J. L. BEIL.

WATER WHEEL.

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942,811.

Patented Dec. 7, 1909.

Fig. 1.

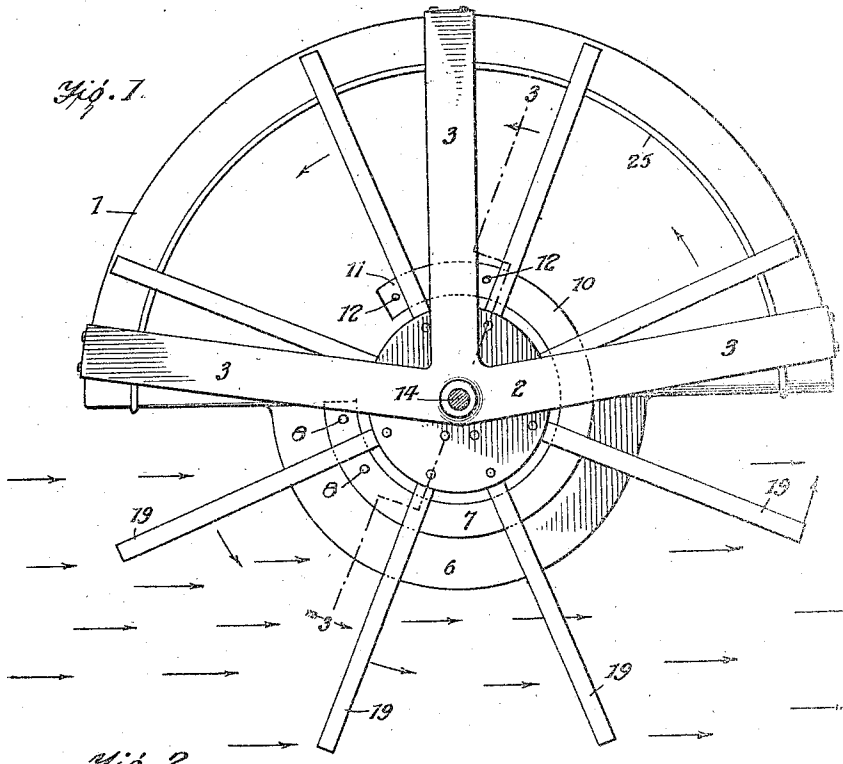


Fig. 2.

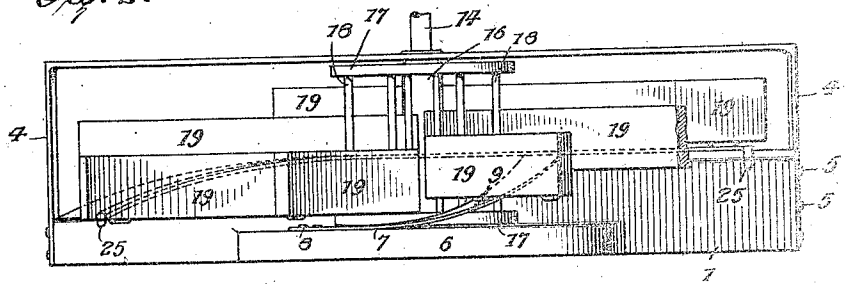


Fig. 4.

