

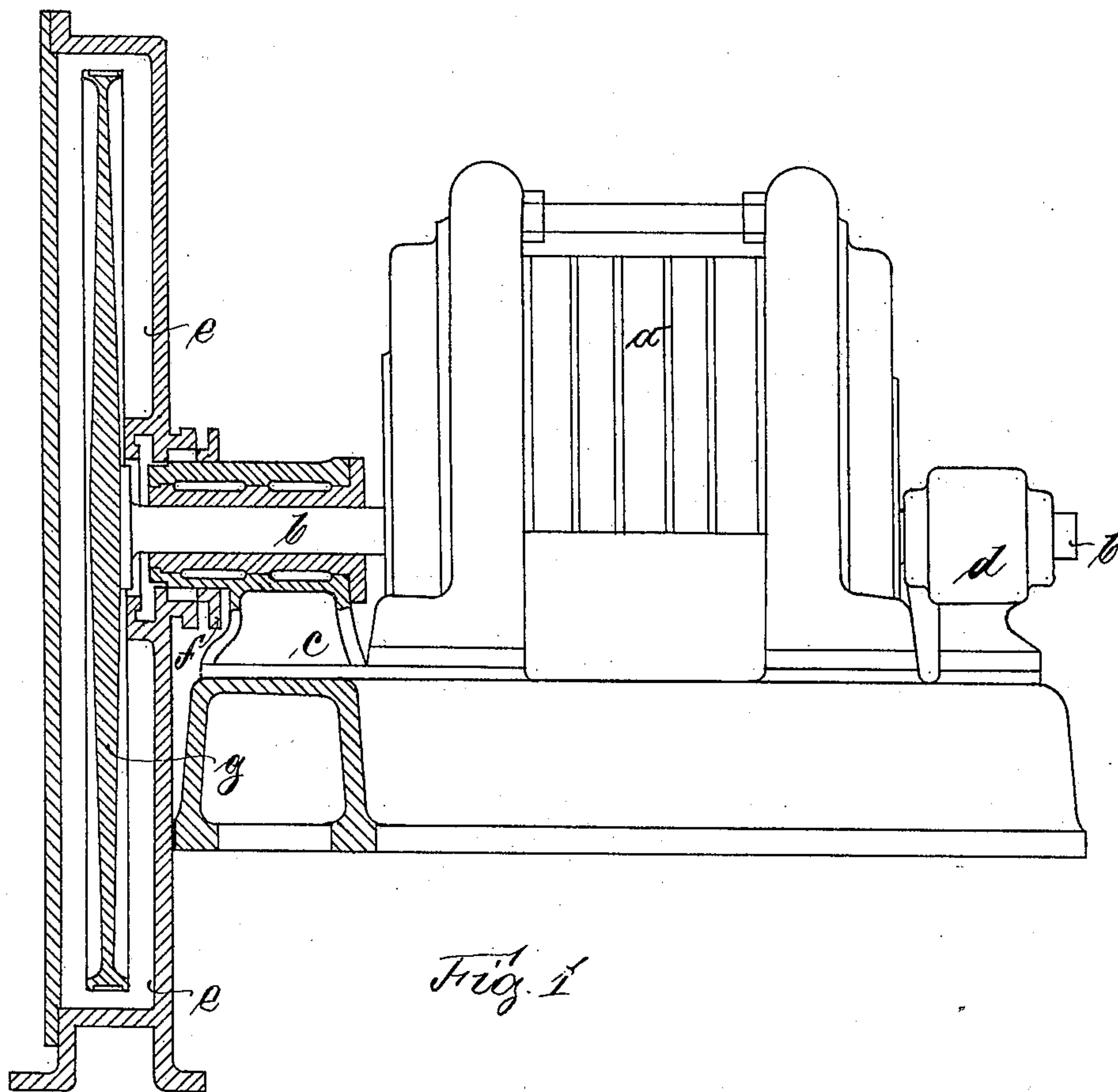
No. 760,036.

