

No. 785,177.

PATENTED MAR. 21, 1905.

R. R. MORRISON.
ROTARY ENGINE.

APPLICATION FILED NOV. 26, 1902.

2 SHEETS—SHEET 1.

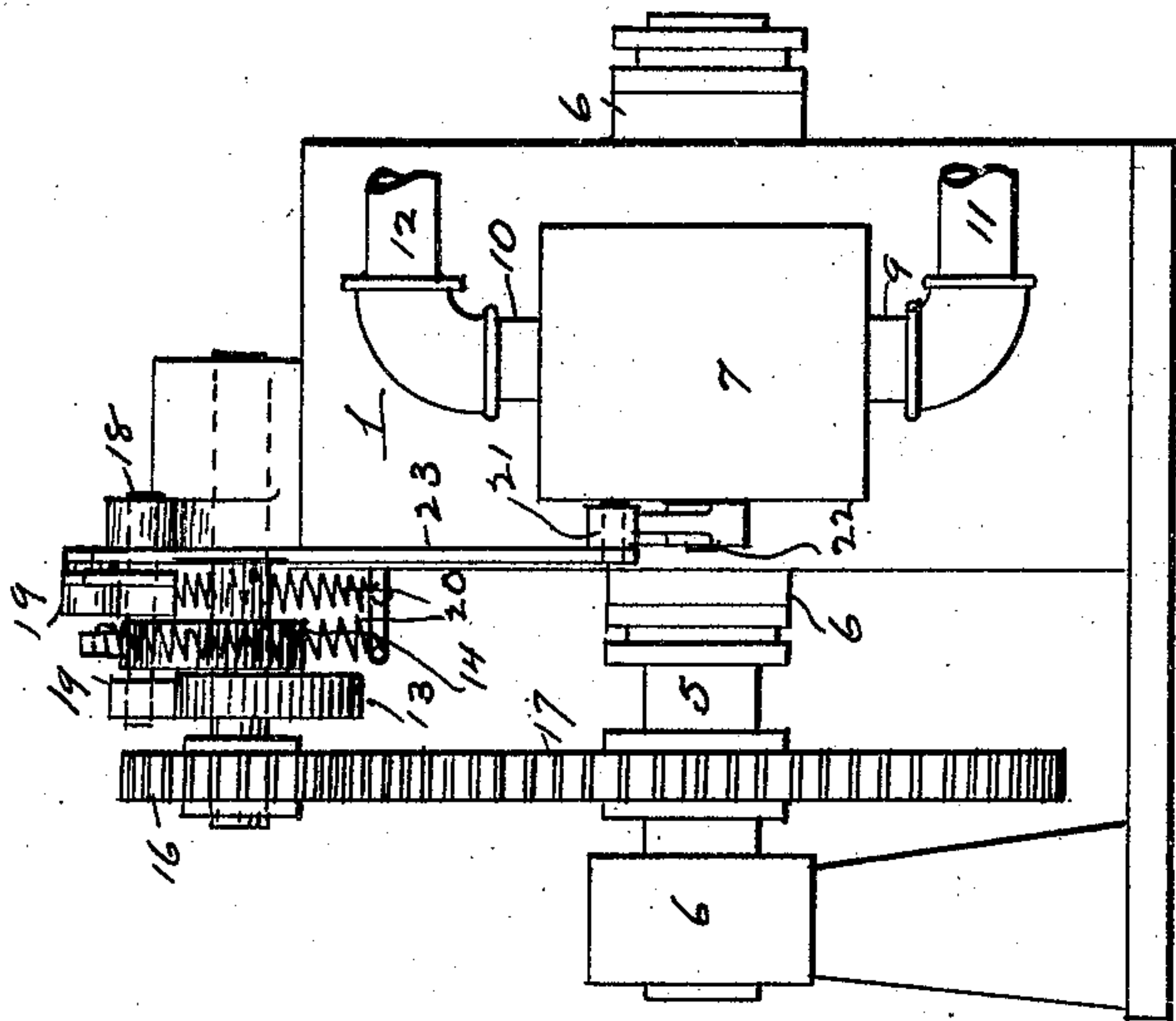


Fig. 2

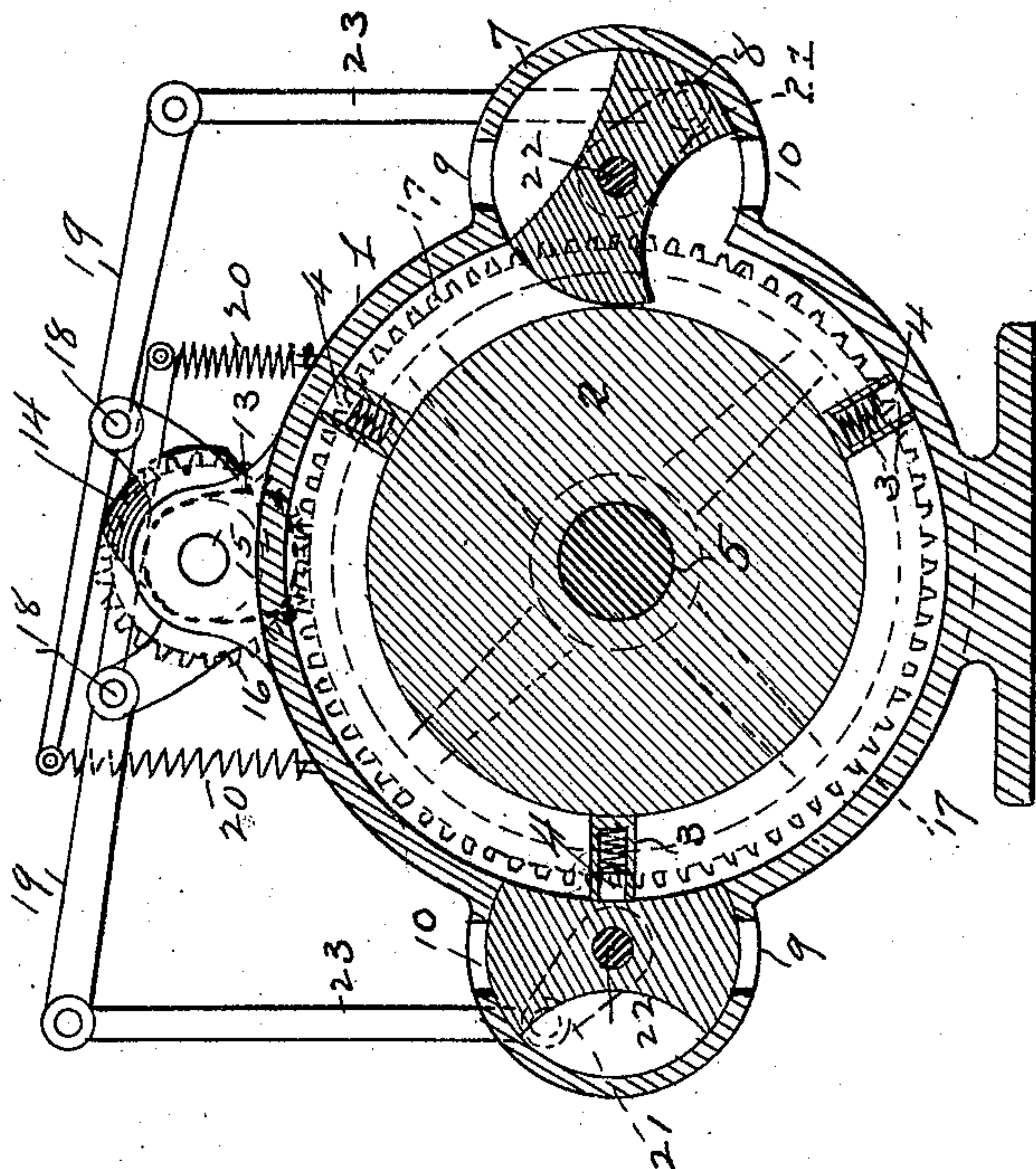


Fig. 1

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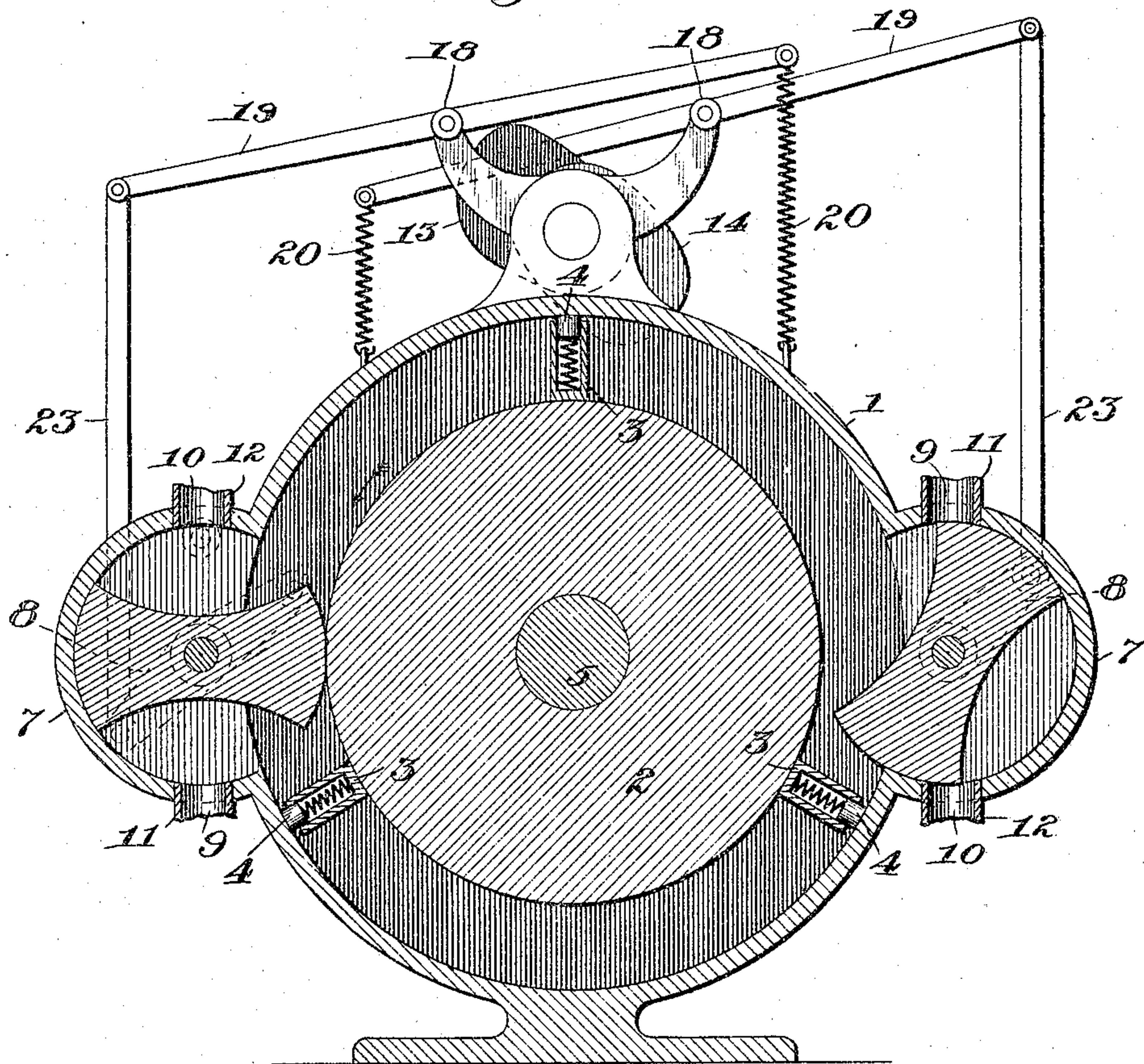
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2 SHEETS—SHEET 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

REASON R. MORRISON, OF MINERAL CITY, OHIO.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 785,177, dated March 21, 1905.

Application filed November 26, 1902. Serial No. 132,964.

To all whom it may concern:

Be it known that I, REASON R. MORRISON, a citizen of the United States, and a resident of Mineral City, county of Tuscarawas, State of Ohio, have invented certain new and useful Improvements in Rotary Engines, of which I hereby declare the following to be a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in rotary steam-engines; and the objects of the invention are to provide an automatic engine of that character with means for varying the moments of steam admission and exhaust, as well as the duration of the steam-admission, whereby the steam can be used expansively in the cylinder.

My invention consists in the rotary piston or disk within the cylinder, oppositely-placed partially-rotary valves having each of the combined uses of admission and exhaust, and cam devices with intervening mechanism whereby the valves can be operated and the angle of either valve can be changed at pleasure, with the various driving mechanism for the cams and combination and arrangement of the various parts, as hereinafter described, shown in the accompanying drawings, and specifically pointed out in the claims.

