No. 750,316. PATENTED JAN. 26, 1904.

J. STUMPF.

STEAM OR GAS TURBINE.

APPLICATION FILED SEPT. 8, 1903.

NO MODEL.

Fig. 1.

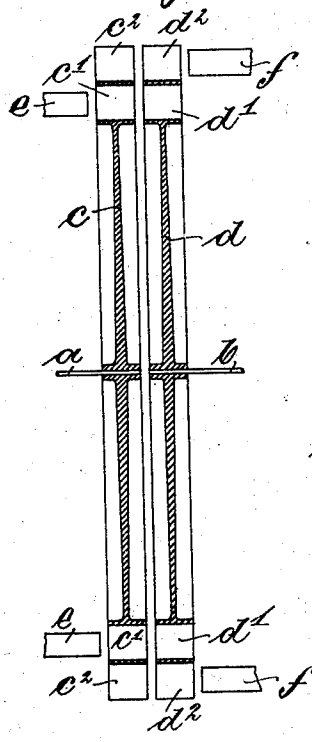
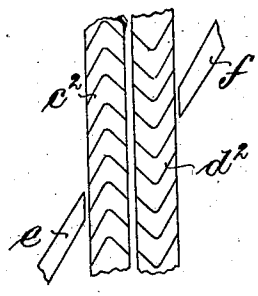


Fig. 2.



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No. 750,316. Patented January 26, 1904.

UNITED STATES PATENT OFFICE.

JOHANN STUMPF, OF CHARLOTTENBURG, GERMANY.

STEAM OR GAS TURBINE.

SPECIFICATION forming part of Letters Patent No. 750,316, dated January 26, 1904.

Application filed September 8, 1903. Serial No. 172,241. (No model.)

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, Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Steam or Gas Turbines, of which the following is an exact specification.

My invention relates to improvements in steam or gas turbines, and more especially to turbines with two or more turbine-wheels rotating in opposite directions. It has already been tried to construct such turbines in which the deleterious effect of the reactionary force produced by the steam or compressed air when leaving the nozzles is avoided, which reactionary force tends to move the nozzle-rim or the casing in which the nozzle-rim is fixed in a direction opposite to the direction in which the turbine-wheel revolves. The turbines by means of which this reactionary force should be avoided were constructed in such a way that nozzles were arranged for both the primary wheel as well as the secondary wheel, so that the reactionary forces of both nozzle-rims compensate each other and that one wheel forms the primary wheel for the second one and the second wheel forms the primary wheel for the first one. These constructions have, however, the disadvantage that the nozzles of one turbine-wheel must always alternate with the nozzles of the other one in order to avoid the steam-jets flowing in opposite direction meeting one another in the turbine-wheels. In consequence hereof only a restricted number of nozzles could be arranged. In order to do away with this disadvantage, I provide my present invention, which consists in providing each turbine-wheel with two or more bucket or vane rims situated one concentrically around the other one. In case, for instance, of two bucket or vane rims being provided for each wheel the inner rim of one turbine-wheel is fed with fresh steam, which after flowing through the buckets of this inner rim flows into the buckets of the inner rim of the second turbine-wheel. The outer rim of this second turbine-wheel is fed again with fresh steam, which after passing the outer rim of this wheel flows into the outer rim of the first wheel. It will be clear that it is attained by this arrangement that both turbine-wheels have the same useful effect and that the reactionary force produced by the steam or compressed air when leaving the nozzles cannot have any deleterious effect. The steam in this construction flows through each bucket only in one direction, so that the shape of these buckets can be constructed so as to be most fit for the respective direction of the steam-flow and that guide-vane rims are not necessary at all.

In order to make my invention more clear, I refer to the accompanying drawings, in which—

Figure 1 shows a vertical section of a turbine constructed according to my invention. Fig. 2 shows parts of the circumference of the turbine-wheels.

In the drawings, c and d are turbine-wheels. The turbine-wheel c is fixed to a shaft a and the turbine-wheel d is fixed to the shaft b. Both turbine-wheels are provided with two concentric vane-rims c' c^2 and d' d^2. The nozzles e are situated so as to lead the steam into the vane-rim c' and the nozzles f are situated so as to lead the steam into the vane-rim d^2. It will be clear that it is impossible in this construction that two steam-jets meet one another. The nozzles can be provided all around the circumference of the turbine-wheels.

The construction may naturally be modified in different ways—so, for instance, three or more turbine-wheels may be provided or each turbine-wheel may be provided with four or more concentric bucket-rims. The different bucket-rims belonging together c' d' and c^2 d^2 may be fed with fresh steam or may be fed after the compound system—for instance, by leading the steam leaving the vanes d' into the nozzles f.

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 or gas turbine, the combination of two turbine-wheels rotating in opposite directions, with two concentric vane-rims

for each turbine-wheel, and means for leading steam to the inner rim of one turbine-wheel and means for leading steam to the outer rim of the second one, substantially as described and for the purpose set forth.

2. In a steam or gas turbine, the combination of several turbine-wheels, each provided with several concentric vane-rims, means being provided for leading steam to both sides into the concentric rows of vanes, substantially as described and for the purpose set forth.

3. In a steam or gas turbine, the combination of two or more turbine-wheels, the adjacent wheels adapted to rotate in opposite directions, two or more vane-rims for each turbine-wheel, and independent means for leading steam to the alternate sides of the said vane-rims, substantially as described.

4. In a steam or gas turbine, the combination of a plurality of turbine-wheels, each wheel having two or more vane-rims, and nozzles for leading steam alternately to the opposite sides of said vane-rims, substantially as described.

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

JOHANN STUMPF.

Witnesses:
HENRY HASPER,
WOLDEMAR HAUPT.