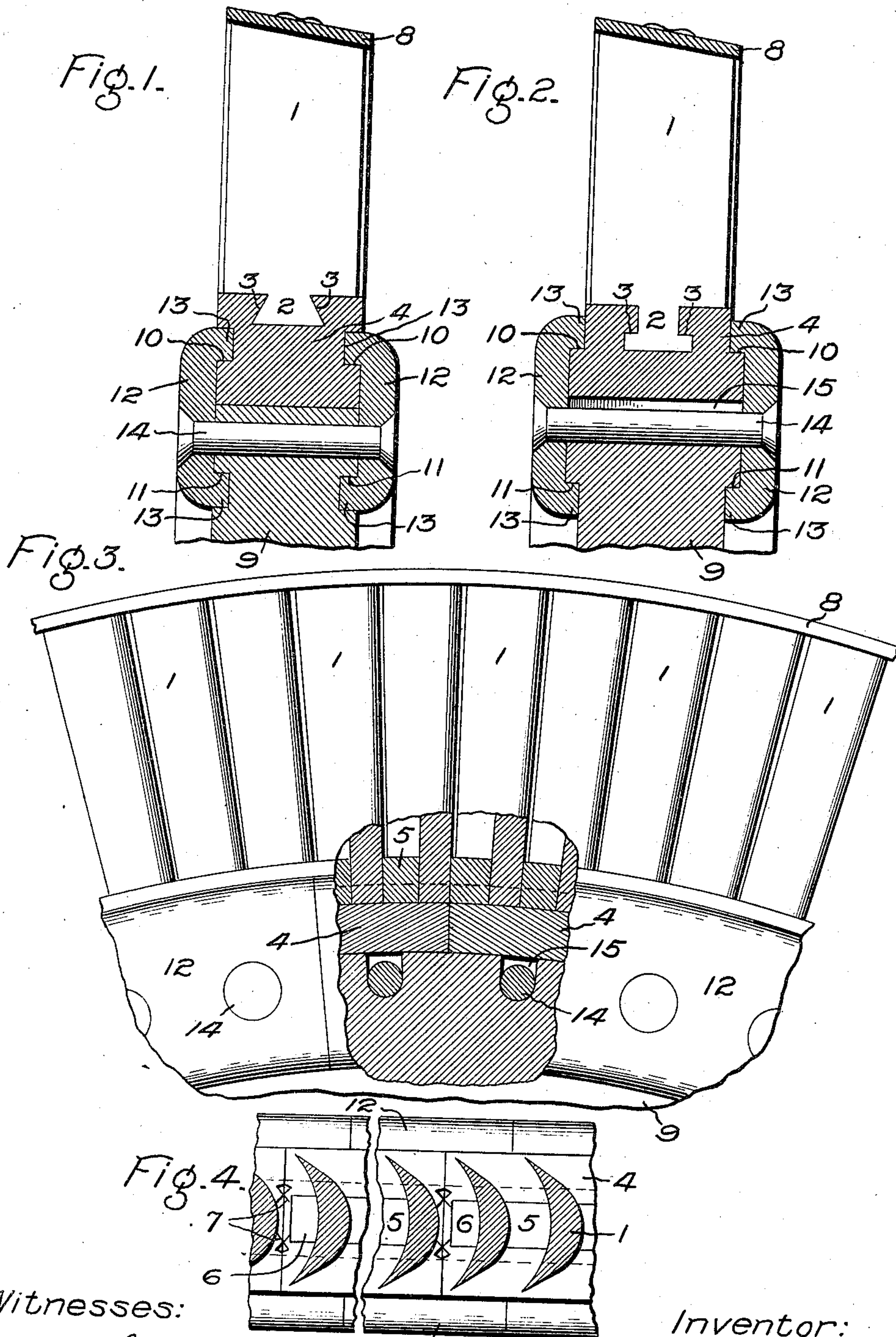


No. 876,971.

PATENTED JAN. 21, 1908.

O. JUNGREN.  
BUCKET SECURING MEANS FOR TURBINES.

APPLICATION FILED JULY 25, 1906.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## BUCKET-SECURING MEANS FOR TURBINES.

No. 876,971.

Specification of Letters Patent.

Patented Jan. 21, 1908.

Application filed July 25, 1906. Serial No. 327,597.

