(No Model.)

W. W. ROSSMAN.

TURBINE WATER WHEEL.

No. 488,029. Patented Dec. 13, 1892.

FIG. 1.

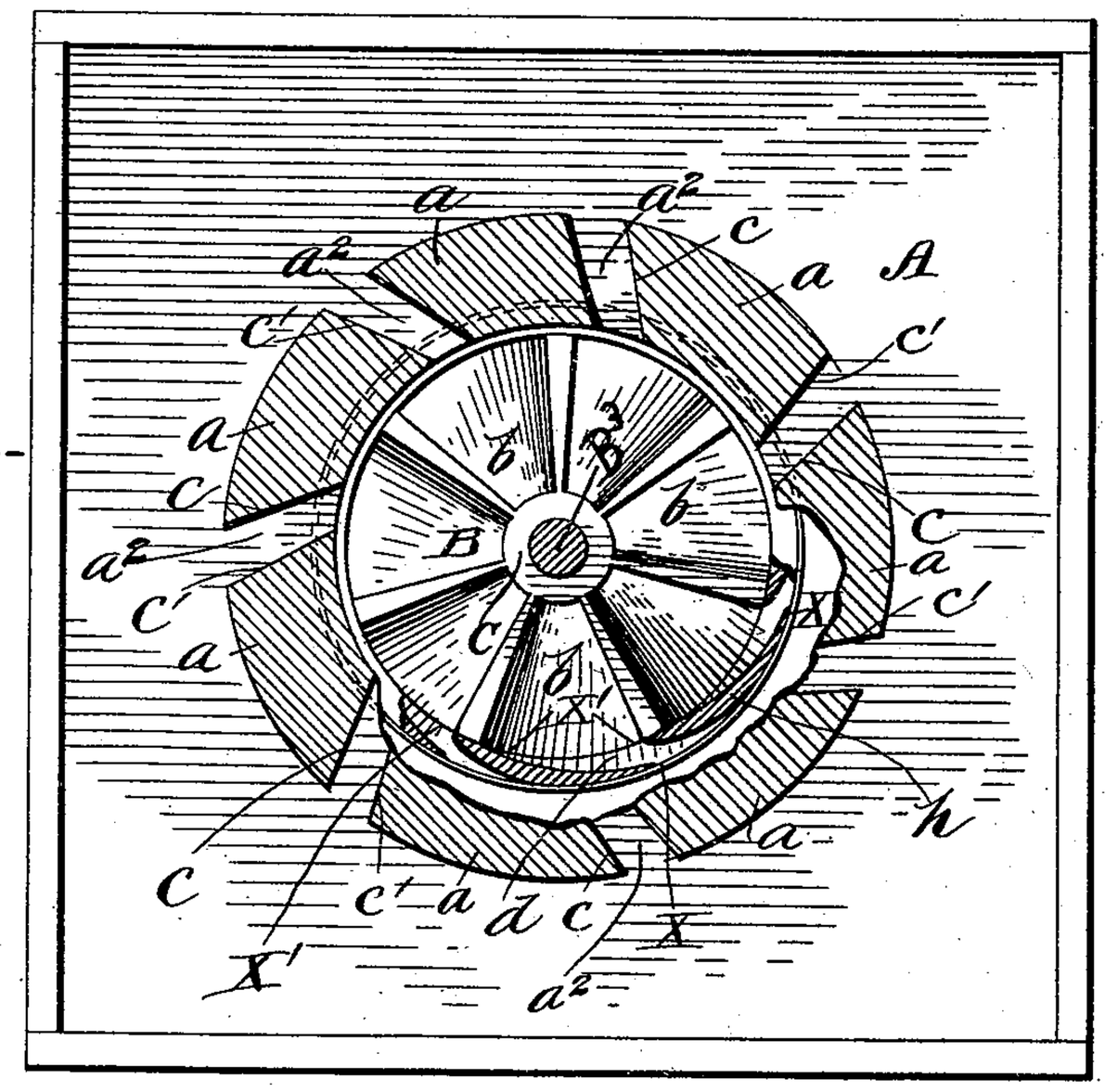


FIG. 2.

