

No. 831,558.

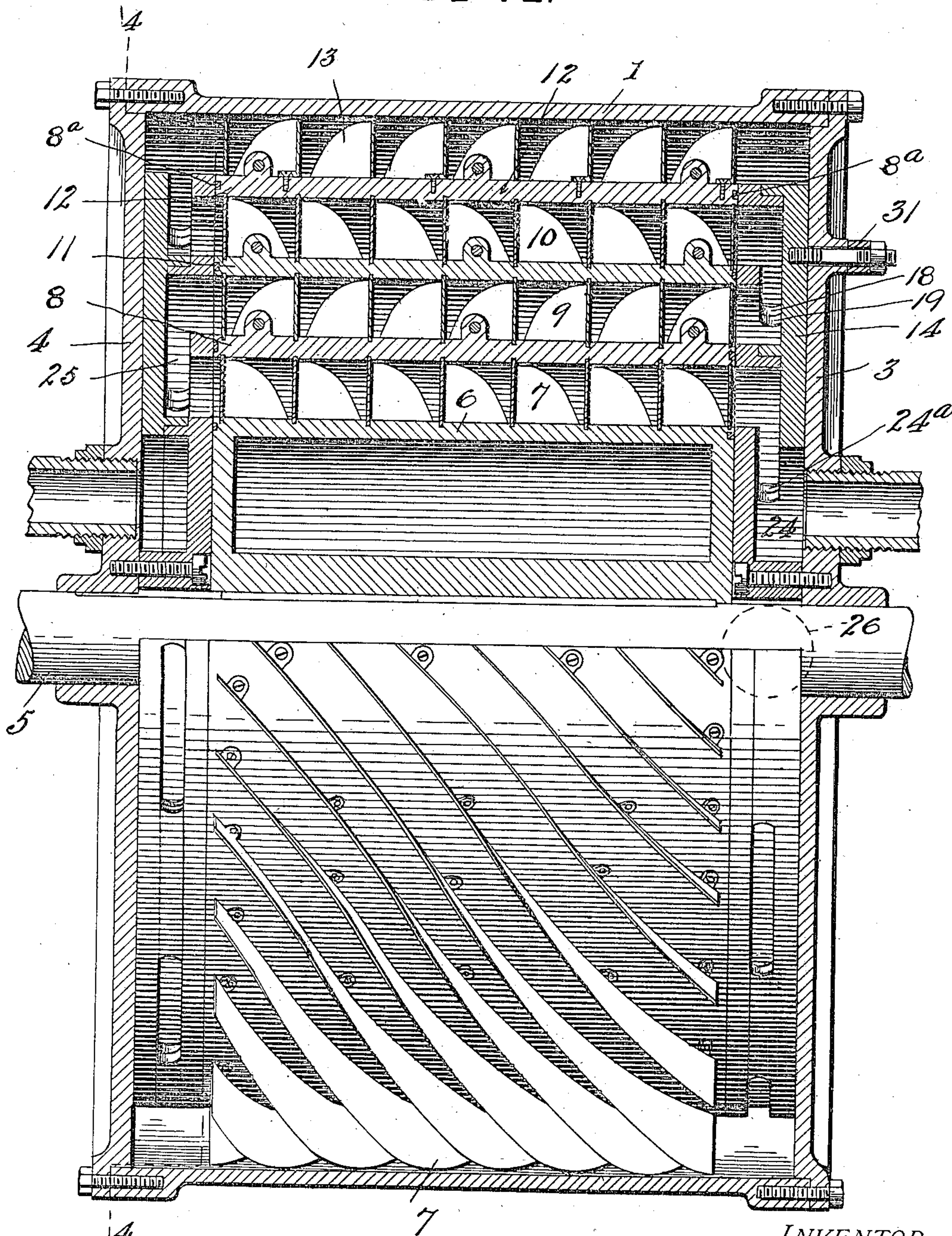
PATENTED SEPT. 25, 1906.

W. F. LIMBERG.
STEAM TURBINE.

APPLICATION FILED JUNE 14, 1905.

4 SHEETS—SHEET 1.

FIG. 1.



WITNESSES:

Chas. K. Davis.