PATENTED MAY 17, 1904.

J. STUMPF.  
STEAM TURBINE.  
APPLICATION FILED SEPT. 8, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



*Fig. 1*

Witnesses:  
Emil Kayser.  
Max Weschen

Inventor  
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No. 760,036.

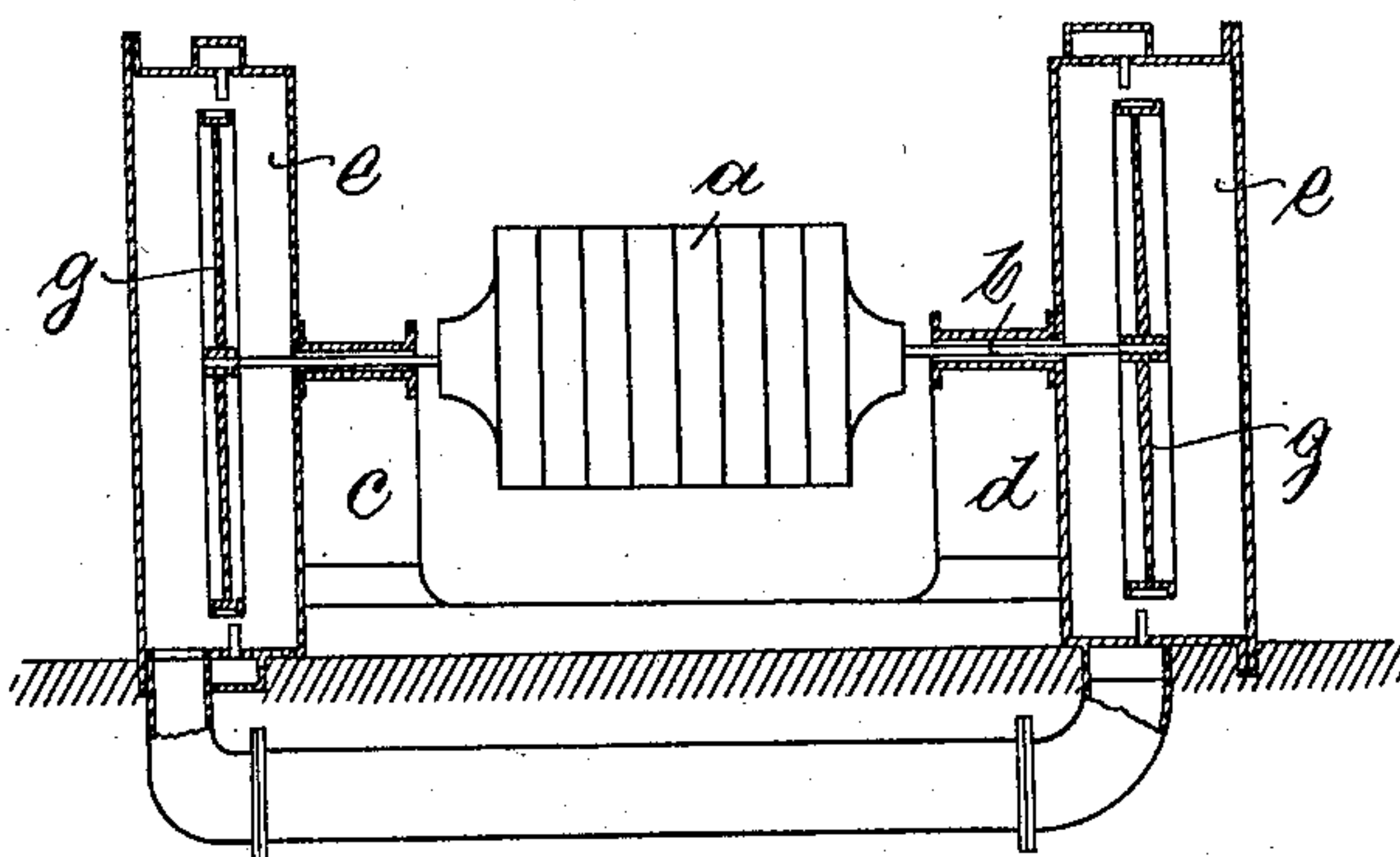
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NO MODEL.

