No. 839,243. PATENTED DEC. 25, 1906.

J. WILKINSON.

TURBINE BUCKET WHEEL.

APPLICATION FILED JUNE 4, 1906.

Fig. 1.

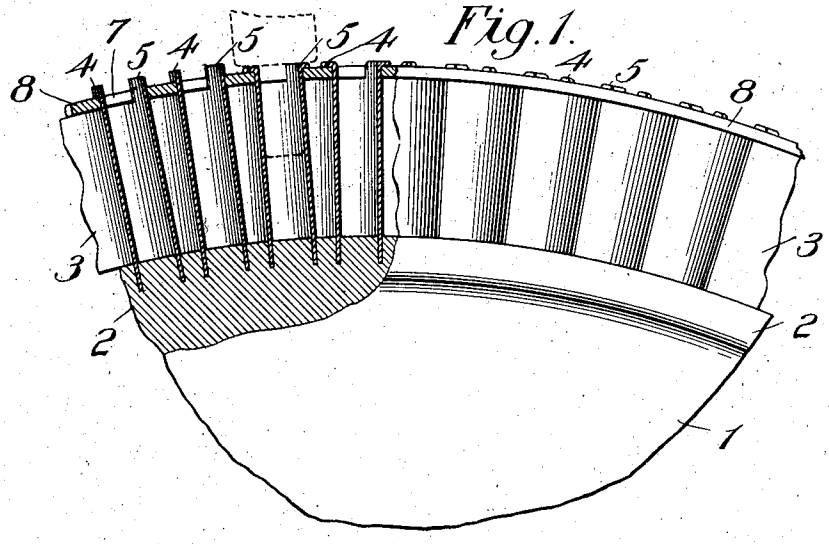


Fig. 2.

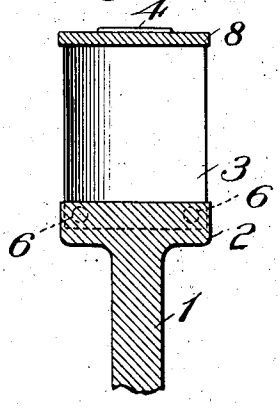


Fig. 3.

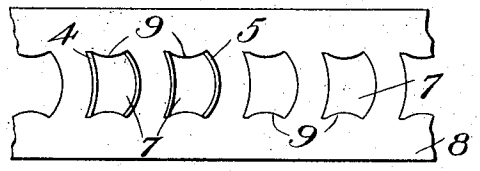


Fig. 4.

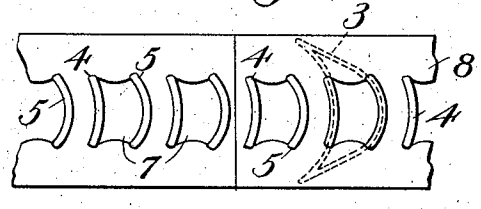


Fig. 5.

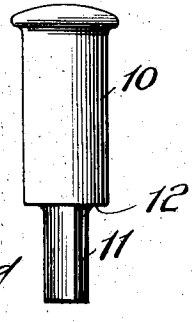


Fig. 6.



Witnesses

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UNITED STATES PATENT OFFICE.

JAMES WILKINSON, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO WILKINSON TURBINE COMPANY, A CORPORATION OF ALABAMA.

TURBINE BUCKET-WHEEL.

No. 839,243. Specification of Letters Patent. Patented Dec. 25, 1906.

Application filed June 4, 1906. Serial No. 320,114.

To all whom it may concern:

Be it known that I, JAMES WILKINSON, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented new and useful Improvements in Turbine Bucket-Wheels, of which the following is a specification.

My invention relates to an improvement in the manufacture of turbine bucket-wheels, its object being to produce at a small cost a light and durable bucket-wheel in which tubular buckets are used and cast-jointed to the wheel-rim in the manner described and claimed in other pending applications. A whole wheel or a rim portion only may be cast to the buckets, or segments of the wheel or rim may be cast-jointed to segmental rows of buckets.

My invention also contemplates the provision of a novel form of band for the other ends of the buckets which serves to brace and strengthen the tubular buckets against collapse while leaving their outer ends open to prevent the accumulation of water in the buckets due to condensation.

