(No Model.)

P. H. HOLMES.

TURBINE WATER WHEEL.

No. 356,124. Patented Jan. 18, 1887.

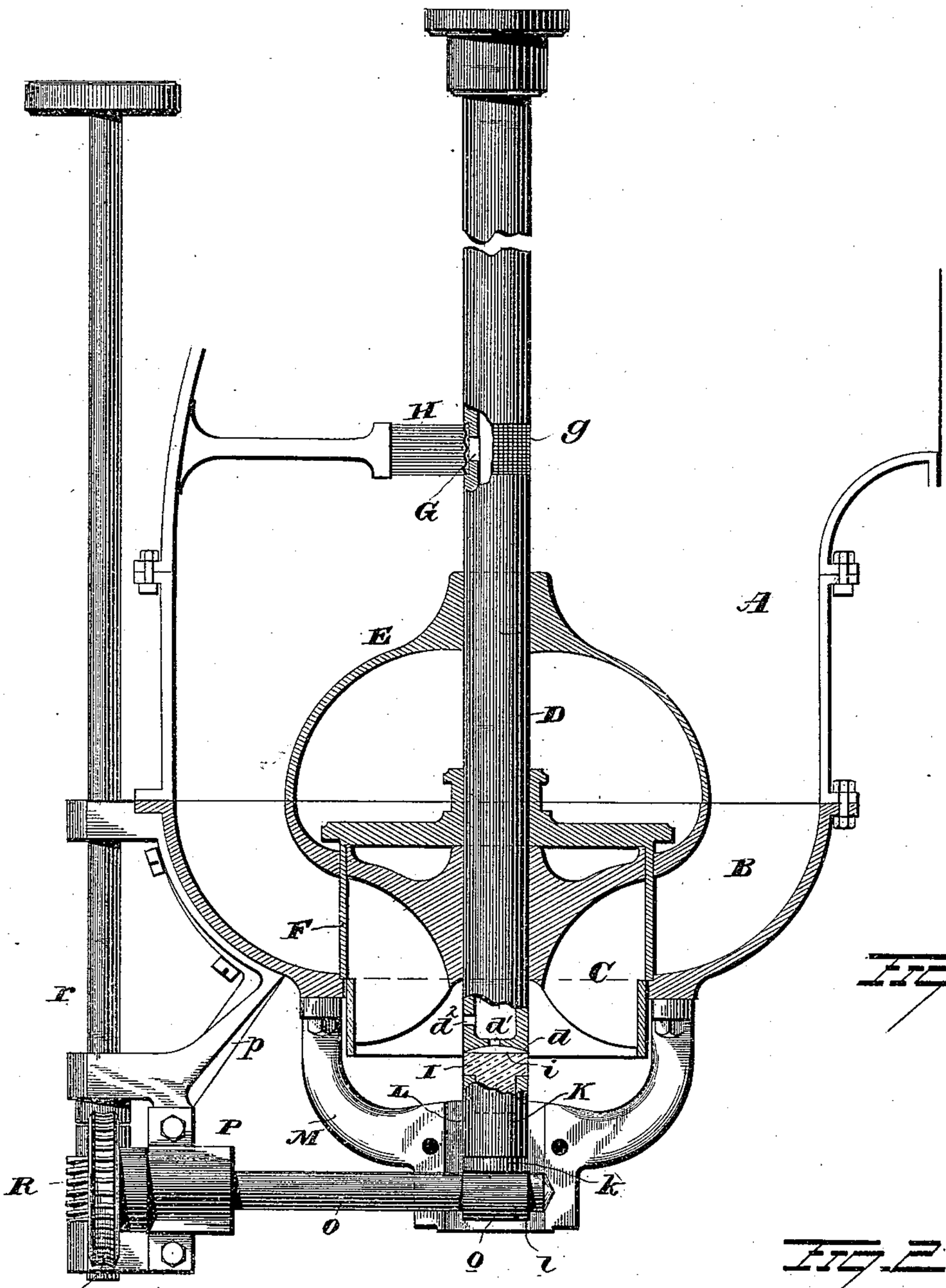

FIG. 1.

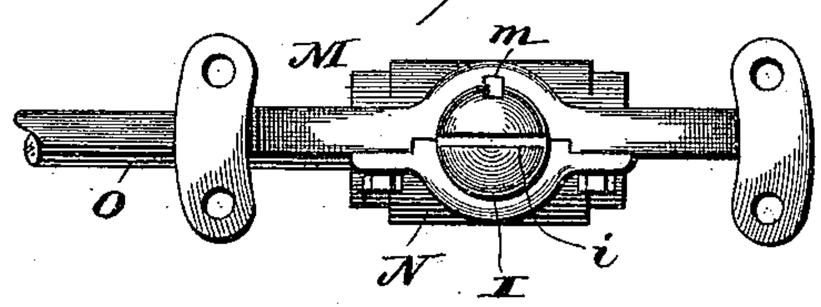

FIG. 2.

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PHILIP HENRY HOLMES, OF GARDINER, MAINE.

TURBINE WATER-WHEEL.

SPECIFICATION forming part of Letters Patent No. 356,124, dated January 18, 1887.

