J. Y. DAHLSTRAND.

TURBINE BUCKET BLADE AND METHOD OF MAKING THE SAME.

APPLICATION FILED NOV. 14, 1917.

1,307,082.

Patented June 17, 1919.

Fig. 1.

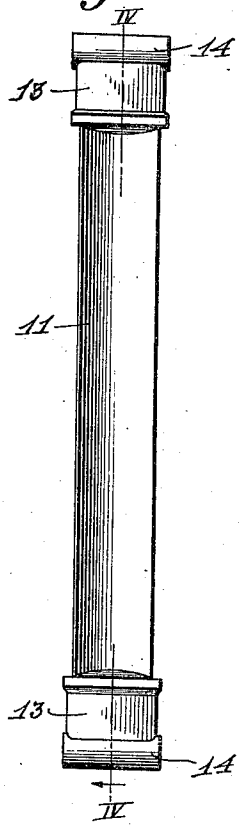


Fig. 2

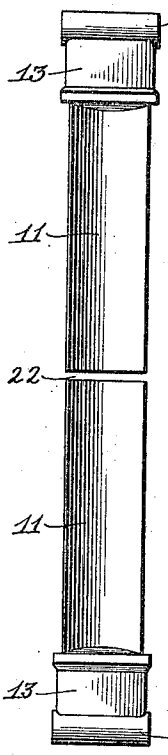


Fig. 3.

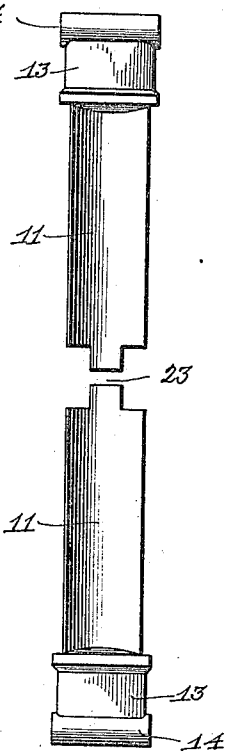


Fig. 4.

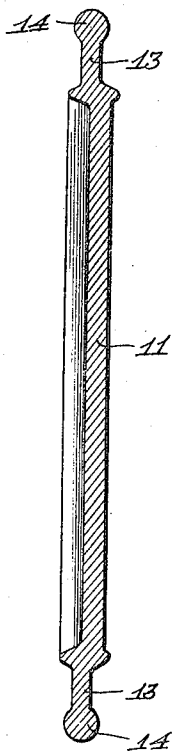


Fig. 5.

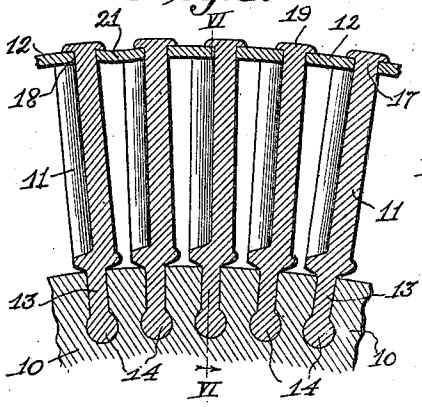


Fig. 6.

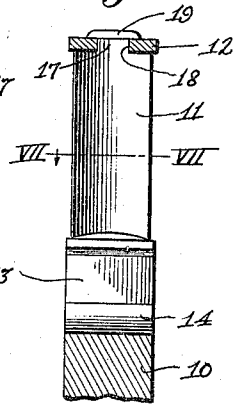


Fig. 7.

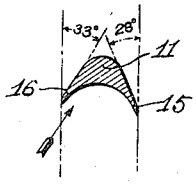
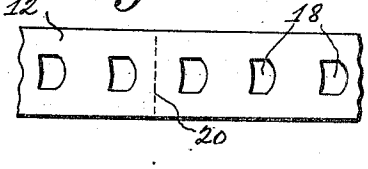


Fig. 8.



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UNITED STATES PATENT OFFICE.

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TURBINE-BUCKET BLADE AND METHOD OF MAKING THE SAME.

1,307,082. Specification of Letters Patent. Patented June 17, 1919.

Application filed November 14, 1917. Serial No. 201,966.

To all whom it may concern:

Be it known that I, JOSEF Y. DAHLSTRAND, a citizen of Sweden, residing at Wellsville, in the county of Allegany and State of New York, have invented certain new and useful Improvements in Turbine-Bucket Blades and Methods of Making the Same.

