

L. CUBELIC.
UTILIZING LEAKAGE STEAM IN STEAM TURBINES.
APPLICATION FILED OCT. 16, 1912.

1,062,892.

Patented May 27, 1913.

Fig. 1.

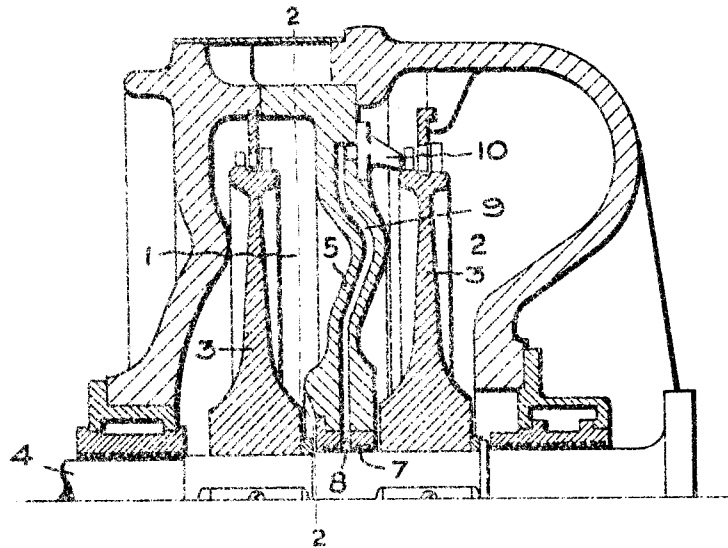
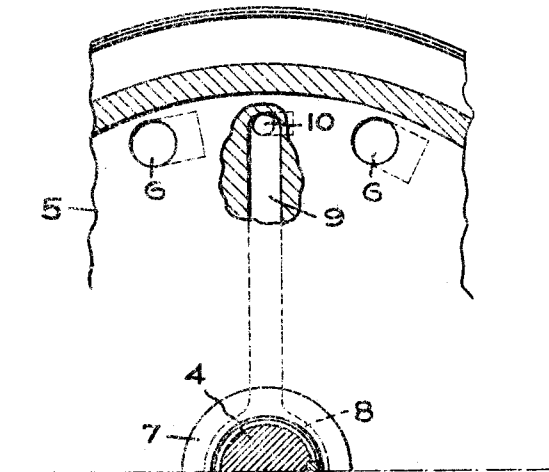


Fig. 2.



Witnesses:

Marcus C. Byng.
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Att'y.

UNITED STATES PATENT OFFICE.

LUDWIG EUBELIC, OF CHARLOTTENBURG, GERMANY, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

UTILIZING LEAKAGE STEAM IN STEAM-TURBINES.

1,062,892.

Specification of Letters Patent.

Patented May 27, 1913.

Application filed October 15, 1912. Serial No. 725,825.

To all whom it may concern:

Be it known that I, LUDWIG EUBELIC, a subject of the King of Prussia, residing at Charlottenburg, Germany, have invented certain new and useful Improvements in Utilizing Leakage Steam in Steam-Turbines; of which the following is a specification.

This invention relates to elastic fluid turbines, and its object is to enable the steam which leaks through the stuffing boxes between the different pressure stages of a multi-stage turbine to be utilized for the performance of work, by expansion in one or more nozzles of a lower stage.

One embodiment of the invention is illustrated in the accompanying drawing, wherein—

Figure 1 shows in longitudinal section a portion of a two-stage turbine equipped with said invention, and Fig. 2 is a cross-section on the line 2—2, Fig. 1, partly broken away.

The turbine shown has two stages 1 and 2, in each of which is a bucket wheel 3 mounted on the shaft 4. A diaphragm 5 separates the two stages, the steam being led from the stage 1 to act upon the buckets of the wheel in stage 2 through nozzles 6 of any desired construction mounted on said diaphragm. At the point where the shaft passes through it, the diaphragm is provided with a stuffing box or packing device 7. At some point between the ends of said packing device, I provide means for collecting the steam which may leak through it, such means consisting preferably of an annular groove 8 in said packing device which communicates by a conduit 9 with a suitable device to discharge the leakage steam against the buckets of the wheel in stage 2. The conduit 9 is preferably made in the diaphragm itself as shown though this is not essential. The discharge device is preferably a special nozzle 10, located on the diaphragm in line with the buckets on the wheel 3 in stage 2.

This invention reduces quite substantially the leakage losses. It is evident that the leakage steam may be led to one of the regular nozzles 6, if desired, instead of to a special nozzle.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative, and that the invention can be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States is:—

1. In a turbine, the combination of a rotor, a casing therefor, a shaft for the rotor, a packing for the shaft, and means receiving leakage fluid from the packing and discharging it against the rotor in a direction to assist its rotation.

2. In a turbine, the combination of a rotor having buckets, a casing therefor, a shaft for the rotor, a packing for the shaft, a device for discharging fluid against the buckets, and means for supplying fluid to the device from the packing.

3. The combination with a multi-stage turbine having diaphragms between stages, of a packing device for a diaphragm provided with means for collecting leakage steam, and a conduit for conveying said steam to a point where it can act upon the bucket wheel of a lower stage.

4. The combination with a multi-stage turbine having diaphragms between stages, of a special nozzle on one of said diaphragms, a packing device for a diaphragm provided with an annular groove for collecting leakage steam, and a conduit conveying said steam to said special nozzle.

5. The combination with a multi-stage turbine having diaphragms between stages, of a packing device for a diaphragm having an annular groove for collecting leakage steam, and a conduit formed in said dia-

phragm for connecting said groove with a nozzle.

6. The combination with a multi-stage turbine having diaphragms between stages, 5 of a special nozzle on one of said diaphragms, a packing device for said diaphragm having means for collecting leakage steam, and a conduit formed in said dia-

phragm for conveying said steam to said nozzle.

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In witness whereof, I have hereunto set my hand this 28 day of September 1912.

LUDWIG CUBELIC.

Witnesses:

FRIEDRICH GANZERT,

OTTO SHMIDT.