*To all whom it may concern:*

Be it known that I, OSCAR JUNGREN, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Bucket-Securing Means for Elastic-Fluid Turbines, of which the following is a specification.

This invention relates to elastic fluid turbines, and especially to the mode of securing separately formed buckets to the bucket wheel.

In carrying out my invention, I provide separately formed buckets, preferably made of extruded metal cut to the proper lengths and provided with shanks having suitable shoulders to engage in undercut grooves formed in bases or other supports. It is preferred to make these bases in segments and secure them to the rim of the wheel; each segment carrying its set of buckets, suitably held apart by spacing blocks, and secured by fastening the end blocks. On the wheel and on the base segments are shoulders which co-operate with clamping rings suitably secured to the wheel.

The details of construction and the features of novelty in my invention will be hereinafter set forth, and particularly pointed out in the appended claims.

In the accompanying drawing, Figure 1 is a radial cross-section of a portion of a bucket wheel, base segment and clamping rings; Fig. 2 is a similar view of a modified construction; Fig. 3 is a side elevation, partly in section; and Fig. 4 is a sectional plan or edge view.

The buckets 1 are crescent or lune-shaped in cross-section, being formed preferably of extruded metal, cut into suitable lengths. At one end is provided a shank 2 having shoulders 3 to engage in undercut grooves formed longitudinally in the base-segments or other supports 4. Between the shanks 2 are interposed spacing blocks 5, and filling blocks 6 are put at the ends, so that the buckets are firmly held in place when the end blocks are secured. This is preferably accomplished by riveting down the metal of the base around the ends of the groove, so that lips 7 overlap the end blocks and force all the parts into close and rigid juxtaposition. A cover 8 is secured to the outer ends of the buckets. The base-segments are fitted to the rim of the wheel 9, whose per-

iphery is preferably smooth as shown. In order to secure the segments in place, I provide on each side of said segments a shoulder 10, the shoulders on all the segments being in line and concentric with the axis of the wheel. Near the rim of the wheel on each side is formed a shoulder 11 concentric with the axis of the wheel.

In Fig. 1, the shoulders 10, 11 are formed by cutting grooves in the base-segments and the wheel; while in Fig. 2 the shoulders are formed by deep narrow flanges on these two parts. Two clamping rings 12 have flanges 13 which engage with the shoulders 10, 11 and are retained in place by rivets 14 passing through the rings and passages in the wheel, and having their heads countersunk flush with the outer face of said rings. The passages in the wheel may be holes, as shown in Fig. 1, or notches 15 in the rim of the wheel, as shown in Figs. 2 and 3, as may be found most desirable. The clamping rings may be continuous; or made in segments, as indicated in Figs. 3 and 4. The segmental construction is preferable for large wheels, and also facilitates removal when repairs are necessary.

It will be seen that by having the shanks 2 substantially in the middle of the base segments, and placing a clamping ring on each side of the wheel the centrifugal strains are evenly distributed and cannot tend to warp the buckets out of their plane of revolution. The construction is simple but strong: the parts are all held rigidly together, and yet any defective bucket can be readily removed without dismantling the whole wheel.

In accordance with the provisions of the patent statutes, I have described the principle 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 by other means.

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

1. In an elastic fluid turbine, the combination with a wheel, of base segments fitted thereto, buckets anchored in the segments, shoulders on each side of said wheel and segments, flanged rings engaging with said shoulders, and rivets passing through said rings and wheel.

2. In an elastic fluid turbine, the combina-



tion with a wheel having a concentric shoulder on each side and transverse passages, of base-segments fitted to the rim of said wheel and provided with shoulders concentric there-  
5 with, separately formed buckets secured in said segments, flanged clamping rings engaging with said shoulders, and rivets passing through said rings and the passages in said wheel.  
10 3. In an elastic fluid turbine, the combination with a wheel having a smooth periphery and concentric shoulders on its sides, of base segments fitted to said periphery, provided with longitudinal undercut grooves and hav-

ing concentric shoulders on each side, separately formed buckets having shanks engaging in said grooves, spacing blocks between them, segmental clamping rings having flanges engaging with said shoulders on the base segments and wheel, and rivets passing 20 through said rings and wheel.

In witness whereof I have hereunto set my hand this 23d day of July, 1906.

OSCAR JUNGREN.

Witnesses:

BENJAMIN B. HULL,  
FRANK J. DORE.