C. S. RICE.

ELASTIC FLUID TURBINE.

APPLICATION FILED AUG. 30, 1919.

1,415,266. **Patented May 9, 1922.**

Fig. 1.

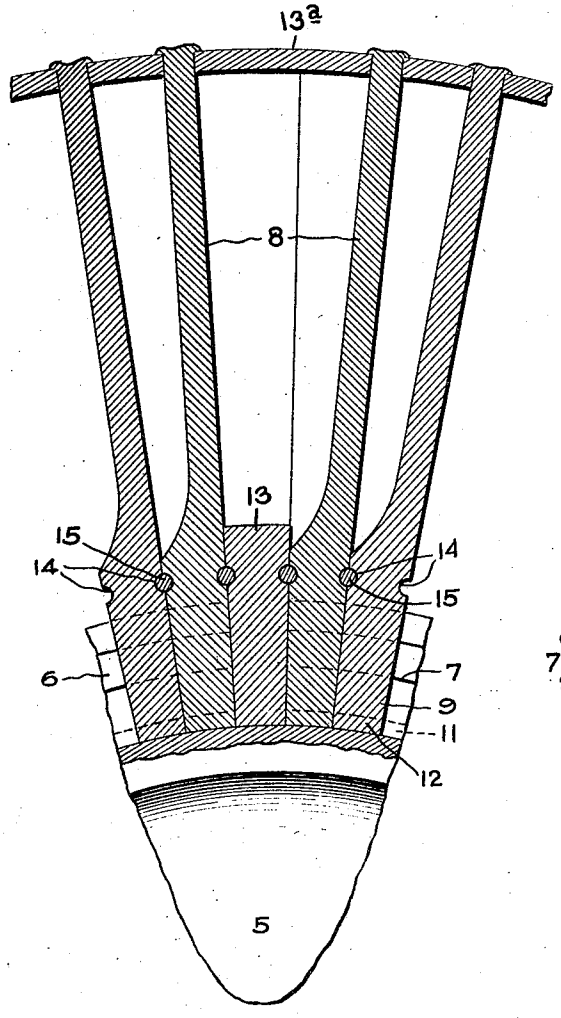
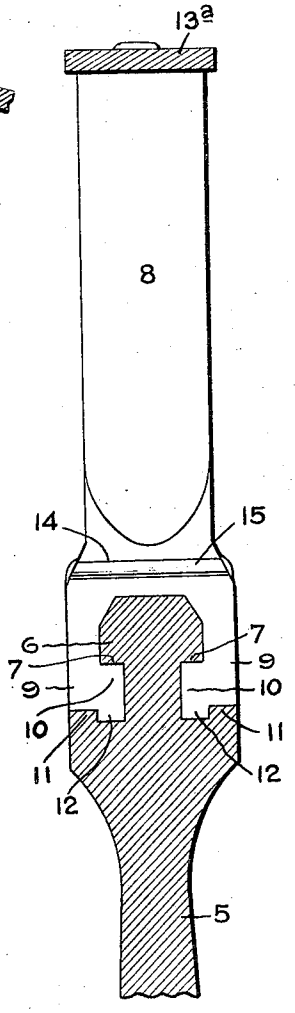


Fig. 2.



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UNITED STATES PATENT OFFICE.

CHESTER S. RICE, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELASTIC-FLUID TURBINE.

1,415,266. Specification of Letters Patent. Patented May 9, 1922.

Application filed August 30, 1919. Serial No. 320,759.

To all whom it may concern:

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

The present invention relates to elastic fluid turbines and has for its object to provide an improved structure and arrangement for fastening the buckets or vane rings on the bucket carrying member or wheel.

For a consideration of what I believe to be novel and my invention, attention is directed to the accompanying specification and the claims appended thereto.

In the drawing, Fig. 1 is a side elevation partly in section of a part of a turbine wheel embodying my invention, and Fig. 2 is a sectional view at right angles with Fig. 1.

Referring to the drawing, the bucket carrying member is illustrated as being a wheel comprising a web 5 and a rim 6, the rim being undercut on opposite sides to form annular shoulders 7. Mounted on rim 6 is a ring of turbine buckets 8, the same being provided with slots in their bases forming furcations or legs 9 which straddle rim 6 and have projections 10 fitting under shoulders 7. The rim of the wheel is also provided with holding rings 11, behind which fit annular projections 12 on the bottoms of furcations or legs 9. The purpose of rings 11 and projections 12 is to prevent the furcations or legs 9 from spreading latterly.

In Fig. 1, 13 is a filling piece which is used to close the filling slot, as is well understood, and 13^a is the bucket cover.

The arrangement just described forms what is termed an inverted dove-tail type of bucket fastening means and so far as my invention is concerned may be taken as typical of any type of fastening means.

It will be noted that the bases of the buckets are in contact with each other just beyond the rim of the wheel and, according to my invention, I provide at such points between adjacent bucket holes or openings 14, which extend transversely of the buckets and are formed partly in one bucket base and partly in the adjacent bucket base. Located in holes 14 are pins 15. The holes 14 are preferably formed after the buckets have been assembled on the wheel and pins 15 are of such diameter that they make a tight or drive fit with the holes 14. If desired, a tapered pin may be used so it will firmly wedge in hole 14 to lock the bucket bases together. The pins 15 may be slightly shorter than the length of the holes and after being put into place may be fastened therein by peening over the edges of the holes; or the pins may be longer than the length of the holes and riveted on the outside. In the present instance the latter arrangement is shown.

The pins 15 form in substance a supplemental holding means for the buckets, being a holding means in addition to that formed by the inter-engaging dove-tail connections, and in case a leg or the legs of a bucket should break, the bucket will still be held in place by the adjacent pins 15.

It will be noted that the holes 14 are formed beyond the periphery of the bucket carrying member 5 which is a point where the bucket bases are comparatively thick and have ample strength. By this arrangement the formation of the holes 14 does not weaken or diminish the strength of the buckets as a whole.

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 combination, a bucket-carrying member, a ring of buckets having their bases fixed thereto, the bases of the buckets being in engagement with each other just beyond the periphery of the carrying member at which points said bases are provided with holes extending transversely of the member, each hole being formed partly in one bucket base and partly in the adjacent bucket base, and pins located in said holes making a tight fit therewith, said pins forming a supplemental holding means for the ring of buckets.

2. In combination, a bucket carrying member, a ring of buckets thereon, the bases of such buckets being in engagement with

each other just beyond the periphery of said member, and pins located between adjacent bucket bases at the points where they are in engagement, said pins forming a supplemental holding means for maintaining the ring of buckets in place.

3. In combination, a wheel having a rim, a ring of buckets, said ring of buckets being fastened to the rim by dove-tail connections, the bases of adjacent buckets being in engagement with each other just beyond the periphery of the wheel at which points said bases are provided with holes extending transversely of the wheel each hole being formed partly in one bucket base and partly in the adjacent bucket base, and pins located in said holes and making a tight fit therewith, said pins forming a supplemental holding means for the ring of buckets.

In witness whereof, I have hereunto set my hand this 29th day of August, 1919.

CHESTER. S. RICE.