No. 746,163. PATENTED DEC. 8, 1903.

H. G. REIST.

DETACHABLE BUCKET FOR TURBINES.

APPLICATION FILED MAR. 24, 1903.

NO MODEL.

Fig. 1.

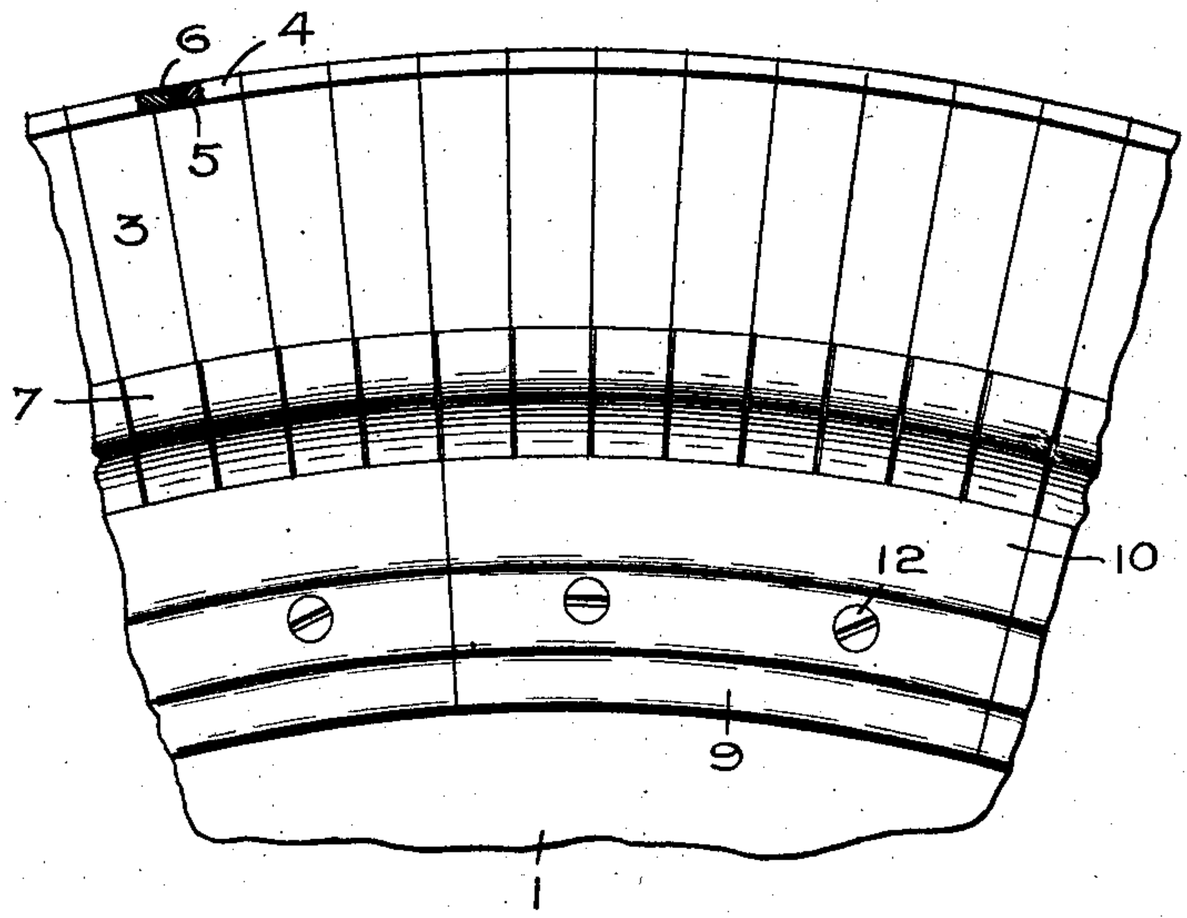
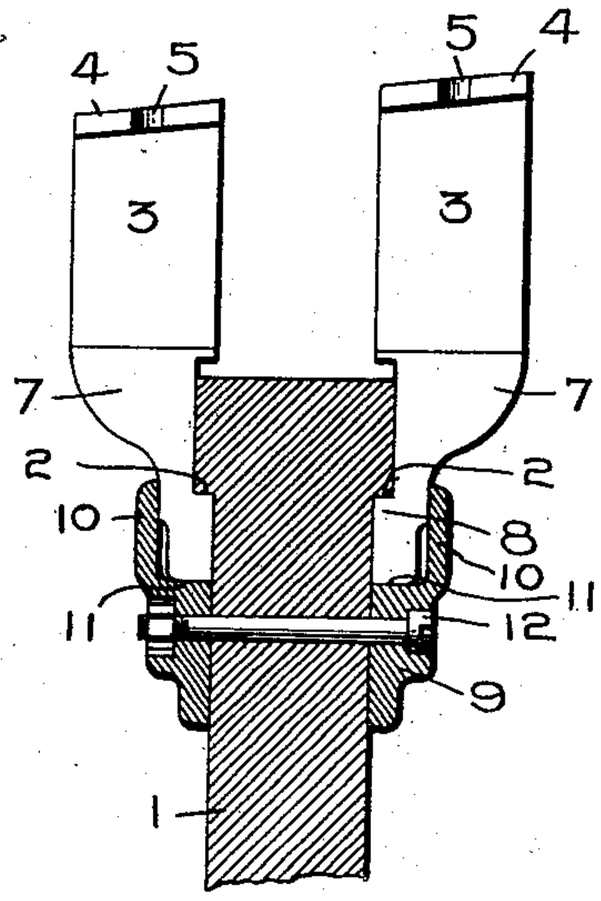


Fig. 2.



