No. 784,431. PATENTED MAR. 7, 1905.

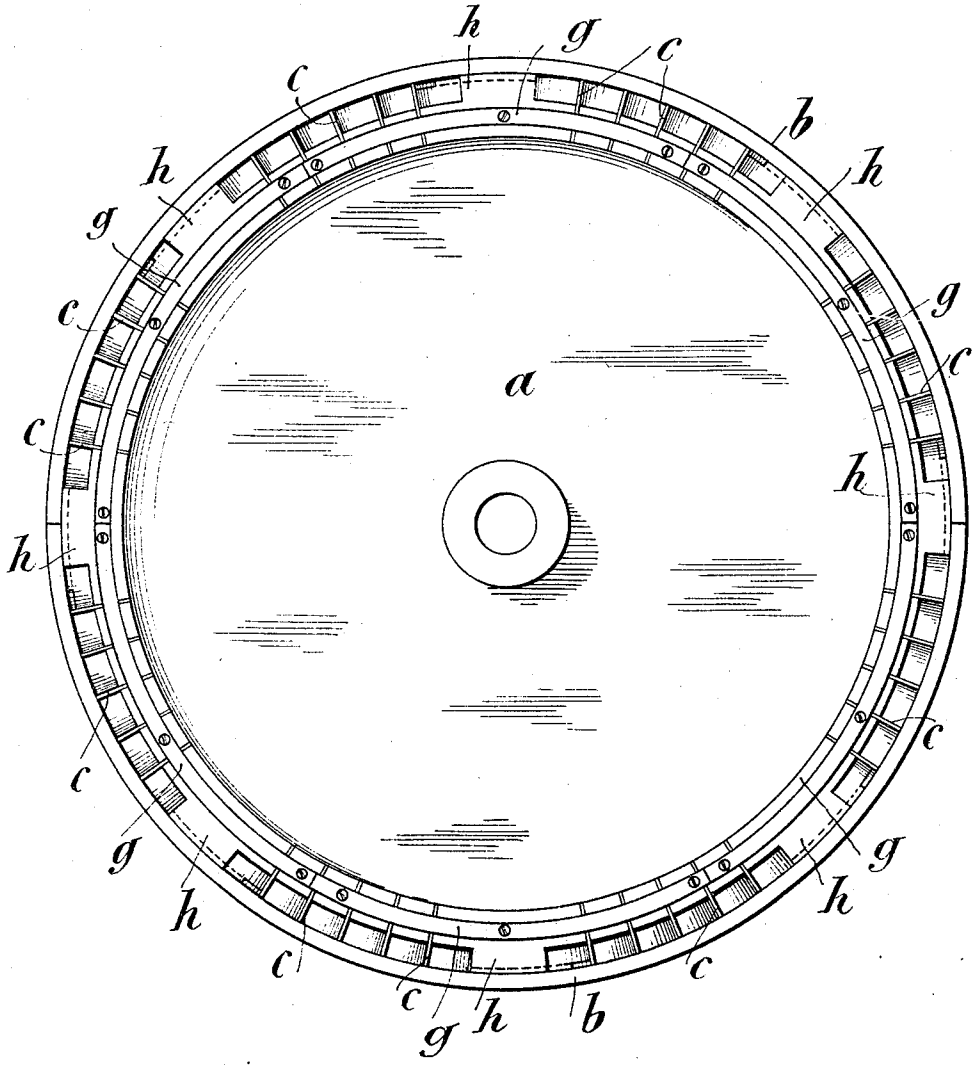
P. RAMBAL.

STEAM TURBINE.

APPLICATION FILED FEB. 23, 1904.

2 SHEETS—SHEET 1.

Fig. 1



Witnesses:

Inventor:
Pierre Rambal
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No. 784,431. PATENTED MAR. 7, 1905.

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STEAM TURBINE.

APPLICATION FILED FEB. 23, 1904.

