G. McINTOSH.

TURBINE.

APPLICATION FILED MAR. 31, 1910.

1,095,587. Patented May 5, 1914.

Fig. 1.

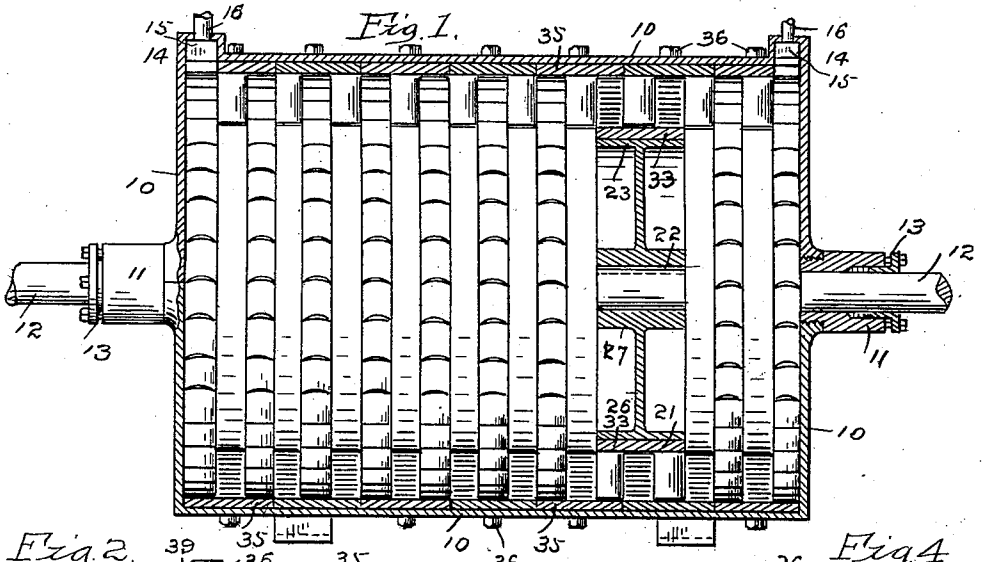


Fig. 2.

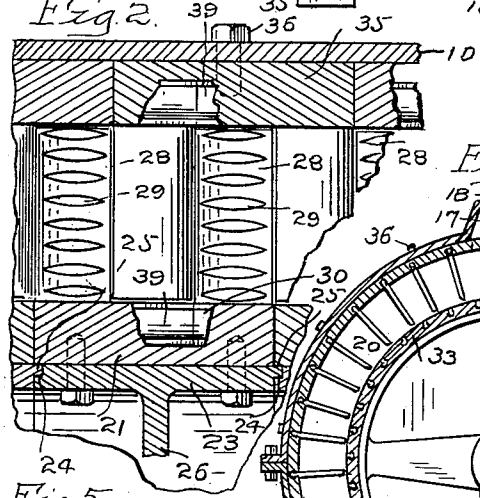


Fig. 3.

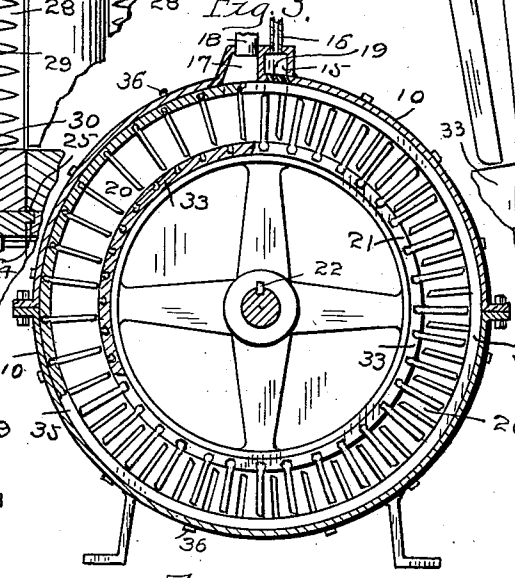


Fig. 4.

