J. H. RIVERS.

TURBINE.

APPLICATION FILED APR. 4, 1910.

981,311.

Patented Jan. 10, 1911.

3 SHEETS—SHEET 1.

Fig. 1.

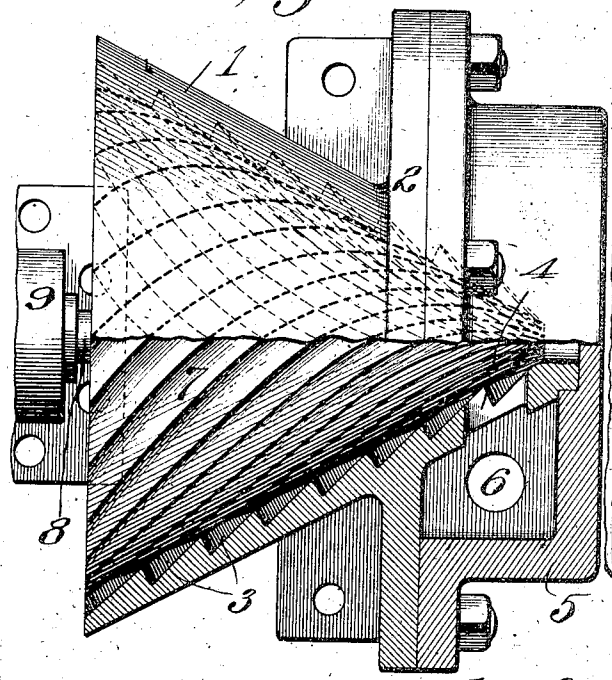


Fig. 2.

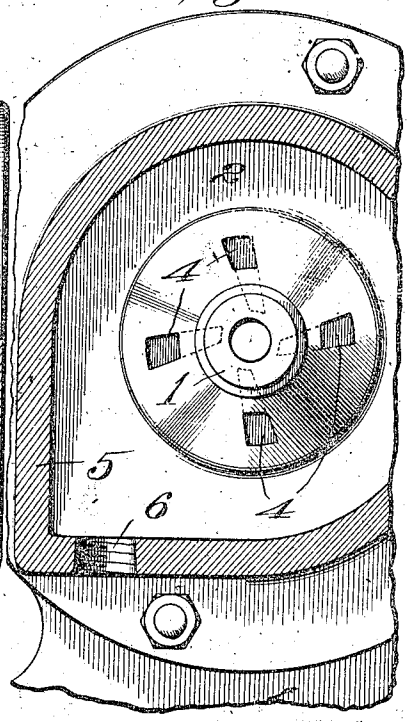
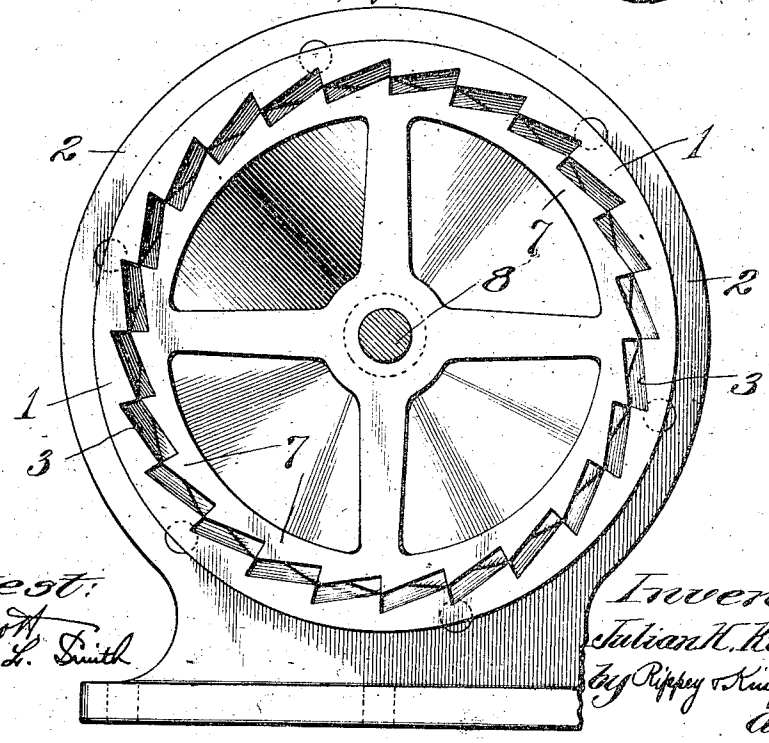


Fig. 3.