My invention further comprises the details of construction and arrangement of parts hereinafter more particularly specified and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a portion of the wheel broken away to show the buckets partly in section and partly in side elevation and illustrate the manner of gripping the outer band in place. Fig. 2 represents a partial sectional view through the rim of a bucket-wheel provided with my improved form of bucket. Fig. 3 is a top plan view of the band, showing the perforations therein before the bucket-lips have been turned. Fig. 4 is a similar view of the band with the bucket-lips bent into engagement therewith. Figs. 5 and 6 represent bottom and side views of the tool for turning over the bucket-lips to grip the band.

Similar reference-numerals refer to similar parts throughout the drawings.

As illustrated in its preferred form my invention comprises a wheel-web 1, having an integral rim 2, in which the inner ends of a ring of tubular buckets 3 are embedded. The buckets are formed for lightness and cheapness from thin steel tubing which is shaped to present the desired exterior cross-sectional contour, each bucket being provided at its outer end with a pair of curved integral lips 4 and 5 and at its inner end with any desired number of perforations, as 6, to give a positive lock to the cast-joint.

The lip 4 of each bucket constitutes a narrow extension of its concave or working face, while the lip 5, which is wider than 4, forms an extension of the bucket's convex face. These substantially similarly curved lips are adapted to pass through apertures 7 in a band 8, the apertures having concave and convex front and rear edges which correspond with the curve of the lips 5 and 4. The side edges 9 of these apertures are convex throughout the greater part of their length, as seen in Fig. 4. When the lips are inserted through the band and bent over, as seen in Fig. 5, the sides 9 serve to grip the lips and strengthen the buckets against collapse. This latter effect is further increased by the curved character of the lips and front and rear edges of the apertures. To turn the lips, I use the tool 10, (illustrated in Figs. 6 and 7,) inserting its end 11 through the band and well into the open end of the bucket. It makes a close fit with the bucket and band opening, as seen in Fig. 5. The shoulder 12 on the tool engages the lips and when struck spreads them over to grip the band, the end 11 holding the walls of the bucket from flexing or collapsing. This manner of banding the buckets leaves them open at their outer ends, thereby preventing the accumulation of water in them while running.

This construction provides an extremely light-weight bucket-wheel which may be cheaply constructed and which will provide ample strength for moderate-speed turbines.

What I claim is—

1. A turbine bucket-wheel comprising tubular buckets connected thereto, and a band which surrounds the ring of buckets and is connected to their outer ends which are left open.

2. A turbine bucket-wheel having a ring of tubular buckets connected thereto, and a band surrounding said buckets and connected to their outer ends, said band after being connected having openings therein opposite the open ends of the buckets.

3. A turbine bucket-wheel having a ring of tubular buckets connected thereto, a

curved lip at the outer end of each bucket formed by an extension of one of its curved faces, a band having curved slots therein to receive said lips which are adapted to be bent over into engagement with said band for the purposes described.

4. A turbine bucket-wheel, a plurality of hollow tubular buckets connected thereto, an apertured band engaging the outer ends of said buckets, projections integral with the concave and convex faces of each of said buckets which project through said apertures in the band and are bent into engagement therewith.

5. A turbine bucket-wheel comprising a wheel-blank, tubular buckets connected to the periphery thereof, and an outer band having concavo-convex openings therein adapted to receive and grip curved lips integral with the outer ends of said buckets.

6. The combination with a bucket-wheel provided with a ring of tubular buckets, of a band surrounding said buckets and provided with openings having curved and rear edges and inwardly-projecting side edges, and curved projections on said buckets which engage the curved edges of said openings and are bent to grip said band, substantially as described.

7. The combination with a turbine bucket-wheel provided with a ring of tubular concavo-convex buckets, of a bucket-band provided with equidistant apertures, each aperture having one convex and three concave edges, and projections on the buckets which pass through said apertures and are gripped to said band, substantially as described.

8. A bucket-wheel comprising tubular buckets having curved lips integral with their front and rear faces, a band having apertures 7 therein to receive said lips which are adapted to be bent over into engagement with said band.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JAMES WILKINSON.

Witnesses:

JAMES H. NOLAN,

JOHN F. GRANDFIELD.