G. W. PETERSON.

REVERSING TURBINE.

APPLICATION FILED FEB. 13, 1919.

1,315,153.

Patented Sept. 2, 1919.

2 SHEETS—SHEET 1.

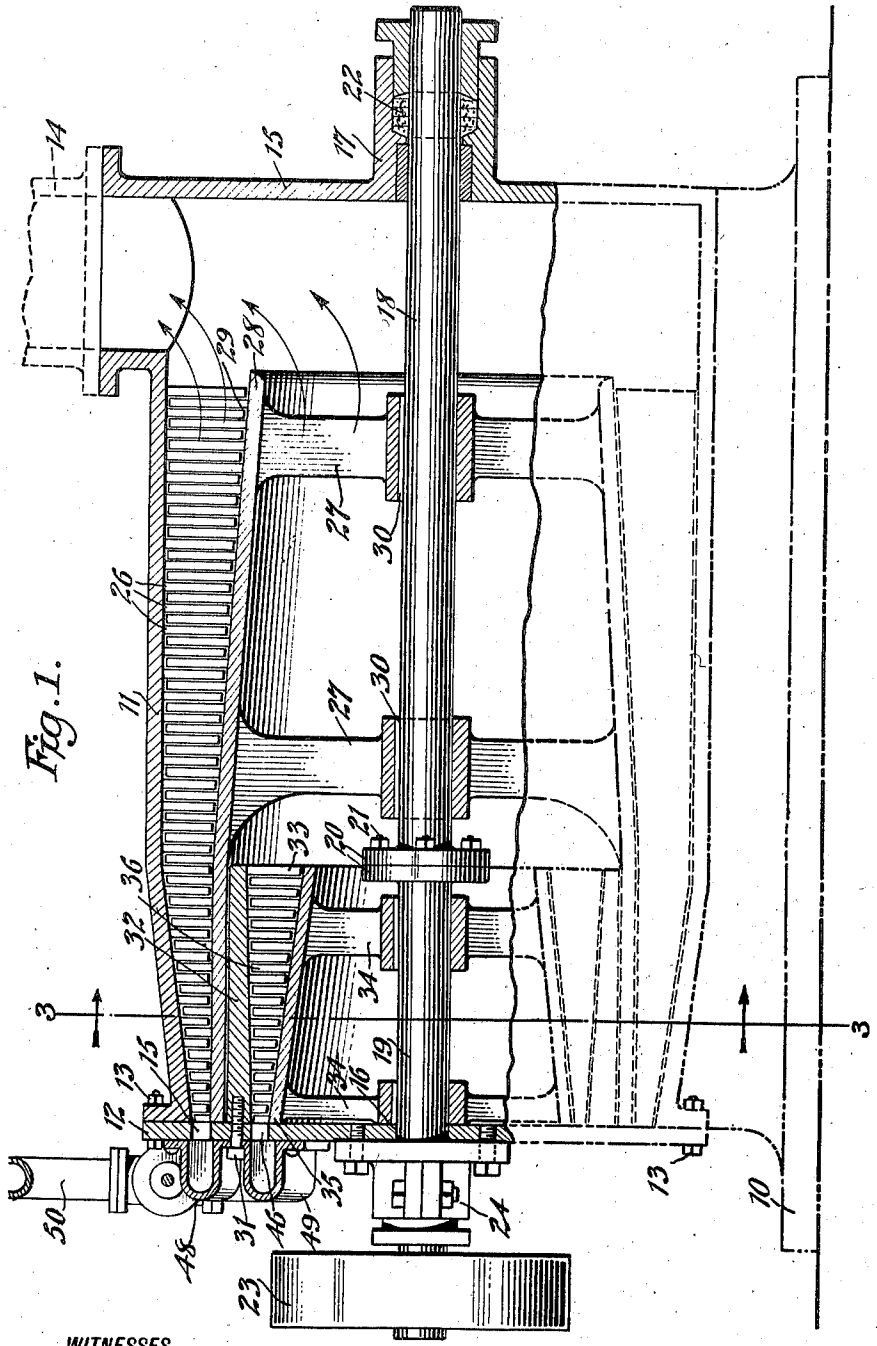


Fig. 1.

