

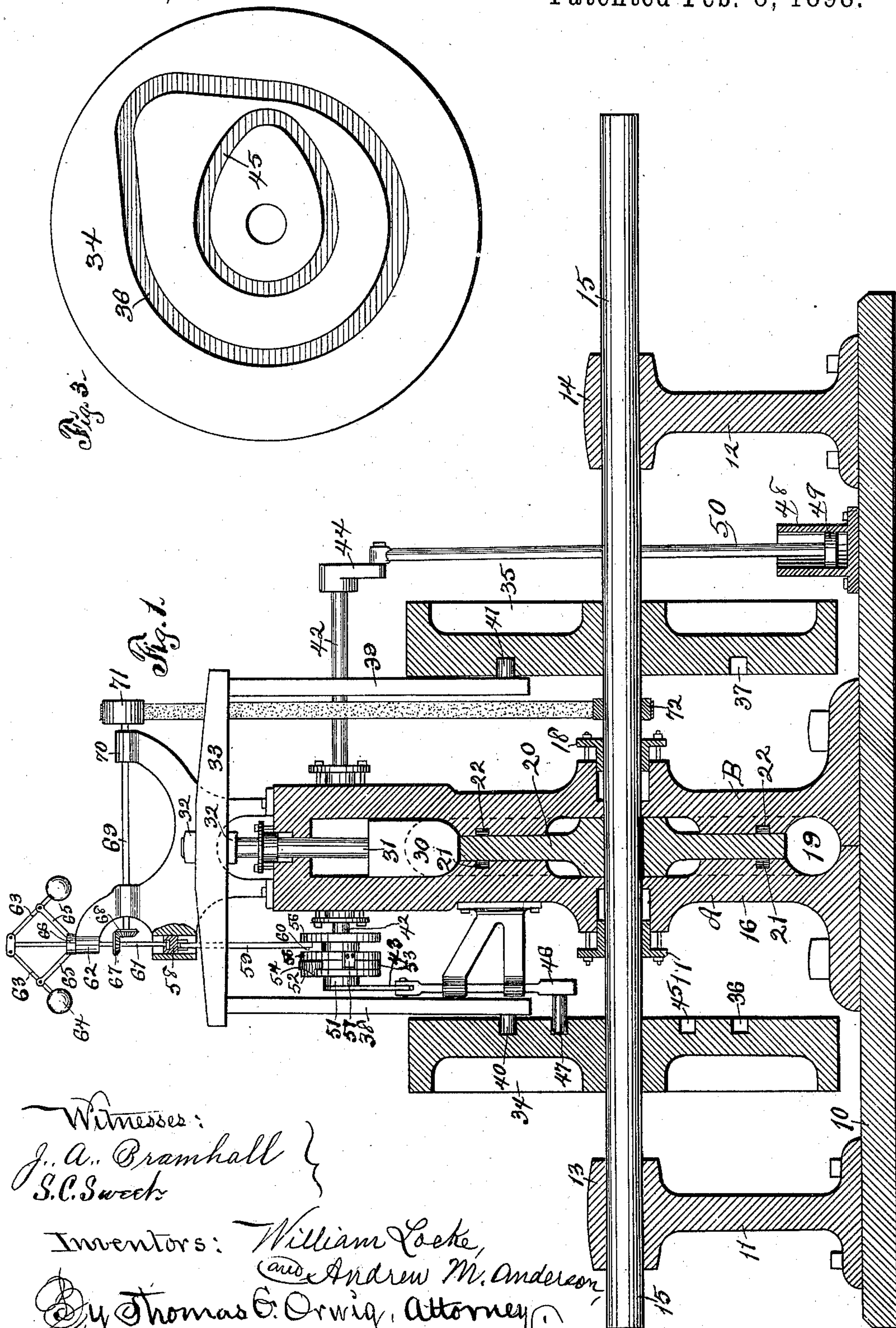
(No Model.)

2 Sheets—Sheet 1.

W. LOCKE & A. M. ANDERSON.  
ROTARY ENGINE.

No. 598,793.

Patented Feb. 8, 1898.



Witnesses:  
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S. C. Sweet }

Inventors: William Locke,  
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By Thomas G. Orwig, Attorney.



