H. J. HANZLIK.

SHROUD AND BUCKET.

APPLICATION FILED FEB. 2, 1915.

1,152,812. Patented Sept. 7, 1915.

Fig 1.

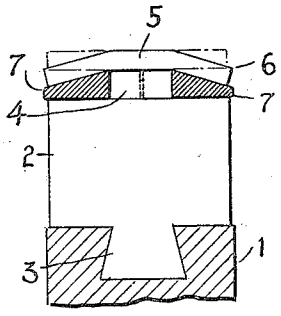


Fig 3.

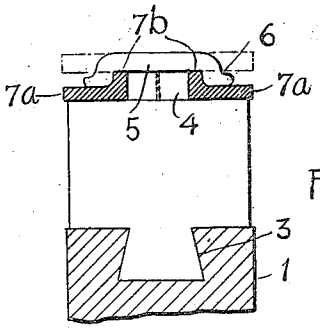


Fig 2.

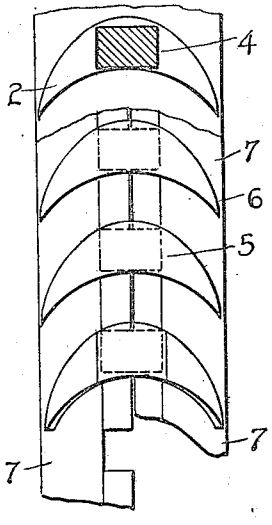


Fig 4.

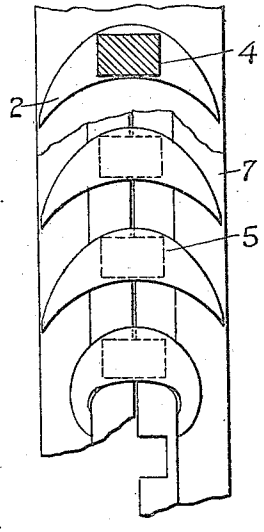
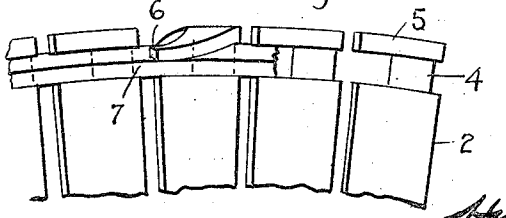


Fig 5.



Attest:

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UNITED STATES PATENT OFFICE.

HENRY J. HANZLIK, OF TRENTON, NEW JERSEY, ASSIGNOR TO DE LAVAL STEAM TURBINE COMPANY, OF TRENTON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SHROUD AND BUCKET.

1,152,812. Specification of Letters Patent. Patented Sept. 7, 1915.

Application filed February 2, 1915. Serial No. 5,630.

To all whom it may concern:

Be it known that I, HENRY J. HANZLIK, a citizen of the United States of America, and a resident of Trenton, in the county of Mercer and State of New Jersey, have invented certain new and useful Improvements in Shrouds and Buckets, of which the following is a specification.

My invention relates to improvements in shrouds and buckets, and is particularly intended for use in elastic fluid turbines, though not necessarily restricted to such use.

My invention comprises improved means for connecting the shrouds and buckets.

The object of my invention is to improve the methods of and means employed for securing shroud rings to the buckets of rotors and stators, particularly rotors and stators of elastic fluid turbines, and to provide an improved construction whereby the shroud rings may be attached and, when required, detached, more readily.

I will now proceed to describe my invention with reference to the accompanying drawings, and will then point out the novel features in claims.

In said drawings: Figure 1 shows a fragmentary section of a bucket carrier and shows an elevation of a bucket carried thereby, together with a section of my improved shroud ring in place on such bucket. Fig. 2 shows a top view of a portion of such a carrier with buckets and shroud rings thereon, one of the buckets being sectioned horizontally above the shroud ring. Fig. 3 is a view similar to Fig. 1, but illustrating an alternative construction. Fig. 4 is a view similar to Fig. 2, but showing the construction of Fig. 3. Fig. 5 is a fragmentary side elevation of a portion of a bucket carrier provided with buckets and shroud rings, the latter held in place according to the construction illustrated in Figs. 1 and 2.