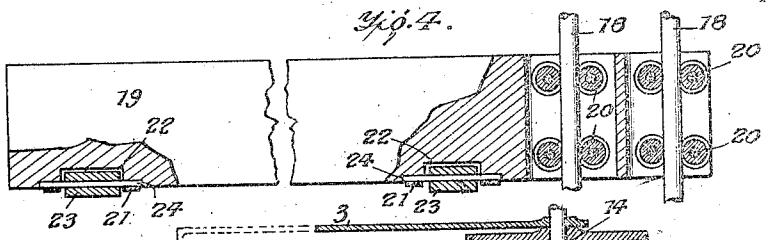


Fig. 5

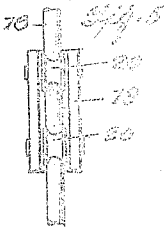
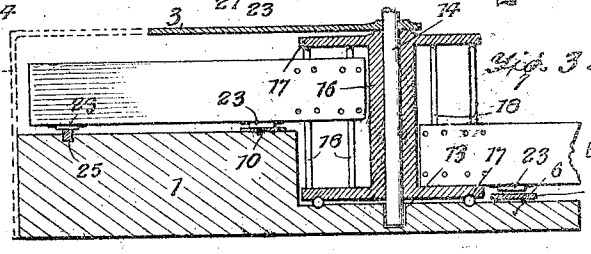


Fig. 3.



WITNESSES

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WATER-WHEEL.

942,811. Specification of Letters Patent. Patented Dec. 7, 1909.

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To all whom it may concern:

Be it known that I, JOHN LORRAIN BEIL, a citizen of the United States, and a resident of Galena, in the county of Jo Daviess, State of Illinois, have invented certain new and useful Improvements in Water-Wheels, of which the following is a specification.

My invention is an improvement in water wheels, and consists in certain novel constructions and combinations of parts hereinafter described and claimed.

The object of the invention is to provide a water wheel adapted to be partially immersed in a stream in a horizontal position, and wherein the rotor comprises a plurality of vertically movable vanes, which by the movement of the rotor are moved out of and into the water.

Referring to the drawings forming a part hereof: Figure 1 is a plan view of the improvement; Fig. 2 is a transverse section; Fig. 3 is a section on the line 3—3 of Fig. 1; Fig. 4 is a side view of a blade partly in section; and Fig. 5 is an end view of Fig. 4.

The embodiment of the invention shown in the drawings comprises a frame which is substantially a half cylinder, and is adapted to be placed horizontally in a stream of water with the flat side thereof substantially parallel with the direction of flow of the water, the rotor to be presently described being supported in the casing and projecting through the open flat side of the frame.

The frame is open, comprising a substantially semicircular plate 1 of wood or other suitable material, and a bearing plate 2 arranged above and concentric with the plate, and connected therewith by radial arms 3 which radiate from the bearing plate, and are provided with angular portions 4 which are riveted to the plate 1, as at 5.

At approximately the center of the flat side of the plate 1 an extension 6 is provided, and a curved cam plate or guide plate 7 is secured to the extension by one end, as at 8, from whence it curves around concentric with the center of the frame, gradually rising, as at 9, then extending substantially horizontal for some distance, as at 10, and then gradually descending, as at 11, until it meets the plate to which the other end is secured, as at 12.

The frame is provided at the center of its lower face with a step bearing 13 in which is journaled the lower end of a shaft 14, the other end being journaled in the bearing plate 2 before mentioned, and secured to the shaft is a hub 16, having at each end an annular flange 17 which are connected at spaced intervals by pairs of vertical pins or rods 18, the members of each pair being arranged radially with respect to the shaft and spaced apart from each other.

A blade or vane 19 is connected with each pair of rods, each pair of rods forming a guide for the respective vane, by means of rollers 20, each blade being provided with four pairs, two pairs embracing each rod. As shown in Fig. 5 the rollers are peripherally grooved, and one member of each pair is arranged on one side of the rod, and the other member on the other side. The arrangement of the rollers permits the vane to move up and down on the rods, while at the same time it is constrained to retain a vertical position with its plane perpendicular to the plate 1. As shown in Fig. 3, the vanes are of lesser width than the length of the rods, so that they may move a distance equal to their width, that is, they may be displaced bodily vertically.

