No. 865,164. PATENTED SEPT. 3, 1907.

J. H. CORTHÉSY.

TURBINE.

APPLICATION FILED JAN. 2, 1907.

2 SHEETS—SHEET 1.

FIG. 1.

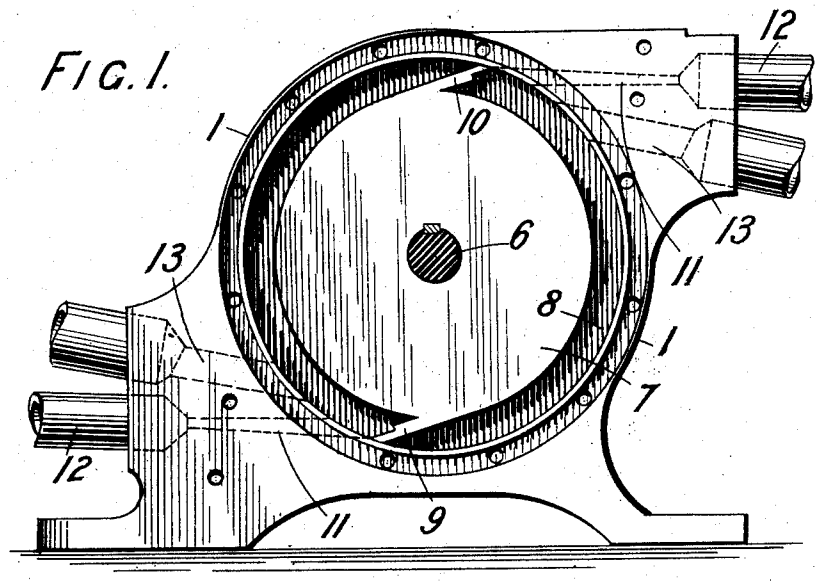


FIG. 2.

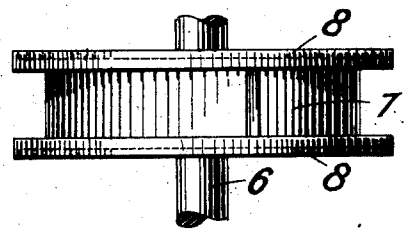
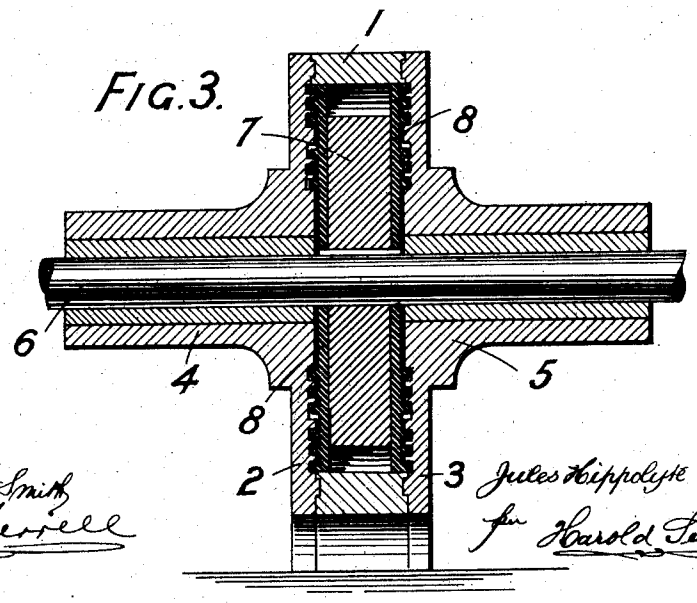


FIG. 3.



Witnesses

Chas. K. Smith

A. Harold Serrell

Inventor

Jules Hippolyte Corthésy.

per Harold Serrell

his atty.

No. 865,164. PATENTED SEPT. 3, 1907.

J. H. CORTHÉSY.

TURBINE.

APPLICATION FILED JAN. 2, 1907.

2 SHEETS—SHEET 2.

FIG. 5.