Edmund Albert

INVENTOR

Wm. F. Limberg

By

Shepherd and Parker
Attorneys

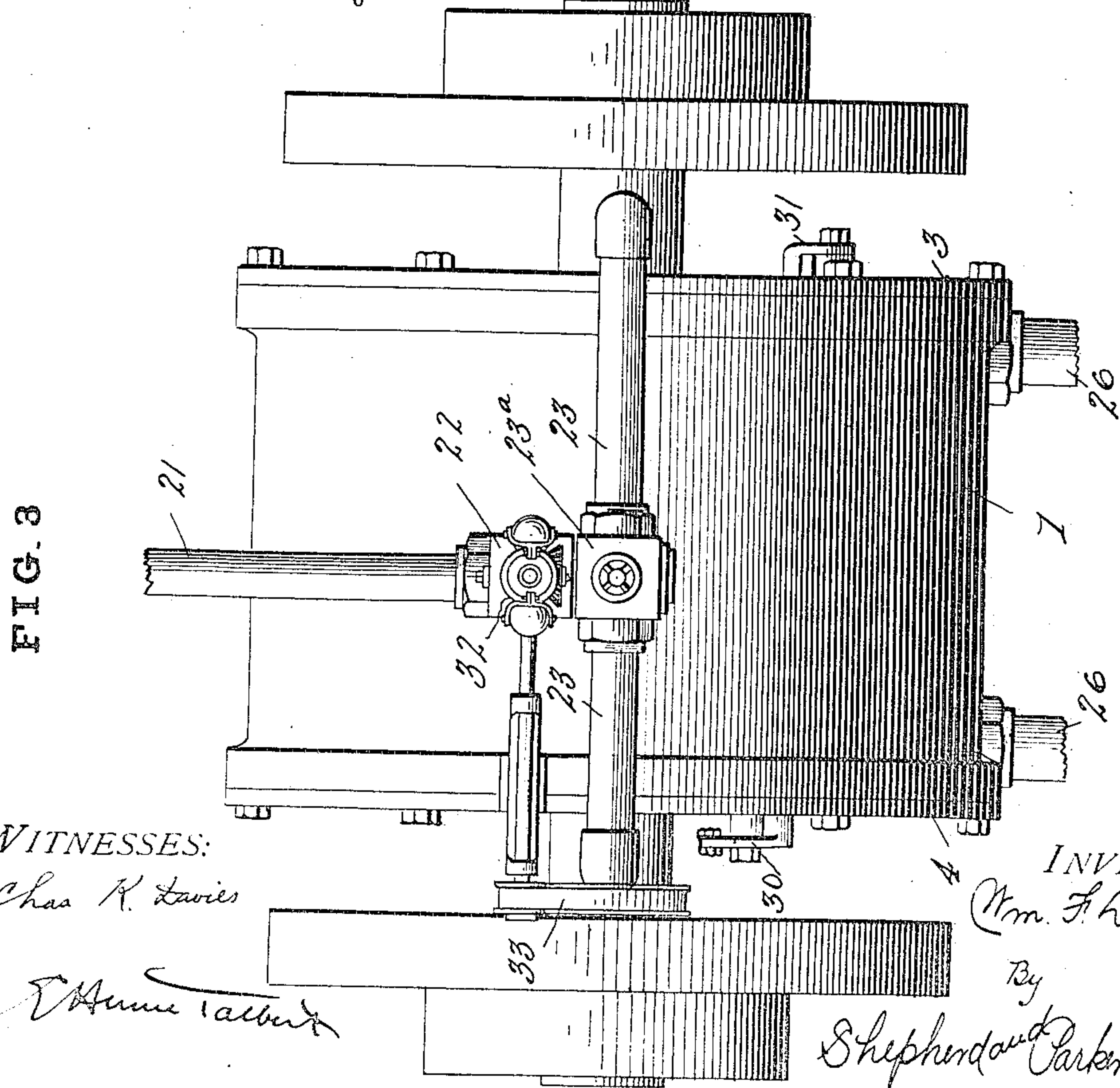
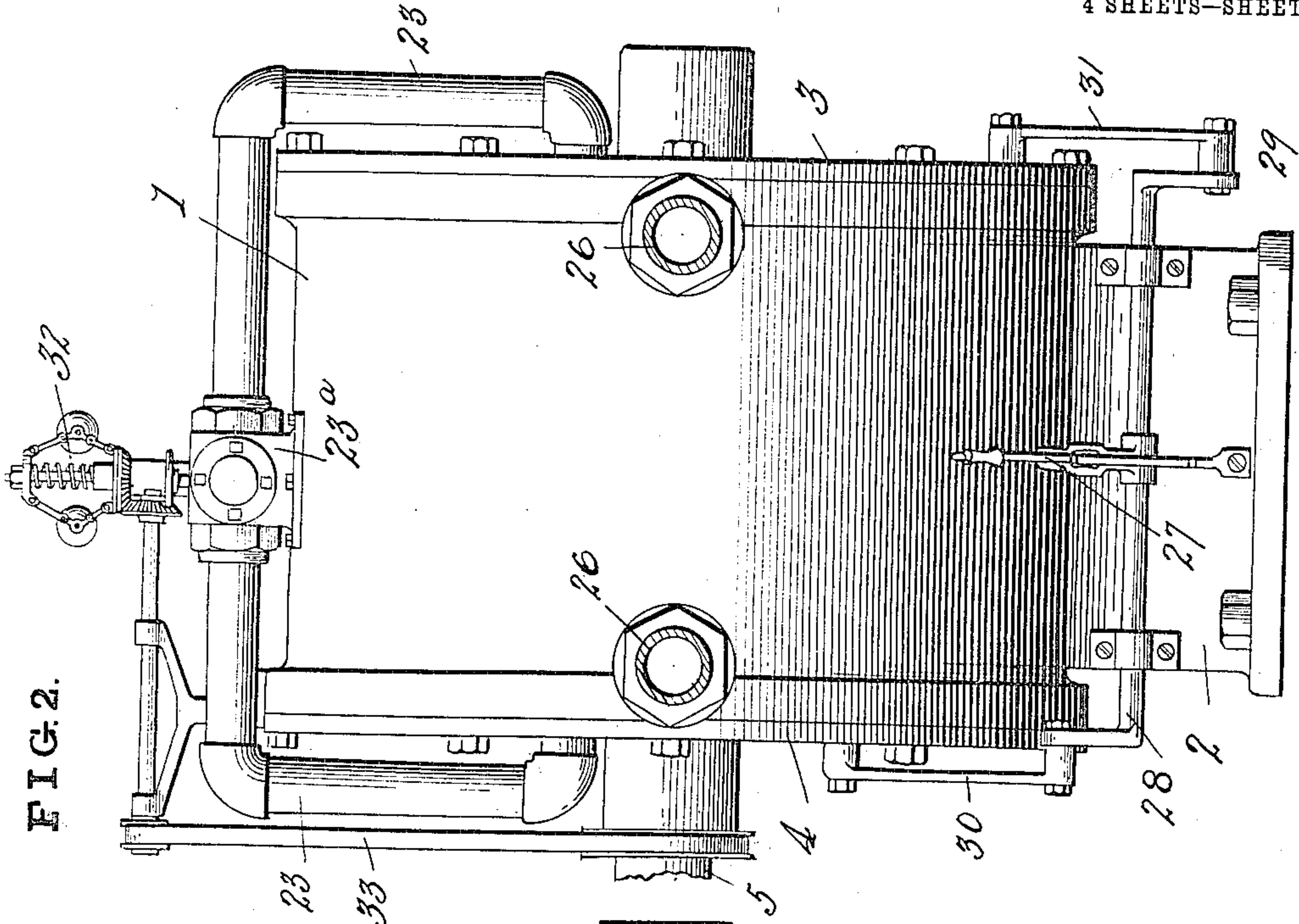
No. 831,558.

