

C. E. HICKS.
TURBINE.

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976,260.

Patented Nov. 22, 1910.

2 SHEETS—SHEET 1.

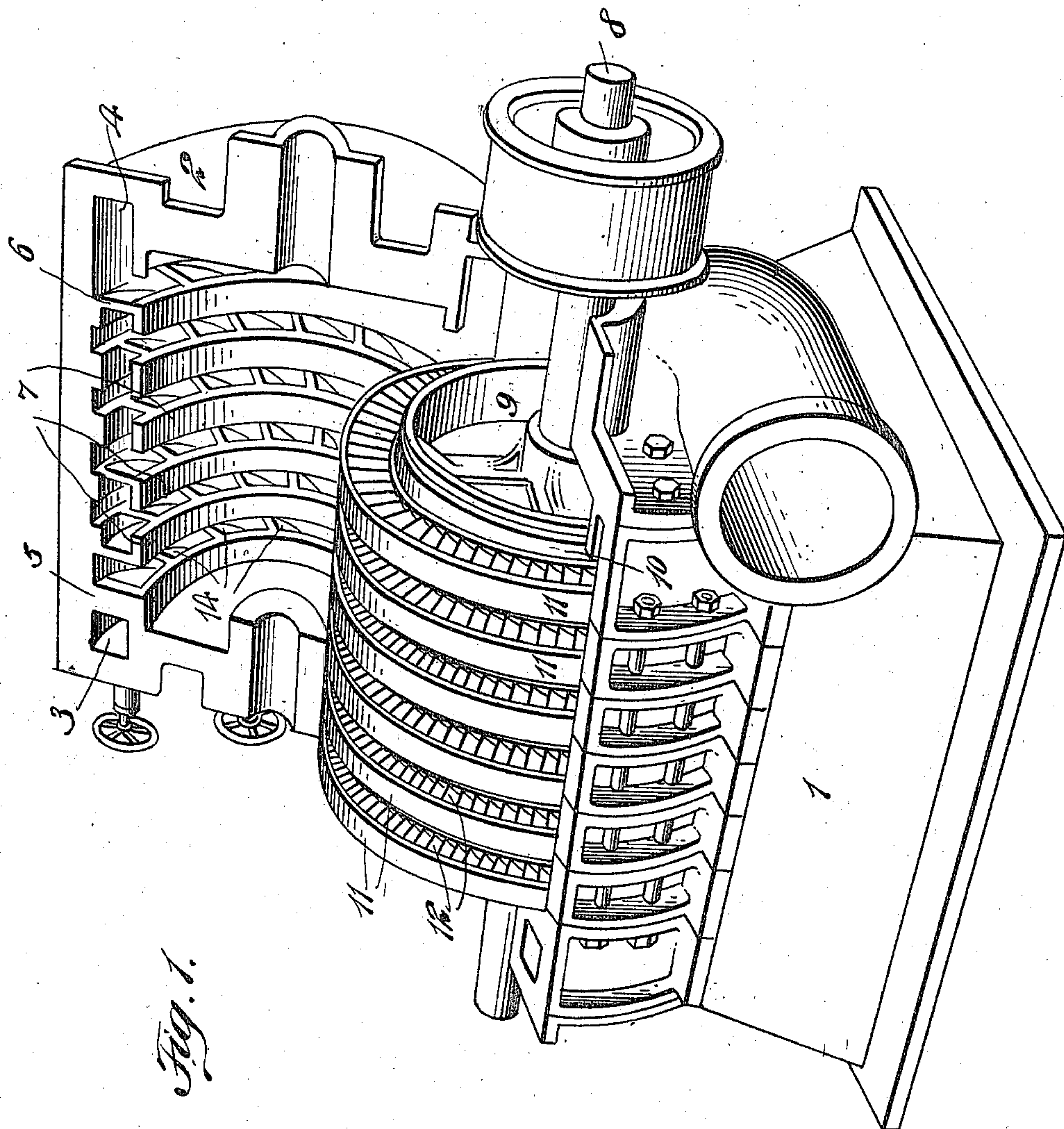


Fig. 1.

WITNESSES
Julius H. Hoff
E. Louis Frank

INVENTOR
Charles E. Hicks
BY *Almon R. [Signature]*
ATTORNEY

UNITED STATES PATENT OFFICE.

CHARLES E. HICKS, OF MECHANICSVILLE, NEW YORK.

TURBINE.

976,260.

Specification of Letters Patent. Patented Nov. 22, 1910.

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To all whom it may concern:

Be it known that I, CHARLES E. HICKS, citizen of the United States of America, residing at Mechanicsville, Saratoga county, New York, have invented certain new and useful Improvements in Turbines, of which the following is a specification.

The present invention relates to the class of turbines described and illustrated in my co-pending application for United States Letters Patent #343279 filed Nov. 13th, 1906.

