W. TAYLOR.

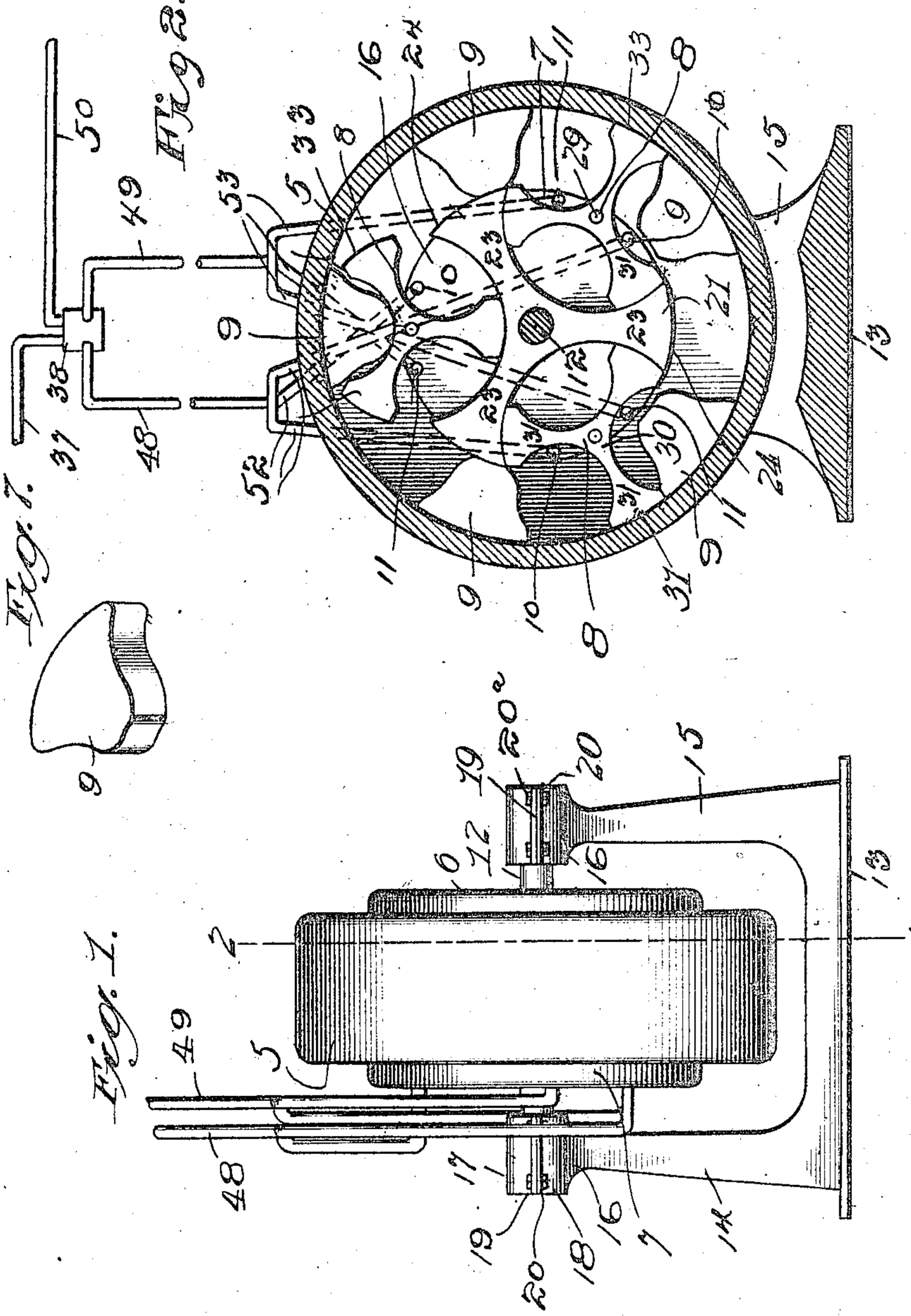
ROTARY MOTOR.

APPLICATION FILED APR. 14, 1909.

949,605.

Patented Feb. 15, 1910.

