

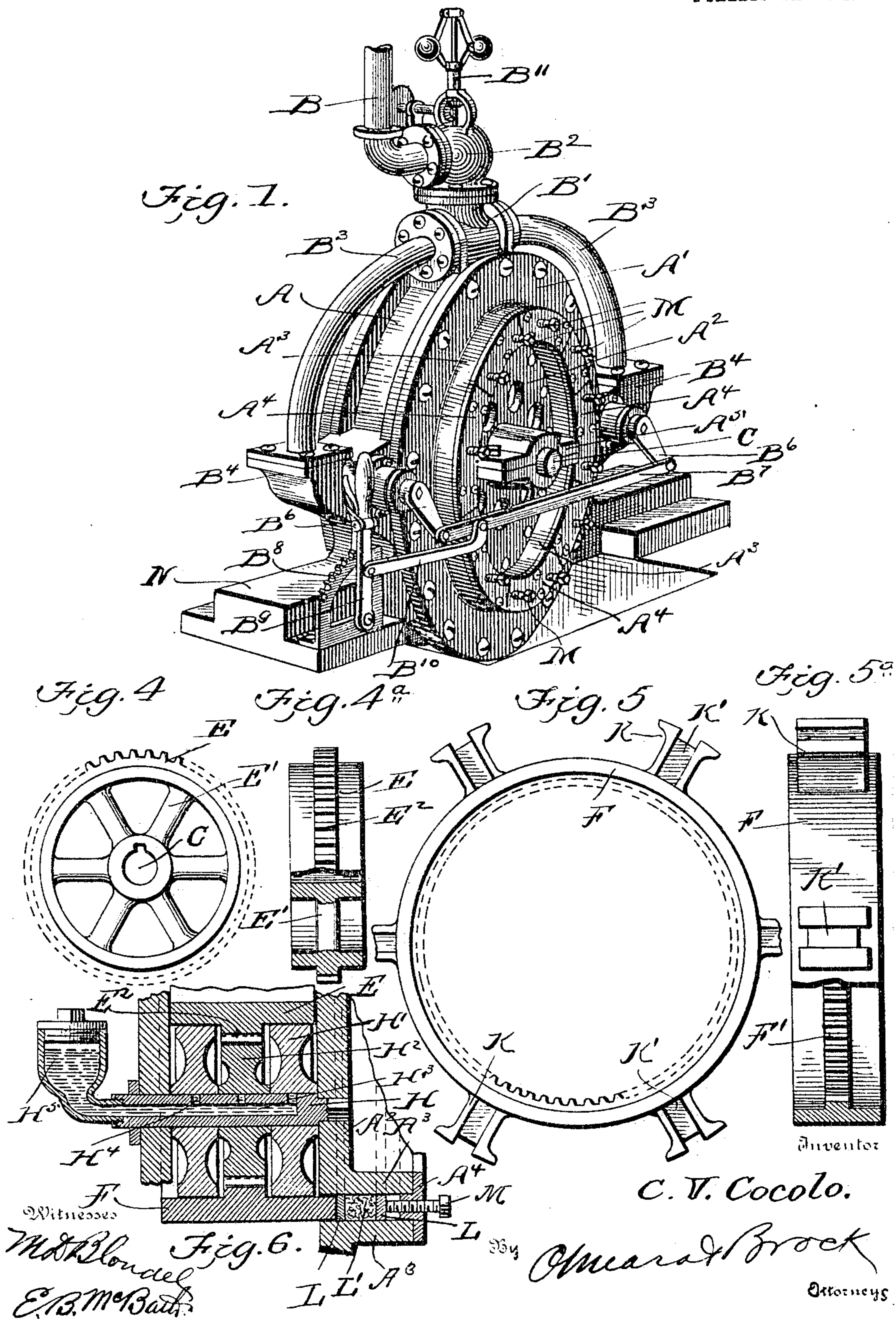
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C. V. COCOLO.
TURBINE ENGINE.