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3 SHEETS—SHEET 2.

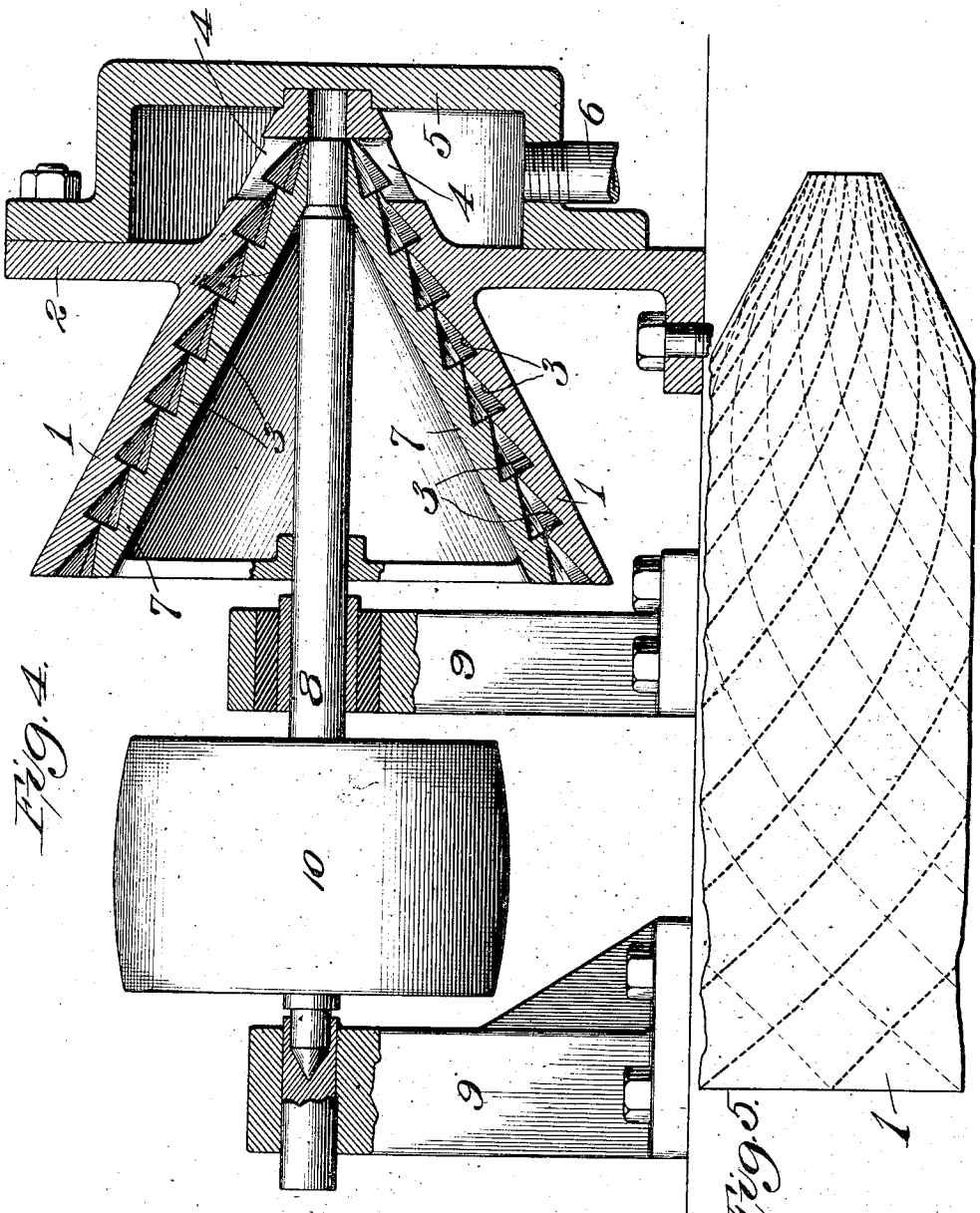

Fig. 4.

Fig. 5.

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3 SHEETS—SHEET 3.

Fig. 7.

