No. 748,495. PATENTED DEC. 29, 1903.

J. GARY.

ROTARY ENGINE.

APPLICATION FILED JUNE 26, 1901. RENEWED JUNE 3, 1903.

NO MODEL. 2 SHEETS—SHEET 1

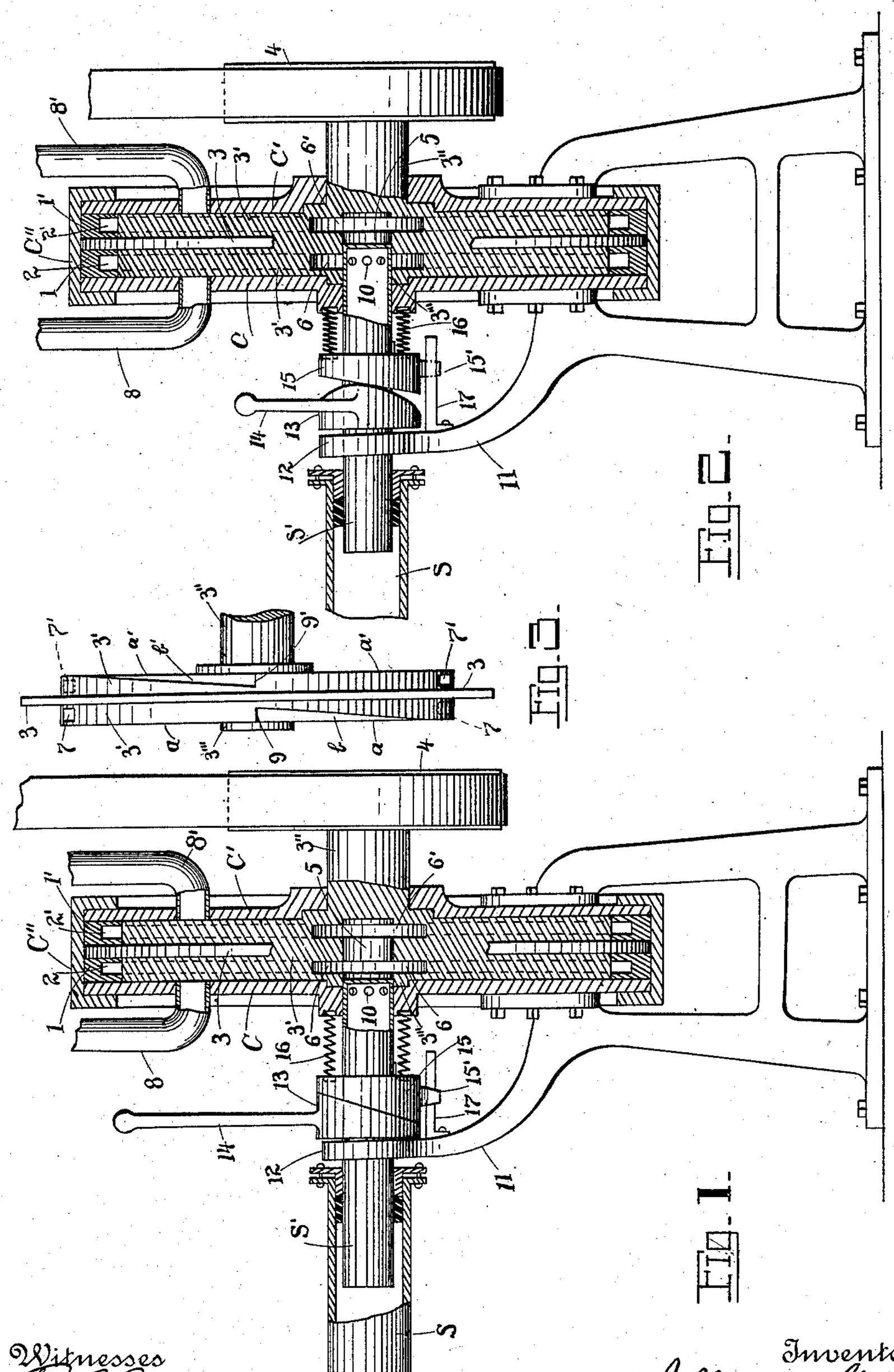

FIG. 1.

FIG. 2.

FIG. 3.