According to my invention the shroud ring or band is formed in a plurality of sections, each section provided with means, such for example as a beveled upper surface, or a projection or flange on its upper surface, for lateral engagement by securing means, such for example, as projecting ears, formed on the buckets. By lateral engagement I mean such engagement as tends to hold the shroud band sections against lateral displacement.

Referring first to Figs. 1, 2 and 5, 1 designates the bucket carrier, and 2, 2 buckets carried thereby. The particular buckets shown are formed from "extruded" rods, and therefore are of uniform section; though this is immaterial to the present invention. Each bucket is secured to the carrier 1 by means of a dove-tail 3 fitting within a corresponding groove in the carrier; and, near its outer end, each bucket is provided with a neck portion 4, beyond which neck portion is a head 5 having projecting ears 6. In practice, the neck 4 is formed by cutting into the sides of the bucket; and until after the shroud ring is put in place, the ears 6 occupy the positions indicated in dot and dash lines in Fig. 1.

The shroud ring is formed in two sections, 7, 7 notched to embrace the necks 4 of the buckets, the notched edges of the two sections 7 being in abutting relation. After the two shroud sections 7 have been set in place the bucket ears 6 are bent down over the beveled tops of the shroud sections 7 as indicated in full lines in Fig. 1, and as indicated in Fig. 5; and it will be clear that, because of the bevel tops of the shroud section 7, the ears 6, when so bent down, hold the shroud sections in place firmly. It is easy to make the ears 6 of sufficient thickness and stiffness so that they will hold the shroud rings in place under any stress to which those shroud rings may be subjected in practice. It will also be evident that it is easy to bend the ears 6 backward or upward, when required, and thereby to loosen the shroud ring sections so that they may be removed.

In the alternative construction illustrated in Figs. 3 and 4, the shroud ring sections, there designated by numerals 7^a, are of approximate L-section, instead of having beveled tops, as in the construction illustrated in Figs. 1 and 2; that is to say, the shroud rings 7^a of Figs. 3 and 4 have upwardly projecting flanges 7^b; and in securing these shroud rings in place the ears 6 of the buckets are pressed downwardly and forwardly, as indicated in Fig. 3 and as indicated at the bottom of Fig. 4. It will be obvious that it is easy to bend back these ears 6 when it is desired to detach the shroud ring sections.

The two constructions described constitute very simple constructions whereby the shroud rings are attached very firmly to the buckets and nevertheless may be removed

very easily when desired; and the attachment of the shroud rings to the buckets may be performed very rapidly and easily and by relatively unskilled labor.

What I claim is:—

1. The combination with a bucket carrier, and buckets thereon provided with necks and with projecting ears beyond such necks, of a sectional shroud band comprising a plurality of sections notched to engage the necks of the buckets and provided with means adapted for engagement by said ears, the said bucket ears being bent down upon such shroud band sections and thereby engaging the latter and holding them in place.

2. The combination with a bucket carrier, and buckets thereon provided with necks and with projecting ears beyond such necks, of a sectional shroud band comprising a plurality of sections notched to engage the necks of the buckets and formed on their upper sides for lateral engagement by said ears, the said bucket ears having lateral engagement with said shroud band sections.

3. The combination with a bucket carrier, and buckets thereon, of a sectional shroud band comprising a plurality of sections provided with means adapted for lateral engagement by portions of said buckets for the holding of such shroud band sections in place, said buckets comprising means having lateral engagement with such engaging portions of the shroud band sections.

4. The combination with a bucket carrier, and buckets thereon provided with projecting ears, of a sectional shroud band comprising a plurality of sections mounted on said buckets and having beveled upper surfaces, the said ears of said buckets being bent into lateral engagement with said shroud band sections.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

HENRY J. HANZLIK.

Witnesses:

A. PETERSON,

C. R. WALLER.