APPLICATION FILED DEC. 27, 1904.

2 SHEETS—SHEET 1.



UNITED STATES PATENT OFFICE.

CANDIDE VICTOR COCOLO, OF CHATTANOOGA, TENNESSEE.

TURBINE-ENGINE.

No. 798,662.

Specification of Letters Patent.

Patented Sept. 5, 1905.

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To all whom it may concern:

Be it known that I, CANDIDE VICTOR COCOLO, a citizen of the United States, residing at Chattanooga, in the county of Hamilton and State of Tennessee, have invented a new and useful Improvement in Turbine-Engines, of which the following is a specification.

This invention relates to a turbine-engine adapted for use in power plants or for marine propulsion, the object of the invention being an engine of this class which will be noiseless, free from vibration, and readily reversible.

The invention consists of two concentrically-arranged gears, one of which is keyed to a shaft and the other and outer one provided with a plurality of blades against which a fluid, preferably steam, is projected, a plurality of rollers and pinions being arranged between the two gears, the said pinions and rollers rotating on fixed shafts and the pinions meshing with each of the concentric gears.

The invention also consists in the novel features of construction hereinafter described, pointed out in the claims, and shown in the accompanying drawings, in which—

Figure 1 is a perspective view of my device. Fig. 2 is a horizontal section taken on the axial line. Fig. 3 is a vertical section, the rollers and blades being shown in elevation. Fig. 4 is a detail side view of the inner gear and end view of the shaft. Fig. 4^a is a peripheral view of the inner gear, partly in section. Fig. 5 is an elevation of the outer gear and blades. Fig. 5^a is a peripheral view of the outer gear, partly broken away and in section. Fig. 6 is a detail sectional view through the inner and outer gears, pinions and rollers, and through an oil-cup and packing-rings.

In the drawings, A indicates a cylinder provided with cylinder-heads formed of outer rings A' and an inner disk A², outwardly flanged, as shown at A³, and spaced apart, the flanges being connected by a sectional ring A⁴, one of these rings being arranged upon each side or head of the cylinder.

A steam-pipe B admits steam into a steam-chest B', carried by the cylinder A, the steam passing through a globe or other form of valve B². From the steam-chest B' pipes B³ lead to opposite sides of the cylinder, and admission of steam into the chest B' is regulated by a governor B⁴ of any desired construction. The steam-pipes B³ lead to casting B⁴, carried by the sides of the cylinder and in which rotate one-way valves B⁵, and the outer ends of the

valve-stems carry cranks B⁶, which are pivotally connected by a link B⁷. Adjacent one side of the cylinder is arranged a rack-segment B⁸, on which works a lever B⁹, pivotally connected to the link B⁷ by a link B¹⁰, whereby both valves are simultaneously actuated by one operation. The inner-disk portions A⁴ are provided with journal-boxes A⁵, in which rotate a shaft C, which carries at one end a belt-wheel C'.

The castings B⁴ are formed with forty-five-degree ports D and D', oppositely arranged, which admit steam into the cylinder, the valves B⁵ having a passage-way adapted to be brought into communication with either of the said ports, both valves communicating at the same time with ports D or with ports D', respectively, the said ports also being oppositely arranged with respect to each other, one being directed downwardly and the other upwardly.

Within the cylinder A the shaft C carries a hub having radial spokes E', which support a ring E, and, as shown in Fig. 4^a, the said ring is provided on its periphery with a central circumferential flange or rim having a plurality of teeth E² formed thereon.