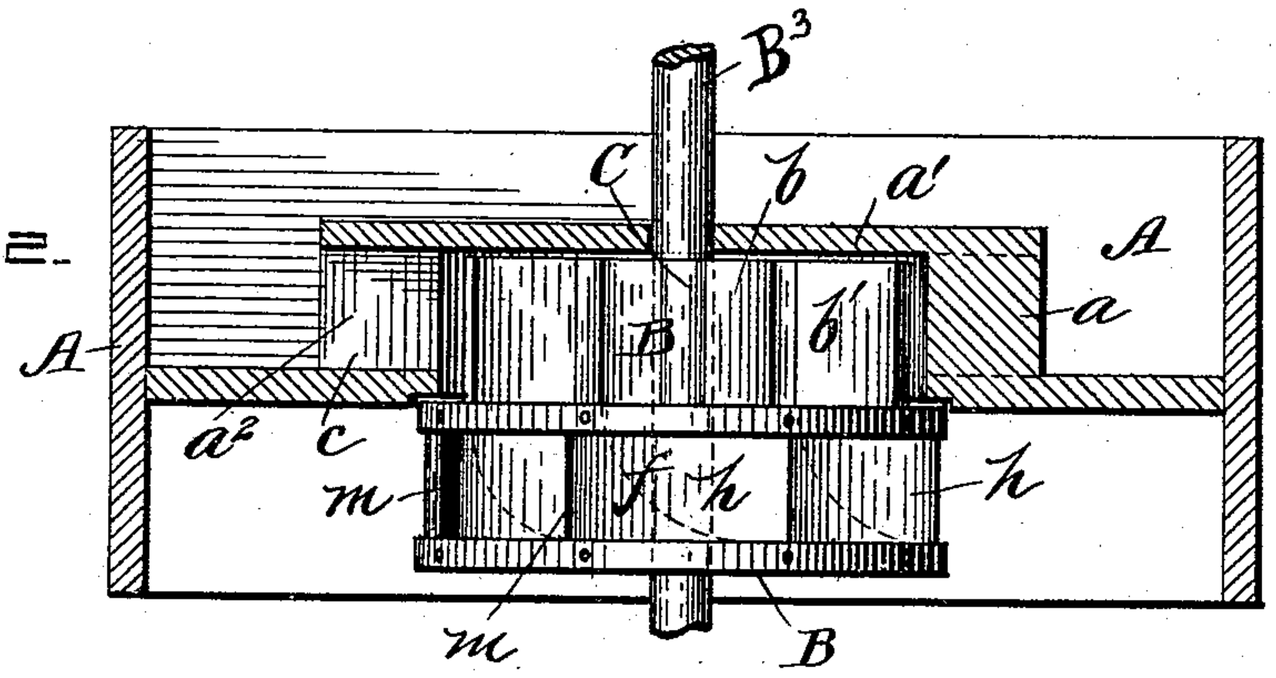
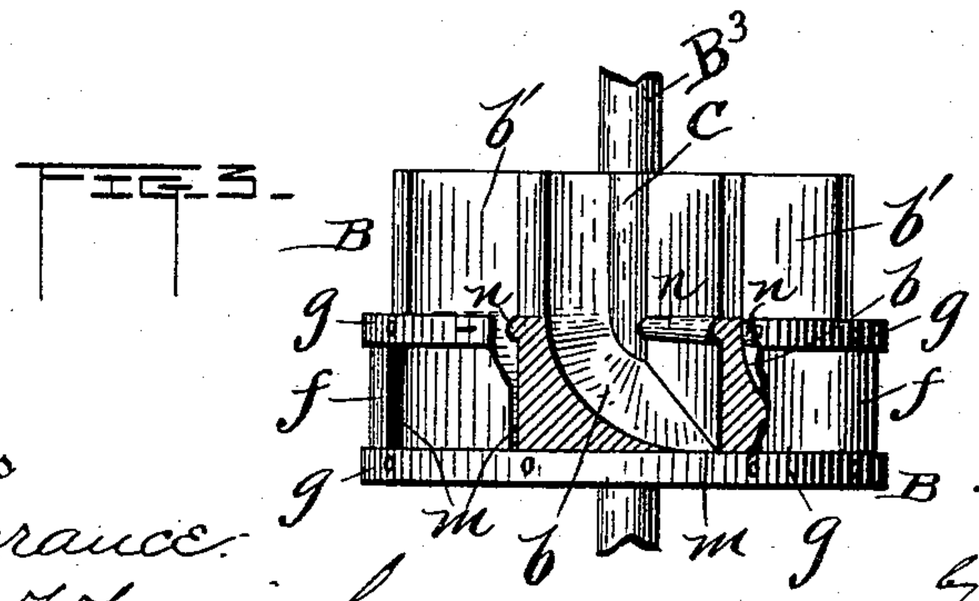


FIG. 3.



