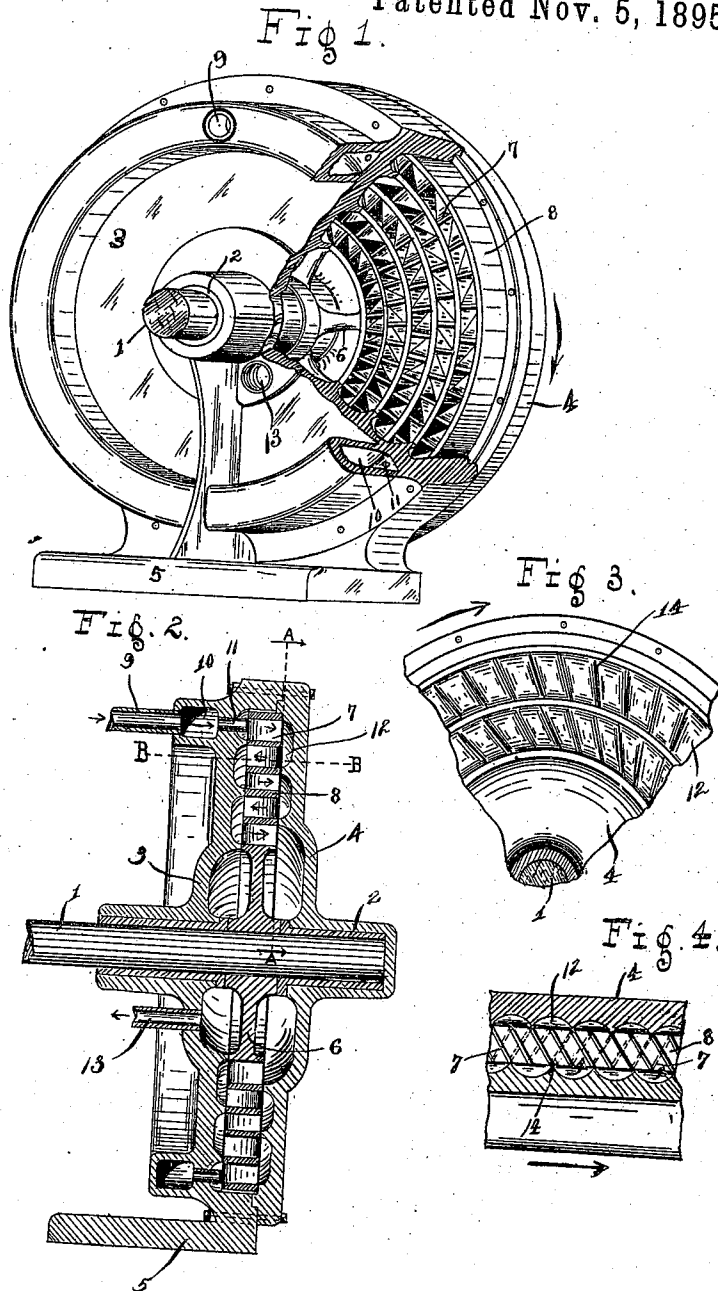


(No Model.)

G. C. PYLE.
STEAM TURBINE.

No. 549,277.

Patented Nov. 5, 1895.



Witnesses

A. S. Crisbright.
Lela Monroe.

Inventor

George C. Pyle
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UNITED STATES PATENT OFFICE.

GEORGE C. PYLE, OF INDIANAPOLIS, INDIANA, ASSIGNOR OF ONE-HALF
TO FRANK H. EWERS, OF SAME PLACE.

STEAM-TURBINE.

SPECIFICATION forming part of Letters Patent No. 549,277, dated November 5, 1895.

Application filed October 1, 1894. Serial No. 524,616. (No model.)

To all whom it may concern:

Be it known that I, GEORGE C. PYLE, of Indianapolis, county of Marion, and State of Indiana, have invented certain new and useful Improvements in Steam-Turbines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like numerals refer to like parts.

My invention relates to a steam-turbine of a novel form, whose object is to increase its power without increasing its dimensions. While it is adapted to drive various kinds of machinery, it has been designed with special reference to electric headlights for locomotives, where it is desirable to have a motor of small dimensions yet with considerable power.