WITNESSES

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Fig. 3.

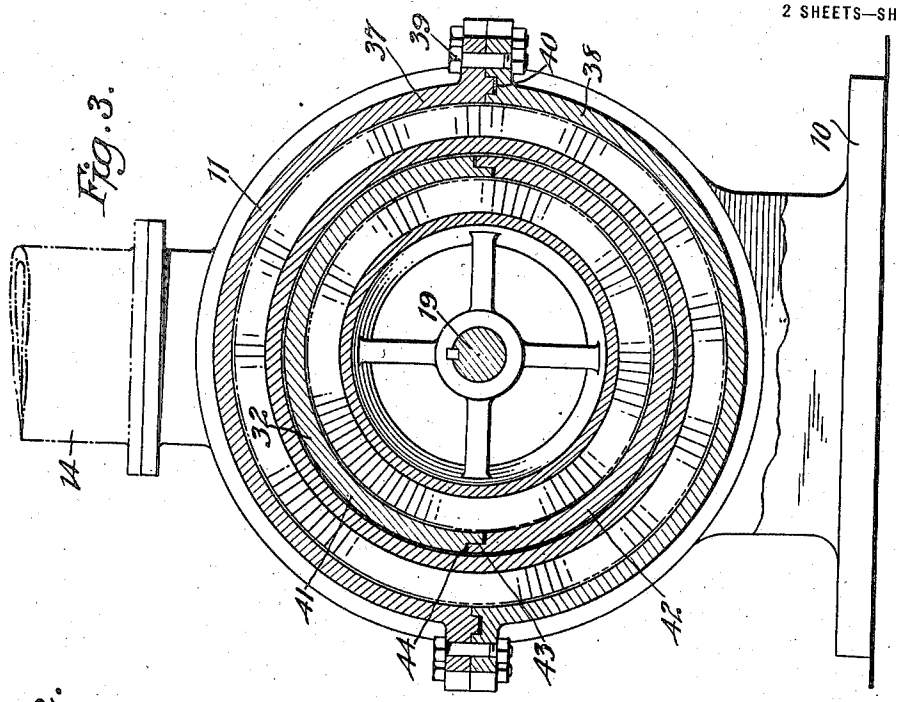
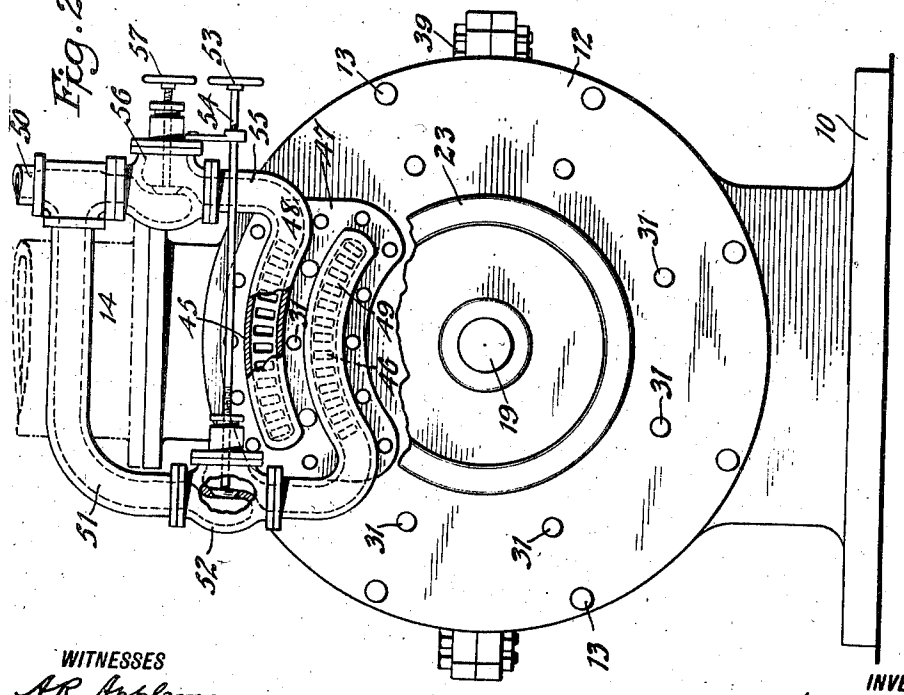


Fig. 2.