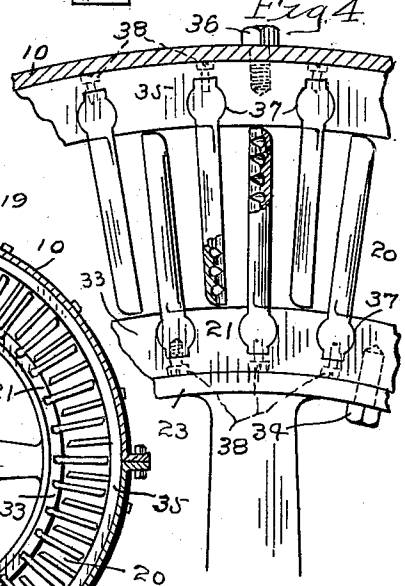


Fig. 5.

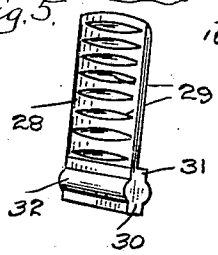
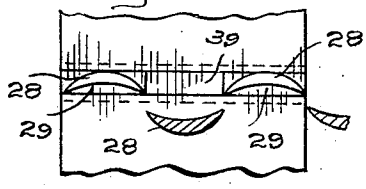


Fig. 6.



WITNESSES:

E. P. Wold

S. W. Atherton

INVENTOR

George McIntosh

BY

A. M. Wooster

ATTORNEY

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GEORGE McINTOSH, OF STONINGTON, CONNECTICUT.

TURBINE.

1,095,587. Specification of Letters Patent. Patented May 5, 1914.

Application filed March 31, 1910. Serial No. 552,587.

To all whom it may concern:

Be it known that I, GEORGE McINTOSH, a citizen of the United States, residing at Stonington, county of New London, State of Connecticut, have invented an Improvement in Turbines, of which the following is a specification.

This invention relates to the class of turbines illustrated and described in my former Letters Patent Number 920,489, dated May 4, 1909, in which a plurality of rotors attached to a shaft rotate between guide wheels attached to the casing, and the present invention has for its objects to dispense with the guide wheels, to provide novel rotor and guide blades and to provide novel means for securing the rotor and guide blades in place, which shall be simple and effective and shall greatly reduce the cost of construction.

With these and other objects in view I have devised the novel structure, of which the following description in connection with the accompanying drawing is a specification, reference characters being used to indicate the several parts.

Figure 1 is a view partly in longitudinal section and partly in elevation, showing the construction of my novel turbine; Fig. 2 a detail longitudinal section on an enlarged scale, showing the arrangement and mode of attachment of the guide blades and rotor blades; Fig. 3 a transverse section of the casing and one of the steam chests with the rotor and guide blades in elevation; Fig. 4 a detail view partly in elevation and partly in section on a line transverse to the section line in Fig. 2; Fig. 5 a perspective of a blade detached; and Fig. 6 is a plan view of a portion of the periphery of a rotor with guide blades in section.

For convenience in description we will suppose the operating fluid to be steam although the structure is equally adapted to be driven by any other operating fluid.

10 denotes a cylindrical casing shown as made in two sections bolted together, the end hubs 11 being shown as made separate from the casing and detachably secured thereto. The shaft 12 extends through the casing and the hubs, each of which is shown as provided with a stuffing box, indicated by 13. One section of the casing is shown as provided at each end with a steam chest 14, each steam chest being divided longitudinally into a receiving chamber 15 into which a steam pipe 16 leads and an exhaust chamber 17 from which an exhaust pipe 18 leads. The inner wall of the receiving chamber is provided with a plurality of ports 19 which may or may not be placed at an angle and which lead into the blade chamber 20, that is the circular chamber between the periphery of the rotors and the inner wall of the casing.

21 denotes rotors, a plurality of which are rigidly secured to the shaft as by keys 22. The specific construction of the rotors is immaterial so far as the present invention is concerned. It is simply required that each rotor be provided with a rim 23, said rims lying closely in contact with each other. In order to make steam-tight joints between the rotors I have shown each rotor rim as provided with a circular groove 24 in one edge and a circular rib 25 on the other edge which engages the corresponding groove in the contiguous rim. In the present instance I have shown the rims as supported by spokes 26 which extend from hub 27, the hubs lying closely in engagement with each other and being rigidly secured to the shaft in any suitable manner, in the present instance by the keys 22.