The vertical movement is brought about by the cam plate before mentioned. As the blades emerge from the open side of the frame and meet the force of the current, indicated by the arrows in Fig. 1, the rotor comprising the hub and vanes is rotated on the shaft, and as each blade engages the cam plate it is gradually lifted out of the water until it rests upon the horizontal portion of the plate. When again near the place of emergence from the frame the blade begins to fall, and when it emerges it is again in lowered position. It will be understood that the frame is intended to be half submerged in the water, the upper half being above the surface, and that the power may be transmitted from the shaft by any suitable means.

Each blade is provided on its lower edge with spaced bearings 21 and with recesses 22 between the bearings, and a roller 23 is journaled in each recess, the rollers having trunnions 24 journaled in the bearings. A guide or track 25 is arranged concentric with the shaft near the periphery of the frame for engagement by the outer roller, and the inner roller engages the cam plate. It will be understood that the guide 25 follows the cam plate and assists it to move

the blades in the manner described, both together forming a guide or track for the blades.

The blades may be of any suitable material, as may also the frame and other parts, and the bottom plate 1 has its upper surface preferably shaped roughly like the track or guide, as indicated in Fig. 3.

I claim:

1. A water wheel comprising a substantially semi-cylindrical frame adapted to be partially immersed in a horizontal position in a stream, and with the flat side thereof substantially parallel with the direction of flow of the current, a vertical shaft journaled at the center of the frame, a hub on the shaft within the frame and provided at each end with a marginal annular flange, radially arranged pairs of rods connecting the flanges at spaced intervals, a blade or vane for each pair of rods and provided with upper and lower pairs of grooved rollers for engaging the rods of the pair, rollers on the lower edges of the blades, and cam plates on which the rollers run, each plate comprising an elevated horizontal portion offset from the bottom of the frame and connected thereto by inclined portions, for the purpose specified.

2. A water wheel comprising a vertical shaft, a hub journaled thereon and provided at each end with a flange, pairs of rods connecting the flanges at spaced intervals, the members of each pair being arranged in alinement and radial with respect to the shaft, a blade for each pair, each of said blades having an upper or lower pair of grooved rollers for engaging the rods of the pair, rollers on the lower edges of the blades, and cam plates for engagement by the rollers to raise and lower the blades.

3. A water wheel comprising a frame, a shaft journaled therein, a rotor on the shaft, said rotor comprising a hub, pairs of rods supported by the hub in spaced relation, the members of each pair being in alinement and radial to the hub, a blade supported by each pair, each of said blades having a plurality of pairs of grooved rollers for each rod and engaging the rod between the members of the pairs, and a cam plate for raising and lowering the blades for the purpose specified.

4. A water wheel comprising a frame, a shaft journaled therein, a rotor on the shaft, said rotor comprising a hub, pairs of rods supported by the hub in spaced relation, the members of each pair being in alinement and radial to the hub, a blade supported by each pair, each of said blades having a plurality of pairs of grooved rollers for each rod and engaging the rod between the members of the pairs, and means for raising and lowering the blades, for the purpose specified.

5. A water wheel comprising a frame, a shaft journaled therein, a rotor on the shaft, said rotor comprising a hub, pairs of rods supported by the hub in spaced relation, the members of each pair being in alinement and radial to the hub, a blade for each pair, means for connecting the blade to the rods to permit said blade to move longitudinally thereof, while retaining it perpendicular and radial to the hub, and means for lifting the blades, for the purpose specified.

6. In a water wheel, a rotor, comprising a hub provided with spaced annular flanges, pairs of rods connecting the flanges at spaced intervals, the members of each pair of rods being arranged in alinement radial to the hub, a blade for each pair, each of said blades having upper and lower pairs of grooved rollers for engaging the rods of the pairs, and means for lifting the blades in succession and permitting them to drop, for the purpose specified.

7. In a water wheel, a rotor, comprising a hub having spaced annular flanges, blades between the flanges and radial to the hub and in spaced relation, means for connecting the blades to the hub to permit them to move longitudinally thereof while retaining them vertical and parallel to the longitudinal axis of the hub, and means for lifting the blades, for the purpose set forth.

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Witnesses:

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