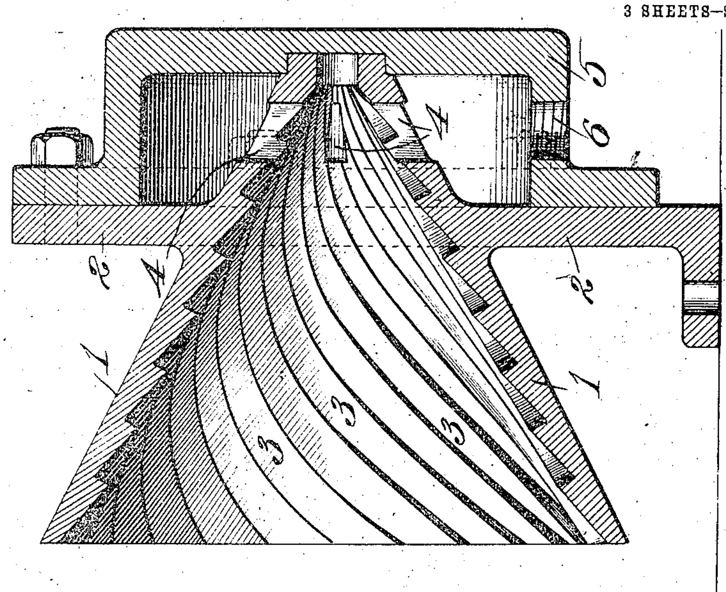
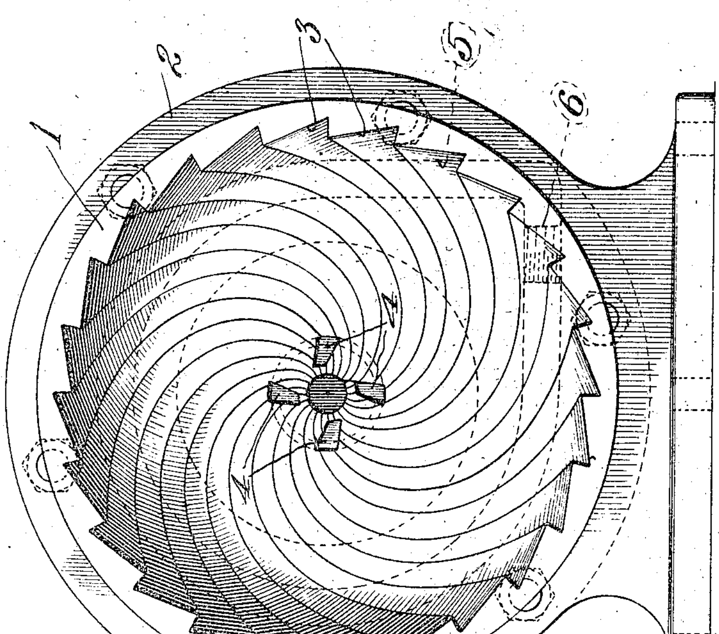


Fig. 6.



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UNITED STATES PATENT OFFICE.

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TURBINE.

981,311. Specification of Letters Patent. Patented Jan. 10, 1911.

Application filed April 4, 1910. Serial No. 553,281.

To all whom it may concern:

Be it known that I, JULIAN H. RIVERS, a citizen of the United States, residing at Niotaze, in the county of Chautauqua, in the State of Kansas, have invented a new and useful Improvement in Turbines, of which the following is a specification.

This invention relates to the construction of turbines; and it has for its object the arrangement of complementary shaped surfaces in such machines of such contours as will be better adapted to the expansion of steam than those now in use, as well as much cheaper in construction.

In turbines of the parallel flow type, the steam flows in a cylindrical shell-shaped body or mass which passes to successively larger chambers to allow for expansion; while in the radial flow type the increase in circumference as the flow passes outwardly through the machine does likewise. But in neither type is the expansion allowed for in the normal manner. If the normal expansion of steam from pressure of, say one hundred pounds, to that of atmosphere be platted as progressing laterally centrally on a fixed axis the contour of the normally expanding flow is of conic or conoidal shape, much resembling that of the bell of a horn; from which it is clear that a conic or conoidal form of the complementary acting surfaces in a turbine will, from its shape alone, allow for the expansion of the steam in a normal manner in its lateral progress through the machine. To avoid the expense of attaching vanes to these surfaces I form the surfaces of the interior and exterior conoids themselves into series of alternating grooves and ridges arranged spirally, with those of the interior cone or conoid oppositely developed to those of the exterior cone or conoid, the conic or conoid shape lending itself readily to such formation by the ordinary operation of molding and casting.

