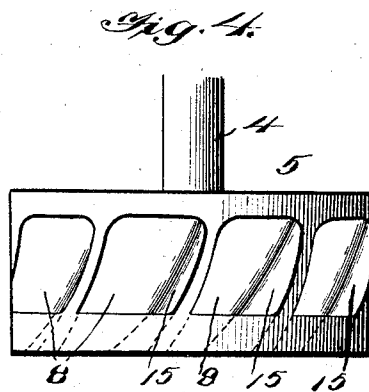
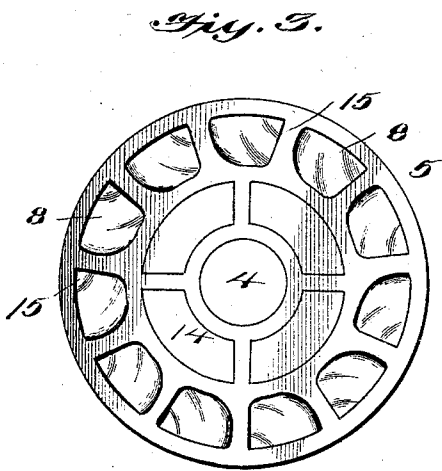
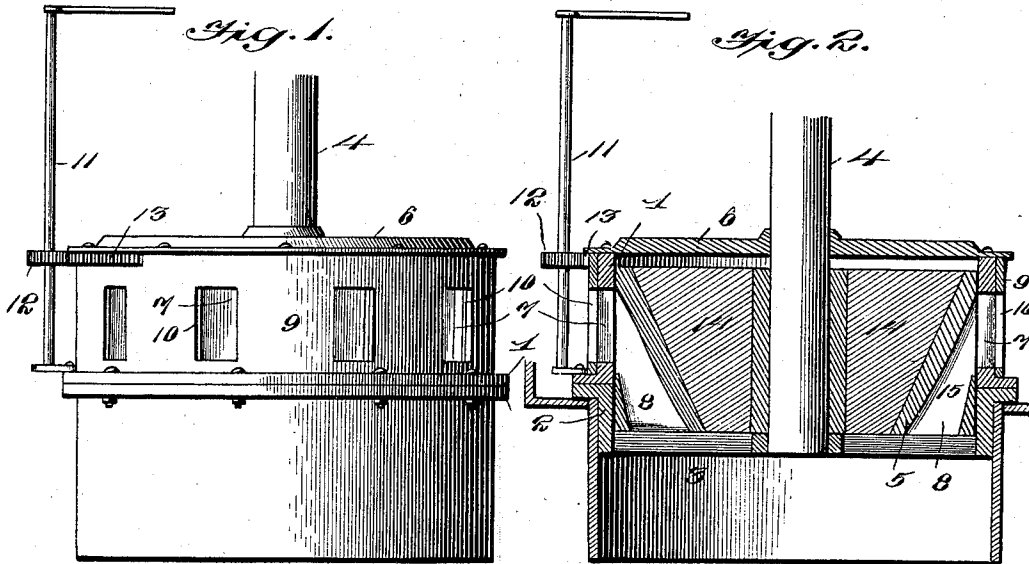


(No Model.)

R. D. RALSTON.
TURBINE WATER WHEEL.

No. 580.897.

Patented Apr. 20, 1897.



Witnesses
W. J. Koerth.
V. B. Hillyard.

By *his* Attorneys.

Inventor
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UNITED STATES PATENT OFFICE.

ROBERT D. RALSTON, OF WILSCOT, GEORGIA.

TURBINE WATER-WHEEL.

SPECIFICATION forming part of Letters Patent No. 580,897, dated April 20, 1897.

Application filed May 15, 1896. Serial No. 591,669. (No model.)

To all whom it may concern:

Be it known that I, ROBERT D. RALSTON, a citizen of the United States, residing at Wilscot, in the county of Fannin and State of Georgia, have invented a new and useful Turbine Water-Wheel, of which the following is a specification.

This invention relates to turbine water-wheels, and has for its object to construct an engine of this character which can be utilized to advantage on small streams, so that a comparatively large wheel can be operated by means of a relatively small stream and give better results than are possible under like conditions with turbine water-wheels as generally constructed.

For a full understanding of the merits and advantages of the invention reference is to be had to the accompanying drawings and the following description.