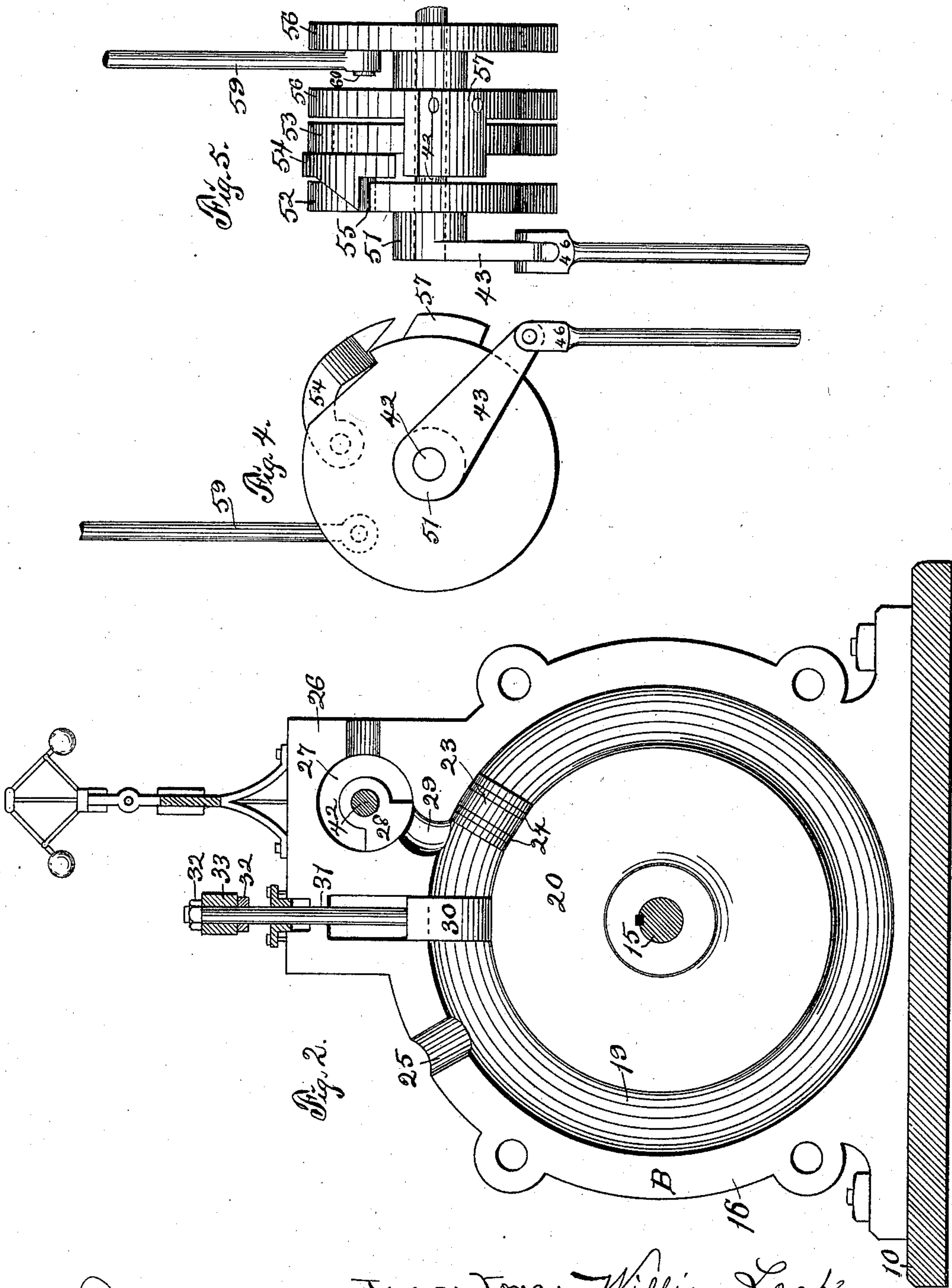
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# UNITED STATES PATENT OFFICE.

WILLIAM LOCKE AND ANDREW M. ANDERSON, OF BODE, IOWA, ASSIGNORS  
OF ONE-THIRD TO S. M. SANGESTAD, OF SAME PLACE.

## ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 598,793, dated February 8, 1898.

Application filed February 5, 1897. Serial No. 622,134. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM LOCKE and ANDREW M. ANDERSON, citizens of the United States of America, and residents of Bode, in the county of Humboldt and State of Iowa, have invented a new and useful Rotary Engine, of which the following is a specification.

The object of our invention is to provide improved means for utilizing the expansive force of steam in the rotation of mechanism.

Our invention consists in the construction, arrangement, and combination of elements hereinafter set forth, pointed out in our claims, and illustrated by the accompanying drawings, in which—

Figure 1 is a sectional elevation of the machine. Fig. 2 is a sectional elevation of the machine at right angles to the section of Fig. 1. Fig. 3 is an elevation in detail of one of the cam-grooved balance-wheels. Fig. 4 is an end elevation of the valve-shaft carrying the cut-off wheels, and Fig. 5 is a front or face elevation of the same.

In the construction of the apparatus as shown the numeral 10 designates a base to which are fixed standards 11 12, carrying on their upper ends journal-boxes 13 14. A shaft 15 is mounted for rotation in the journal-boxes 13 14 and the axis of said shaft is horizontal. Upon the shaft 15 there may be mounted any desired kind of gearing, whereby the motion of said shaft may be transmitted to machinery to be driven, or the said shaft may be directly connected to said driven machinery. Mounted on the central portion of the base 10 is a cylinder 16, divided into two like parts A B on a plane at right angles to the axis of the shaft 15. The cylinder 16 is axially bored, and the shaft 15 loosely traverses the axial bore therein, stuffing-boxes 17 18 being mounted on said shaft and removably and replaceably bolted to the parts or sections A B of the cylinder, around and concentric with the axial bore therein. Concentric with and outside of the axial bore of the cylinder 16 is formed a steam-chamber or piston-chamber 19 of annular form and circular in cross-section. The piston or steam chamber 19 is formed one-half in each of the members A B of the cylinder 16. The members A B of the cylinder 16 are cut out in their

central portions to make room for a disk 20, which disk is rigidly mounted on the shaft 15 between said members of the cylinder and is of a diameter coincident with the diameter of that portion of the cylinder within the axial margin of the steam-chamber 19. Packing-rings 21 22 are mounted in grooves formed in the members A B of the cylinder immediately within and concentric with the axial margin of the steam-chamber 19 and engage by their adjacent faces the outer or opposite faces of the disk 20. A piston-head 23 is fixed to the periphery of the disk 20 and is of such shape and conformation as to fit snugly within and transversely of the steam-chamber 19. The piston-head 23 is relatively thin and is provided with one or more packing-rings 24 on its periphery, whereby to effect a steam-tight joint with the surface of the steam-chamber 19. An exhaust-port 25 is located or formed in the cylinder 16 and communicates with the steam-chamber 19, near the top and to one side of the said steam-chamber. A steam-chest 26 is positioned on top of the cylinder 16 and is provided with a steam-chamber 27, containing a rock-valve 28, which rock-valve is so positioned relative to the steam-chamber as to govern a port of ingress 29, which port affords communication between the steam-chamber 27 and the top of the steam-chamber 19. A gate or piston-head 30 is mounted in slide-bearings in the steam-chest casing 26 and the cylinder 16 and is of such shape and conformation as to extend transversely of said steam-chamber 19 and in contact with the axial margin thereof in the vertical plane of the axis of the shaft 15 and entirely close or form a cut-off or gate for said steam-chamber 19. It will be observed that the exhaust-port 25 is located adjacent to the gate or piston-head 30 and on the opposite side thereof from the ingress-port 29. The gate or piston-head 30 is provided with a stem 31, adjustably connected by means of nuts 32 to a cross-head 33 above the steam-chest. Balance-wheels 34 35 (one or more of which may also be employed as belt-wheels) are mounted rigidly on the shaft 15 on opposite sides of the cylinder 16, and the adjacent faces of said balance-wheels are formed with like cam or eccentric grooves 36 37. Pitmen 38 39 are connected at their