Witnesses:
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No. 746,163. Patented December 8, 1903.

UNITED STATES PATENT OFFICE.

HENRY G. REIST, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

DETACHABLE BUCKET FOR TURBINES.

SPECIFICATION forming part of Letters Patent No. 746,163, dated December 8, 1903.

Application filed March 24, 1903. Serial No. 149,247. (No model.)

To all whom it may concern:

Be it known that I, HENRY G. REIST, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Detachable Buckets for Turbines, of which the following is a specification.

The present invention relates to detachable buckets for turbines, and has for its object to provide a bucket which is simple in construction and is capable of withstanding the enormous centrifugal strains to which it may be subjected and at the same time is readily attached to or detached from its wheel or support.

For a consideration of what I believe to be novel in my invention attention is called to the description and claims appended thereto.

In the accompanying drawings, which represent one embodiment of my invention, Figure 1 is a partial view in elevation of a bucket-wheel, and Fig. 2 is an axial section of the same.

1 represents a wheel or support which is provided at or near its periphery with shoulders 2, formed on opposite sides, with which the detachable buckets engage. These shoulders extend circumferentially around the wheel or support, and by locating the shoulders at some little distance from the periphery they can be made strong enough to resist the centrifugal strains to which they are subjected.

I prefer to form the buckets 3 out of drop-forgings; but for certain classes of work they can be cast. Formed integral with each of the buckets is a cover 4, which is provided with a notch 5 and a projection 6. The projection on one bucket is arranged to enter the notch in the adjacent bucket, this arrangement being useful in alining and preserving the alinement of the several buckets. Each bucket is provided with a tapered shank 7 of suitable shape, which extends parallel with and on one side of the wheel. Each of the shanks is provided with a hook-like projection 8, that engages with a shoulder 2, formed on the disk or support 1. The projection 8 is made to contain considerable metal, so as to resist the centrifugal strain to which the bucket is subjected. The buckets are retained in place by clamps 9, which are L-shaped in cross-section, as is indicated in Fig. 2. These clamps can with advantage be made in the form of a ring and afterward split into sections, as is indicated in Fig. 1. For certain wheels the clamps can be made in a single piece, if desired, and in other wheels each bucket can be provided with its own clamp. The inner surface of the clamp where it engages with the face of the disk has considerable area, so that it may be firmly seated. Extending parallel with the disk and formed integral with the clamp is an extension 10, that engages with the bucket at a point opposite the disk-shoulder 2. The buckets are prevented from moving outward in a radial direction by the shoulder 2 and inward by the surface 11 on the clamp which engages with the inner end of the bucket-shank.

In mounting the buckets on the disk or other support they are mounted in place, as shown in Fig. 1, after which the clamps 9 are applied and retained by the bolts 12, which pass through both of the clamps and also through the web of the disk or support. If it becomes necessary to remove one or more of the buckets, the retaining-bolts 12 of one of the clamps are removed, after which the bucket is moved inward until the projection 6 is disengaged from the notch 5, after which the bucket as a whole can be removed and a new one substituted and the clamp 9 replaced. The space between the bucket-shanks permits one bucket to be moved independently of the other.

My construction is particularly applicable to wheels having a double row of buckets, with a space between the rows for the intermediates, because it enables me to reduce the amount of stock in the wheel to a minimum. It also enables me to make the shanks of substantial size and capable of resisting the heavy strains to which the wheels are subjected. When the clamping devices are situated on the sides of the wheel, there is considerable economy in space, and at the same time the clamp can be made as strong as is necessary.

In accordance with the provisions of the Patent statutes I have described the princi-

ple of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out in other ways.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a turbine, the combination of a wheel or support having a shoulder formed on one side and near its periphery, detachable buckets having shoulders that interlock with the shoulder on the side of the wheel or support, detachable clamps which hold the buckets in engagement with the wheel or support, and means for securing the clamps in place.

2. In a turbine, the combination of a wheel or support having a shoulder formed on one side and near its periphery, detachable buckets having shoulders that interlock with the shoulder on the wheel or support, detachable clamps which hold the bucket in engagement with the wheel or support, and axially-extending bolts that pass through the clamps into the wheel or support.

3. In a turbine, the combination of a disk or support having shoulders formed on opposite sides thereof, a double row of detachable buckets having shoulders which engage with the shoulders on the disk or support, detachable clamps which engage with the buckets and also with the sides of the disk or support, and bolts which pass through the clamps and into the disk.

In witness whereof I have hereunto set my hand this 23d day of March, 1903.

HENRY G. REIST.

Witnesses:

BENJAMIN B. HULL,

HELEN ORFORD.