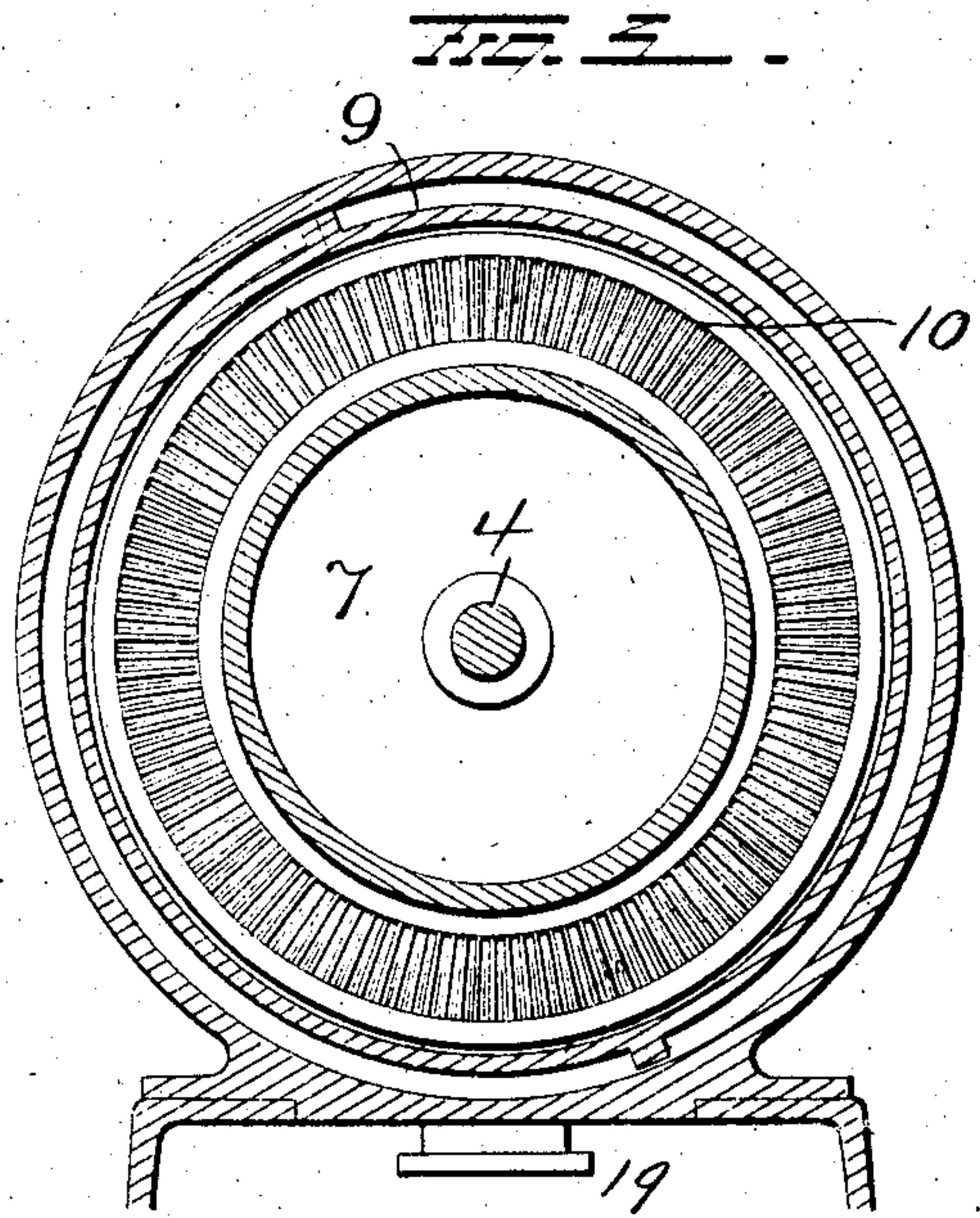