2 SHEETS—SHEET 2.

Fig. 2

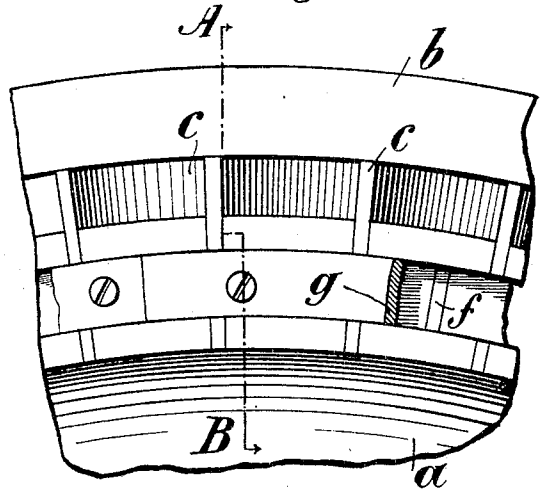


Fig. 3

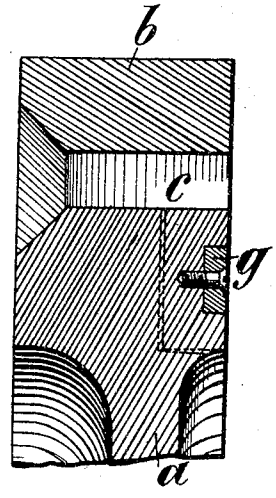
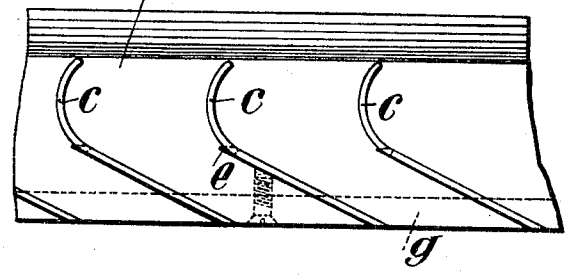


Fig. 4



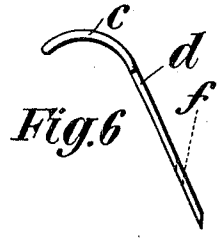


Fig. 6

Fig. 7

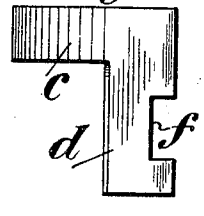
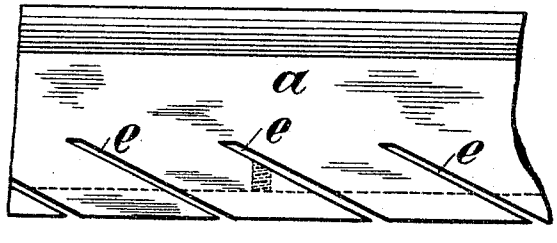


Fig. 5



Witnesses:

B. Lober

B. L. Sommers

Inventor:

Pierre Rambal

by Henry Orth & Son

Attys.

No. 784,431. Patented March 7, 1905.

UNITED STATES PATENT OFFICE.

PIERRE RAMBAL, OF ZURICH, SWITZERLAND, ASSIGNOR TO THE FIRM OF ACTIEN-GESELLSCHAFT DER MASCHINENFABRIKEN VON ESCHER WYSS & CO., OF ZURICH, SWITZERLAND.

STEAM-TURBINE.

SPECIFICATION forming part of Letters Patent No. 784,431, dated March 7, 1905.

Application filed February 23, 1904. Serial No. 194,899.

To all whom it may concern:

Be it known that I, PIERRE RAMBAL, a citizen of the Republic of Switzerland, residing at Zurich, Switzerland, have invented new and useful Improvements in Steam or Gas Turbines, of which the following is a specification.

This invention has relation to elastic-fluid turbines, the characteristic feature of the invention lying in the construction and arrangement of the blades, of the directing device or intermediate, and in means for securing them to the body of said device so that this may be effected in a simple manner with great facility and so that any one or more of the blades may be removed and another or others substituted should this become necessary from any cause.

That my invention may be fully understood I will describe the same in detail, reference being had to the accompanying drawings, in which—

Figure 1 is a face view of a directing device embodying my invention, and Figs. 2 to 7 are fragmentary and detail views drawn to an enlarged scale, Fig. 2 showing a face view of a portion of the wheel-rim, Fig. 3 being a section on line A B of Fig. 2. Fig. 4 is a plan view of Fig. 2 with the cover-ring removed. Fig. 5 is a view similar to Fig. 4 with the blades removed. Fig. 6 is a plan view, and Fig. 7 an elevation, of one of the blades.

Like reference-letters indicate like parts wherever such may occur in the described figures of the drawings.

The directing device or intermediate consists of a disk *a*, in the rim of which are formed slots *e*, that extend from one face of said rim obliquely or in the direction of rotation of the turbine-wheel toward the other face, as shown in Fig. 5. These slots are intersected by a circular face groove or recess forming a seat for a sectional locking-ring *g*.

