J. S. GREEN.

ELASTIC FLUID TURBINE.

APPLICATION FILED MAY 2, 1905. RENEWED APR. 20, 1908.

940,802. Patented Nov. 23, 1909.

Fig. 1.

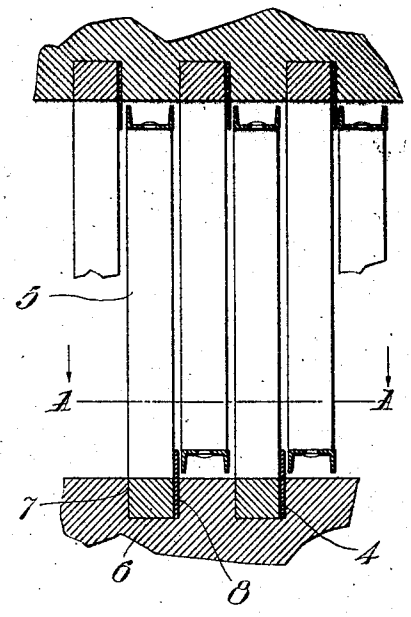


Fig. 2.

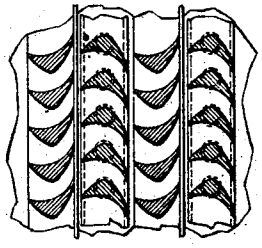
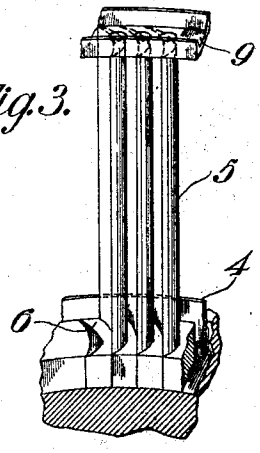


Fig. 3.



WITNESSES:

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ELASTIC-FLUID TURBINE.

940,802. Specification of Letters Patent. Patented Nov. 23, 1909.

Application filed May 2, 1905, Serial No. 258,471. Renewed April 20, 1908. Serial No. 428,141.

To all whom it may concern:

Be it known that I, JONATHAN S. GREEN, a citizen of the United States, and a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Elastic-Fluid Turbines, of which the following is a specification.

This invention relates to elastic fluid turbines.

It is now common in certain parallel flow elastic fluid turbines of the impact and reaction type to shroud the blades and vanes, and various means to this end have been proposed. When the blades or vanes are shrouded, it has been found necessary to provide some sort of a guard or abutment for reducing the leakage of steam between the shrouds and the casing or rotor, as the case may be. Various means to this end have been attempted, but all of them with which I am familiar are more or less costly, and an object of this invention has been to produce a simple means to this end. This object I attain by means of the device described in the specification and illustrated in the drawings accompanying this application, and throughout the several views of which similar elements are denoted by like characters.

In the drawings, Figure 1 is a view in end elevation of a plurality of turbine blades or vanes arranged in annular rows, in which the holding elements, that is, the stator and the rotor, are equipped with this device: Fig. 2 is a plan view taken on the line A—A in Fig. 1 looking in the direction of the arrows: Fig. 3 is a view in perspective of a portion of a stator or rotor, as the case may be, to which three blades or vanes are secured, and which stator or rotor is equipped with this invention.

The blade or vane holding element is provided with circumferentially extending or annular slots or channels. Into these slots or channels a steel or other suitable metal strip 4 is placed, which extends out beyond the surface of the holding member a sufficient distance to form the desired abutment or guard, as shown in Fig. 1. The blades or vanes 5, alternating with the calking or spacing pieces 6, are next placed within the channels or slots, and by means of suitable calking irons or other tools, pressure is applied to the tops of the calking pieces whereby they are spread transversely to the applied pressure and caused to grip the wall 7 of the channel, the bases of the blades or vanes and the abutment strip 4, which abutment strip is forced into contact with the wall 8. Either before the blades or vanes are assembled, or after the assembling operation, as is desired, a suitable shroud 9 is secured to their outer ends. By this means it will be seen that suitable guards or abutments are secured, whereby the steam in its progress through the turbine is directed to the effective portions of the blades or vanes and away from the clearance space between their outer ends and the adjacent holding element.

It is apparent from the foregoing description that my invention may be practiced in connection with rotor blades or stator vanes and for that reason I do not wish to limit myself to any specific use. In the following claims, I will use the words "blade" or "blades" in their broadest sense; that is, to include both the rotating blades and the stationary vanes of a turbine.

Having thus described this invention, what I claim is:

1. In combination with a blade holding element provided with a circumferentially extending or annular slot or channel, a guard or abutment piece the base of which lies within said slot or channel, a plurality of blades lying within said slot and separate calking or spacing pieces alternating with said blades.

2. In an elastic fluid turbine, in combination with the annular rows of shrouded rotor blades, the roots of which are secured within slots or channels by means of separate calking and spacing pieces, abutment pieces secured in said slots or channels and which project therefrom.

3. In combination with a blade holding element provided with a circumferentially-extending slot, an abutment piece, the base of which lies within said slot, a plurality of blades adjacent thereto and means for mounting said blades within said slot.

4. In combination with an annular row of turbine blades, a guard or abutment piece mounted on the discharge or exhaust side thereof.

5. In combination with an annular row of turbine blades, means for mounting said blades, and a guard or abutment piece mounted adjacent to the bases of said blades.

6. In combination with a blade holding element provided with a circumferentially-extending slot, a plurality of blades mounted in said slot, and a guard or abutment piece mounted in said slot.

7. In combination with a blade holding element, provided with a circumferentially-extending slot, a guard or abutment piece, the base of which lies within said slot, and separate calking means for each blade.

8. In combination with an elastic fluid turbine, a rotor element, a circumferentially-extending slot therein, a plurality of shrouded blades, means for mounting said blades in said slots, and an abutment piece secured in said slot which projects therefrom.

9. In combination with an elastic fluid turbine, a rotor element, a circumferentially-extending slot therein, a plurality of blades, means for mounting said blades in said slots, and an abutment piece secured in said slot which projects therefrom.

10. In combination with an elastic fluid turbine, a stator element, a circumferentially-extending slot therein, a plurality of shrouded blades, means for mounting said blades in said slot, and an abutment piece secured in said slot which projects therefrom.

11. In combination with the blade mounting element of a turbine, a blade mounting slot provided in said element, a plurality of blades and a segmental abutment piece secured in said slot and projecting therefrom.

12. In combination with the blade holding element of an elastic fluid turbine, a circumferentially extending slot, an abutment piece located within said slot and projecting therefrom, a plurality of blades located within said slot and separate spacing pieces between the blades.

13. In combination with the blade holding element of an elastic fluid turbine provided with a circumferential slot, an abutment piece located within said slot and projecting therefrom and a plurality of blades adjacent thereto and means for mounting said blades within said slot.

14. In combination with an annular row of stationary blades, an abutment piece mounted on the discharge side thereof.

In testimony whereof, I have hereunto subscribed my name this twenty fourth day of April, 1905.

JNO. S. GREEN.

Witnesses:
DAVID WILLIAMS,
E. W. MCCALLISTER.