No. 765,759. PATENTED JULY 26, 1904.

W. WYAND.

ROTARY ENGINE.

APPLICATION FILED NOV. 21, 1903.

NO MODEL.

FIG. 1.

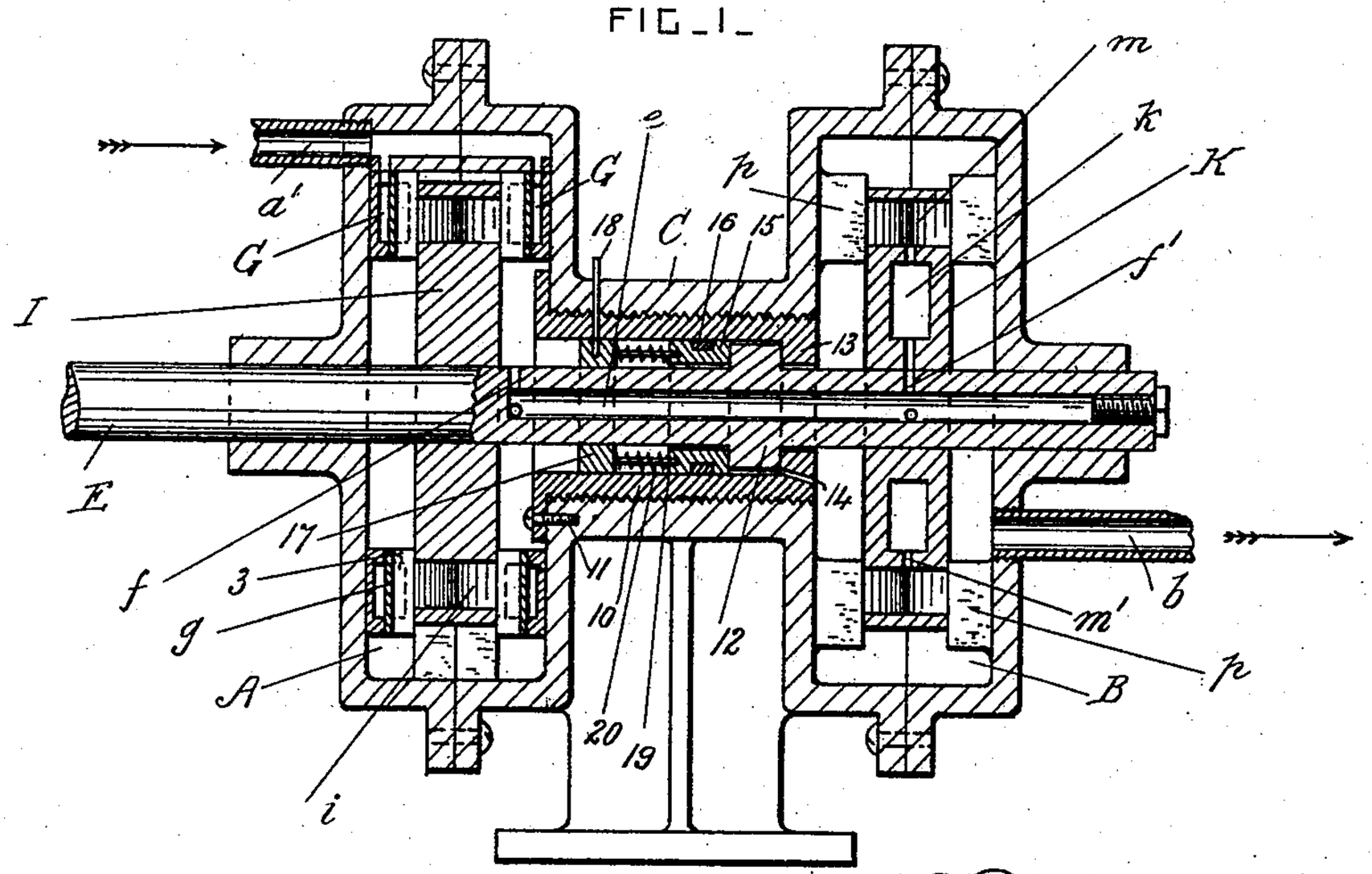


FIG. 2.