This invention relates to new and useful improvements in turbines and more particularly to the construction of the blades used either in connection with the rotor or stator element of a steam turbine.

The objects of this invention are to provide an improved method of making bucket blades whereby the latter may be produced with uniformity, accuracy and at a comparatively low cost.

My invention is illustrated in the accompanying drawings and will be hereinafter more fully and clearly described, and particularly pointed out in the appended claims.

Referring to the sheet of drawings in which similar reference characters indicate the same parts in the several figures;

Figure 1 is a side elevation of an article comprising two turbine buckets or blades and made according to the invention;

Fig. 2 is a similar view illustrating one method of separating the buckets;

Fig. 3 is another similar view, illustrating a different method of separating the buckets;

Fig. 4 is a longitudinal sectional view on the line IV—IV of Fig. 1;

Fig. 5 is a transverse sectional view of a fragment of a turbine wheel or rotor member provided with buckets made according to my invention;

Fig. 6 is a sectional view on the line VI—VI of Fig. 5;

Fig. 7 is a sectional view on the line VII—VII of Fig. 6; and

Fig. 8 a development of a fragment of the shroud ring appearing in Figs. 5 and 6.

Referring to Figs. 5 to 8, the numeral 10 indicates the central disk of a turbine wheel, the buckets being indicated at 11, and the shroud ring at 12. The base of each of the buckets is provided with a tab 13 which fits a slot in the periphery of the wheel 10 and serves as means for securing the bucket to the wheel. In the form of bucket illustrated, the tabs 13 are provided with bulbs 14, but it will be understood that the invention is in nowise restricted to this particular detail. In Fig. 7 a cross-section of the working length of the bucket is shown and it will be noted that the discharge side 15 is extended more than the intake side 16 and the angles of the sides are respectively, 28° and 33°, as indicated in Fig. 7. To provide for either the clockwise or counter clockwise direction of rotation, as seen when looking in the direction of flow of the motive fluid, it is therefore necessary to have right and left hand buckets. In constructing a turbine for clockwise rotation, one type of bucket is used and for counter clockwise rotation, the other type of bucket is used.

The shroud ring 12 may be secured to the ends of the buckets by various methods, one of which is shown in Figs. 5 and 6, consists in providing each bucket with a tenon 17 at the outer end and have these tenons project through suitable perforations 18 in the ring 12. The tenons 17 are riveted over on the outer surface of the ring 12 as indicated at 19. The ring 12 may be formed from a strip of suitable length, the ends of which may be welded on a line 20, see Fig. 8. Unequal expansion of the buckets and shroud ring may be compensated for by means of bends 21 in the ring, as shown in Fig. 5.

The buckets are, according to my invention, formed in pairs as indicated in Fig. 1, wherein the bases 13 of the buckets are at the ends of the blank or article from which the buckets are cut. This blank is one solid piece of metal in which a right hand bucket and a left hand bucket are arranged end to end with their outer ends united. This blank may be die-formed in a manner that is well understood by those skilled in the art of die-making.

After the blank has been formed, the next operation is to cut it in two, and the manner of doing this will be determined by the method of attachment of the buckets or blades to the shroud ring 12. If the ends of the buckets are to be welded to the shroud ring, a plain saw cut such as is indicated at 22, in Fig. 2, will answer. The material removed from the blank must, of course, be of such amount as to provide the proper length of buckets. If the buckets are to be attached to the shroud ring as shown in Figs. 5 and 6, they should be cut as indicated at 23, in Fig. 3, either by sawing or by a punching operation.

A very material advantage of this method of making buckets is that the blank, as shown in Fig. 1, is suitable for making buckets of different length, and the blanks may be made

in large quantities and stored away for use as needed. The blanks are of symmetrical form, the ends being alike, and this is of advantage on account of permitting systematic and compact storage of the blanks without liability of injury to the edges.

What I claim is:

1. The herein-described method of making turbine buckets which consists in forming an oblong blank comprising a right hand bucket and a left hand bucket having their similar and outer ends integrally united at the center section of the blank, and then cutting the blank in two normal to its length and through the integral buckets at their united ends.

2. An article consisting of a blank having two turbine buckets in end to end arrangement and with the peripheral ends of the buckets integrally united at the center section of the blank.

3. An article consisting of a blank having a right hand turbine bucket and a left hand turbine bucket in end to end arrangement and with the bases of the buckets at the ends of the blank and the portions of the bucket forming the peripheral ends of said buckets integrally united at the center section of the blank.

In testimony whereof I affix my signature.

JOSEF Y. DAHLSTRAND.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."