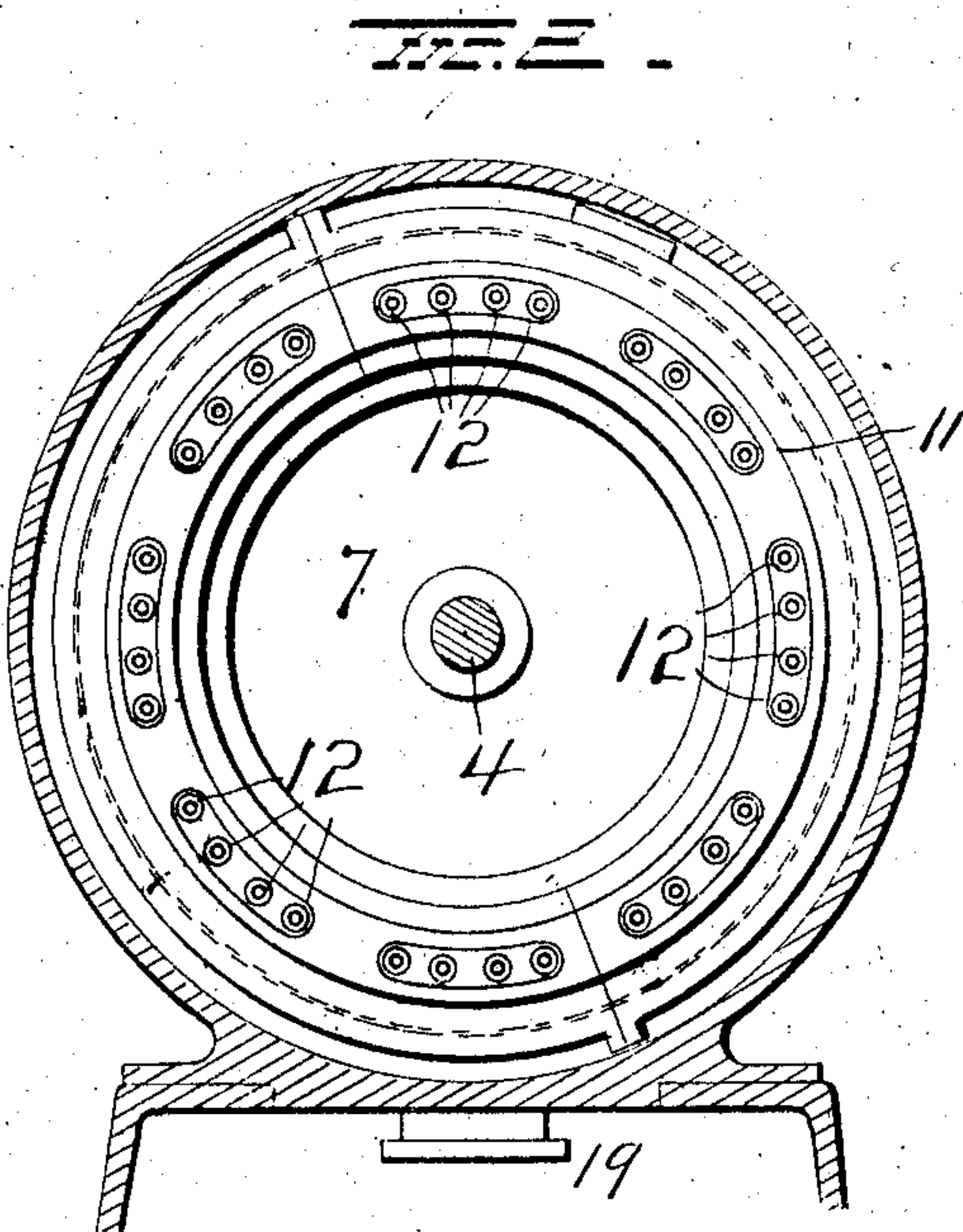