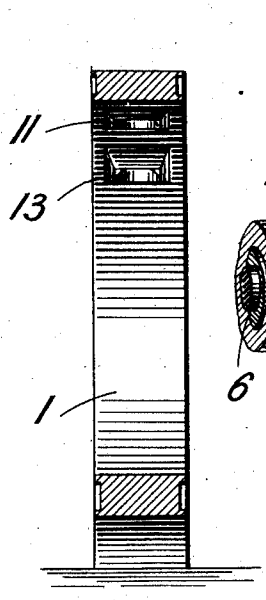
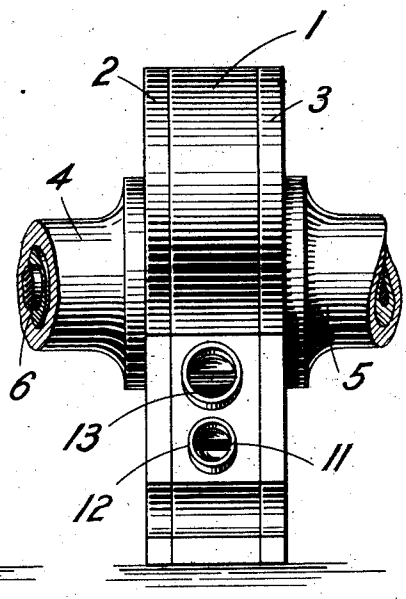


FIG. 4.



Witnesses

Chas. H. Smith

A. Harrell

Inventor

Jules Hippolyte Corthésy

per Harold Serrell

his atty.

UNITED STATES PATENT OFFICE.

JULES HIPPOLYTE CORTHÉSY, OF LONDON, ENGLAND, ASSIGNOR OF ONE-HALF TO GERARD FEATHERSTONE GRIFFIN, OF LONDON, ENGLAND.

TURBINE.

No. 865,164. Specification of Letters Patent. Patented Sept. 3, 1907.

Application filed January 2, 1907. Serial No. 350,513.

To all whom it may concern:

Be it known that I, JULES HIPPOLYTE CORTHÉSY, a Swiss citizen, residing at London, England, have invented a certain new and useful Improved Turbine, and of which the following is a specification.

This invention refers to a new or improved turbine, which conforms so far to a known type, that it has a cylindrical casing through which passes a central shaft carrying a concentrically arranged disk, which disk has around its periphery, pistons, dividing the annular chamber, and the casing has steam and exhaust ports. In such a turbine, I locate in the cylindrical casing a concentric revoluble piston-carrying disk—hereafter termed rotor—of such a diameter that an annular piston-divided chamber is formed within the casing, and I form a tangentially-directed steam inlet passage into the annular chamber, of sufficient length to give direction to the steam or other fluid pressure, hereafter termed "steam"; I also form an exhaust passage in the casing opening into the annular chamber at the rear of, and adjacent to, the inlet passage, whereby the steam in front of the tangential jet is at a high pressure, while the steam behind the jet is at a lower pressure, being freely open to the exhaust.

I form the openings of the tangentially-directed steam passages and the exhaust passages on the interior periphery of the annular chamber, of a width equal to the width of the piston or pistons carried by the rotor, and consequently equal in width to that of the annular chamber; and these inlets may be produced from a circular flow by connecting to an entrance narrowing in one direction and widening in the other, or several steam passages may be allowed to widen side by side and then communicate with each other and form one directing entrance for the flow of steam which thus unites to form a wall of incoming steam.

The rotor can be constructed with one or more pistons, the casing being formed with an equal number of pairs of passages to the number of pistons employed, each pair of passages consisting, as aforesaid, of a tangentially-directed steam inlet passage and an adjacent exhaust passage. Auxiliary steam inlets may be employed to reinforce the main jets when required.

In a construction of my improved turbine where the rotor is provided with two pistons, these are arranged diametrically opposite to each other, a tangentially-directed steam inlet passage and an adjacent exhaust passage entering the annular chamber at one part, and a similar pair of passages entering the annular chamber diametrically opposite to the aforesaid first pair of passages in the annular chamber at another part opposite the first pair, so that steam entering the first steam inlet passage of one pair, will exhaust by the exhaust passage of the next pair, and so on.

In a turbine according to my invention, as a piston passes an inlet port, it will receive the impact of steam entering at a high velocity, supposing the rotor to be rotating at a high rate of speed, and this column of steam passing into the annular chamber in a tangential direction, and being practically equal in sectional form to the annular chamber, acts with great effect in driving the rotary piston and the shaft with which it is connected, while behind the column of steam, the opening to the exhaust is entirely free, and through this opening the steam in front of the piston passes away. Thus, the incoming steam itself alone divides the annular chamber, and allows the contents upon one side of the exhaust aperture (and which are at a lower pressure than the contents upon the other side) to escape through the exhaust, and thus one inlet and one exhaust are both open to the chamber simultaneously, without the incoming steam traveling direct to the exhaust.

