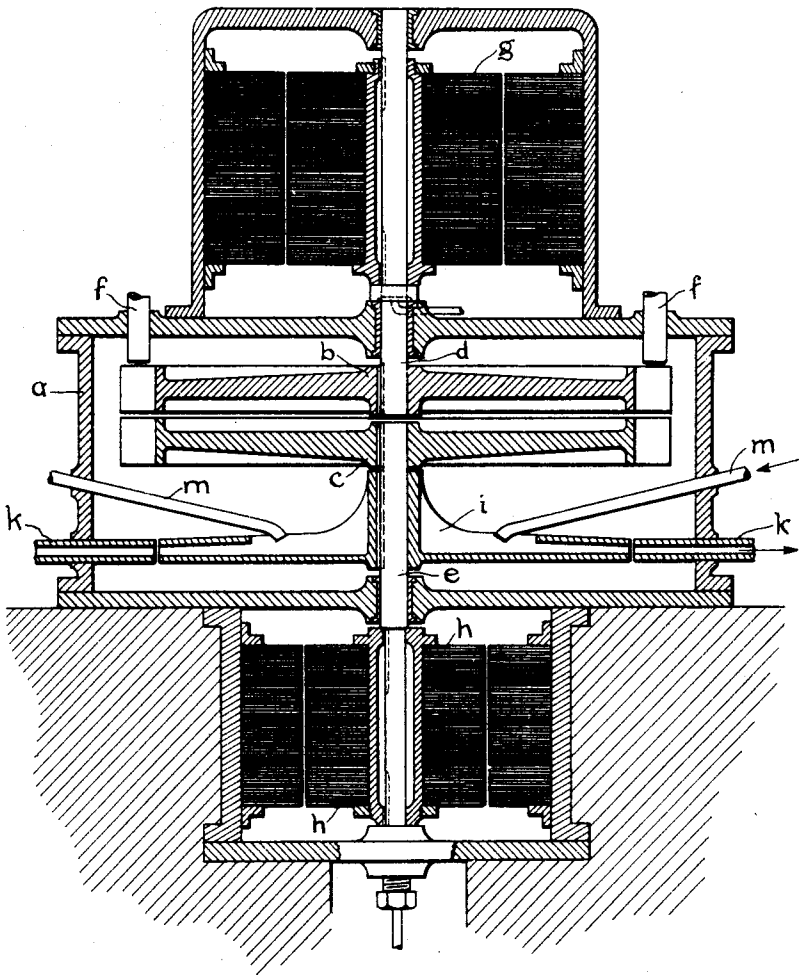


No. 791,055.

PATENTED MAY 30, 1905.

J. STUMPF.
STEAM TURBINE.

APPLICATION FILED SEPT. 8, 1903. RENEWED OCT. 19, 1904.



Witnesses:

Irving E. Myers.
Allen Oxford

Inventor,

Johann Stumpf.

By *Allen S. Davis*
Att'y.

UNITED STATES PATENT OFFICE.

JOHANN STUMPF, OF CHARLOTTENBURG, GERMANY, ASSIGNOR TO
GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

STEAM-TURBINE.

SPECIFICATION forming part of Letters Patent No. 791,055, dated May 30, 1905.

Application filed September 8, 1903. Renewed October 19, 1904. Serial No. 229,110.

To all whom it may concern:

Be it known that I, JOHANN STUMPF, a subject of the King of Prussia, German Emperor, and a resident of 27 Rankestrasse, Charlottenburg, near Berlin, in the Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Steam-Turbines, of which the following is an exact specification.