My present application relates especially to the form and construction of the rotor blades, and to the form and construction of the walls which define the motive-fluid expansion-passages between the several series of rotors in the turbine.

It is my purpose to avoid all reaction of the motive fluid in its passage through the several turbine stages and also to avoid formation of eddies adjacent the rotor and stator parts. These several purposes I accomplish by the construction about to be described.

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

Figure 1 is a perspective view of a turbine showing the upper half of the casing raised; and Fig. 2 is a diagram, illustrative of the construction and relative arrangement of the rotor and stator parts.

According to my invention I employ a base 1 upon which is securely mounted by any suitable means an exterior shell or casing 2, having at one end a steam chamber 3 and at its opposite end an exhaust chamber 4. The steam chamber and exhaust chamber are divided from the interior of the stator by suitable walls, 5 and 6, respectively. The interior surface of the shell 2 is provided with a series of inwardly projecting transversely arranged ribs 7 spaced apart to afford paths for the rotor or rotary elements of the turbine to revolve.

Bearing in the casing 2 is the turbine shaft 8 which carries a plurality of rings 9 whereon are suitably held as by a key or in any other convenient manner the rotary elements which comprise upper and lower rings 10, 11, having therebetween and preferably integral therewith the rotor blades 12 each of which (as will be seen upon reference to Fig. 2) has the form of a half-lune, the small or thin end of each blade being arranged at the intake side of the rotor and the widest

part of the blade being arranged at the exhaust side of the rotor.

Formed in the ribs 7 of the stator are expansion passage ways 13, the shape of which is determined by equidistantly arranged substantially ogee-shaped walls 14, the small end of each ogee-wall being adjacent the exhaust side of its preceding rotor element and the widest part of the ogee-wall being adjacent the intake side of its next succeeding rotor element, it being also noted that the width of the ogee-wall at its wide end corresponds precisely to the distance or space between two rotor blades at their thin ends. In the preferred form of my invention the distance between any two of the said ogee-walls at their wide parts is equivalent to three spaces between four rotor blades at their intake ends.

In Fig. 2 the extended arrow line P shows the course followed by the steam or other motive agent employed in its passage through the turbine. The steam enters one of the nozzles N passing at a tangent into or through the rotor element, then expanding in a tangential direction between two walls of the stator element, then passing at a tangent through the next adjacent rotor element and so on through the several turbine stages constantly in a spiral course and progressively expanding.

The turbine above described acts entirely upon the impact or impulse principle and by the novel construction of rotor blades and stator walls, all reaction of the motive fluid is avoided, and as a consequence the loss of such fluid is minimized.

By the present construction no impediments to the steam passage are present and the full effect of the velocity of the steam is employed to produce power and efficiency.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a turbine, the combination with a stator having inwardly extending passaged ribs, of a series of rotor elements provided with half-lune-shaped blades.

2. In a turbine, the combination with a stator having inwardly extending passaged ribs, of a series of rotor elements provided with half-lune-shaped blades, the smaller ends of said blades forming the intake side and the widest parts of said blades forming the exhaust side of said rotor elements.

3. In a turbine, the combination with a

stator having inwardly extending ribs and passages therethrough formed between substantially ogee-shaped walls, of a plurality of rotor elements adapted to revolve between said flanges.

4. In a turbine, the combination with a stator having inwardly extending ribs through which passages are formed defined by substantially ogee-shaped walls, of a plurality of rotor elements adapted to revolve between said flanges, each said rotor element comprising a ring or disk carrying a plurality of half-lune-shaped blades.

5. In a turbine, the combination with a stator having inwardly extending ribs through which passages are formed defined by substantially ogee-shaped walls, of a plurality of rotor elements adapted to revolve between said flanges, each said rotor element comprising a ring or disk carrying a plurality of half-lune-shaped blades, the smaller ends of said blades forming the intake side of the rotor and the wider ends of said blades forming the exhaust side of said rotor.

6. In a turbine, the combination with a stator having passages formed therein defined by substantially ogee-shaped walls, of

a rotor provided with a series of half-lune-shaped blades, substantially as described.

7. In a turbine through which the motive agent passes in a spiral path, the combination with a stator having passages therethrough defined by ogee-shaped walls, of a rotor having a plurality of half-lune-shaped blades, the smaller ends of said blades forming the intake side of said rotor and the wider ends of the blades forming the exhaust side of said rotor, the distance between the wide parts of two of said ogee-walls corresponding precisely with three spaces between four rotor blades at their intake ends.

8. In a turbine, the combination with a stator having passages formed therein defined by substantially ogee shaped walls, of a rotor adapted to revolve in relation to said walls, the width of each said wall at its wide end corresponding exactly to the distance or space between two rotor blades at their thin ends.

In testimony whereof I have affixed my signature in presence of two witnesses.

CHARLES E. HICKS.

Witnesses:

OTTO MUNK,
CLARISSA FRANCK.