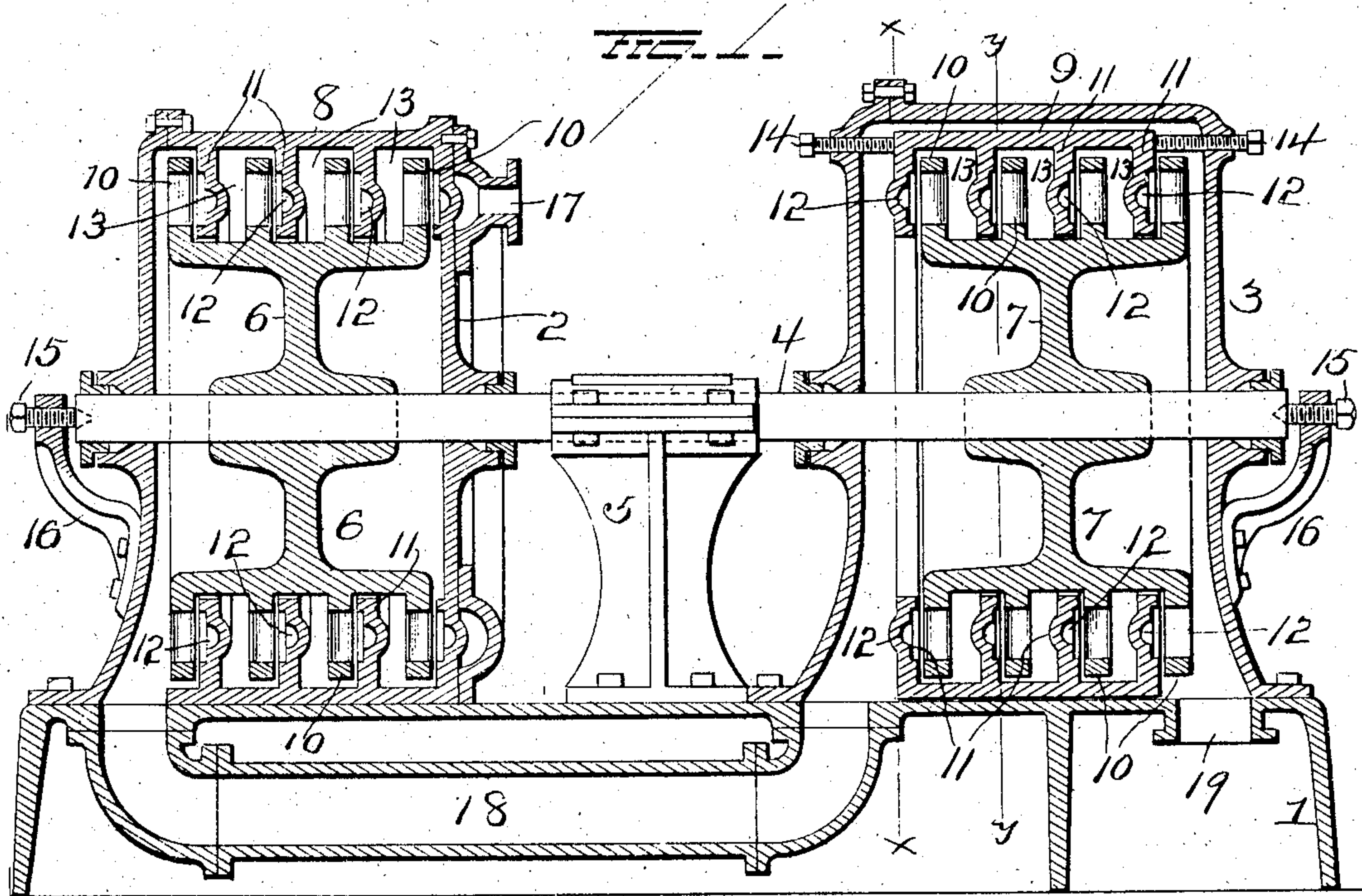