PATENTED SEPT. 25, 1906.

W. F. LIMBERG.
STEAM TURBINE.

APPLICATION FILED JUNE 14, 1905.

4 SHEETS—SHEET 2.



WITNESSES:
Chas. K. Davies

Wm. F. Limberg

INVENTOR
Wm. F. Limberg

By
Shepherd and Parker Attorneys.

No. 831,558.

PATENTED SEPT. 25, 1906.

W. F. LIMBERG.
STEAM TURBINE.

APPLICATION FILED JUNE 14, 1905.

4 SHEETS—SHEET 3.

FIG. 5.

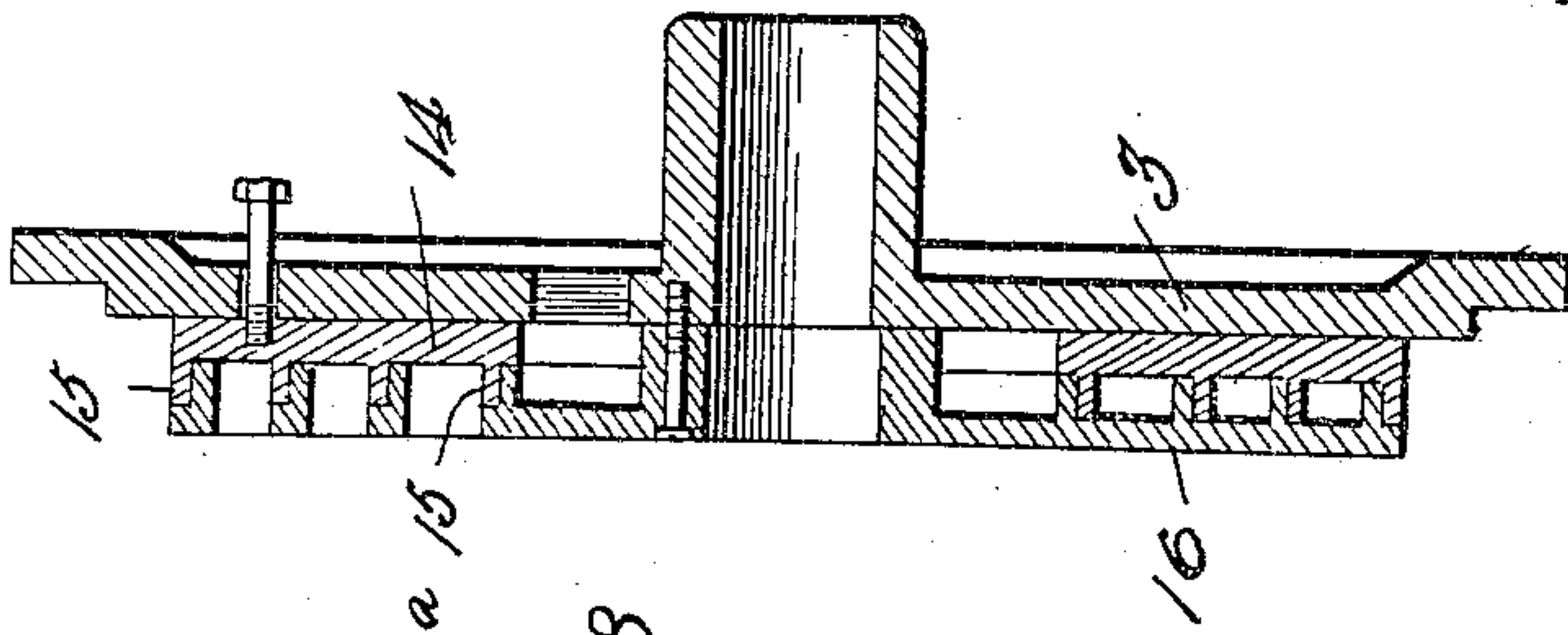


FIG. 4.