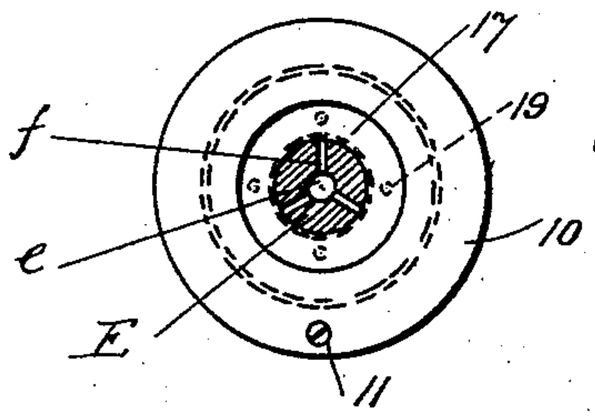


FIG. 3.

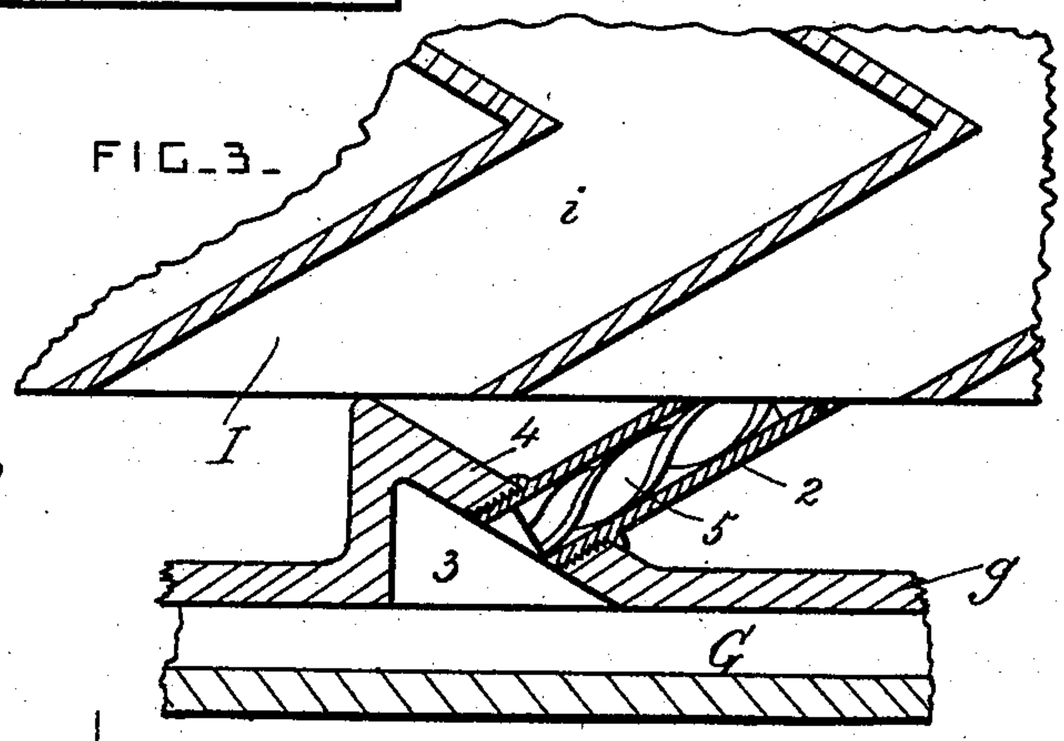


FIG. 4.

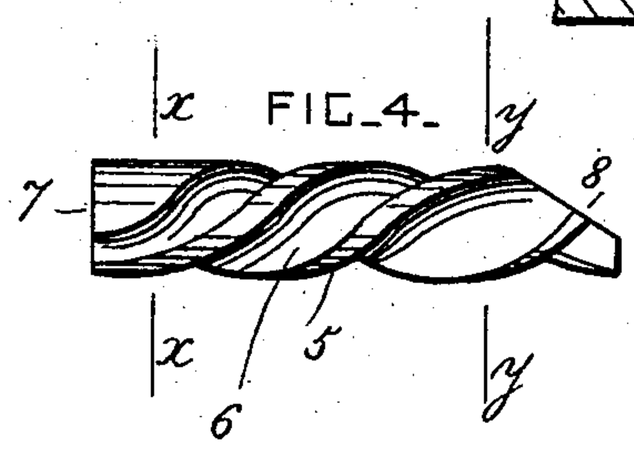


FIG. 5.

