

(No Model.)

S. J. TUTTHILL.
ROTARY HYDRAULIC MOTOR.

No. 534,772.

Patented Feb. 26, 1895.

Fig. 1.

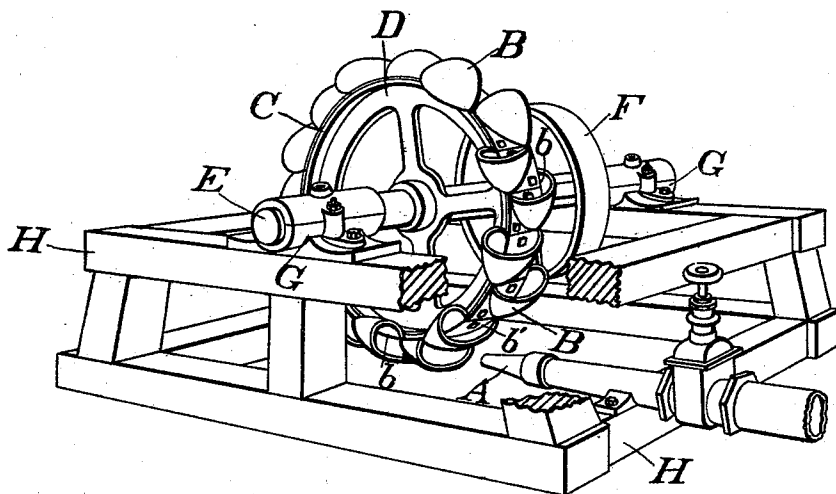


Fig. 2.

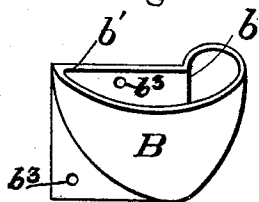
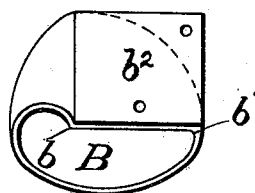


Fig. 3.



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ROTARY HYDRAULIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 534,772, dated February 26, 1895.

Application filed October 13, 1894. Serial No. 525,809. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN JAMES TUTTHILL, a citizen of the United States, residing at Ashland, in the county of Jackson and State of Oregon, have invented certain new and useful Improvements in Rotary Hydraulic Motors; and I do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in rotary hydraulic motors, and its object is the thorough transfer of working force from a jet of water moving with high velocity to a water wheel of this description, through the agency of a bucket of original design and the arrangement of a number thereof as herein specified and claimed.

It consists particularly in the individual shape of the buckets, which, each by its single flat side, is bolted upon the face of a wheel set vertically, in such manner as to be firm in place and to present to the jet a bucket-mouth, the edges of which may be thinned and rounded, extending quite across and alternately over and below the opposite edges of the wheel-face, thus preserving a wide opening through which the water, having given up its energy, as the buckets leave it may drop into the sluice beneath the motor. Such buckets are readily removed and replaced, and their size and that of the wheel and connections depends upon the pressure of fluid at hand.

In the accompanying drawings like letters represent like parts in the several views.

Figure 1 is an outline perspective of my device, with part of the framework broken away to exhibit the buckets in position. Fig. 2 is the right hand bucket and Fig. 3 the left hand bucket, the observer facing diagonally in the direction of the operating stream of water.

With its axis in the vertical plane dividing the wheel and face into halves, A is the nozzle terminating the service pipe by which the jet is directed upon the buckets, B. The easy curving walls and bottoms of said buck-

ets turn the stream gradually from its first course during such a period of its flow through them as will cause the resultant of the pressure due to the momentum of the water to be exerted in said central vertical plane of the wheel and face, in this way avoiding injurious lateral vibrations.

The desired number of buckets are made of any chosen material stamped or cast into the special form which constitutes the main feature of this invention.

The angles in the bucket-walls at b and b' are rounded on the inside of the buckets, but b is sharp on the exterior to fit for a distance the outer edges of the heavy band or tire of the wheel.

One side of the bucket is flat, b^2 , and slightly curved to follow the face of the wheel and this side continues into a triangular piece beyond the bottom of the bucket. Through the said flat side into the bucket and through the rearward triangular extension of the said flat side bolt holes, b^3 , are drilled, and to securely fasten the bucket screw-bolts or equivalents press the said flat side against the face of the wheel, C, in such position that the divergent planes of the angle at b closely embrace the outer edge of the tire of the wheel, preventing the displacement of the bucket by the repeated blows of the jet of water.

The curving sides of the buckets may be regarded as beginning at lines formed on the interior of the buckets by the apices of the plane angles at b and continuing a short distance at approximately right angles with the said flat side and in the direction of the hub of the wheel, then turning and with a curve of increasing radius bending outward and back to the plane angle at b' , best shown in Fig. 1. From this contour near the mouth the curved walls of the buckets bend in every direction toward the bottom and always approaching the flat side, b^2 , which is lessened somewhat in width by its incurved lateral boundary line at b' , and which turns at the back to meet the curved walls; so that a rear view of any bucket would show a narrow rounded and curved bottom with the curving walls expanding into a cross section at the mouth of the outline shown, Figs. 2 and 3.

The mouths of the buckets extend quite

across the wheel-face to take up the blow from the jet centrally, and the sharp bend of the curving walls toward the hub of the wheel continues the width of said mouths for the disposal of the retarded water particles. Moreover, these enlargements being placed alternately upon opposite sides over and below the edges of the wheel-face, still further aid such clearance. On all sides the jet is met and turned by easy curves, saving to useful work the force of otherwise repeated shocks to the motor, and from the rear, the narrow rounded bottom and expanding sides of my buckets offer to backward splashing water an inclined and curved surface against which its power for opposing effort is reduced to a minimum.

The mode of operation of the motor is usual and believed to appear sufficiently plain upon an inspection of the drawings making a part of this description.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a rotary hydraulic motor, a bucket having one side flat and slightly curved to fit the face of the wheel and provided with bolt holes, the remaining sides of the bucket being curved and forming by their meeting with the said flat side a plane angle upon the outside of the bucket adapted to abut against the wheel and to closely fit the edge of the wheel-face as shown and described for

the purpose of preventing the displacement of the bucket by the repeated blows of the jet as set forth.

2. In a rotary hydraulic motor, the combination of a delivery nozzle suitably directed and provided with a valve, a shaft revoluble at right angles to the axis of the said nozzle in bearings borne by a supporting frame, a wheel fixed upon the said shaft, buckets attached to the face of the said wheel, each bucket having one side flat and slightly curved to fit the face of the wheel and bolt holes through the flat side as shown, the remaining sides of each bucket being curved and starting in opposite directions from opposite edges of the said flat side, the said curving portion upon one side turning about and reversing its direction to meet the curved portion from the other side, the meeting of the said curved and flat portions forming at one side a plane angle on the exterior of the bucket adapted to abut against the wheel and to closely fit the edge of the wheel-face, the outwardly curved portions forming the said plane angles with the said flat sides being alternately arranged upon opposite sides of the wheel-face substantially as shown and described for the purposes set forth.

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Witnesses:

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