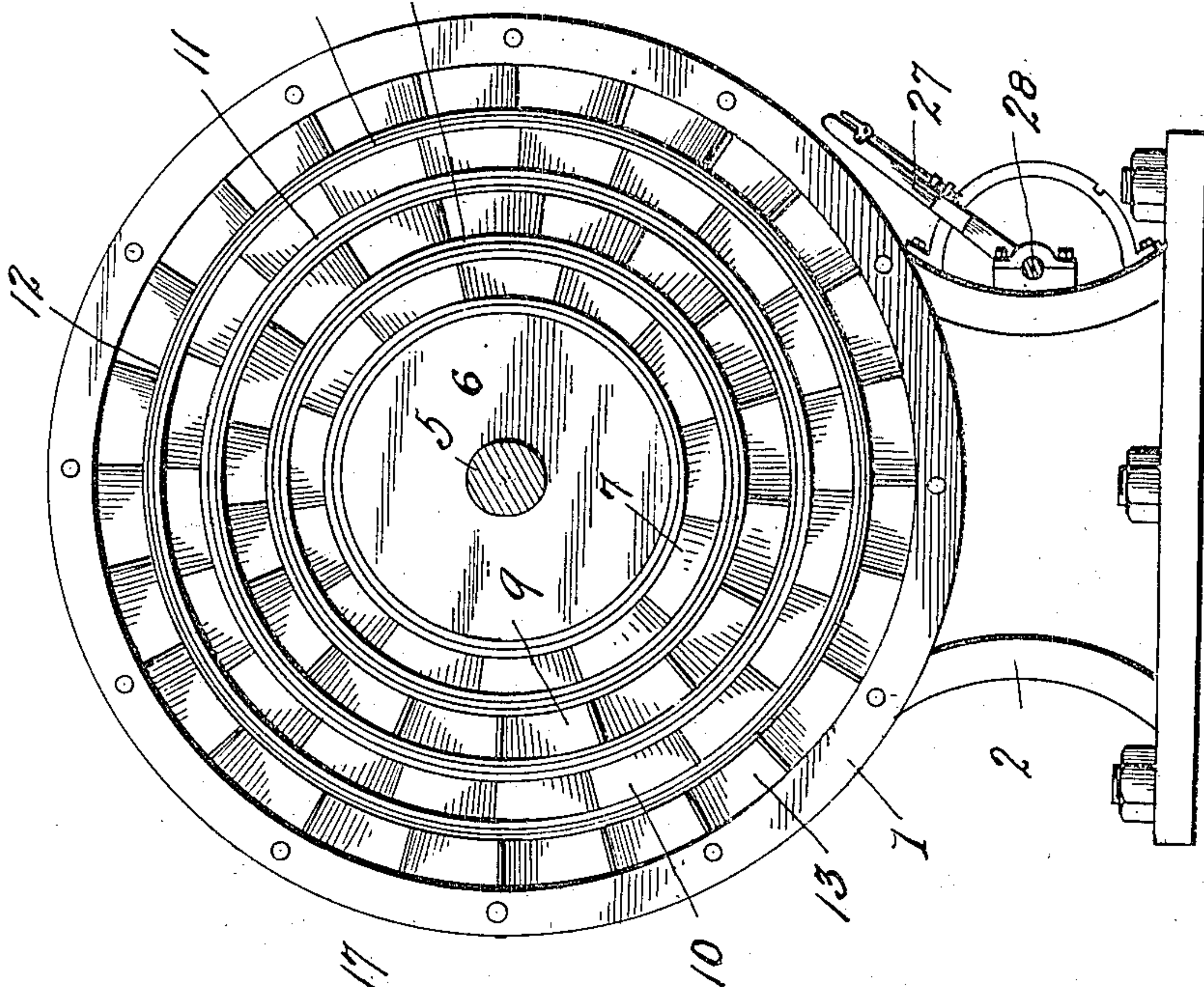
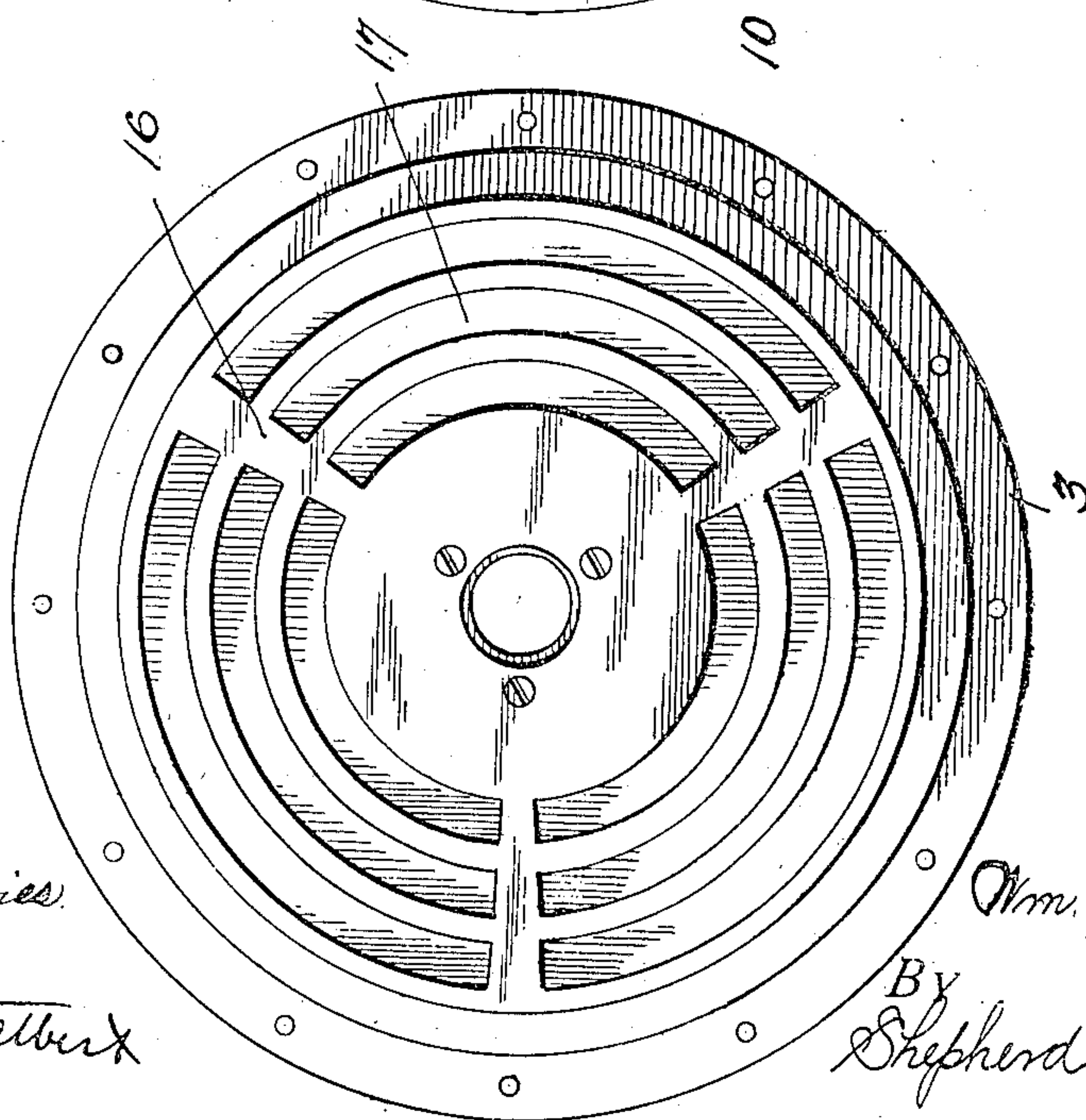


FIG. 6.