My invention relates to improvements in steam-turbines, and more especially to a steam-turbine with two turbine-wheels situated one at the side of the other one, so that the steam can flow from one turbine-wheel directly into the other one without fixed leading vane-rims being arranged between the turbine-wheels. In such turbines the primary wheel—that is, the wheel directly impinged upon by the fresh steam—naturally develops a greater power than the secondary wheel. Therefore these two turbines can advantageously be used for driving two machines which require a different power—as, for instance, two dynamo-machines of different size. In all steam-turbines it is a great advantage to have the turbine-wheels rotate in a horizontal direction—that is to say, to have the shafts of the turbine-wheels situated in the vertical direction. If by means of a steam-turbine two different machines shall be driven, it is naturally advantageous to arrange one machine above the turbine-wheels and the other one below the same. The machine situated below the turbine-wheels will advantageously be situated in the foundation of the turbine, and it has proved a great disadvantage that this machine is not sufficiently cooled. The upper machine can be easily cooled on account of the same being free from all sides. Now in order to avoid a heating of the lower machine by the steam of the turbines and to effect a cooling of the same I provide my present invention, which consists in arranging between the lower machine and the turbine-wheels a condenser.

In order to make my invention more clear, I refer to the accompanying drawing, which shows in a somewhat diagrammatic manner a

vertical section of a turbine constructed according to my invention.

In the example shown in the drawing a centrifugal condenser is shown; but it will be understood that any other suitable condenser may be used.

In the drawing, *a* is the turbine-casing, in which the turbine-wheels *b* and *c* are situated. The turbine-wheel *b* is fixed to a shaft *d*, and the turbine-wheel *c* is fixed to a shaft *e*.

f represents the steam-admission nozzles, through which the steam flows upon the turbine-wheel *b*. After passing the vanes of this turbine-wheel the steam flows into the vanes of the turbine-wheel *c*. The primary wheel *b* naturally develops a greater power than the secondary wheel *c*. It will be understood that the wheels *b* and *c* rotate in opposite directions.

Above the turbine-casing *a* a machine to be driven is arranged. In the example shown in the drawing a dynamo-machine is to be driven, the armature *g* of which is fixed to the shaft *d*. Below the turbine-casing *a* a smaller machine to be driven is situated. In the example shown in the drawing this is also a dynamo-machine, the armature *h* of which is fixed to the shaft *e*. It will be seen that this smaller dynamo-machine is situated perfectly in the foundation of the turbine.

i is the impeller of a centrifugal condenser. This impeller is fixed to the shaft *e*. Around the impeller *i* the fixed vane-rim *k* is situated. The cooling-water enters through pipes *m*. It will be understood that instead of these pipes any other convenient means may be provided for leading the water to the impeller. The steam in the turbine-casing *a* comes naturally in contact with the water, condenses, and the condensed steam is taken along by the water entering through the pipes *m* and is thrown out of the casing through the openings in the vane-rim *k*.

The condenser forms a partition between the turbine and the lower dynamo-machine, which partition on account of being cooled by the water avoids the detrimental effect of the heat of the turbine upon the lower machine.

Having thus fully described the nature of this invention, what I desire to secure by Letters Patent of the United States is—

1. In a steam-turbine, the combination of
5 two turbine-wheels rotating in opposite directions, a driven element connected with each wheel, means for admitting steam above said turbine-wheels, a casing inclosing said turbine-wheels, an extension on said casing inclosing the driven element below the wheels,
10 and a condenser in said casing extending across the space and forming a partition between the turbine-wheels and said lower driven element, substantially as described.

2. A turbine, comprising a casing, relatively rotating buckets and fluid-discharging devices, in combination with a support for the turbine, a driven element located below the casing and within the support, a second
20 element also driven by and located above the turbine, and a condenser located between the

exhaust side of the wheel-buckets and one of said elements.

3. A turbine, comprising a casing, oppositely-rotating bucket-wheels, and nozzles
25 which are common to the wheels, in combination with a support which supports the turbine in a vertical position, an element located above the bucket-wheels and driven by one of them, a second element located below the
30 bucket-wheels and within the support, and conduits for conveying water to and from the wheel-casing at a point above the lower driven element and below the bucket-wheels.

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

JOHANN STUMPF.

Witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.