Oct. 30, 1956 T. E. WORRE 2,768,808

TURBINES

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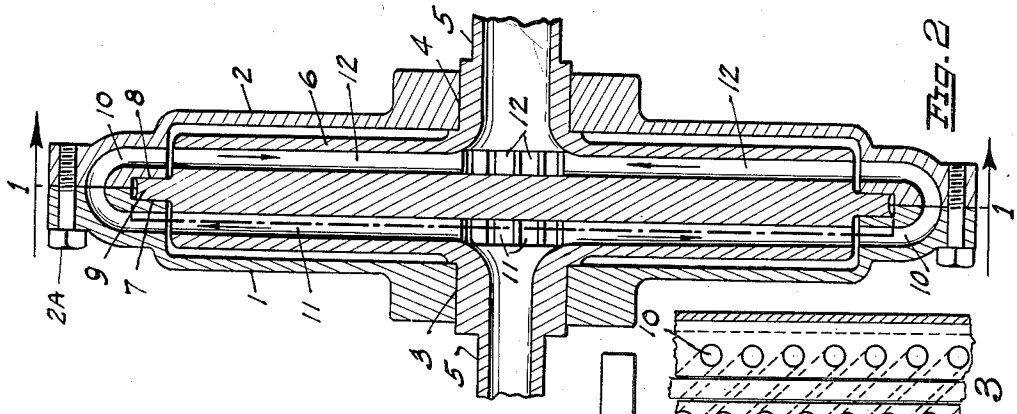


Fig. 2

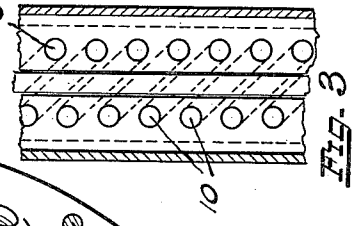


Fig. 3

Fig. 1

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TURBINES

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1 Claim. (Cl. 253—89)

This invention relates to improvements in steam turbines.

It is one of the principal objects of the invention to provide a turbine of this character which comprises a single compact casing and a single rotor mounted within the casing and wherein the rotor is provided with nozzles working against fixed buckets formed in the casing and also wherein the power of the steam is utilized throughout its entire travel from the inlet to the exhaust of the turbine.

These and other objects will appear as my invention is more fully hereinafter described in the following specification, illustrated in the accompanying drawing, and finally pointed out in the appended claim.

In the drawing:

Figure 1 is a sectional side elevation of a turbine made in accordance with my invention, and taken along the line 1—1 of Figure 2.

Figure 2 is an axial sectional view taken approximately along the line 2—2 of Figure 1.

Figure 3 is a fragmentary sectional detail plan view of a modified arrangement of "buckets."

Referring now more particularly to the drawing:

The invention comprises a circular main body member in the form of a casing made up of two identical sections indicated at 1 and 2, and secured together with bolts as at 2A with a suitable gasket between the sections. The sections are enlarged and bored at their centers to provide aligned bearings 3 and 4 for a hollow shaft 5 cast integral with or secured to a rotor 6 adapted to be located in the interior of the casing.

The inner edges of the abutting surfaces of the casing sections 1 and 2 are formed with annular recesses 7 and 8 which, when the casing sections are bolted together, form a channel which embraces by a working fit an annular sealing flange 9 cast integral with the rotor.

The annular marginal portion of the casing is formed with a plurality of fixed spaced-apart "buckets" each in the form of a U-shaped duct 10 whose open ends are spaced-apart equal to the spacing between the open ends of intake and outlet ducts 11 and 12, respectively, formed in the rotor 6 and curved outwardly as shown toward the periphery of the rotor in the direction opposite to the direction of rotation of the rotor. The U-shaped ducts and the intake and outlet ducts are of uniform inside diameter. In operation, the tubes 11 serves as nozzles for directing the steam in the direction indicated by the arrows applied to the tubes into one leg or one end of a bucket while the tubes 12 serve as an exhaust for the steam after it has passed through the bucket.

With particular reference to Figure 2, it will be noted that the interior of the hollow shaft 5 on the intake side is of lesser diameter than the outlet side thereof and that steam passes through the turbine from the left to the right hand side as viewed in Figure 2.

As steam enters the tubes 11 from the intake side of the shaft it will impart rotation to the rotor in the direction of the arrow applied thereto in Figure 1 because of the resistance of the curved tubes against the steam pressure which, as is well known, will travel in a straight line when not restricted.

When the steam leaves the nozzle end of each tube and impinges upon each bucket an additional power thrust is obtained. Then as the steam leaves the bucket and enters the curved outlet tube 12 further pressure is applied to the rotor in the same direction as that applied by the steam in the intake tubes.

For clearness of illustration I have shown in Figure 1 a number of buckets equal to the number of nozzles and outlet tubes, but it is to be understood that a greater number of buckets may be formed in the casing as illustrated in Figure 3 in order to obtain maximum efficiency.

While I have shown particular forms of embodiment of my invention I am aware that many minor changes therein will readily suggest themselves to others skilled in the art without departing from the spirit and scope of the invention. Having thus described the invention, what I claim as new and desire to protect by Letters Patent is:

A rotary engine comprising in combination a casing made of two identical disc-shaped sections secured together at abutting annular surfaces at their peripheries to form a chamber centrally of the casing, axially and radially extending mating annular recesses formed on the abutting surfaces of said sections to form a circumferential channel opening into said chamber, U-shaped circumferentially spaced apart axially extending ducts formed in said abutting surfaces of the casing astraddle said channel and open at both ends into said chamber, a hollow intake shaft extending into one side of said casing, a hollow outlet shaft extending outwardly from the other side of the casing, said intake shaft being of lesser inside diameter than the inside diameter of said outlet shaft, a rotor secured to said shafts, a circumferential sealing flange formed about the periphery of said rotor and operatively disposed within said circumferential channel to seal off the interior of said chamber on one side of the rotor from the interior of the chamber on the opposite side of the rotor, a plurality of curved and substantially radially extending intake ducts formed in said rotor and in open communication at their inner ends with the interior of said hollow intake shaft, the opposite ends of said intake ducts being adapted for intermittent and progressive communication with one end of each of said U-shaped ducts, a plurality of curved and substantially radially extending outlet ducts formed in said rotor and in open communication at their inner ends with the interior of said hollow outlet shaft, the outer ends of said outlet ducts being adapted for intermittent and progressive communication with the opposite end of each of said U-shaped ducts, the spacing between the terminal ends of said U-shaped ducts being equal to the spacing between the outer terminal ends of said intake and outlet ducts, all of said ducts being of uniform inside diameter and all of said intake and outlet ducts being curved away from the direction of rotation of said rotor.

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