WITNESSES:

Chas. H. Davies.

E. Hume Talbot.

INVENTOR

Wm. F. Limberg

By
Shepherd and Parker
Attorneys.

No. 831,558.

PATENTED SEPT. 25, 1906.

W. F. LIMBERG.
STEAM TURBINE.

APPLICATION FILED JUNE 14, 1905.

4 SHEETS—SHEET 4.

FIG. 8.

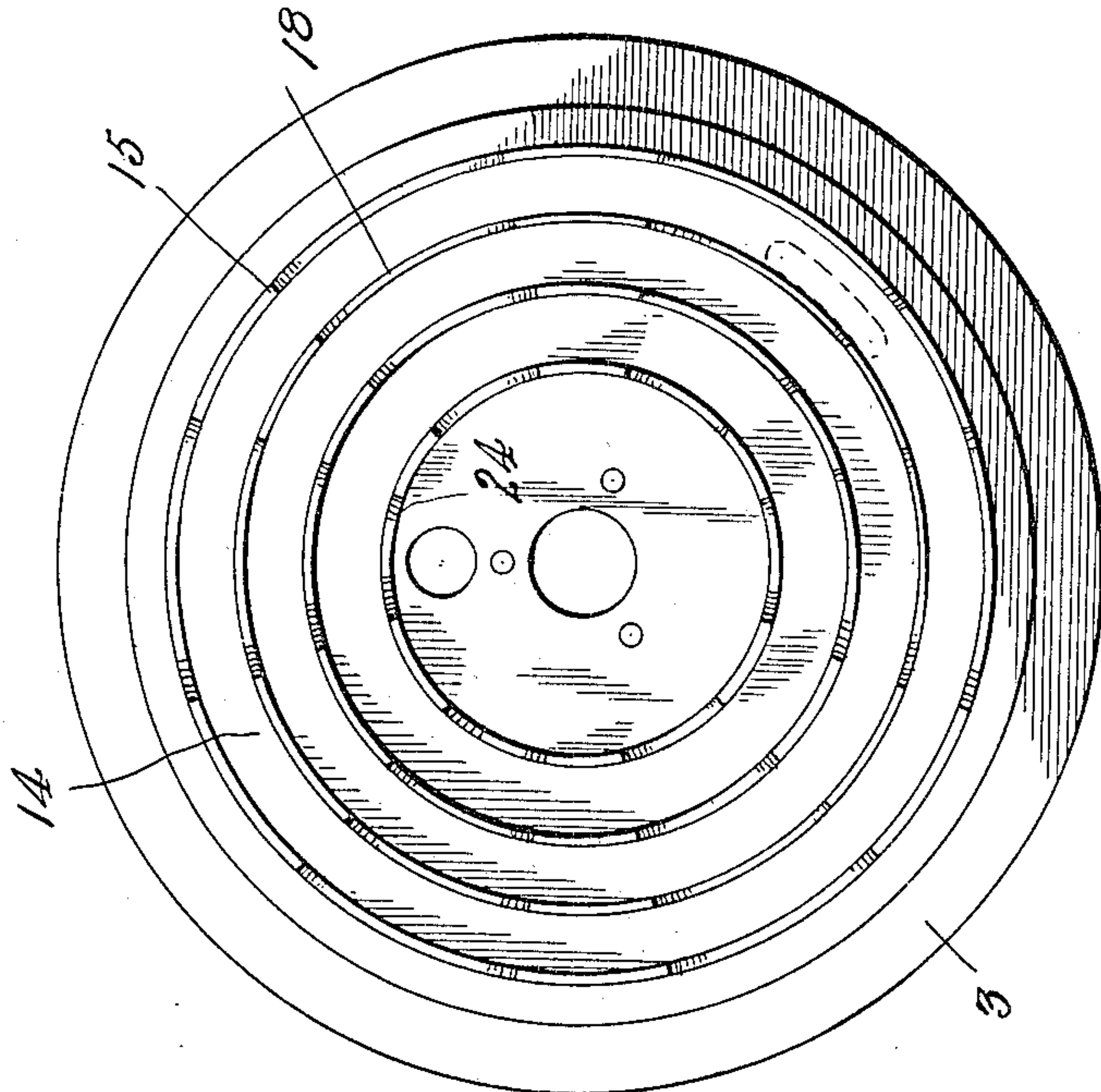
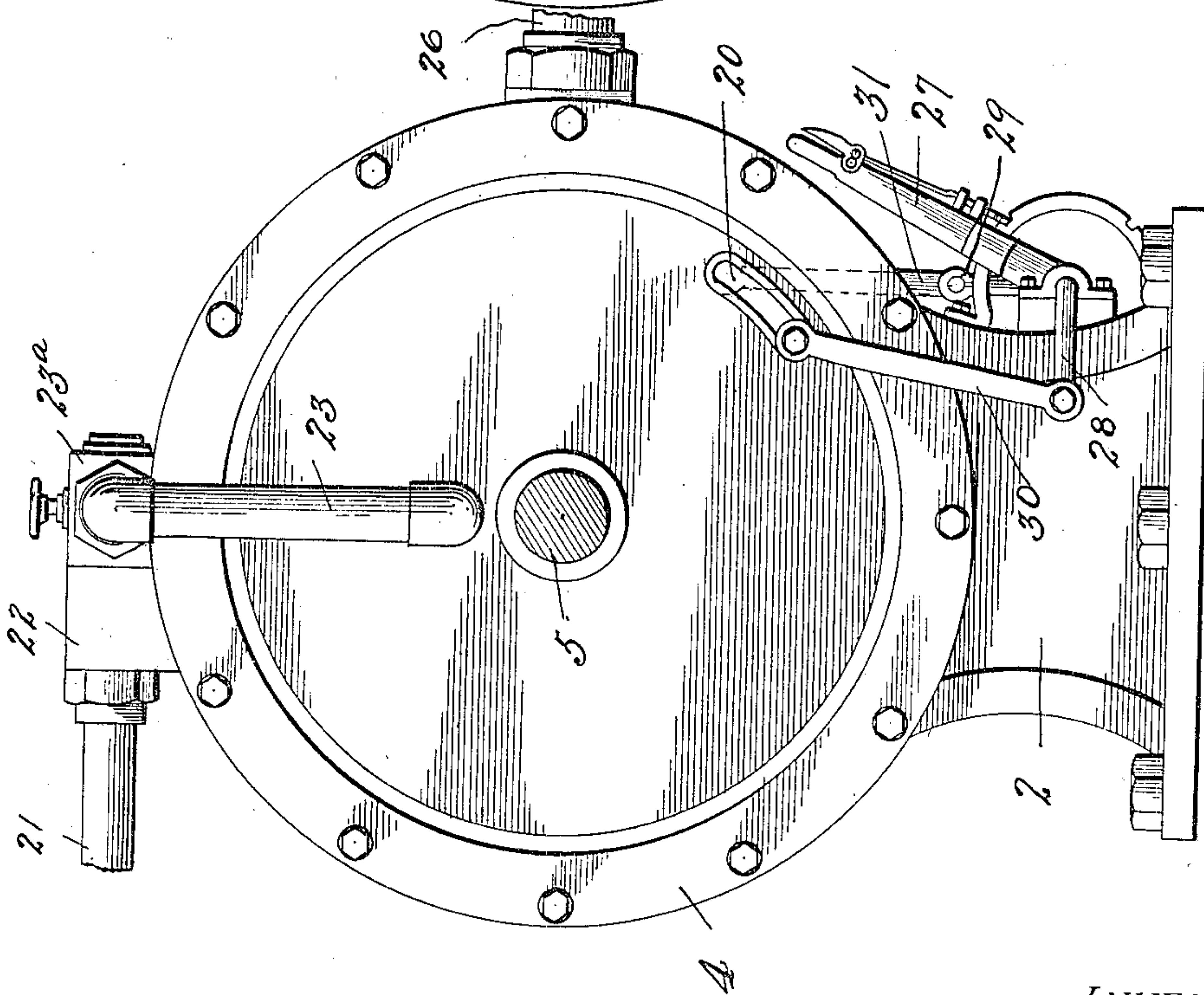


FIG. 7.



WITNESSES:

Chas. K. Davies

Estimate (about)

INVENTOR

Wm. F. Limberg

BY

Shepherd and Parker

Attorneys.

UNITED STATES PATENT OFFICE.

WILLIAM F. LIMBERG, OF FAIRGROUND, NEW YORK.

STEAM-TURBINE.

No. 831,558.

Specification of Letters Patent.

Patented Sept. 25, 1906.

Application filed June 14, 1905. Serial No. 265,268.

To all whom it may concern:

Be it known that I, WILLIAM F. LIMBERG, a citizen of the United States, residing at Fairground, in the county of Suffolk and State of New York, have invented certain new and useful Improvements in Steam-Turbines, of which the following is a specification.