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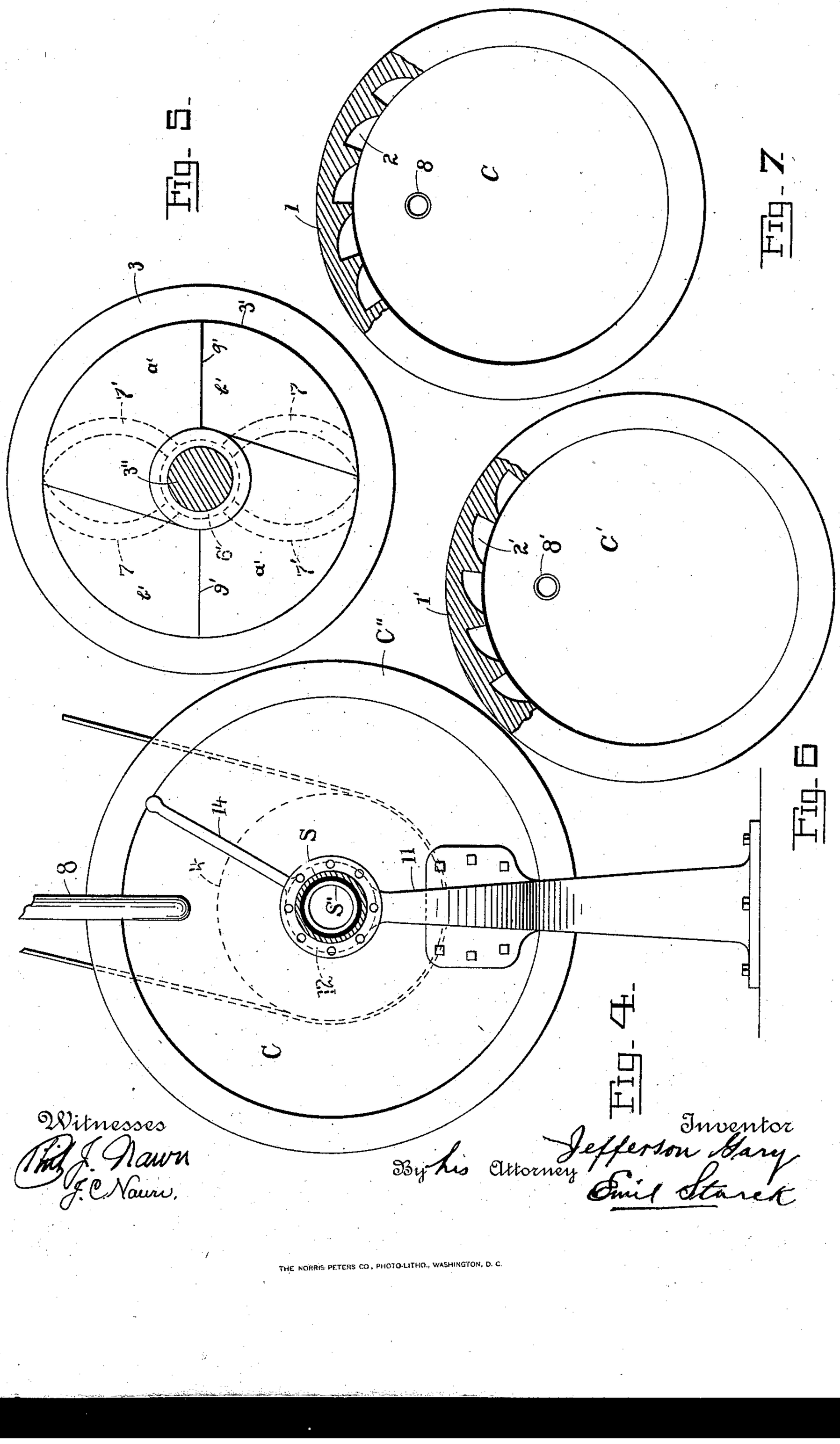

Fig. 5

Fig. 7

Fig. 6

Fig. 4.

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No. 748,495. Patented December 29, 1903.

UNITED STATES PATENT OFFICE.

JEFFERSON GARY, OF ST. LOUIS, MISSOURI, ASSIGNOR OF SIX-SEVENTHS TO GEORGE W. BOLDREW, PHINEAS SMITH, WILLIS BARNETT, HENRY H. JONES, HAMILTON SMITH, AND GEORGE W. BROWN, OF ST. LOUIS, MISSOURI.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 748,495, dated December 29, 1903.

