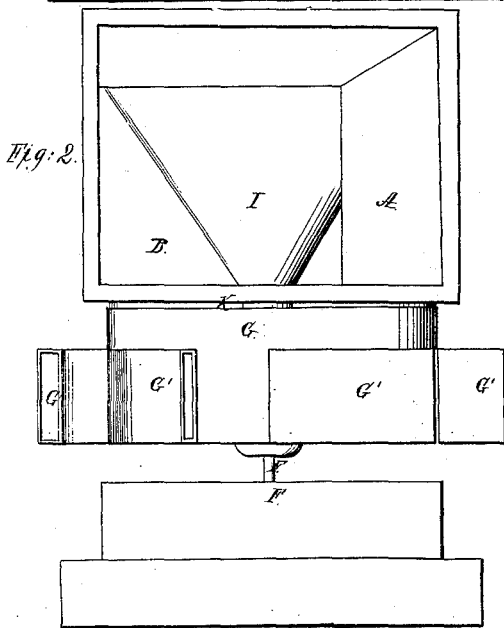
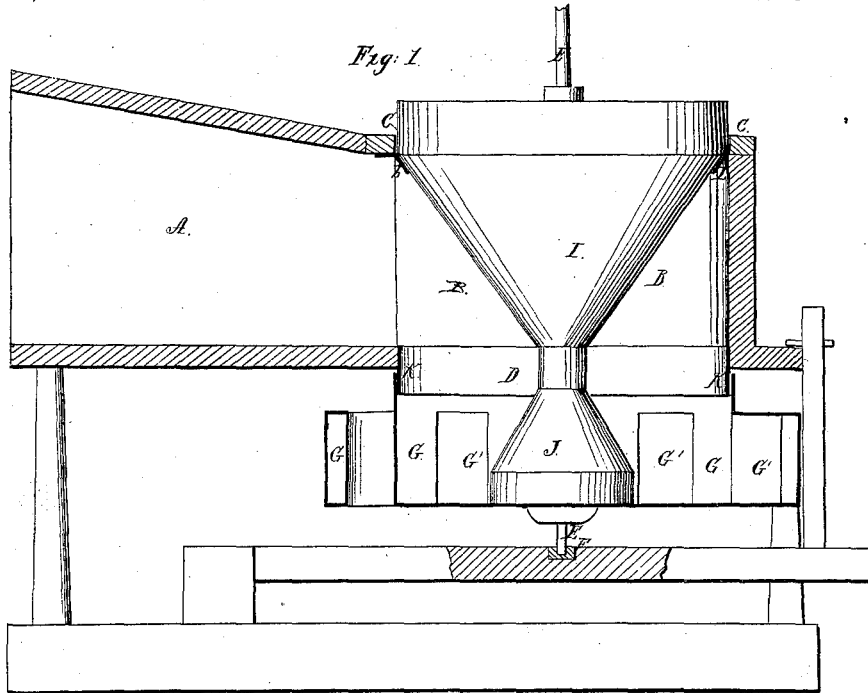


G. W. Armstrong,

Water Wheel,

No. 31,217.

Patented Jan. 29, 1861.



Witnesses: *Woodward & Loeb*
C. H. Deane

Inventor:
G. W. Armstrong
by *Robt. W. Fenwick*
Attorney

UNITED STATES PATENT OFFICE.

GEORGE W. ARMSTRONG, OF CLINTON, NORTH CAROLINA.

WATER-WHEEL.

Specification of Letters Patent No. 31,217, dated January 29, 1861.

To all whom it may concern:

Be it known that I, G. W. ARMSTRONG, of Clinton, in the county of Sampson and State of North Carolina, 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 accompanying drawings, forming a part of this specification, in which—

Figure 1, is a vertical longitudinal section. Fig. 2, is a front view, and Fig. 3, a horizontal section of my improved wheel.

Similar letters of reference, in each of the several figures indicate corresponding parts.

The nature of my invention consists in the employment of a vertical shaft which has, on its lower portion, an enlargement of a form approximate to that of an hour glass in combination with a centrifugal discharging reaction water wheel and a cylindrical casing, as will be hereinafter described.

It also consists in the employment of a suspended elastic packing ring in combination with a water wheel which is supported on a vertical shaft enlarged as above stated and is raised and lowered in the manner hereinafter described.

To enable others, skilled in the art, to make and use my invention, I will proceed to describe its construction and operation.

A, represents a penstock of any approved form. It terminates in a cylindrical casing B, which has a circular opening C, in its top and a similar opening D, in its bottom.

E, is a vertical shaft having its bearing in an adjustable step F, and passing up centrally through the casing B. On this shaft near its base is hung a water wheel consisting of a hollow cylindrical chamber G, with a series of tapering curved nozzles G' projecting from its circumference.

That portion of the shaft inclosed by the water wheel and cylindrical casing of the penstock is made in a form approximating that of an hour glass, being formed by placing two cones I, J, with their apexes nearly meeting one another on the shaft, as represented. The upper cone I, is of a much greater area than the lower one J, or equal to the area of the bottom of the wheel and the lower cone in order that the upward pressure of the water shall equal the downward pressure and thus much of the dead weight of the wheel upon the step F, over-

come. The cones—especially the upper one—also serve for giving a proper direction to the water in its passage to the discharging nozzles of the wheel. The cones should be made of a buoyant substance or be cast hollow, in order that their specific weight shall be less than that of the water they displace.

K, is a rubber packing ring attached to the inside of the cylindrical casing and extending down below the lower edge of the water-wheel. By this arrangement, it will be seen that the joint between the casing and the water-wheel is closed and that whenever the pressure of the head of water is acting on the wheel the packing ring is distended slightly, and thus caused to pack the joint with sufficient tightness to prevent any considerable escape or loss of water. It will further be seen that the wheel may be raised and lowered to a limited extent without requiring an adjustment of the packing ring.

The joint between the upper cone and the cylindrical case may be packed in any approved manner, but I prefer to attach a rubber packing ring L, to the inside of the cylinder case in such manner that the pressure of water shall serve to hold it in contact with the cone, as represented.

My wheel is to be operated by pressure of a head of water and is adapted to be located at or below the level of the water in the tail race so as to obtain the full effect of the pressure due to the head of water. The water in seeking to pass out radially through the curved tapering nozzles impinges upon the tangential surface thereof and causes the wheel and the shaft to revolve very rapidly.

In practice a mill stone may be placed upon the top of the shaft and another suspended in a hanger above the top of the same. When a mill stone is thus arranged the balancing of the shaft by the pressure of the water on the cones becomes of still greater importance as the stone is kept always up to its work and being held by water is capable of accommodating itself to positive obstructions between the grinding surfaces.

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

1. The employment of a vertical shaft E, which has on its lower portion, an enlargement I, J, of the form described, in combination with a centrifugal discharging reac-

tion water wheel G, and a cylindrical casing B, in the manner and for the purposes set forth.

2. The employment of a suspended elastic
5 packing ring K, in combination with a water
wheel G, G', which is supported on a vertical
shaft E, I, J, enlarged as above stated,

and is raised and lowered in the manner and
for the purposes set forth.

G. W. ARMSTRONG. [L. s.]

Witnesses:

JNO. H. JOHNSON,
E. S. JACOB.