2 SHEETS—SHEET 2.

*Fig. 2.*



Witnesses:

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# 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. 760,036, dated May 17, 1904.

Application filed September 8, 1903. Serial No. 172,243. (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 the direct coupling of the turbine-wheels to the shaft of the machine to be driven.

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

Figure 1 shows the invention applied to a dynamo-machine to be driven by means of a steam-turbine. Fig. 2 is a modification of the construction shown in Fig. 1, in which modification two turbines are used for driving the dynamo-machine.

In the construction shown in Fig. 1, *a* is a dynamo-machine. *b* is a shaft carrying the armature of the same. The shaft *b* is journaled in bearings *c* and *d*. *e* is the turbine-casing. *g* is the turbine-wheel, fixed to the end of the shaft *b*. *f* is a stuffing-box, which stuffing-box may be constructed so as to allow small movements of the shaft *b* in a radial direction. The arrangement of the turbine-wheel *g* at the end of the shaft *b* has great advantages. First, it must be considered a great advantage that by this arrangement only two bearings are necessary for the dynamo-machine and the turbine; second, the turbine-wheel forms a counterweight for the armature of the dynamo-machine, so that the shaft *b* of the armature can have a smaller diameter without the same bending by the weight of the armature. A third advantage consists in the shambling of the turbine-wheel being avoided by arranging the same upon the shaft of the armature. In all turbines a shambling of the turbine-wheels occurs on account of it being impossible to perfectly balance the wheels. Even in case the turbine-wheels are perfectly balanced before starting the turbine it occurs that by the several buckets or vanes

not wearing equally a shambling of the turbine-wheels begins after the turbine has been running for a while. This shambling occurs from the center of gravity of the turbine-wheel not being situated exactly in the axis of the same. In consequence thereof a centrifugal power arises, by means of which the shambling is effected. Now on account of the turbine-wheel being arranged upon the shaft of the dynamo-armature the shambling cannot so easily occur on account of the great weight of the structure. By the great weight of the armature the shaft to which this armature and the turbine-wheel are fixed is pressed down, so that the centrifugal power arising by the center of gravity of the turbine-wheel not being exactly situated in the axis of the same is not sufficient for overcoming the weight resting upon the shaft and for effecting a shambling of the turbine-wheel.

It will be understood that instead of arranging one turbine-wheel upon the end of the shaft outside the bearing two or more turbine-wheels may be arranged upon this end. It will also be understood that turbine-wheels may be arranged upon both ends of the shaft, as shown in Fig. 2 of the drawings. In the construction shown in this figure only one turbine-wheel is shown upon each end of the shaft, and the steam leaving one turbine is guided to the second one; but it will be understood that two or more turbine-wheels may be arranged on each end of the shaft and that the turbines may both be fed by fresh steam.

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 a machine to be driven, the shaft of this machine being journaled in two bearings, with a turbine-wheel situated upon the free end of this shaft outside the bearing, and means for permitting a small radial movement of said shaft, substantially as described and for the purpose set forth.

2. In a steam or gas turbine, the combination of a machine to be driven, the shaft of this machine being journaled in two bearings,

with two turbines, the wheels of which are situated upon the free ends of the shaft outside the bearings, substantially as described and for the purpose set forth.

- 5 3. In a steam or gas turbine, the combination of a machine to be driven, a shaft for said machine, bearings for said shaft upon the opposite sides of said machine, two turbines the wheels of which are situated upon the free ends  
10 of said shaft outside the bearings, and means

for exhausting steam from the primary turbine to the secondary turbine, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses. 15

JOHANN STUMPF.

Witnesses:

HENRY HASPER,  
WOLDEMAR HAUPT.