

C. STEENSTRUP.
ELASTIC FLUID TURBINE.
APPLICATION FILED NOV. 9, 1917.

1,270,232.

Patented June 18, 1918.

FIG. 1.

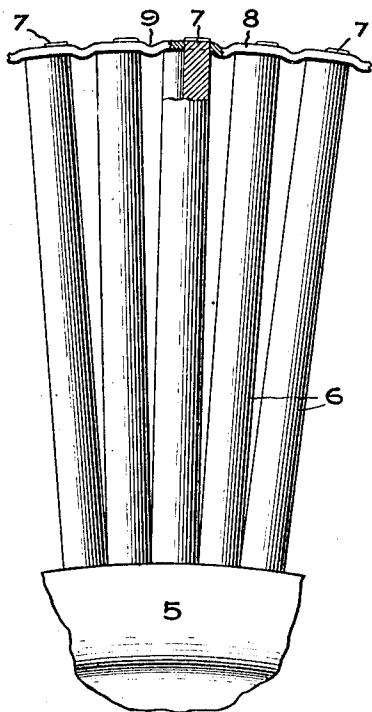


FIG. 2.

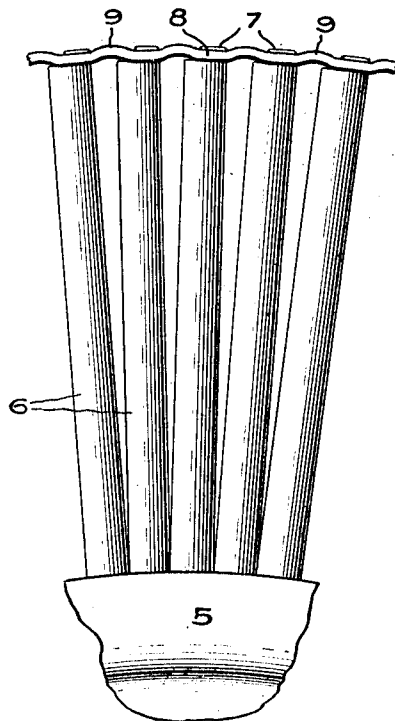
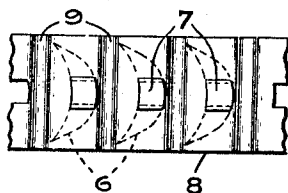


FIG. 3.



Inventor:
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UNITED STATES PATENT OFFICE.

CHRISTIAN STEENSTRUP, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELASTIC-FLUID TURBINE.

1,270,232.

Specification of Letters Patent.

Patented June 18, 1918.

Application filed November 9, 1917. Serial No. 201,017.

To all whom it may concern:

Be it known that I, CHRISTIAN STEENSTRUP, 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 particularly to the covers for the rings of vanes, blades or buckets. Elastic fluid turbines as commonly constructed are provided with one or more rings or rows of vanes, blades or buckets arranged on a rotor and provided with a cover fastened to the tips or ends of the buckets to definitely define the space for the passage of the elastic fluid.

In the operation of elastic fluid turbines substantial temperature changes occur when starting up and when changes of load occur, and because of this when covers of the usual type are used, stresses of considerable magnitude are put on the buckets due to the difference in temperature between the cover and the wheel or cylinder occasioned by the fact that the cover heats up more quickly than the wheel or cylinder, and, therefore, expands more rapidly. This difficulty can to a greater or less extent be overcome by utilizing a bucket cover having a certain degree of flexibility or elasticity whereby it may expand or contract independently of the buckets and without putting any substantial strain upon them, and the object of the present invention is to provide an improved structure in a bucket cover which will have a desired degree of flexibility or elasticity and which will be simple to build and which may be very readily put into position.

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, Figure 1 is a side elevation partly in section of a portion of a turbine rotor illustrating one form of my invention; Fig. 2 is a similar view of a modification, and Fig. 3 is a top plan view of a short section of buckets with the improved bucket cover in place thereon.

Referring to the drawing, 5 indicates a turbine rotor, as a wheel, having a ring of

buckets 6 fastened to it by a suitable dovetailed connection or otherwise. On the tips of the buckets are tenons 7 by means of which the bucket cover 8 is fastened in place. In the bucket cover, and preferably between each two buckets, is a transverse bend or corrugation 9 which extends from one edge thereof to the other. In Fig. 1 this corrugation is shown as being bent inwardly toward the center of the wheel, while in Fig. 2 it is shown as being bent outwardly. As will be clear, this provides for a certain degree of flexibility or elasticity in the bucket cover between each two buckets so that in case of quick temperature changes the bucket cover will be able to expand more or less without putting a great strain upon the buckets. Also due to the spring or elasticity in a bucket cover formed in this manner it will not be likely to be itself broken, due to expansion.

Heretofore with bucket covers made of rigid strips of material it has been the practice on account of the great temperature changes met with to make the covers in comparatively short sections, each section expanding separately. Trouble has been experienced with these short sections, however, due to group vibrations being set up in the buckets covered by each bucket cover section. By the use of my improved flexible bucket cover I am enabled to make each bucket cover section much longer than heretofore. By this arrangement I accordingly overcome the difficulty just referred to which is experienced with short cover sections.

As is obvious, a bucket cover as above described is very simple to construct, the corrugation being very readily formed thereon, and the cover can be fastened into place with the same ease as an ordinary flat or straight bucket cover.

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 combi-

nation of a ring of buckets, and a bucket cover fastened thereon, said cover having transverse corrugations whereby it may expand and contract to a certain amount without putting undue stress on the buckets.

5 2. In an elastic fluid turbine, the combination of a ring of buckets, and a bucket cover fastened thereon, said cover having a transverse corrugation between each two
10 buckets whereby it may expand and contract

to a certain amount without putting undue stress on the buckets.

3. In an elastic fluid turbine, the combination of a ring of buckets having tenons on their ends, and a bucket cover riveted to the
15 buckets by said tenons, said bucket cover being provided with transverse corrugations.

In witness whereof, I have hereunto set my hand this 6th day of November, 1917.

CHRISTIAN STEENSTRUP.

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