Application filed June 26, 1901. Renewed June 3, 1903. Serial No. 159,979. (No model.)

To all whom it may concern:

Be it known that I, JEFFERSON GARY, a citizen of the United States, residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Rotary Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in rotary engines; and it consists in the novel arrangement and combination of parts more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a combined cross-section and elevation of the engine, showing the valve-pipe fully retracted. Fig. 2 is a similar view showing the valve-pipe discharging the motor fluid to the first series of ports formed in the piston-disk. Fig. 3 is an edge view of the piston-disk detached. Fig. 4 is an end elevation of the engine. Fig. 5 is a plan of one side of the piston-disk. Fig. 6 is a combined section and elevation of one series of pockets formed on the inner face of one of the walls of the cylinder or casing, and Fig. 7 is a similar view of the pockets of the opposite wall of the casing.

The object of my invention is to construct a rotary engine which shall be characterized by a maximum compactness, lightness, minimum number of parts, and maximum durability.

A further object is to construct an engine which shall be under perfect control and readily reversible and one possessing further and other advantages better apparent from a detailed description thereof, which is as follows:

Referring to the drawings, C C′ represent, respectively, the front and rear walls of the casing or cylinder whose periphery is formed by the circular cover-plate C″. Disposed, respectively, along the inner faces of the walls C C′ are annular bands 1 1′, along whose inner peripheral walls are disposed a series of pockets 2 2′, respectively, each pocket having a terminal wall disposed in the line of the radius of the band and an inclined basal wall, (see Figs. 6 and 7,) the pockets in the band 1 tending in one direction, while those of the opposite band tend in the opposite direction. (See Figs. 6, 7.) Between the adjacent faces of the bands 1 1′ is adapted to revolve the central annular peripheral rib 3 of the rotary piston 3′, the bands 1 1′ embracing the periphery of the piston on each side of said central rib 3. By this arrangement the periphery of the piston on each side of the central rib 3 is encompassed by the open ends of the series of pockets formed in the respective bands.

Projecting from one face of the piston 3′ and forming an integral part therewith is a central stud or shaft 3″, to which the drive-pulley 4 is directly coupled and whence the power may be transmitted to any desirable machinery, (not shown,) there being a short boss 3‴ on the opposite face. Formed in the piston opposite the base of the stud 3″ and extending to within a suitable distance of the face from which the stud projects is a central passage 5, with which communicate the annular steam-distributing chambers 6 6′, respectively, said chambers being disposed exteriorly to the planes of the opposite faces of the rib 3. Leading from substantially diametrically opposite points of the chamber 6 and passing entirely through the diameter of the piston are the curved ports 7 7, whose outer ends open at the periphery of the piston on one side of the rib 3, a similar series of ports 7′ 7′ leading from the chamber 6′ and opening at the periphery of the piston on the opposite side of the rib 3. The only difference between the disposition of the ports 7 7′ is that while the outer ends of the ports 7 are directed to discharge the motor fluid tangentially in one direction from the periphery of the piston to cause said fluid to impinge against the terminal walls of one set of pockets 2 the outer ends of the ports 7′ discharge the motor-fluid in the opposite direction to cause the same to impinge against the terminal walls of the opposite set of pockets 2′, (which, as previously stated, tend in the opposite direction from the pockets 2.) It may be stated in passing (and before describing the details by which steam is admitted to the

ports 7 7′) that the steam or other motor fluid as the same is discharged from the ports 7 7′ at the periphery of the piston, and as it impinges against the pockets 2 2′, the force of the jet thus discharged will drive the piston in the opposite direction to that in which the jet is escaping, so that if steam is allowed to pass through the ports 7 and impinge against the pockets 2 the piston will rotate in one direction, while if the steam is fed to the ports 7′ the piston will travel in the reverse direction. After the jet has performed its work the exhaust or spent steam will escape through the exhaust pipes or ports 8 8′, such exhaust-steam finding vent or escape through the space formed between the adjacent faces of the piston and walls C C′, such space being formed by dividing the opposite faces of the piston into four quadrants *a a b b*, (*a′ a′ b′ b′*,) two opposite ones of which *a a* (*a′ a′*) shall have their faces incline gradually from the center of the piston to the faces of the remaining pair *b b* (*b′ b′*) to a depth indicated by the ledges 9 9′. The ledges 9 gather, as it were, the exhaust-steam occluded between the inclined faces of the quadrants *a a* and the adjacent face of the wall C and gradually force it out of the exhaust-pipe 8. Owing to the reverse rotation imparted to the piston when steam is fed through the ports 7′, it is obvious that the ledges 9′ shall tend in the opposite direction to the ledges 9 to effectively force the exhaust-steam through the pipe 8′.