A feature of my invention consists in providing concentric series of buckets in a wheel and introducing steam to the outer series and deflecting it from the outer series to an inner series by means of the walls of the casing within which the wheel is mounted, whereby the full force of the steam will be utilized while it is passing from the circumference to the exhaust near the center of the wheel.

Figure 1 is a perspective of this turbine with a portion of the casing broken away. Fig. 2 is a cross-section of the same. Fig. 3 is a side view of a section of one side of the casing at A A, Fig. 2; and Fig. 4 is a plan view of the turbine on the line B B, Fig. 2.

I mount a shaft 1 in bushings 2 within the casing formed of the sides 3 and 4, the side 3 being mounted on the base 5. Within the casing is a wheel 6, mounted on the shaft 1, provided with concentric series of buckets 7, held between concentric ribs 8. The buckets are radial and set at an angle with the axis of the wheel, each series being set at an angle the reverse of the adjoining series.

9 is a steam-pipe through which steam from the locomotive is fed into an annular chamber 10, formed in the casing 3, from which is a series of pipes 11, extending horizontally, so that the steam passing through them will enter perpendicularly to the sides of the wheel and engage the outer series of buckets, causing the wheel to rotate in the direction indicated by the arrow in Fig. 1. The steam

passes through this series of buckets and through a passage-way or groove 12 in the casing, whereby it is deflected or turned back against the second series of buckets, which are set at an angle the reverse of the preceding series, in order that the return of the steam horizontally through the wheel will tend to rotate the wheel in the direction of the arrow. From these buckets it passes through another groove in the opposite side of the casing and continues crossing through the wheel backward and forward until it has passed through all the series of buckets, entered the central opening about the hub of the wheel, and passed out of the exhaust-pipe 13.

The buckets in each series through which the steam passes horizontally in one direction are set at substantially the same angle to the axis of the wheel, while the buckets in the series through which the steam passes horizontally in the opposite direction are set at a reverse angle to the axis of the wheel. The radial width of the groove 12 is substantially the same as the width of two series of buckets, thus connecting those two series. The groove 12 is divided by ribs 14, that extend across the groove at an angle to the radius of the wheel in a direction to the right of the center if the wheel rotates to the right or to the left of the center if the wheel rotates to the left. This is to permit the free movement of the steam which is carried in this inclined direction by virtue of the velocity of the wheel instead of moving in a straight line from the circumference to the center. The capacity of the grooves or passage-ways 12, as well as the dimensions of the buckets, should increase somewhat from the circumference toward the center to allow for the expansion of the steam. This construction is an advantage, inasmuch as it permits the series of buckets to be located close to each other, whereby a large number of series can be placed in a wheel of small diameter, and thus enable me to produce a certain amount of power with a wheel much smaller than the usual steam-turbine.

What I claim as my invention, and desire to secure by Letters Patent, is the following:

1. In a steam turbine, the casing with the sides 3 and 4 provided interiorly with the grooves 12, and having the annular steam-

chamber 10 with the inlets 11, and the wheel 6 provided with a concentric series of buckets 7, all combined substantially as set forth.

2. In a steam turbine, a casing, and wheel 5 in such casing provided with a concentric series of buckets, a series of passage ways in the casing leading from outer to inner series of buckets, such passage ways separated by ribs inclined somewhat in the direction in which the wheel rotates, substantially as set forth.

3. A steam turbine comprising a shaft, a suitable casing within which such shaft is mounted, a wheel mounted on such shaft provided with concentric series of buckets extending radially and at an angle to the axis

of the wheel, a series of passage ways formed in the walls of the casing on either side of the wheel and so disposed relative to each other and to the buckets as to form a sinuous passage way for the steam to and fro horizontally through the wheel, a steam port for the introduction of steam for the outer series of buckets, and an exhaust opening near the center of the wheel, substantially as set forth.

In witness whereof I have hereunto set my hand this 22d day of September, 1894.

GEORGE C. PYLE.

Witnesses:

V. H. LOCKWOOD,
LELA MONROE.