In the accompanying drawings in which I have illustrated one form of my invention, Figure 1 is a broken plan of a turbine illustrating the opposing grooves and ridges in interior and exterior cones or conoids. Fig. 2 is a sectional view on the line 2—2 of Fig. 1, showing the inlet passages through the exterior conoid. Fig. 3 is a view on the line 3—3 of Fig. 1, showing the grooves opening to atmosphere. Fig. 4 is a longitudinal sectional view of the turbine. Fig. 5 is a diagrammatic view, the intersecting dotted spiral lines showing the direction of the grooves and ridges in the interior and exterior conoids. Fig. 6 is a view looking into the exterior conoidal shell. Fig. 7 is a longitudinal sectional view of the exterior shell.

The exterior shell 1, which is of conic or conoidal form, is integral or rigid with a supporting part 2, and may extend through or beyond said part as shown in Fig. 7. The interior surface of the exterior shell contains a series of spiral grooves 3 starting from the small end and spreading apart uniformly to the opposite or larger end in the manner shown in Figs. 6 and 7. At or near the small end of the shell 1 the inlet openings 4 are formed. A housing 5 incloses the protruding end of the shell and forms a chamber into which the steam for the operation of the turbine is admitted, said steam entering the said chamber through an inlet opening 6.

The interior conic or conoidal shell 7, Fig. 4, is attached to a shaft 8 and its exterior surface contains spiral grooves and ridges of opposing development to those on the exterior shell. These grooves and ridges start from the small end of the shell and run spirally to the opposite end, spreading uniformly over the larger surface. The ridges on the interior and exterior conoids being opposingly arranged constitute abutments for the steam whereby the interior conoid will be driven as the steam passes outwardly through the machine. The shaft 8 has bearings 9 and a power transmission pulley 10.

In operation the steam is admitted through the pipe 6 tangentially into the chamber or steam chest 5, thence by the converging tangential parts 4, impinging upon the ridges of the rotor 7; striking obliquely part of its force is expended in driving the rotor 7 and part in causing a rebound toward the large end of the machine, the expansion likewise tending to drive the steam forcibly toward the large end, and such steam as tends to follow the grooves of the rotor, in its outward course expansively engages the ridges in the stator, and vice versa. Thus by proportioning the size of the inlets 4 and the large and small diameters of the engaging surfaces of the rotor 7 and stator 1, I am enabled to admit steam of sufficient quantity at a stated pressure to employ it continu-

ously and expansively until its entire force is exhausted and it reaches atmosphere.

I am aware that there may be many variations in the construction and arrangement of the parts, and in the manner in which they are assembled, without departure from the spirit and scope of the invention. I do not restrict myself to specific features or arrangement, nor to the utilization of steam or any particular motive fluid pressure for driving the turbine, but

What I claim and desire to secure by Letters Patent is—

1. A turbine comprising conic surface acting members telescoped one within the other, oppositely developed ridges on the adjacent surfaces of said members, and means for admitting steam into the exterior conic member tangentially to the ridges thereon, substantially as specified.

2. A turbine comprising an exterior conic member having interior spiral ridges, an interior conic member within said exterior member and having spiral ridges developed oppositely to the said ridges on said exterior member, inlet passages through said exterior member tangentially to said ridges on said interior member, and a steam chest inclosing said inlet passages, substantially as specified.

3. In a turbine, an exterior conic member having interior spiral ridges starting from the smaller end and spreading apart uniformly to the opposite end, in combination with a rotary member within said conic member, and inlet passages opening through said exterior member tangentially to the ridges thereon, substantially as specified.

4. In a turbine, a piston casing or shell having a conical chamber, spiral ridges on the inner wall of said chamber starting from the smaller end and spreading apart uniformly to the opposite end, and a rotary member within said chamber, substantially as specified.

5. In a turbine, a piston casing or shell having a conical chamber, spiral ridges on the inner wall of said chamber starting from the smaller end and spreading apart uniformly to the opposite end, in combination with a rotary conical member within said chamber, spiral ridges on said conical member starting from the smaller end and spreading apart uniformly to the opposite end, and inlet passages opening into said piston casing tangentially to the ridges on said conical member, substantially as specified.

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

JULIAN H. RIVERS.

Witnesses:
FRANKLIN MILLER,
J. D. RIPPEY.