O. JUNGGREN.

NOZZLES IN ELASTIC FLUID TURBINES.

APPLICATION FILED SEPT. 11, 1914.

1,118,352. Patented Nov. 24, 1914.

Fig. 1.

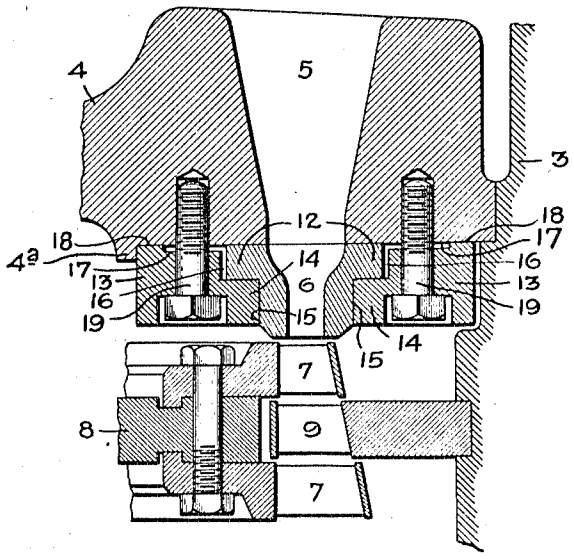
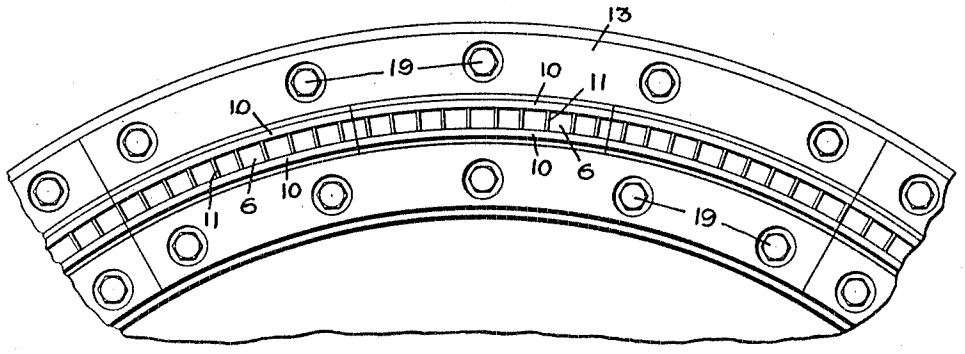


Fig. 2.



Witnesses:

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His Attorney.

UNITED STATES PATENT OFFICE.

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NOZZLES IN ELASTIC-FLUID TURBINES.

1,118,352. Specification of Letters Patent. Patented Nov. 24, 1914.

Application filed September 11, 1914. Serial No. 861,283.

To all whom it may concern:

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

The present invention relates to elastic-fluid turbines and particularly to means for attaching the nozzles to the diaphragms.

In turbines where the nozzles are formed separate from the diaphragms and attached thereto, considerable difficulty has been experienced, especially in the first stages of high pressure machines, where both the temperatures and pressures are high, in firmly anchoring the nozzles to the diaphragms. This has been especially true where the nozzles have been formed of a material different from the diaphragm, as for example, bronze, as there has been a tendency for the nozzles to soften and yield, permitting more or less leakage and distortions.

The object of the present invention is to provide an improved fastening means for attaching the nozzles to the diaphragm which will effectually overcome the above difficulties.

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

Referring to the drawing, Figure 1 is a sectional view through a portion of a turbine illustrating my invention, and Fig. 2 is a plan view of a portion of a diaphragm showing the nozzles and attaching means.

3 indicates the outer shell or casing of a turbine and 4 the diaphragm through which are the usual openings 5 for the passage of the elastic fluid.

4^a is a shoulder or projection on the diaphragm 4.

6 are nozzles arranged to direct the elastic fluid passing through the openings in the diaphragm against the buckets 7 carried by the web member 8 of a turbine rotor. A single wheel having two rings of buckets with a ring of intermediate directing vanes 9 between is illustrated. The nozzles may extend all or only part of the way around the diaphragm, depending upon the requirements, and are here illustrated as being formed in sections as shown in Fig. 2. The sections are of convenient length, and comprise side members 10 between which are arranged the partitions 11, the spaces between the partitions forming the nozzle passages which may be diverging or non-diverging in character. The bases of the nozzle sections are provided with flanges 12 by means of which the nozzles are fastened to the diaphragms. The fastening means comprise segmental bars 13 having flanges 14 which fit over the flanges of the nozzle sections and engage the faces thereof. The one bar 13 fits against the shoulder 4^a on the diaphragm. The inner surfaces 15 of the flanges 14 fit tightly against the outer portion of the nozzle sections. This serves to brace the same and prevent their yielding under the high temperatures and pressures met with. There is a slight clearance between the sides of the flanges 12 and the members 13 as indicated at 16 and the members 13 are cut away as at 17 so that they engage the diaphragm only at their outer sides as indicated at 18. The bars 13 are fastened to the diaphragm by means of spaced threaded bolts 19. When these bolts are secured in place the bars 13 will give slightly so as to cause the flanges of the nozzle sections to be very firmly held against the diaphragm and at the same time the outer portion of the nozzles will be squeezed between the flanges 14 at the points 15 so as to brace the same. The nozzles are thus firmly and uniformly pressed against the diaphragm at every point and there is no opportunity for leakage to occur between the nozzles and the diaphragm as might otherwise be the case. At the same time the fastening members 13 squeeze the outer portions of the nozzles between them and hold them to shape.

In the present instance the segmental bars are shown of such length as to embrace three nozzle sections, but it will be understood that this is a matter of design, as any suitable relative lengths may be used. It will be noted that the joints between the segmental fastening bars are axially alined with the joints between adjacent nozzle sections. This permits one group of nozzle sections to be removed for repair or other purpose without disturbing the other.

The drawing shows my invention as ap-

plied to a vertical turbine, but it will be understood that it is equally well adapted for a horizontal machine, and that any references to direction are wholly relative.

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 of a diaphragm, a nozzle having flanges on its two sides, and means for fastening the flanges to the diaphragm comprising shouldered members which fit over the flanges and make a close fit with the face of the flanges and the sides of the outer portion of the nozzle, and means for fastening the members to the diaphragm.

2. In an elastic-fluid turbine, the combination of a diaphragm, a nozzle having flanges on its two sides, and means for fastening each flange to the diaphragm comprising a shouldered member which fits over the flange and makes a close fit with the face of the flange and the side of the outer portion of the nozzle and is spaced back from the side of the base, said member being cut away so that it engages with the diaphragm only at its outer edge, and means fastening the members to the diaphragm.

3. In an elastic-fluid turbine, the combination of a diaphragm, nozzle sections having flanges on their sides, and means for fastening the flanges to the diaphragm comprising a fastening member having a shoulder which fits over a flange and makes a close fit with the face of the flange and the side of the nozzle, said member being cut away so that it engages with the diaphragm only at its outer edge, and means for attaching the fastening member to the diaphragm.

In witness whereof, I have hereunto set my hand this 10th day of September, 1914.

OSCAR JUNGGREN.

Witnesses:
F. M. Beaubish,
Benjamin B. Hull.