In the accompanying drawings, Figure 1 is a transverse vertical section of cylinder, showing the construction of the parts and with the operating-gearing shown principally in dotted lines. Fig. 2 is a side view of the same. Fig. 3 is a similar view to Fig. 1, showing the valves at full and partial admission.

In the views, 1 is the cylinder.

2 is a disk-shaped piston provided with the vanes 3, in which spring-backed packing-strips 4 maintain the contact with the cylinder. The piston is secured upon a shaft 5, which is mounted in suitable bearings 6 on the cylinder. Upon opposite sides of this cylinder are seen cylindrical valve-seats 7, in which partially rotate or oscillate doubly-concave valves 8.

9 and 10 are respectively the steam admission and exhaust ports on either side of the valve-seats, to and from which lead the steam and exhaust pipes 11 and 12.

The operation of the valves is automatic, and the means employed therefor may be described as follows: 13 and 14 are cams mounted upon a shaft 15, which is pivoted in a suitable bearing. These cams are under constant rotation and present their engaging surfaces at the time of the valves movement and are operated by means of the small spur-gear 16 upon the cam-shaft and the larger gear 17 upon the piston-shaft. Pivoted upon bearings 18 are seen the levers 19, which rest upon the cams and are normally kept in engagement therewith by means of the dash-pots or springs 20, attached to their outer extremities and to a stationary part of the device, as the cylinder. The outer extremities of the levers are connected with the valves by means of the cranks 21, mounted upon the valve-stems 22 and links 23. It will readily be seen that as the piston rotates in the cylinder the gears will rotate the cams, and the levers will alternately raise and lower the valve-cranks to partially rotate the valves in their seats. The valve at the left of the figure is shown as closed to permit the piston-packing to sweep past it and the valve at the right closed at the steam-admission, but widely open for the exhaust. Here in dotted lines the valve is shown partially open just before closing, showing manner of cutting off steam at a portion of the one-third circumference between the valves. There are three vanes shown. Hence the large gear is made three times the diameter of the small gear, which actuates the cams. Hence the valves reciprocate three times or once for each vane during one rotation of the piston. It will be seen that the valves engage the periphery of the piston at their longest diameters and engage the edges of the vanes at one of their concave surfaces, so as always to make steam-tight surfaces, and it will readily appear that while one vane is opposite one valve, as seen at the left of Fig. 1, the valve will present its concave surface thereto; but while the valve at the opposite side of the cylinder is between two vanes it will present its longest diameter to the piston-disk on which it will roll. It will also be readily seen that the cams can be set at any desired angle desired upon their shaft, and thus change at will

the moments of steam admission and exhaust and cut off the steam-admission at one-half to one-fourth or at any other fractional part of the distance between the vanes as they pass the valve. Both valves are used for admission and exhaust and the capacity of the engine thereby doubled.

Any number of vanes could be employed as desired, and a corresponding difference in the proportions of the gearing and number of valves should then be preserved. For instance, if four valves were employed the gears should be as four to one, &c. On account of the reverse movements of the valves the steam and exhaust ports are reversed in position on the opposite sides of the cylinder.

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

1. In a rotary engine, the combination with a cylinder, a shaft and piston thereon, of vanes upon the piston, engaging the cylinder, cylindrical valve-seats communicating with said cylinder, doubly-concave valves in said seats, said valves arranged to engage the said piston-periphery at their longest diameters, and the extremities of the vanes with one of their concave surfaces, live-steam and exhaust ports in said valve-seats, and means for recip-

rocating said valves to admit and exhaust steam from the cylinder, consisting of a gear on the piston-shaft, cams and a cam-shaft, a gear on said cam-shaft adapted to engage said gear on the piston-shaft, levers actuated by said cams, and suitable mechanism connecting the valves and levers, substantially as described.

2. In combination, a cylinder, a piston and shaft thereon, vanes upon said piston, valve-seats on either side of the cylinder, and steam and exhaust ports for said seats, rotary valves doubly concave, valve-stems in said seats, and cam mechanism operated by the rotation of the piston-shafts, constructed and arranged to rotate said valves in opposite directions, whereby the one valve will be closed to admit the passage of one vane, and the other will be open to admit of the steam admission and exhaust between the vanes on the opposite side of the piston, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

REASON R. MORRISON.

Witnesses:

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