My invention has for its object to provide a rotary engine which is adapted to utilize the continuous expansion of the steam with the least amount of friction.

With these and other objects in view the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, and minor details may be made within the scope of the claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a vertical sectional view of my improved engine. Fig. 2 is a side elevation. Fig. 3 is a top plan view. Fig. 4 is a vertical sectional view through line 4 4 of Fig. 1. Fig. 5 is a cross-section of one end of the casing and valve. Fig. 6 is a view of the inside of one end of the casing, showing the valve attached thereto. Fig. 7 is an end elevation. Fig. 8 is a view of the valve-disk attached to the casing end.

Referring to the drawings, in which like numerals indicate corresponding parts throughout the several views, 1 is the cylinder-casing of my improved engine supported by a suitable base 2. The casing is provided with end plates 3 and 4, in which are formed bearings for shaft 5. A cylinder 6, keyed to shaft 5, is provided upon its outer surface with a series of ribbon-blades 7, securely fastened thereto, the outer edges of said blades being secured to the inner surface of the concentric cylinder 8. In a like manner blades 9 and 10 are secured to cylinders 11 and 12. Cylinder 12 has fixed upon its outer surface blades 13, the outer edges of which are in close proximity to the inner surface of casing 1. Each series of blades is arranged in an opposite direction to the two series adjacent to it for reasons which will be hereinafter explained.

Valve-disks 14, provided with annular ribs 15 upon their inner faces, are located between the ends of the casing and plates 16, which are secured to the ends 3 and 4 of casing 1.

These plates have annular openings 17, which register with the spaces between ribs 15, said ribs 15 being adapted to enter annular recesses in plates 16. The annular openings 17 in the plates register with the spaces between the concentric cylinders.

Ports 18 and 19, located in the disk 14 and plate 16, respectively, are caused to register by rotating disk 14, which may be done through a lever mechanism connected therewith through slots 20. These ports are so located that when two adjacent chambers communicate at one end communication will be closed at the opposite end. The ends of concentric cylinders 6, 8, 11, and 12 are adapted to fit closely between plates 16, and in order to insure a steam-tight joint packing 8^a is provided.

Supply-pipe 21, which connects with the casing through pipes 23, is provided with governor-valve 22 and a three-way valve 23^a.

The operation of my device is as follows: Steam is conducted from the boiler by pipe 21 through governor-valve 22 and cut-off 23^a and thence by pipes 23 to the ends of the cylinder-casing. The steam enters chamber 24 of the valve, from which it passes through opening 24^a into the chamber between concentric cylinders 6 and 8. The ports in the corresponding end of cylinder 8 being closed, the steam will pass to the left and escape through port 25 into the chamber between cylinders 8 and 11. The steam continues backward and forward between the cylinders, exerting force against the several series of blades to move them in the same direction until it reaches the outer casing 1, where it will exhaust through pipe 26. The engine may be reversed by moving lever 27 to the opposite end of its stroke, which will operate through crank-arms 28 and 29 and links 30 and 31 to close the open ports and open the closed ports, which will cause the steam to operate on the opposite side of the blades.

The engine above described utilizes to the fullest extent all the power to be derived from the expansion of the steam. It is simple in construction, compact, and will not easily get out of order.

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

1. In a rotary engine, the combination with a casing of a rotating piston comprising a plurality of concentric walls extending across the major portion of said casing, blades

carried by the said walls and extending in concentric relation obliquely and alternately in opposite directions from points slightly short of one end wall of the casing to points slightly short of the other end wall thereof, a valve adapted to admit steam at the same ends of alternate chambers formed by said first-named walls and means for reversing the direction of the steam.

- 10 2. In a rotary engine, the combination with a casing of a rotating piston comprising a plurality of concentric walls, severally integral in their concentric relation and terminating short of the end walls of the casing, blades
15 carried by said walls in spaced parallel relation and extending obliquely thereacross, and in their concentric relation alternately in opposite directions and valves adjacent each of said end walls adapted to admit steam at the
20 same ends of alternate chambers formed by said first-named walls, said valves being open at one end wall and closed at the other end

wall and means for reversing the relative positions of said valves.

3. In a rotary engine, the combination 25 with a casing of a rotating piston comprising a plurality of concentric walls, blades carried by said walls extending in concentric relation of series alternately in opposite directions, elements disposed adjacent to the end 30 walls of the casing and formed with openings communicating with the chambers afforded between said walls and adapted to be brought into registry with one another and means for effecting movement of one of said elements 35 on each end of the casing with relation to the corresponding element.

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

WILLIAM F. LIMBERG.

Witnesses:

PHILIP PEARSALL,
CHARLES E. SAMMIS.