WITNESSES

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UNITED STATES PATENT OFFICE.

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REVERSING-TURBINE.

1,315,153. Specification of Letters Patent. Patented Sept. 2, 1919.

Application filed February 13, 1919. Serial No. 276,877.

To all whom it may concern:

Be it known that I, GUST WILLIAM PETERSON, a citizen of the United States, and a resident of Fall River, in the county of Bristol and State of Massachusetts, have invented a new and Improved Reversing-Turbine, of which the following is a full, clear, and exact description.

The present invention relates to steam engines, and pertains more particularly to steam engines of the turbine type.

The primary object of the invention is to so construct a turbine as to render the same readily reversible.

A further object of the invention resides in the provision of two rotors arranged one within the other, the impulse blades of one of said rotors being positioned oppositely to the impulse blades of the other rotor.

A further object of the invention is to construct the valve chest of a steam turbine in such a manner that the steam may be admitted to either of the rotors at the will of the operator.

A further object of the invention consists in a novel arrangement of parts whereby the assembling and taking down of the turbine is facilitated.

With the foregoing recited objects in view together with others which will appear as the description of the case progresses, reference will be had to the accompanying drawings in which—

Figure 1 is a view partly in elevation and partly in section of a turbine engine constructed in accordance with the present invention;

Fig. 2 is an end view thereof, and

Fig. 3 is a transverse sectional view on the line 3—3 of Fig. 1.

Referring more particularly to the drawings, the reference character 10 designates a base, and carried by said base is a substantially cylindrical casing 11, having a removable end wall 12, which is secured in place by means of bolts 13. Leading from the rear end of the casing 11, is an exhaust pipe 14. The two end walls 12 and 15 of the casing 11 are provided with bearings 16 and 17, respectively, and mounted in said bearings is a shaft which comprises two sections 18 and 19, the meeting ends of which are provided with face plates 20, through which the bolts 21 pass to secure the two sections of the shaft together. The bearing 17 is provided with a suitable gland or stuffing box 22, to maintain a steam-tight joint around the rear end of the shaft, the other end of the shaft being extended beyond the wall 12, and provided with a fly wheel 23. The end wall 12 is likewise provided with a suitable stuffing box 24, which provides for a steam-tight joint between the shaft and the removable end wall 12.

Rigidly secured in any desired manner to the inner face of the casing 11, is a plurality of vanes 26, which are arranged in spaced relation and extend throughout the entire interior surface of the casing 11. Mounted by means of the spiders 27, to the section 18 of the two-part shaft, is a rotor 28, and said rotor is provided on its outer periphery with a plurality of vanes 29 arranged in spaced relation and adapted upon movement of the rotor to pass between the spaced vanes 26 of the casing 11. These spiders 27 are keyed to the shaft 18 by means of the keys 30.

Secured to the removable front wall 12 of the casing 11, by means of bolts 31, is a cylindrical casing 32 arranged interiorly of the rotor 28 and concentrically therewith. Projecting inwardly from the inner surface of this casing 32, is a plurality of vanes 33, which are arranged in spaced relation and positioned at an angle opposite to the angular position of the vanes 26 carried by the casing 11. Keyed to the extension 19 of the two-part shaft are two spiders 34, and said spiders form the means for supporting a rotor 35, the peripheral surface of which is provided with spaced vanes 36, which are adapted to operate between the spaces of the vanes 33 of the casing 32, and their angular disposition is opposite to that of the vanes 29 carried by the rotor 28.