Application filed April 26, 1886. Serial No. 200,180. (No model.)

To all whom it may concern:

Be it known that I, PHILIP HENRY HOLMES, of Gardiner, in the county of Kennebec and State of Maine, have invented certain new and useful Improvements in Turbine Water-Wheels; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in turbine water-wheels.

In that class of water-wheels in which the paddles or blades are secured to a vertical shaft and the water admitted to the blades from an inclosed chamber in which it is received under pressure it is found desirable to employ a bearing or step of hard wood for the lower end of the shaft to rest and turn upon. It becomes, therefore, of considerable importance that the bearing should be kept cool and made to last as long as possible.

The object of my present invention is to provide an automatic supply of cool water to the step, and an improved construction of step-seat and step-operating mechanism, by means of which the step may be readily removed and a new one adjusted in its place and the wear taken up with great precision.

With these ends in view my invention consists in certain features of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical section of a wheel embodying my invention, and Fig. 2 is a view of the step-seat in plan.

A represents the dome or upper section of the supply or pressure chamber, and B represents the lower or channel section of the same. The wheel C is incased within the lower portion of the channel-section B, and is secured to an upright shaft, D, which extends upwardly through the apex of the dome-section A. A hemispherical cap, E, rests on a circular seat at the top of the cylindrical wheel-casing, and serves to isolate the wheel from the water within the dome. A gate, F, consisting of a ring-casing, surrounds the wheel, and is adapted to slide up and down thereon to admit the water to or shut it off from the wheel.

The shaft D is constructed hollow, or provided with a pipe-channel, and at a point within the dome A is provided with an opening, G, sufficiently large to admit a small quantity of water to the interior channel. The opening G, or it may be more than one, is covered by a strainer—consisting of a fine wire screen, *g*, for example—which prevents the flow of any trash through the opening G that would be liable to obstruct the channel. The meshes in the strainer or screen are kept open by means of a brush, H, attached to the interior of the dome A, and adapted to engage the screen as the shaft rotates.

On the lower end of the shaft is a concave or cup-shaped upper step, as shown at *d*, to receive the convex or rounded face of the step I. At the center of its lower end the upper step is provided with a small opening, *d'*, to allow the water to flow onto the step, and to prevent the opening *d'* from filling by its wearing on the step the latter is provided with a slot, *i*, extending diametrically across its top. Another opening, d^2, a short distance above the lower end of the upper step, causes the water to flow freely and constantly through the shaft, thereby keeping the water at the step continually cool and preventing any liability of the step burning down, as sometimes happens when the water in the tail-race is below the step.

The step I, which is preferably composed of wood, is removably secured in a metallic holder or plunger, K, adapted to work up and down in a socket, L. The socket L is half formed in the side of a yoke, M, secured to the lower section, B, and half in a removable interlocking cap, N, adapted to be bolted or screwed or otherwise secured to the side of the yoke. A second socket, *l*, extending at right angles to and below the socket L, is also formed half in the yoke and half in the cap N. Within the latter socket works a shaft, O, provided at a point immediately below the shaft D with a cam wheel or disk, *o*, the face of which is adapted to engage the lower end of the plunger K, or a washer, *k*, inserted between the plunger and cam. The plunger, and hence the step I, is prevented from rotating with the shaft D by means of a feather and groove, *m*, or by other suitable means. The shaft O is further supported in a suitable bearing, P, attached to a depending bracket, *p*, attached to

the lower section, B. A worm-gear, Q, is secured to the end of the shaft O, and is adapted to mesh with and be driven by a worm, R, on an upright shaft, *r*, journaled in the bracket *p*. This construction of step admits of its being removed without disturbing the wheel and a new one put in its place, thus overcoming a serious objection to former constructions, where the wheel has generally been required to be taken out and the old step bored out of its holder on account of the wood swelling. This step may also be adjusted with the greatest precision by means of the worm-gear and cam. These features, taken in connection with the improved means for keeping the step cool, serve to materially increase the convenience, effectiveness, and durability of the wheel as a whole.

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

1. In a water-wheel, the combination, with a water-supply chamber and a bearing or step, the latter having a convex bearing-surface, of a water-wheel shaft having a concave lower end and provided with a water-channel leading from a point within the water-supply chamber through the concave lower end of the shaft, and with a second outlet-opening a short distance above the lower end, substantially as set forth.

2. In a water-wheel, the combination, with the hollow wheel-shaft having a water-inlet opening within the water-supply or pressure chamber, and two outlets, one at the lower end and one a short distance above the lower end, of a strainer covering the inlet-opening, and a brush adapted to free the meshes of the strainer, substantially as set forth.

3. In a water-wheel, the combination, with a removable step adapted to be vertically adjusted within its socket, of a rotary cam for adjusting the step, and a removable cap adapted to lock the cam-shaft and step in position on the yoke, substantially as set forth.

4. In a water-wheel, the combination, with a vertically-movable step and a rotary cam for adjusting the step, of a removable interlocking cap adapted to secure the cam-shaft and step in their positions on the yoke, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

PHILIP HENRY HOLMES.

Witnesses:

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