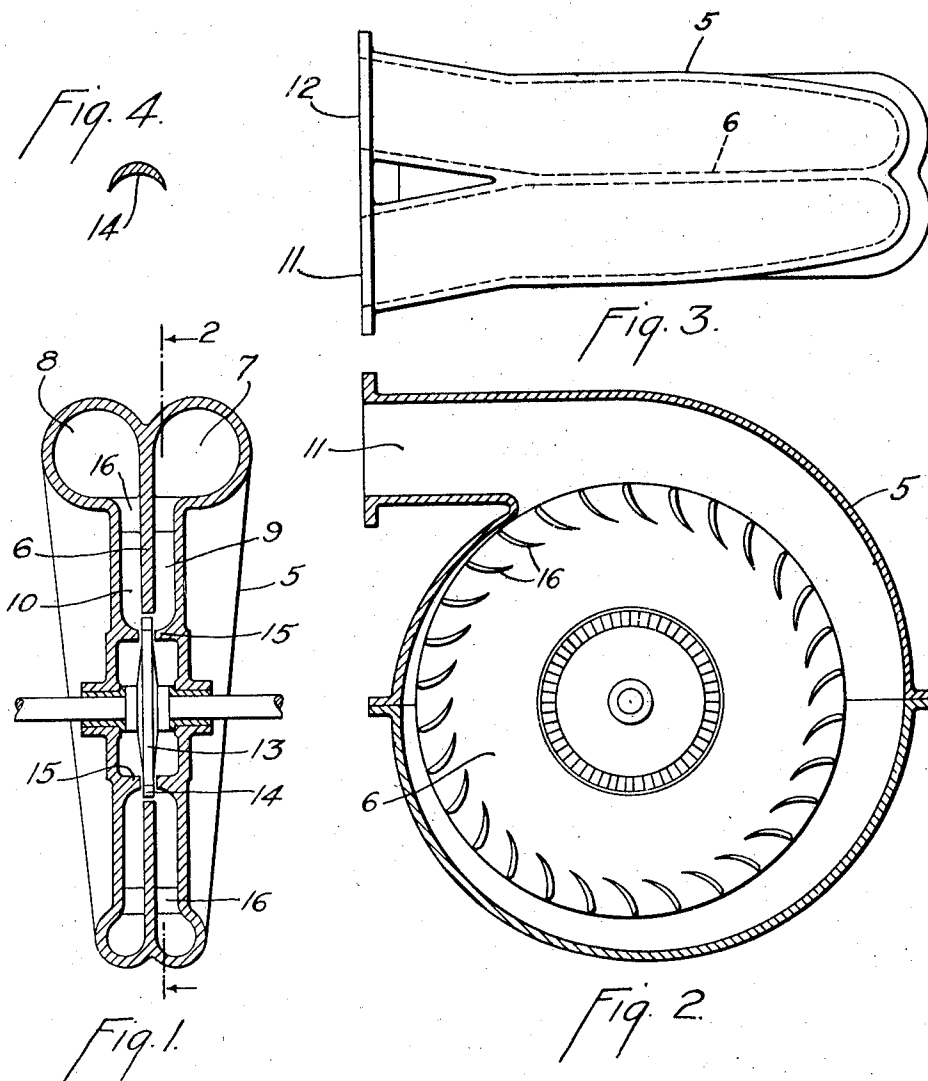


A. T. KASLEY.
TURBINE.
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1,328,835.

Patented Jan. 27, 1920.



INVENTOR.

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TURBINE.

1,328,835.

Specification of Letters Patent.

Patented Jan. 27, 1920.

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To all whom it may concern:

Be it known that I, ALEXANDER T. KASLEY, a citizen of the United States, and a resident of Swissvale, in the county of Allegheny and State of Pennsylvania, have made a new and useful Invention in Turbines, (which is a division of application Serial No. 777,432, filed July 5, 1913,) of which the following is a specification.

10 This invention relates to turbines and has for an object to produce a turbine which runs in the same direction on motive fluid flowing in either direction through the turbine.

15 A further object is to produce a turbine which operates efficiently, and runs continuously in the same direction, when supplied with motive fluid which is periodically reversed in the direction of its flow.

20 A further object is to produce an efficient turbine which runs in the same direction when supplied with motive fluid flowing in either direction, and in which no valve or valve mechanisms are required for causing the turbine to run continuously in one direction when the direction of the flow of the motive fluid is reversed.

25 In the well known forms of hot air engines the power is generated by alternately heating and cooling air or other expansible fluid, causing alternate expansion and contraction of the fluid and consequently variations in its pressure. These variations in the pressure are utilized in the production of available energy.

30 The turbine illustrated as an embodiment of my invention is well adapted to take the place of the pressure pistons of well known air engines, since it is capable of abstracting the velocity energy from the expansible fluid when the fluid is flowing in either direction, and since it rotates in the same direction independently of the direction of flow of the motive fluid through its working passages. For this reason it is capable of extracting available energy from the fluid as it flows in first one and then the other direction in response to the alternate heating or cooling to which the fluid is subjected during the cycle of operation of the engine.

35 A further object of my invention is therefore to produce a turbine which is capable of being employed as the power developing

or power transmitting agent of a hot air engine, and which is also capable of being operated by hot air, vapors or other expansible fluids.