No. 778,326.

PATENTED DEC. 27, 1904.

P. C. OSCANYAN.  
STEAM TURBINE.

APPLICATION FILED DEC. 3, 1903.



WITNESSES

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# UNITED STATES PATENT OFFICE.

PAUL CHRISTOPHER OSCANYAN, OF NEWARK, NEW JERSEY, ASSIGNOR,  
BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-HALF TO G. A. THOM-  
SON, OF SOMERVILLE, NEW JERSEY, AND THE ADAMS-BAGNALL ELEC-  
TRIC COMPANY, OF CLEVELAND, OHIO.

## STEAM-TURBINE.

SPECIFICATION forming part of Letters Patent No. 778,326, dated December 27, 1904.

Application filed December 3, 1903. Serial No. 183,645.

*To all whom it may concern:*

Be it known that I, PAUL CHRISTOPHER OSCANYAN, a resident of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Steam-Turbines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improved steam-turbine, the object of the invention being to provide improvements of this character in which the rotary element is provided with several series of buckets, each of which series receives direct impact of steam discharged thereagainst by suitable nozzles or discharge-orifices, and interposed between each series of buckets and the next series of nozzles or discharge-orifices is a receiver-chamber into which steam from the series of buckets in advance is directed after the kinetic energy due to expansion in the nozzle has been absorbed by the buckets, and by this means the entire motive force of a given quantity of steam is utilized, and the speed of the turbine can be controlled by the number of nozzles in use.

With this object in view the invention consists in certain novel features of construction and combinations and arrangements of parts, as will be more fully hereinafter described, and pointed out in the claim.

In the accompanying drawings, Figure 1 is a view in section illustrating one embodiment of my invention. Fig. 2 is a view in section on the line *x x* thereof. Fig. 3 is a view in section on the line *y y*.

1 represents a base on which two casings 2 and 3 are mounted, and a shaft 4 is located in aligned bearings in said casings, suitably packed to prevent escape of steam and supported between the casings by a post or standard 5. In casing 2 a rotating element or member 6 is located, and a similar rotating member 7 is located in casing 3, both being securely fixed on shaft 4, and stationary members 8 and 9

are located in the respective casings. The rotating members 6 and 7 are both provided with several annular series of dished vanes or buckets 10, located beside rings 11 of the stationary members and suitably packed to prevent the passage of steam except through nozzles or ports 12 in the rings, and between each ring 11 and the series of buckets 10 in advance thereof a receiver or chamber 13 is provided for a purpose which will hereinafter appear. Set-screws 14 may be provided to adjust the position of the stationary members to compensate for wear, and set-screws 15, located in brackets 16, may be provided to adjust the shaft and rotating members.

17 is an inlet for steam into casing 2, from which it exhausts through a pipe 18 into casing 3 and exhausts therefrom through a port 19.

The nozzles or ports 12 are located at an angle to direct the steam directly against the dished buckets in the direction of rotation thereof, and the operation of my improvements is as follows: Steam enters inlet 17 and is directed by the first set of nozzles 12 against the first series of buckets 10, which direct impact of the steam under its pressure will serve to drive the rotating members at a rapid rate. After passing between the first series of buckets 10 the steam collects in the first annular chamber 13 and then passes through the next series of nozzles 12, expanding therein to the pressure of the next stage against the next series of buckets 10 into the next chamber 13, and so on throughout the casing. The expanding of the steam in several nozzles and subsequent impact of this expanded steam serves to control and steady the operation of turbine, at the same time utilizing all the power of the steam. From casing 2 the steam exhausts through pipe 18 into casing 3, and the operation above described is repeated in this casing, which serves as a further controlling medium for the turbine and insures the steady uniform operation thereof.

A great variety of different constructions



might be employed to carry out my invention, which consists, broadly, in a series of nozzles to direct steam against one series of vanes or buckets of a rotating element and a receiving-chamber into which the steam from the buckets or vanes escape and is directed therefrom by another series of nozzles against a second series of vanes or buckets of the rotating element.

10 With my improvements the speed of the turbine can be controlled perfectly and at the same time the power of the steam utilized to the maximum degree.

A vast number of changes might be made in the general form and arrangement of the several parts described without departing from my invention, and hence I would have it understood that I do not restrict myself to the precise details set forth, but consider myself at liberty to make such slight changes and alterations as fairly fall within the spirit and scope of my invention.

20 Having fully described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

In a turbine, the combination of a casing provided with a series of normally fixed rings, each having a series of nozzles constructed to develop adiabatical expansion of fluid and discharge the same into the annular chambers between said rings at a pressure equal to that in said chambers, a wheel mounted to rotate in said casing and provided on its periphery with a series of vanes, each having a series of buckets to receive the fluid-pressure issuing from said nozzles, the width of each vane being appreciably less than that of the annular chamber in which it revolves.

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

PAUL CHRISTOPHER OSCANYAN.

Witnesses:

C. F. SMITH,

FRANK Y. DAVIS.