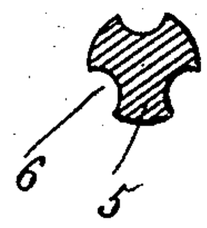
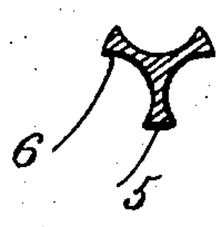


FIG. 6.



WITNESSES:

J. Lingg Poole

Walter Allen

INVENTOR

William Wyand.

BY

Herbert W. Jenner.

Attorney

No. 765,759. Patented July 26, 1904.

UNITED STATES PATENT OFFICE.

WILLIAM WYAND, OF COLLINGSWOOD, NEW JERSEY, ASSIGNOR TO WYAND-SOMERS-MOORE PATENT DEVELOPING COMPANY, OF COLLINGSWOOD, NEW JERSEY.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 765,759, dated July 26, 1904.

Application filed November 21, 1903. Serial No. 182,111. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WYAND, a citizen of the United States, residing at Collingswood, in the county of Camden and State of New Jersey, have invented certain new and useful Improvements in Rotary Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to steam rotary or turbine engines of the class shown and described in a separate application filed September 15, 1902, Serial No. 173,327; and it consists in the novel construction and combination of the parts hereinafter fully described and claimed whereby the action of the steam-jets is rendered more effective upon the steam-wheels and whereby the steam is prevented from passing from the high-pressure cylinder to the low-pressure cylinder otherwise than through the passage prepared for it.

In the drawings, Figure 1 is a vertical longitudinal section through the engine. Fig. 2 is a detail end view of the bearing between the two cylinders. Fig. 3 is a diagram showing in section a portion of one of the face-plates provided with the improved steam-jet and a portion of the steam-wheel, said parts being drawn to a larger scale. Fig. 4 is a detail view of the steam-guide which is inserted in the jet-tube. Fig. 5 is a cross-section through the steam-guide, taken on the line $x\,x$ in Fig. 4. Fig. 6 is a similar cross-section, but taken on the line $y\,y$ in Fig. 4.

A is the high-pressure cylinder or casing, provided with an inlet-passage a' for high-pressure steam.

B is the low-pressure cylinder or casing, provided with an outlet or exhaust passage b.

C is a tubular distance-piece between the cylinders A and B.

E is the engine-shaft, which is journaled in bearings on the said cylinders, and e is a steam-passage formed longitudinally in that portion of the shaft E which extends between the two cylinders. The shaft E has also radial holes f, connecting the passage e with the cylinder A, and radial holes f' in its end portion which comes inside the cylinder B.

G represents two circumferential steam-chambers arranged one at each side of the cylinder A near its periphery, and these two chambers are constantly in communication with the steam-inlet passage a', as shown in Fig. 1. These chambers G have facing-rings g, which are provided with steam-jet tubes, as will be more fully described hereinafter.

I is the high-pressure steam-wheel, which is secured upon one end portion of the shaft E inside the cylinder A and which runs in contact with the two facing-rings g or with the ends of the jet-tubes. V-shaped chambers i are formed in the wheel I between the two facing-plates and extend in a series all around the wheel.

K is the low-pressure steam-wheel, which is secured on the other end portion of the shaft E inside the cylinder B. This wheel K has an internal chamber k, which is constantly in communication with the holes f' of the engine-shaft, and m represents V-shaped chambers which extend in a series all around the wheel K at its periphery. These chambers have holes m' in their bottoms which communicate with the chamber k. Abutment-plates p are provided upon the sides of the cylinder B in line with the side openings of the chambers m.

High-pressure steam is admitted to the cylinder A through the inlet-passages and revolves the wheel I by impact against the bottoms of its chambers i. The steam passes from the cylinder A through the holes f, passage e, and holes f' into the chamber k of the low-pressure wheel B. The steam expands further inside the low-pressure wheel and revolves it by impinging against the abutment-plates p, finally passing out by the exhaust-passage b.