28 denotes the blades, preferably concavo-convex in configuration, which are all alike so that any blade may be used either as a guide blade or a rotor blade. The operative faces of the blades are concave curves and they may or may not be provided with transverse grooves 29 which are made deepest at the center and run out at or near the edges of the blades. Each blade is provided with a base 30 which comprises a rectangular portion 31 having longitudinal curved ribs 32 on opposite sides which are preferably placed centrally as shown. In superficial contour these ribs are arcs of a circle described from the center of the base. The rotor blades are carried by convex retaining plates 33 which are rigidly secured to the rims in any suitable manner as by screws 34, and the guide blades are carried by concave retaining plates 35 which are rigidly secured to the casing in any suitable manner as by screws 36. The mode of securing the blades to plates 33 and 35 is an important feature of the invention. It consists in providing said plates with transverse sockets 37 which correspond in configuration with the bases of the blades and into which said bases may be passed longitudinally. These sockets are formed by drilling holes transversely in the plates which just receive the curved

ribs of the bases and then cutting transverse slots in the plates which just receive the rectangular portions of the bases. I thus insure accurate fitting of the parts and reduce the cost of construction to the minimum. The bases are made to fit closely in the sockets into which they slide transversely and may if required be calked, brazed or soldered.

As an additional means of attachment and in order to give the most perfect rigidity to the blades, I preferably tap holes in plates 33 and 35 and in the bases of the blades which are engaged by screws 38 countersunk in the plates and extending into the bases of the blades. In practice, plates 33 and 35 are set out of alinement, as clearly shown in Fig. 2. The length of these plates is wholly immaterial. They may be made of any length most convenient to meet the conditions of manufacturing and use. The width of each plate corresponds with the width of three blades, a blade being placed at the outer end of each socket 37 with a spacing block 39 between them. The spacing blocks preferably correspond in contour with the bases of the blades, so that two bases with a spacing block between them closely fill each socket from end to end. The guide blades and the rotor blades are of course placed alternately, the space between each peripheral ring or circle of rotor blades just receiving a peripheral ring or circle of guide blades, as clearly shown in Figs. 1 and 2. The operation will be readily understood from the drawing. The steam passes into the blade chamber from either receiving chamber through ports 19, then through the blade chamber over the faces of the blades and out through the exhaust chamber at the other end of the casing.

Having thus described my invention I claim:

1. A turbine comprising a casing, a shaft, rotors rigidly secured to the shaft and provided with blades and guide blades secured to the casing and lying intermediate the rotor blades, said blades being provided with transverse grooves.

2. A turbine comprising a casing, a shaft, rotors rigidly secured to the shaft and having rims closely in engagement, rings of blades on each rotor with a space between the rings and rings of guide blades secured to the casing and lying intermediate the rings of rotor blades, said blades being provided with transverse grooves.

3. A turbine comprising a casing, a shaft, rotors secured to the shaft and having rims, convex plates secured to the rims and concave plates secured to the casing, said plates being provided with transverse sockets, rings of guide blades having bases engaging the recesses in the concave plates and rings of rotor blades lying intermediate the rings of guide blades and having bases engaging the sockets in the convex plates.

4. A turbine comprising a casing having concave plates on its inner side, a shaft, rotors secured to the shaft and having rims, convex plates secured to the rims, said sets of plates being provided with transverse sockets and peripheral rings of blades having bases engaging said sockets with spacing blocks between them, the blades carried by the rotors and the blades secured to the casing lying in alternate peripheral rings.

5. A turbine comprising a casing having concave plates on its inner side, a shaft, rotors secured to the shaft and having rims provided with interengaging circular ribs and grooves on their edges, convex plates secured to the rims, said sets of plates being provided with transverse sockets and peripheral rings, blades having bases engaging said sockets and spacing blocks between the bases.

6. In a turbine, the combination with a casing having guide blades secured to its inner side in peripheral rings, of rotors having blades secured to their peripheries in peripheral rings and lying between the rings of guide blades, said blades being each provided with transverse grooves.

7. In a turbine, the combination with a casing having concave plates secured to its inner side and provided with transverse sockets and rotors having convex plates secured to their rims and provided with transverse sockets, of blades having bases engaging said sockets and spacing blocks between the bases, the blades on the casing and rotors lying in alternate peripheral rings.

8. In a fluid engine, a plurality of sets of alternate fixed and movable blades, said blades being ribbed across their working face, said blades being adapted to be individually supported in spaced apart relation one with the other.

9. In a fluid engine, a plurality of alternate fixed and moving concavo-convex blades having corrugated faces.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE McINTOSH.

Witnesses:

A. M. WOOSTER,

S. W. ATHERTON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."