upper ends to opposite ends of the cross-head 33, and extending downwardly therefrom are provided with laterally-projecting pins 40 41, (which may or may not be provided with  
 5 antifriction-rollers,) which pins engage in the cam or eccentric grooves 36 37 of the balance-wheels 34 35 and are by said grooves raised and lowered in the rotation of said balance-wheels. The valve 28 is mounted rigidly on a stem  
 10 42, which stem is in the nature of a rock-shaft and is provided with a crank 43, loosely connected with one end, and a crank 44 on the end opposite thereto. A cam or eccentric groove 45 is formed in the inner face of  
 15 the balance-wheel 34, entirely within the space bounded by the axial margin of the groove 37, and a pitman 46, provided with a laterally-extending pin 47, is connected at its upper end with the outer end of the crank  
 20 43 and is positioned with the arm 47 engaging in the groove 45, whereby in the rotation of the balance-wheel 34 the said groove or the margins thereof will raise and lower the said pitman. A dash-pot 48 is provided and  
 25 has the usual head 49 and stem 50, and the upper end of said stem is fixed to the outer end of the crank 44. The crank 43 is properly described as being formed on a sleeve 51, which sleeve is loosely mounted upon one  
 30 end portion of the valve-stem 42 and terminates in an integral enlarged or bossed portion in the nature of a wheel 52, also loosely mounted on the valve-stem 42. A wheel 53  
 35 is mounted rigidly on the valve-stem 42 adjacent to the wheel 52, and a pawl 54 is pivoted upon and extends laterally from and over the periphery of the wheel 53 to and across the periphery of the wheel 52. A  
 40 notch 55 of ratchet character is formed in and transversely of the periphery of the wheel 52 and is engaged at times by the pawl 54. A governor-wheel 56, formed of two like members integrally connected by a hub, is mounted  
 45 loosely on the valve-stem 42 on the opposite side of the wheel 53 from the wheel 52 and is provided on its periphery with a tripping-pawl 57, so shaped and arranged as to extend laterally to and across the periphery of the wheel 53. A centrifugal governor is located  
 50 upon the steam-chest 26 of the engine and is provided with a slide 58, which slide is connected by a rod 59, fastened thereto at its upper end, to a wrist-pin 60 on one member of the wheel 56. The slide 58 is swivel-seated  
 55 in its upper face, and extending upwardly therefrom is a governor-stem 61, mounted for rotation in standards 62 of the governor, and to the upper end of said stem are connected the upper or inner ends of the governor-arms  
 60 63. The governor-arms 63 are provided with balls 64 on their outer ends and their centers are connected by means of rods 65 to a block 66, swiveled on the upper ends of the standards 62. A bevel-gear 67 is feathered to the  
 65 lower portion of the stem 61 and meshes with a bevel-gear 68, mounted on the inner end of a governor-shaft 69, which governor-shaft trav-

erses one of the standards 62 and is mounted at the other end in a bearing 70, rising from the steam-chest. A belt-wheel 71 is mounted  
 70 rigidly on the governor-shaft 69 and is belted to a wheel 72 on the shaft 15.