Witnesses
Severance.
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UNITED STATES PATENT OFFICE.

WILLIAM W. ROSSMAN, OF DETROIT, MINNESOTA, ASSIGNOR OF ONE-HALF TO CALVIN K. DAY, OF SAME PLACE.

TURBINE WATER-WHEEL.

SPECIFICATION forming part of Letters Patent No. 488,029, dated December 13, 1892.

Application filed May 25, 1892. Serial No. 434,257. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. ROSSMAN, a citizen of the United States, residing at Detroit city, in the county of Becker and State of Minnesota, 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 turbine water-wheels, and particularly to that type of wheel in which the water is both received and discharged at their periphery in a tangential direction; and it consists in certain novel constructions, combinations, and arrangement of parts, as will be hereinafter described and specifically claimed, whereby a wheel of great simplicity and strength is produced which possesses a powerful starting power which will run steadily and with a comparatively small amount of water and utilize the force of the water to the greatest advantage.

In the accompanying drawings, Figure 1 is a top view, partly in section, of a penstock and my improved water-wheel. Fig. 2 is a side elevation of the same, the penstock being shown in section; and Fig. 3 is a detail view of the wheel partly in section.

A in the drawings represents a stationary penstock of suitable shape and size, having a bottom and sides and provided with a central vertical passage for the insertion and revolution therein of the water-wheel B. Around and extending above the central opening a number of chutes a^2 corresponding to the number of buckets *b* in the wheel—say seven—are provided, the same being formed by placing in a circle at regular intervals segmental pieces *a*, having their ends beveled, as at *c c'*, so as to produce flaring entrances and cause the water to enter and strike the broad surfaces of the buckets near their outer termini, and thus secure an effective pressure of the water and obtain the leverage of the buckets to the greatest extent possible. The chutes are closed at top by a circular cap-plate *a'*, through which the shaft B^3 of the wheel extends, and at bottom by the bottom of the penstock. The wheel proper B consists of a closed bottom portion *d* and a cylindrical vertical portion *f*, firmly bound with strong bands *g g*. The cylindrical portion peripherally is formed in segments *h*, each segment resembling in horizontal section a concave convex lens, and the respective segments are set so that the outer termini of the segments are on a circle X and the inner termini on a circle X', the diameter of the circle X being much greater than that of the circle X'. By this construction the water in emerging from the wheel proper at its periphery will have a gliding free-and-easy movement and not retard the rotation of the wheel.

Between the hub C and the cylindrical portion *f* of the wheel proper and between the hub and chute portion of the penstock buckets *b b'* are constructed. The portions *b* of the buckets are curved, while the portions *b'* are straight up and down and radial. The curved portions have inclination downward and outward from the hub and from the top of the portion *f* and terminate at the base of the discharge-passages *m* in the periphery of the portion *f*. The backs of the buckets are straight for a much greater portion of their depth than are the fronts thereof, and on the said backs horizontal transverse ribs *n* are formed for the purpose of preventing the water which is projected against the fronts of the buckets crowding upward after it has begun to glide off upon the curved portions of the buckets. These ribs also strengthen the buckets.

It will be seen that the water on entering through the chutes exerts its force approximately tangentially or in a direct manner and at points of the buckets far away from the hub, and by this means great leverage is secured for turning the wheel. The water then descends and expends its remaining force, in combination with its gravity, upon the inclined portions of the buckets, and freely escapes through the openings in its periphery. Any tendency of the water to crowd back or rotate in the curved portions is prevented by the ribs, while most rapid and free escape is

afforded by the concave and convex surfaces of the segments opposite each other at each discharge.

What I claim as my invention is—

In a water-wheel in which the water is received and discharged at its periphery, a stationary penstock having outwardly-flaring tangential water-receiving chutes corresponding in number to the buckets of the wheel, each of which causes the water to strike a respective bucket near its outer upper edge on an approximately-parallel line to that in which the water enters the chutes, a wheel having buckets provided with vertical upper portions and downwardly and outwardly curving lower portions, and vertical concavo-convex peripheral discharge-passages at and above the termini of the curved portions of the buckets, substantially as described.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

WILLIAM W. ROSSMAN.

Witnesses:

CHARLES H. STURTEVANT,

ELBERT L. JENNINGS.