L. d'AURIA.

WATER-WHEEL.

No. 190,012. Patented April 24, 1877.

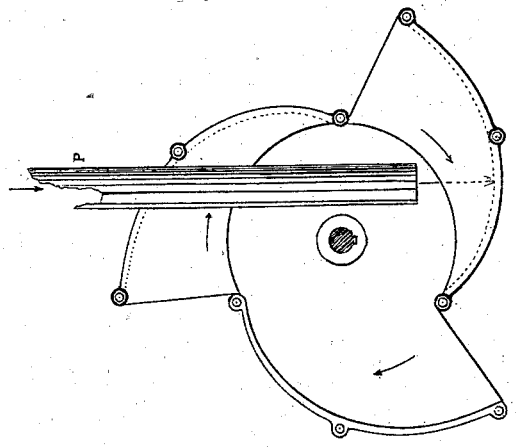

Fig. 1.

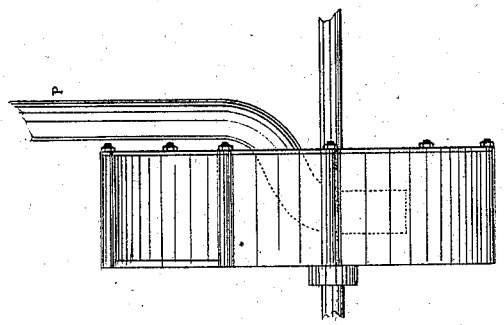

Fig. 2.

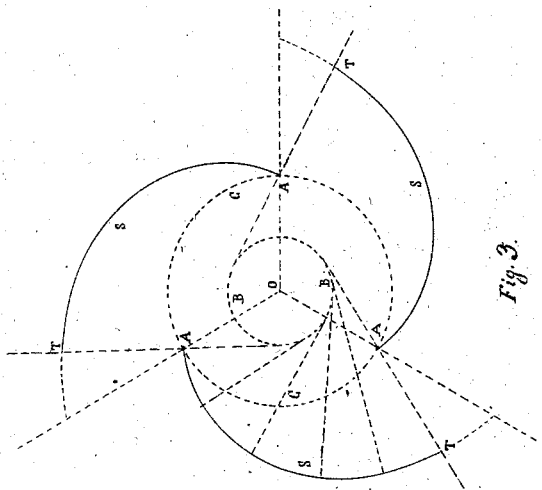

Fig. 3.

Witnesses:
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UNITED STATES PATENT OFFICE.

LUIGI D'AURIA, OF GAETANO, ITALY.

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. **190,012**, dated April 24, 1877; application filed March 12, 1877.

To all whom it may concern:

Be it known that I, LUIGI D'AURIA, of Gaetano di Stabia, near Naples, in the Kingdom of Italy, at present residing in Baltimore, Maryland, have invented a new and useful Improvement in Water-Wheels; and I do hereby declare that the following is a full, true, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front view of a wheel constructed according to my invention, with a portion of the front plate covering one float removed; Fig. 2, a side view thereof, and Fig. 3 a diagram showing the method adopted in "laying out" the curves of the floats.

The object of my invention is to furnish an improvement in that class of wheels in which a stream of water strikes directly on a series of floats; and it consists in forming the floats of a peculiar curve, known as the "involute," by which means the working-surface of these floats receives the force of the impelling fluid always in a normal condition, in whatever position the wheel may be.

Wheels constructed according to my plan may have one, two, three, or any convenient number of floats; but the same principle of construction governs them all, whether a single float or many be employed, and I will therefore give a description of the method of "laying out" a wheel of three floats or buckets, as shown in the drawing.

Describe two concentric circles, B B and C C, as shown in Fig. 3. The circumference of the latter, representing the inner limits of the floats, should then be divided into as many equal parts as there are to be floats by the points of division A A A, and through these dividing lines draw rectilinear tangents to the circumference of the inner circle B B, extending them beyond the outer circle. Then connect each point A A A with the tangent next to it by means of curves S S S, traced by the aid of a cord, which is unwound from a cylinder corresponding with and occupying the position of the inner circle, thus forming what is known as "involute curves," of which the said inner circle is the evolute. The curves thus made show the form of the inner or acting sides of the floats, and, as a result of the peculiar curve employed, any force acting tangential to the inner circle will be normal to the curves S S S, and water directed by one or more tubes, chutes, or equivalent devices, situated tangentially to the imaginary position of the evolute from which the involute curves of the floats are derived, will always strike the face of the floats in a normal direction in every position of the wheel, and will escape from within the buckets with slight velocity, leaving to the wheel nearly all its living force.

The floats, whatever their number, should be suitably connected by plates or heads to prevent loss of water when the wheel is vertical, one of which should be provided with a hub to attach the wheel to the shaft, and the other with a circular opening to receive the water-tube *p*; but when the wheel is used horizontally this last-mentioned head is not absolutely necessary.

To prevent loss of the centrifugal force of the water, it may be advisable, especially when the wheel is to be used horizontally, to extend the curves of the floats until they shall at least meet the prolongations of the radii O A, as shown by the dotted lines in Fig. 3; but the exact amount of this extension will be best shown by experience.

It is obvious that instead of the wheel rotating, it may be stationary, and that the tube or tubes, if combined with the shaft, will then revolve by reaction; and that both the wheel and tubes may be provided with suitable shafts and bearings, so as to have motions in opposite directions, and by suitable gearing transfer their motion to a third shaft, in the usual manner when combined wheels are used.

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

1. A water-wheel having its floats so curved that their inner surfaces will form involutes, and so arranged that the water will strike their inner surfaces normally in every position of the wheel, substantially as described.

2. In combination with a water-wheel having involute floats, a tube, or its equivalent, so arranged as to discharge the water normally to the inner curves of the floats, substantially in the manner set forth.

LUIGI D'AURIA.

Witnesses:

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