In order that my invention may be more readily understood, I will now describe an example of construction of one of my new or improved turbines with reference to the accompanying drawings, whereon at

Figure 1 is shown a sectional elevation with one end cover removed, illustrating the casing, the steam inlet and exhaust passages and the central disk of a rotor having two pistons, Fig. 2 being a plan view of the rotor removed from the casing, and Fig. 3 a vertical cross section of the turbine. Fig. 4 is an end elevation of the casing, and Fig. 5 is a vertical cross section showing the central or ring-like portion of the casing detached, in order to illustrate the openings of a pair of ports on the interior circular surface.

In the construction illustrated according to my invention, the casing consists of a central ring-like portion 1 and two end covers 2, 3, formed with bearings 4, 5, to receive the concentric revoluble shaft 6, which passes entirely through the casing. Keyed or otherwise fixed upon the shaft 6, is a disk 7, formed or fitted with circular side plates 8, one upon each side, the side plates 8 being about equal in diameter to the interior of the cylindrical chamber formed in the casing. These side plates have circular concentric lateral projections or ribs, which freely enter corresponding grooves formed in the end covers 2, 3 so as to compose steam packings, and the rotor should be so made, relatively to the casing, that it freely revolves without friction upon the casing excepting the friction of the bearings of the revoluble shaft 6.

Projecting from the circular surface of the disk of the rotor, pistons are provided, one diametrically opposite to the other, and although it will be understood that I do not limit myself to the shape or size of the pistons, yet in the construction of example

shown, I prefer to form the pistons as shown at 9, 10 extending at an angle on the surface of the disk 7, and these pistons divide the casing into two segmental chambers.

At 11 are indicated, by dotted lines, the steam inlet passages, each consisting of a passage formed through the casing aforesaid and extending tangentially and being fitted with a suitable connection or connections 12 by which it receives a supply of steam. The width of the passage 11, or the combined width of the passages where several passages are employed, is made, as shown at Fig. 5, equal to the width of the annular chamber which they tangentially enter. Adjacent to each inlet passage 11 I form an exhaust passage 13, also generally and preferably equal in width to the width of the annular chamber, and one pair of passages, composed of an exhaust and an inlet passage, is arranged diametrically opposite to the other pair.

With such a construction, supposing the rotor to be rotating at a high rate of speed, upon a piston passing one of the inlet ports, it will receive the impact of steam passing through that inlet port at a high rate of velocity, the steam receiving a definite tangential direction—owing to the length of the passage—and acting through the whole width of the annular chamber. This column of steam passing into the annular chamber in a tangential direction, and being practically equal in sectional form thereto, acts with great effect in driving the rotor and the shaft by which it is carried; while behind the column of steam, the opening to the exhaust is free, and through this opening the steam in front of the opposite piston passes away by that exhaust. Thus the incoming steam itself divides that compartment of the annular chamber formed between two pistons, into front and back portions, the front portion increasing in length as the back portion reduces; and so the back portion being open to the exhaust as aforesaid, allows the contents which are at a lower pressure than the contents of the front portion, to escape through the exhaust and thus the inlet and exhaust are both open to the same compartment simultaneously without the steam from the inlet traveling direct to the exhaust. This effect is obtained by reason of the steam admitted to the compartment being given a definite tangential direction and passing in at high pressure and velocity, so that the momentum and pressure of the incoming steam carries it forward and expends its energy upon the revolving piston in front of it. It is preferable to construct the inlet of the steam of equal width to the compartment, because then the column of steam more effectively divides the compartment into two parts, and prevents the lower pressure at the rear of the inlet from advancing forwards and the high pressure traveling backwards.

The face of the piston (which practically contacts with the circular wall of the casing) may be made of sufficient length to entirely cut off the exhaust as it passes, so that the jet of steam has not a free travel through the annular casing at such a moment.