The feed mechanism or valve by which the steam is conducted to the opening 5 and distributing-chambers 6 6′ is as follows: The feed end of the steam-pipe S has operating therein a sliding extension or valve-pipe S′, closed at its inner end, adjacent to which, however, it is provided with a series of peripheral perforations or discharge-openings 10. When these openings are opposite the chamber 6, the steam will be fed to the ports 7, and when opposite the chamber 6′ the steam will be fed to ports 7′ with results as already described, and when the pipe S′ is withdrawn to bring the openings 10 in line with the wall C the feed will be cut off entirely and the engine remain stationary. This longitudinal movement of the pipe S′ to its various positions is accomplished as follows: Projecting from the wall C of the casing is a bracket or arm 11, having a terminal loop 12 loosely encircling the pipe S′. Loosely rotatable about the pipe S′ and located adjacent the loop 12 is a reversing-disk 13, provided with a lever or arm 14, the said disk 13 having an inclined face coöperating with an inclined face of a second disk 15, keyed to the pipe S′. Interposed between the wall C and the adjacent face of the disk 15 are springs 16, whose tendency is to normally force the pipe S′ outwardly. By rocking the disk 13 in either direction it will cause the inclined faces to ride over one another, this action forcing the disk 15 and pipe S′ inwardly into the passage 5 and bringing the openings 10 opposite one or the other of the chambers 6 6′ and permit the discharge of the steam thereinto and the ports 7 or 7′ and rotate the piston in one direction or the other. To insure against any possible rotation of the pipe S′ during its longitudinal movement, I provide the disk 15 with a lug 15′, which is constrained and guided between two parallel arms 17, projecting from the bracket 11, (one of the arms being removed in Fig. 1.) The disk 15 will thus under all circumstances be forced to advance longitudinally upon rotation of the reversing-disk in the proper direction. To cut off the steam, the lever 14 is rocked in the reverse direction, permitting the spring 16 to force the pipe S′ outwardly sufficiently to bring the perforations 10 opposite the wall C. (See Fig. 1.)

Having described my invention, what I claim is—

1. In a rotary engine, a suitable casing or cylinder, an annular band disposed along each of the inner adjacent faces of the opposite walls thereof, a piston confined between the walls of the casing and having its periphery embraced by the annular bands, two series of ports formed in the piston and discharging peripherally therefrom, one in one direction, and the other in the opposite direction, pockets formed along the inner circle of each of said annular bands, and having abutting walls against which the motor fluid can impinge, the one set of pockets tending in one direction and the other set in the opposite direction, suitable exhaust-ports formed in the walls of the casing, and means for feeding the motor fluid independently to one or the other set or series of ports, the parts operating substantially as, and for the purpose set forth.

2. In a rotary engine, a suitable piston-disk having a central peripheral rib, a central feed-opening being formed on one face of the disk, annular steam-distributing chambers disposed in planes on each side of the rib, ports leading from said chambers and discharging from the periphery thereof, those from one chamber in one direction, and those leading from the other chamber discharging in the opposite direction, the opposite faces of the disk having two opposite segments or quadrants with faces inclined to the plane of face of the disk and forming a tapering shoulder or ledge, whereby a space is formed between said inclined faces and the adjacent wall of the cylinder for the escape of the exhaust, substantially as set forth.

3. In a rotary engine, a rotatable piston having a central feed-opening, and ports leading therefrom to the periphery thereof, a steam-pipe, a movable valve-pipe carried by the steam-pipe, the inner end of the valve-pipe being closed but having feed ports or openings for discharging into the ports afore-

said, a bracket having a loop embracing the valve-pipe, a reversing-disk loosely rotatable about the valve-pipe, a second disk keyed to said valve-pipe, the two disks having inclined faces adapted to ride over one another, means for guiding the disk keyed to the valve-pipe and preventing accidental rotation thereof, and springs interposed between the disk keyed to the pipe and the wall of the cylinder, the parts operating substantially as and for the purpose set forth.

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

JEFFERSON GARY.

Witnesses:
EMIL STAREK,
G. L. BELFRY.