In practical operation steam is turned into the chest 26 and the parts so positioned as that said steam will pass through the port 29 and  
 75 into the steam-chamber 19 between the piston-heads 23 and 30, the said heads being in the positions shown. The expansive force of the steam within the chamber 19 moves the piston-head 23 along said chamber and there-  
 80 by causes the rotation of the disk 20, the shaft 15, and the balance-wheels 34 35, as well as any mechanism connected with said shaft. When the piston-head 23 in its travels passes the exhaust-port 25, the steam heretofore em-  
 85 ployed as a motive power exhausts through said port and the piston-head is carried forwardly to and beyond the ingress-port 29 by the momentum gained in its initial move-  
 90 ment or its movement prior to its passage of the exhaust-port. As the piston-head travels in the space from the exhaust-port 25 to the piston-head 30 the cam-grooves 36 37 of the balance-wheels raise the pins 40 41 and con-  
 95 sequently elevate the pitmen 38 39, the cross-head 33, the valve-stem 31, and the said piston-head 30 out of the way of the piston-head 23, and immediately upon the passage of the piston-head 23 beyond the vertical plane of  
 100 the piston-head 30 the said grooves 36 37 of the balance-wheels cause a reverse movement of the pitmen, cross-head, and stem, that reseats the piston-head 30 transversely of the steam-chamber 19. Immediately after the  
 105 piston-head 30 has been reseated transversely of the steam-chamber 19 the groove 45 in the wheel 34 elevates the pitman 46 and crank 43, thereby oscillating the sleeve 51 and wheel 52, and the notch 55 of the wheel 52 being en-  
 110 gaged by the pawl 54 the wheel 53 is rotated and thereby rotates the valve-stem 42 to such an extent as to open the valve 28, so that the steam may pass from the chamber 27 through the port 29 into the space between the piston-  
 115 heads 23 and 30. It should have been stated before that in the travel of the piston-head 23 the pitman 46 is depressed or caused to descend, thereby releasing the pawl 54 from en-  
 120 gagement with the notch 55 and permitting the closing of the valve 28 across the port 29 by the dash-pot mechanism acting through the crank 44 and valve-stem 42. As the en-  
 125 gine increases in motion the said motion is communicated through the wheels 72 71, belted together, and the shaft 69, gears 68 67, and stem 61 to the governor-balls, which are moved outward centrifugally and depress the stem 61 and slide 58. The movement of de-  
 130 scent of slide 58 is communicated through the rod 59 and wrist-pin 60 to the wheel 56, which wheel is rotatably moved to position the pawl 57 relatively nearer to the pawl 54. Now in the further operation of the engine the valve 28 is alternately opened and closed by the en-



gagement of the notch 55 with the pawl 54 and the operation of the dash-pot mechanism, and as the speed increases and less steam is required to pass through the port 29 to keep the piston 23 in motion the pawl 54 is tripped out of the notch 55 by more speedy engagement with the tripping-pawl 57. By this means the engine is perfectly and automatically governed in its movements.

10 We claim as our invention—

1. A rotary engine comprising a cylinder formed in two like members connected face to face, an annular steam-chamber circular in cross-section formed within said cylinder, 15 a shaft axially mounted in the cylinder, a disk on said shaft, which disk is positioned between the members of the cylinder and is of a diameter coinciding with the diameter of that portion of the cylinder between or within the axial margin of the steam-chamber, a piston-head radiating from said disk within the steam-chamber, packing-rings between the disk and cylinder, a steam-chest, an ingress-port communicating between the 25 steam-chest and steam-chamber within the cylinder, an exhaust-port, a valve controlling the communication between the steam chest and chamber, a piston-head 30, balance-wheels 34, 35 mounted on said shaft and provided with like cam-grooves in their inner faces, pitmen 38, 39 having pins 40, 41 engaging in said like cam-grooves, a cross-head 33 connected to the upper ends of said pitmen and connected at its center to the piston-head 30, a cam-groove 45 in the balance-wheel 34, 35 a rock-shaft connected with the steam-valve,

a sleeve on said rock-shaft connected with the pitman operated by the groove 45, clutch connections between the sleeve and rock-shaft whereby the rock-shaft is moved in one 40 direction, a crank on said rock-shaft a stem 50 connected with said crank, a head 49 on said stem and a dash-pot arranged to receive said head, whereby the said valve and piston-head 30 are alternately moved. 45

2. In a rotary engine, a valve-stem 42, a valve 28 mounted on said stem, a crank 44 on said stem, a dash-pot mechanism connected with said crank 44, a centrifugal governor having a slide arranged for ascent and descent, a tripping-wheel 56 connected with and 50 arranged for rotation by said slide, a wheel 53 mounted on said valve-stem, an actuating-wheel 52 loosely mounted on said valve-stem and positively operated, a pawl 54 pivoted upon the wheel 53 and engaging in the periphery of the wheel 52, a tripping-pawl 57 carried by the tripping-wheel and acting upon the pawl-and-ratchet mechanism aforesaid, a sleeve 51 rigidly connected with the wheel 52, 60 a crank-arm 43 on said sleeve, a pitman 46 on said crank-arm, a balance-wheel 34 rigidly mounted on the main shaft of the engine and provided with a cam-groove 45, a pin 47 traveling in said cam-groove 45 and connected 65 with the pitman 46 to operate said pitman and means for rotating said main shaft.

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Witnesses:

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