The improvement is susceptible of various changes in the form, proportion, and the minor details of construction without departing from the principle or sacrificing any of the advantages thereof, and to a full disclosure of the invention an adaptation thereof is shown in the accompanying drawings, in which—

Figure 1 is a side elevation of a turbine water-wheel embodying the principles of this invention. Fig. 2 is a vertical section thereof. Fig. 3 is a bottom plan view of the runner or motor wheel. Fig. 4 is a side elevation thereof.

Corresponding and like parts are referred to in the following description and indicated in the several views of the drawings by the same reference-characters.

The casing is composed of two parts 1 and 2, which have their opposing or meeting edges outwardly flanged and bolted or otherwise secured together. A spider 3, comprising crossed bars, strengthens and braces the lower portion of the bottom part 2 and provides a bearing for the vertical shaft 4 of the runner or motor wheel 5. A cap or plate 6 is secured to the upper end of the casing in any substantial manner.

The upper part 1 of the casing is provided at intervals in its circumferential length with narrow chutes 7, which extend vertically and tangentially, so as to cause the jets of water to impact against the buckets 8 of the motor-

wheel to propel the latter in the usual way. A gate 9 encircles the part 1 and has openings 10 corresponding in position and number with the chutes 7, so as to register with the latter when it is required to have the full capacity of the chutes disclosed. This gate is adapted to be turned to vary the size of the chutes or entirely close the same and is operated by means of a vertical shaft 11, having a pinion 12 meshing with a toothed portion 13 of the gate 9. By turning the shaft 11 the gate is moved in the desired direction to attain the required end, the shaft being turned by means of a handle, wrench, or other tool applied thereto.

The runner or motor wheel is preferably cast, although this is not essential, and is hollow, the spaces being filled by blocks of wood 14, which are forced into the spaces and secured therein by friction or in any other convenient way.

The buckets 8 are formed in the periphery of the wheel and open at one end through a side thereof, which in the present instance is the lower or bottom side of the wheel. The buckets curve rearwardly toward their lower ends, and their front walls 15 extend radially and form shoulders for the water to impact against when propelling the wheel. The upper ends of the buckets vanish or merge into the peripheral surface of the wheel, and their inner walls slope gradually from the front walls 15 to the peripheral surface, so that the tangential propelling-jets can strike the front walls 15 and impart their full force for driving the runner or motor wheel. By reason of the rearward curvature of the buckets at their lower or discharging ends the water after spending its energy upon the wheel escapes readily without detracting from the force of the wheel. Viewed from the side or edge the runner or motor wheel presents the appearance of having top and bottom rings and intermediate depressions or pockets, the latter forming the buckets. Hence when in operation the water is confined between the casing and the peripheral surface of the motor-wheel and is utilized to the best advantage for propelling the latter.

By having the buckets curving rearwardly throughout their length from their upper

ends the water is readily discharged without detracting in the least from the speed of the wheel, and by having the front walls radially disposed they receive the full impact of the water, thereby resulting in converting a maximum amount of the force into efficient energy. On reference to Fig. 2 it will be seen that the inner and outer walls are straight and divergent toward their lower ends and incline from the vertical in central vertical section, whereby the buckets incline inwardly and increase in depth from top to bottom. The inner walls curve rearwardly from the front walls, thence outwardly, and intersect with the periphery of the wheel on lines parallel with the front walls, as most clearly indicated in Fig. 4. From the foregoing it will be seen that the buckets are devoid of angles, recesses, or cavities tending to collect and hold water, which would result in retarding the speed of the wheel. Moreover, the buckets are constructed with especial reference to ridding themselves quickly of the water without impeding in the least the rotation of the wheel and to utilize a maximum amount of its force.

Having thus described the invention, what is claimed as new is—

A turbine water-wheel constructed to operate horizontally and provided with a series of buckets at intervals in its periphery inclining inwardly and curving rearwardly from their upper ends and opening through the lower side of the wheel a short distance from the periphery, and having the outer and the inner walls straight and divergent in central vertical section, and having the front walls extending radially to provide abrupt surfaces to receive the full impact of the water, and having the said inner walls curving rearwardly, thence outwardly and intersecting with the periphery of the wheel on lines parallel with the said front walls, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

ROBT. D. RALSTON.

Witnesses:

W. C. THOMAS,
H. C. CURTIS.