These and other objects, which will be made apparent throughout the further description of the invention, are attained by means of apparatus embodying the features herein described and illustrated.

In the single sheet drawing accompanying and forming a part hereof, Figure 1 is a diagrammatic longitudinal sectional view of a turbine embodying my invention.

Fig. 2 is a sectional view along the line 2—2 of Fig. 1.

Fig. 3 is a plan view of the turbine shown in Figs. 1 and 2.

Fig. 4 is the end view of a blade which may be employed as a working element of the turbine.

The turbine illustrated includes a casing 5 divided into two similar parts by a radial partition 6 which, with the casing 5, forms two delivery passages 7 and 8 and two annular whirl chambers 9 and 10. The delivery passages 7 and 8 terminate in ports 11 and 12 either of which may be the inlet or the exhaust port continuously or alternately. The delivery passages 11 and 12 also communicate directly with the annular whirl chambers 9 and 10.

A rotor wheel 13, provided with radially extending blades 14 around its periphery, is inclosed by the casing, and is so located that the outer ends of the blades are immediately adjacent to the inner edge of the radial partition 6. The walls of the casing 5 are provided with annular flanges 15, which project in nearly to the rotor wheel 13, at the base of the blades 14, so that the only communication between the annular whirl chamber 9 and the similar opposite chamber 10 is through the blades 14 of the rotor wheel 13.

Around the outer portion of the annular whirl chambers 9 and 10, I have shown a series of vanes 16 for imparting a whirling motion to the gases entering these chambers. The vanes 16 are so formed that the direction of whirl is the same whether the gases are entering through the chamber 9 and leaving by the chamber 10 or vice versa. The blades 14, carried by the rotor wheel 13, are symmetrically formed, as shown in Fig. 4, consequently the effect of the whirl-

ing gases impinging on the blades is the same whether the flow is in at the port 11 and out of the port 12 or in the opposite direction.

5 If the turbine is to be operated on motive fluid having a constant direction of flow it is evident that it is immaterial as to whether the port 11 or the port 12 is connected up as the inlet port. The ports 11 and 12 will, 10 of course, alternately act as inlet and exhaust ports if the motive fluid has a flow which is periodically reversed, such as is the case with some hot air machines.

In the illustrated embodiment of my invention I have provided whirl chambers of relatively large volume in order to provide ample room for the expansion of the gases as they pass through the turbine. However I do not intend to limit my invention to the 15 exact construction shown and it is evident that many changes may be made without departing from the spirit and scope of my invention as set forth in the appended claims.

What I claim is:

25 1. In a turbine, a casing longitudinally symmetrical about an intermediate partition wall, and a rotor wheel inclosed by the casing and operating in the plane of the partition wall.

30 2. A turbine comprising a casing having two fluid delivery ports formed therein and a separate annular fluid delivery passage communicating with each port, vanes arranged in the said passage adapted to cause 35 fluid entering the passage to whirl about the axis of the said passages, a rotor element and blades mounted on said rotor and so located with relation to said passages that the rotor will move in the same direction 40 while receiving motive fluid from either passage.

3. A turbine comprising a casing having two ports, each adapted to operate as a fluid inlet or a fluid outlet port of the casing, a 45 rotor, a separate annular fluid delivery passage communicating with each port and adapted to deliver fluid to or from the full periphery of the said rotor, said passages being substantially identical.

50 4. In combination in a fluid turbine, a casing having two ports, and a separate annular fluid delivery passage communicating with each port, said passages being substantially identical in contour and so located 55 that the casing is longitudinally symmetri-

cal about the center line thereof, a rotor, blades mounted on the rotor and located with relation to said passages so as to permit full peripheral admission of fluid from either passage and so that either passage 60 operates as a discharge passage while the other passage delivers motive fluid to the turbine.

5. In combination in a turbine, a rotor, blades mounted on the rotor and a casing 65 inclosing the rotor and provided with two fluid delivery ports and two annular fluid delivery passages, each passage directly communicating with one of said ports and said ports and passages being substantially 70 identical and being located with relation to the said blades so as to permit full peripheral admission of fluid from either passage and so that fluid delivered to the blades through either passage drives the rotor in 75 the same direction.

6. In combination in a turbine, a rotor, blades mounted on the rotor, a casing inclosing the rotor and provided with two fluid 80 delivery ports, a separate fluid delivery passage communicating with each port, said passages being substantially identical and each comprising a volute shaped portion, and a whirl chamber communicating there- 85 with and establishing communication between the volute portion and the blades.

7. A turbine comprising a diaphragm, a whirl chamber disposed on either side of the diaphragm and communicating through 90 an orifice in the diaphragm, a fluid inlet passage adapted to supply fluid to the periphery of the whirl chamber, and a rotor in the orifice responsive to fluid passing from one whirl chamber to the other.

8. In a turbine, the combination with a 95 casing having a pair of whirl chambers adapted to cause fluid entering through separate passages to whirl in the said chambers, of a full peripheral admission rotor mounted for rotation between the said cham- 100 bers and responsive to fluid passing from one chamber to another.

In testimony whereof, I have hereunto subscribed my name this 15th day of February, 1917.

ALEXANDER T. KASLEY.

Witnesses:

C. W. MCGHEE,

CAROLINE LOEWENTHAL.