In order to render the action of the steam-

jets more effective, the facing-rings *g* are provided with jet-tubes 2, which project from them in an inclined position, as shown in Fig. 3. The facing-ring is preferably provided with an offset pocket 3, having an inclined side 4, and the steam-jet tube is screwed into this inclined side. The steam passes through the jet-tube into the pockets of the wheel and thence passes to the holes *f* of the shaft E. A steam-guide 5 is inserted in each jet-tube. This steam-guide consists of a cylinder having spiral grooves 6 formed in its length, which increase gradually in area from the receiving end 7 to the delivery end 8 of the guide. These grooves allow the steam to expand as it passes through them and give it a rotary motion which prevents it from spreading as it passes into the chambers of the wheel, so that it impinges against the V-pointed portions of the said chambers with greater effect. The steam-guide may be secured in the jet-tube in any approved manner, or it may be secured in an inclined hole in the facing-ring itself, the same as if the jet-tube were formed integral with the said facing-ring. The delivery end of the steam-guide is preferably slightly tapered to facilitate its insertion into the jet-tube.

In order to prevent steam from passing from the high-pressure cylinder except through the passage *e*, which is provided for it, the tubular distance-piece C is provided with a bush 10, which is preferably screwed into it and prevented from working loose by means of a screw 11 or other equivalent locking device.

A collar or ring 12 is rigidly secured upon the shaft E and is arranged inside the bush 10 in contact with its bottom 13. The top of the said collar is clear of the bush, and the bottom of the bush is clear of the shaft. One or more drain-holes 14 are provided for removing condensed steam from the space between the top of the collar and the bush. A ring 15 is inserted in the bush 10 and bears against the opposite side of the collar 12 from the bottom of the bush. This ring does not touch the shaft, and it is provided with a circumferential groove in which a packing-ring 16 is placed. This packing-ring is preferably an expansion metallic ring, such as used in pistons. The ring 15 is slidable longitudinally inside the bush, and it is prevented from revolving by means of a second ring or follower 17, which is secured to the bush by means of a pin 18 or other equivalent fastening device. Projections 19 are provided on one of the said rings which engage with recesses in the other said ring, so that the ring 15 cannot revolve, and 20 represents springs arranged between the said rings and which press the slidable ring 15 lightly against the collar on the shaft, so that the parts are always steam-tight and run with the least possible friction.

What I claim is—

1. In a rotary engine, the combination, with two cylinders, a distance-piece between the said cylinders, a driving-shaft extending through the said distance-piece and provided with a longitudinal passage which connects the said cylinders, and steam-wheels secured on the said shaft inside the said cylinders; of a bush secured in the said distance-piece, a collar on the said shaft which bears against the bottom of the said bush, and a steam-tight ring arranged inside the said bush and bearing against the opposite side of the said collar.

2. In a rotary engine, the combination, with two cylinders, a distance-piece between the said cylinders, a driving-shaft extending through the distance-piece and provided with a longitudinal passage which connects the said cylinders, and steam-wheels secured on the said shaft inside the said cylinders; of a bush secured in the said distance-piece, a collar on the said shaft which bears against the bottom of the said bush, a steam-tight ring slidable in the said bush and bearing against the opposite side of the said collar, and a follower secured to the said bush and provided with means which engage with the said slidable ring and prevent it from revolving.

3. In a rotary engine, the combination, with two cylinders, a distance-piece between the said cylinders, a driving-shaft extending through the distance-piece and provided with a longitudinal passage which connects the said cylinders, and steam-wheels secured on the said shaft inside the said cylinders; of a collar which revolves with the said shaft, annular bearings carried by the said distance-piece and bearing against the opposite sides of the said collar, and means for holding the said bearings in steam-tight relation with the said collar.

4. In a rotary engine, the combination, with a steam-wheel having chambers at its periphery, of a stationary steam-supply chamber arranged at the periphery of the said wheel and provided with a steam-jet passage, and means for imparting a whirling motion to the steam as it passes through the said jet-passage before entering the steam-chambers of the said wheel.

5. In a rotary engine, the combination, with a steam-wheel having chambers at its periphery, of a stationary steam-supply chamber arranged at the periphery of the said wheel and provided with an inclined side portion, a steam-jet tube secured to the said inclined side portion and arranged at an angle to the plane in which the said wheel revolves, and means for imparting a whirling motion to the steam as it passes through the said jet-passage be-

fore entering the steam-chambers of the said wheel.

6. In a rotary engine, the combination, with a facing-plate having an offset pocket provided with an inclined side, of a steam-jet tube secured in the said inclined side, a steam-guide secured in the said tube and provided with a spiral groove which increases in area toward its delivery end, and a steam-wheel which receives the steam from the said jet-tube.

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

WILLIAM WYAND.

Witnesses:
P. T. SHINN,
WILLIAM SOMERS.