The blades, Figs. 6 and 7, consist of the body *c* and of a shank *d* at the inner end of said body, said shank having an edge recess for the reception of the locking-ring *g*.

On the rim of disk *a* are formed segmental projections *h*, forming seats for a cover-ring *b* for the blades, Figs. 1 to 3, which ring is, by preference, also made in sections or segments bolted to the aforesaid projections *h*.

From the description of the construction of the directing element it will be seen that in positioning the blades all that is necessary is to slip the shanks thereof into their respective slots *e* from the inner face of the disk *a*, then secure the several sections of the locking-ring *g* in the circular recess in the face of the disk-rim, said ring engaging the recesses *f* of the blades and locking them securely to the body of the directing device, and this may obviously be effected before or after the cover-ring *b* is secured to the projections *h* on the disk *a*. Obviously, also, any one or more of the blades *c* may be removed at any time by simply removing the proper section of the locking-ring *g*, which sections are bolted to the rim of disk *a* by bolts, as shown in Figs. 1, 2, and 3.

It will be observed that the act of securing the blades in position also effects their adjustment relatively to one another, and as each blade is separately and removably securable to the disk their form may be so chosen as to obtain a maximum efficiency with a given motive fluid.

Obviously the wheel-casing may be so constructed as to form a cover for the wheel-blades.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. A turbine directing device or intermediate, comprising an annular body having slots in its side extending in the direction of rotation of said body, blades insertible into said slots and means to lock said blades against displacement.

2. A turbine directing device or intermediate, comprising an annular body, blades insertible from one side of the body, and means to lock the blades against displacement, in combination with a cover-ring for said blades.

3. A turbine directing device or intermediary, comprising an annular body having slits

cut partly through the body, blades having notched shanks insertible from one side of the body in said slits and a locking-ring engaging the notches of said shanks to lock the blades against displacement.

4. A turbine directing device or intermediary, comprising an annular body, having slits cut partly through the body, blades having notched shanks insertible from one side of the body into said slits and a sectional locking-ring engaging the notches of said shanks to lock the blades against displacement.

5. A turbine directing device or intermediary, comprising an annular body, blades having notched shanks insertible from one side of the body, said blades projecting beyond the periphery of the body, a locking-ring engaging the notches of the blade-shanks and a cover-ring for the blades.

6. A turbine directing device or intermediary, comprising an annular body having separate blade-seats formed in its rim and open on one side of said body, blades insertible into said seats from said side of the body, means to lock said blades against displacement and a sectional cover-ring for said blades.

7. A turbine directing device or intermediate, comprising an annular body having separate blade-seats formed in its rim and open on one side of said body, blades insertible into said seats from said side of the body, means to lock said blades against displacement and a sectional cover-ring for said blades detachably secured to the annular body.

8. In steam or gas turbines, a directing device for the steam or gas with guide-blades, said blades having feet projecting from the body of the blades, a body which supports the guide-blades, said body being provided with slits in which the feet of the guide-blades are placed, a locking-ring arranged in the one face of the body supporting the blades, said ring engaging in notches of the feet of the blades, substantially as set forth.

9. In steam or gas turbines, a directing device with a disk-like body and a ring arranged at some distance around the periphery of the disk-like body, guide-blades arranged between the periphery of the disk-like body and the ring, said guide-blades having feet projecting from the body of the blades and engaging in slits of the disk-like body, a locking-ring arranged in the one face of the disk-like body and engaging in notches of the feet of the blades, substantially as set forth.

10. In steam or gas turbines, a directing device with a disk-like body and a ring supported by pieces projecting from the periphery of the disk-like body, guide-blades arranged in the apertures between the ring and the disk-like body, said guide-blades having feet projecting from the body of the blades and engaging in slits of the disk-like body, a locking-ring arranged in the one face of the disk-like body and engaging in notches of the feet of the blades, substantially as set forth.

11. In steam or gas turbines, a directing device with a disk-like body provided with slits in the periphery, said slits extending to the one face of the body, a ring supported by pieces projecting from the periphery of the disk-like body, guide-blades arranged in the apertures between the ring and the disk-like body, said guide-blades having feet projecting from the body of the blades and fitting in the slits of the disk-like body, a locking-ring arranged in the face of the disk-like body to which the slits extend, said locking-ring engaging in notches of the feet of the blades, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PIERRE RAMBAL.

Witnesses:
A. LIEBERKNECHT,
EMIL BLUM.