What I claim as my invention and desire to secure by patent is:—

1. A turbine consisting of a cylindrical stationary casing having pairs of passages formed through its circular wall and communicating with the interior of the casing, each pair composed of a tangentially-directed steam inlet passage of sufficient length to give direction to the steam, and an exhaust passage immediately at the rear of the inlet passage, a revoluble shaft passing axially through the end covers of the casing, and a rotor on said shaft within the casing but of such diameter as to leave an annular chamber within said casing about the periphery of the rotor, pistons proceeding from and carried by the periphery of the rotor fitting such annular chamber, and means for supplying pressure fluid by the steam inlet passages aforesaid, the number of pairs of steam inlet and exhaust passages in the casing being equal to the number of pistons on the rotor, whereby the steam in front of the tangentially-directed jets passing in by the inlet passages is at a high pressure, while the steam behind the jet is at a lower pressure and freely open to the exhaust substantially as set forth.

2. In a turbine; the combination with a cylindrical casing having a tangentially-directed steam inlet passage through its circular wall of sufficient length to give direction to the steam, and having also an exhaust passage opening into the casing at the rear of the inlet passage; of a revoluble shaft passing axially through said casing, a rotor disk on said shaft located within the casing and of such diameter as to leave an annular chamber within said casing, and a piston proceeding from the periphery of the rotor to divide said annular chamber, whereby the steam in front of the tangential jet entering by the inlet passage is at high pressure, while the steam behind said jet is at low pressure and freely open to the exhaust by the said exhaust passage.

3. In a turbine; the combination with a cylindrical casing having a tangentially-directed steam inlet passage through its circular wall of sufficient length to give direction to the steam, and having also an exhaust passage opening into the casing at the rear of the inlet passage, the openings of said steam inlet passage and exhaust passage on the interior circular periphery of the casing being of a width equal to the width of the interior of the casing; of a revoluble shaft passing axially through said casing, a rotor disk on said shaft located within the casing and of such diameter as to leave an annular chamber within said casing, and a piston proceeding from the periphery of the rotor to divide said annular chamber, whereby the steam in front of the tangential jet entering by the inlet passage is at high pressure, while the steam behind said jet is at low pressure and freely open to the exhaust by the said exhaust passage.

4. In a turbine; the combination with a cylindrical casing having pairs of passages formed through its circular wall communicating with the interior of the casing, each pair consisting of a tangentially-directed steam inlet passage of sufficient length to give direction to the steam, and an exhaust passage immediately at the rear of the inlet passage; of a revoluble shaft passing axially through said casing, a rotor disk on said shaft located within the casing and of such diameter as to leave an annular chamber within said casing, and a plurality of pistons proceeding from the periphery of said rotor disk to divide said annular chamber, the number of the pistons being equal to the number of pairs of said passages through the casing, substantially as set forth.

5. In a turbine; the combination with a cylindrical casing having a pair of passages formed through its circular wall at one part communicating with the interior of the casing, said pair of passages consisting of a tangentially-directed steam inlet passage of sufficient length to give direction to the steam, and an exhaust passage immediately at the rear of the inlet passage, and a similar pair of passages through the casing entering the latter diametrically opposite to the aforesaid first pair of passages; of a revoluble shaft passing axially through said casing, a rotor disk on said shaft located within the casing and of such diameter and width as to leave an annular chamber within said casing, and two pistons proceeding from the rotor to divide said annular chamber, one piston on said rotor being diametrically opposite to the other piston, and means for supplying pressure steam to each tangentially-directed steam inlet passage, whereby steam entering the first steam inlet passage of one pair will exhaust by the exhaust passage of the next pair, and so on, substantially as set forth.

6. In a turbine; the combination with a stationary casing having an internal cylindrical chamber and having pairs of passages formed through its circular wall communicating with said chamber, each pair consisting of a tangentially-directed steam inlet passage of sufficient length to give direction to the steam and an exhaust passage immediately at the rear of the inlet passage; of a revoluble shaft, axial bearings in the end covers of the casing to carry said shaft, a disk of lesser diameter than the chamber fixed concentrically upon said shaft, circular side plates on the disk equal in diameter to said chamber, pistons fixed to and extending from the disk and fitting the remaining annular space within the casing, and means for supplying steam to the tangentially-directed steam inlet passages substantially as set forth.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

JULES HIPPOLYTE CORTHÉSY.

Witnesses:
THOMAS W. ROGERS,
WILLIAM A. MARSHALL.