As shown in Fig. 3, the casing 11 comprises two half sections 37 and 38, which are secured together by means of the bolts 39, and at their meeting edges, a suitable packing 40 is provided to assure a steam-tight joint. By reference to the same figure, it will be seen that the inner casing 32 comprises two half sections 41 and 42, which have overlapping joints 43 provided with packing strips 44, thus insuring a steam-tight joint between the two half sections 41 and 42.

The removable front wall 12 is provided with two series of intake ports 45 and 46,

the series of ports 45 communicating with the space between the outer casing 11 and the rotor 28, and the series of ports 46 communicating with the space between the inner casing 32 and the rotor 35. Secured to the outer face of the removable wall 12, is a steam chest 47, said steam chest being provided with two chambers 48 and 49.

The chamber 48 communicates with the series of ports 45 and is adapted to supply the motive fluid thereto, while the chamber 49 communicates with the series of ports 46, and serves to supply the motive fluid thereto. The reference character 50 designates a steam supply pipe and leading from said steam supply pipe 50 to the chamber 49, is a pipe 51, in which is mounted a valve 52, which is controlled by means of a hand wheel 53 secured to the valve stem 54. The steam pipe 50 is further connected with the chamber 48, by means of a branch 55, and mounted in said branch 55 is a valve 56, which is controlled by means of the hand wheel 57. By this arrangement of the parts, it will be seen that steam may be admitted to either of the chambers 48 or 49 at the will of the operator.

Having thus described the invention, the operation is as follows: The rotor 28 is adapted to drive the shaft in one direction, and upon admission of steam or other motive fluid to the chamber 48, by opening the valve 56 and closing the valve 52, it will be seen that the passage of the motive fluid through the casing 11 will set up a rotation of the rotor 28.

When it is desired to reverse the direction of rotation of the shaft, the valve 56 is closed and the valve 52 is opened, thus admitting steam to the chamber 49. When steam is admitted to the chamber 49, it passes through the ports 46 into the space between the inner casing 32 and the rotor 35, and setting up a rotation of said rotor 35. Owing to the fact that the angular disposition of the vanes 36 carried by the rotor 35, is opposite to that of the vanes 29 carried by the rotor 28, it will be apparent that the passage of the motive fluid will cause the rotor 35 to rotate in a direction opposite to the rotation of the rotor 28.

From the above, it will be readily seen that in order to reverse the direction of rotation of the shaft, it is merely necessary to close the valve 56 and open the valve 52 as before described, which operation removes the action of motive fluid on the rotor 28, at the same time subjecting the rotor 35 to the action of motive fluid.

Having thus described the invention, what is claimed is—

1. A reversing turbine comprising a cylindrical casing have a closed end and an open end, a removable plate secured to the open end of said casing for closing the same, a shaft mounted in the closed end of the casing, a second shaft mounted in the removable plate at the open end of the casing and in alinement with the first-mentioned shaft, means for securing said shafts together, a rotor carried by the first-mentioned shaft, an inner cylindrical casing secured to said removable plate, a rotor carried by the second-mentioned shaft and revoluble in said inner cylindrical casing, and means carried by said removable plate for alternately supplying propelling fluid to said inner and outer cylindrical casings for the purpose of driving their respective rotors.

2. A reversing turbine comprising a cylindrical casing having a closed end and an open end, a removable plate for the open end of said casing, a shaft rotatably mounted in the closed end of said casing, a second shaft rotatably mounted in the removable plate closing the open end of said casing and in alinement with the first-mentioned shaft, means for securing the abutting ends of said shafts together, a rotor carried by the first-mentioned shaft, a second rotor carried by the second-mentioned shaft and positioned within the first-mentioned rotor, a cylindrical open-ended casing interposed between said rotors and carried by the removable plate, and means for alternately admitting steam to said casings as and for the purpose set forth.

GUST WILLIAM PETERSON.