An outer ring F is arranged concentrically with respect to the inner ring E and is formed with an internal gear F', adapted to register but not meshing with the teeth E² of the wheel E. Passing through the disks A² of the cylinder-heads are a plurality of studs H, on which rotate rollers H' and pinions H², the studs being midway the inner and outer rings E and F. The studs are each provided with a longitudinal bore H³ and a plurality of transverse intersecting bores H⁴ and at one end carry an oil-cup H⁵, and by means of this construction the rollers H' and pinions H² are lubricated. As will be readily understood, the pinions H² mesh with the teeth E² of the ring E and also with the teeth or gear F' of the ring F, and the smooth portion of the rings on each side of the teeth engage the rollers H'. The space between the walls of the cylinder A and the periphery of the ring F is divided into a plurality of compartments J by means of blades K formed on or carried by the ring F, and to make the compartments thus formed steam-tight I recess the side and top faces of the blades K, as shown at K' in Fig. 5, and in the recesses arrange springs K², which bear on packing-strips K³, as most clearly shown in Fig. 2.

The ports D and D' open into the compart-

ments J, and midway these ports are formed exhaust-outlets J'.

In the space or groove formed by the flanges A³ and sectional ring A⁴, on each side of the cylinder A, I arrange rings L, and between the rings, two being placed in each groove, is placed suitable packing material. By removing the ring-sections A⁴ the packing may be readily replaced or repaired. The packing and rings are held in position by set-screws M, which pass through the ring-sections A⁴ and bear on the outer ring L, and by adjusting these screws the pressure of this ring on the packing L' is regulated. The inner ring bears against the sides of the rim of the ring F, and a tight joint is thus made and steam prevented from leaking into the space between the rings F and E.

The entire device is mounted upon a suitable base N.

The operation of the engine or turbine is as follows: To revolve the shaft C from right to left, the lever B⁹ is thrown so that the passage-ways through the valves B⁵ will register with the ports D, and the steam discharging therethrough will by the force of its impact against the blades K drive the ring F, which will rotate on the rollers H' and drive the pinions H², which, meshing with the toothed wheel E, will rotate the shaft C, to which such wheel or ring is keyed. To reverse the rotation of the turbine, the lever B⁹ is thrown to the left, as viewed in Fig. 1, and steam will then be admitted in an opposite direction through the ports D'.

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

1. A device of the kind described comprising a shaft, inner and outer rings concentric with respect to each other and the shaft, the inner ring being keyed to the shaft and both rings being toothed, fixed shafts between the rings, pinions on the said shafts meshing with the inner and outer ring-teeth, and rollers on the shafts engaging the rings on each side of the teeth, as and for the purpose set forth.

2. A cylinder having a central, transverse rotatable shaft, a ring mounted thereon, a gear on the periphery of the ring, a ring concentric with and of greater diameter than the first-mentioned ring, an internal gear thereon, fixed shafts or studs carried by the cylinder intermediate the rings, rollers thereon engaging the larger ring on opposite sides of the internal gear, and pinions carried by said studs between the rollers and in engagement with each gear.

3. A turbine having oppositely-arranged steam-inlet pipes and forty-five-degree ports, also oppositely arranged in pairs on each side of the turbine, valves adapted to admit steam to said ports, a ring having blades adapted to receive impact of said steam, a gear carried by the ring, an inner ring, a shaft, said inner ring being keyed to the shaft, a gear on the inner ring, stationary studs, and pinions on the studs adapted to mesh with the gears of both rings.

4. A turbine of the kind described comprising a cylinder, cylinder-heads comprising an outer flanged ring and an inner disk, said disk having an outwardly-extending flange parallel to the flange of the ring, a ring connecting the said flanges, a ring mounted within the cylinder and having blades, rings arranged in the space between the flanges, one of said rings bearing on the edge of the ring having the blades, packing between the rings in the space between the flanges, and adjustable screws bearing on the outer ring between the flanges.

5. A turbine comprising a cylinder, a central shaft, a geared ring keyed thereto, a second gear-ring concentric with the first, studs carried by the cylinder between the rings and having longitudinal and transverse bores, oil-cups carried by the studs, rollers carried by the studs, and pinions carried by a portion of said studs intermediate the rollers and meshing with the gears of the rings.

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Witnesses:

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