3 SHEETS—SHEET 1.



Witnesses

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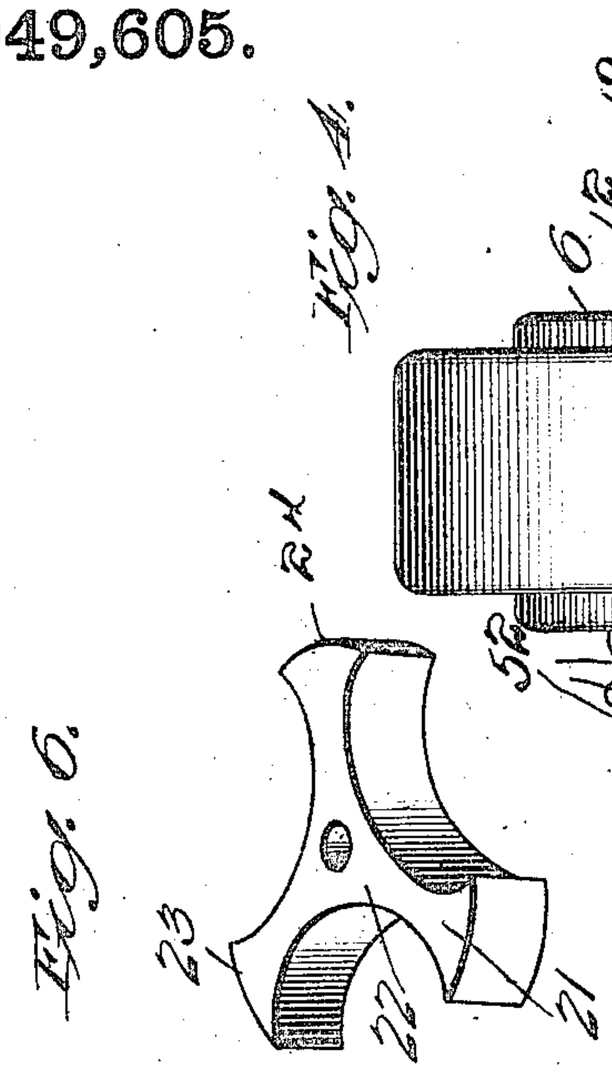

Fig. 6.

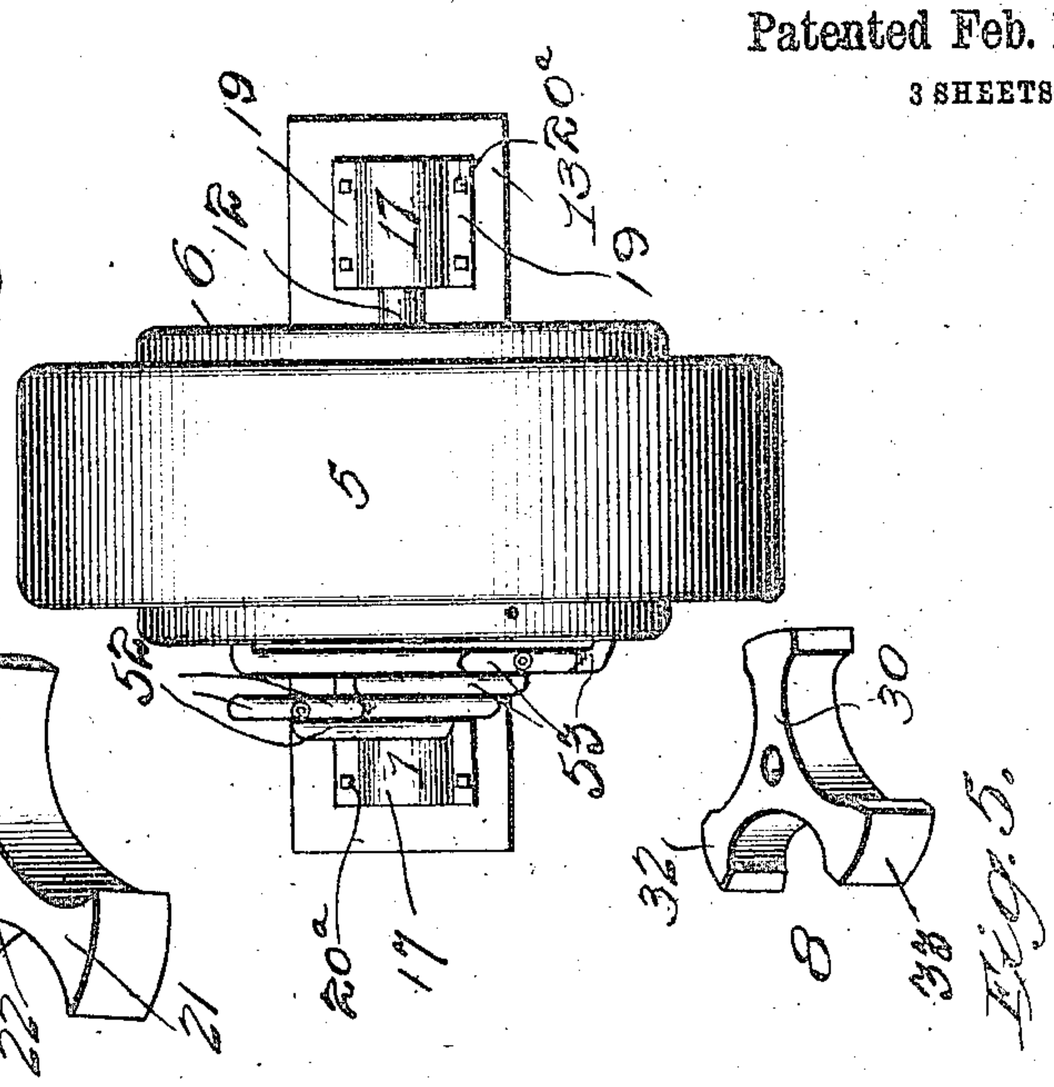

Fig. 5.

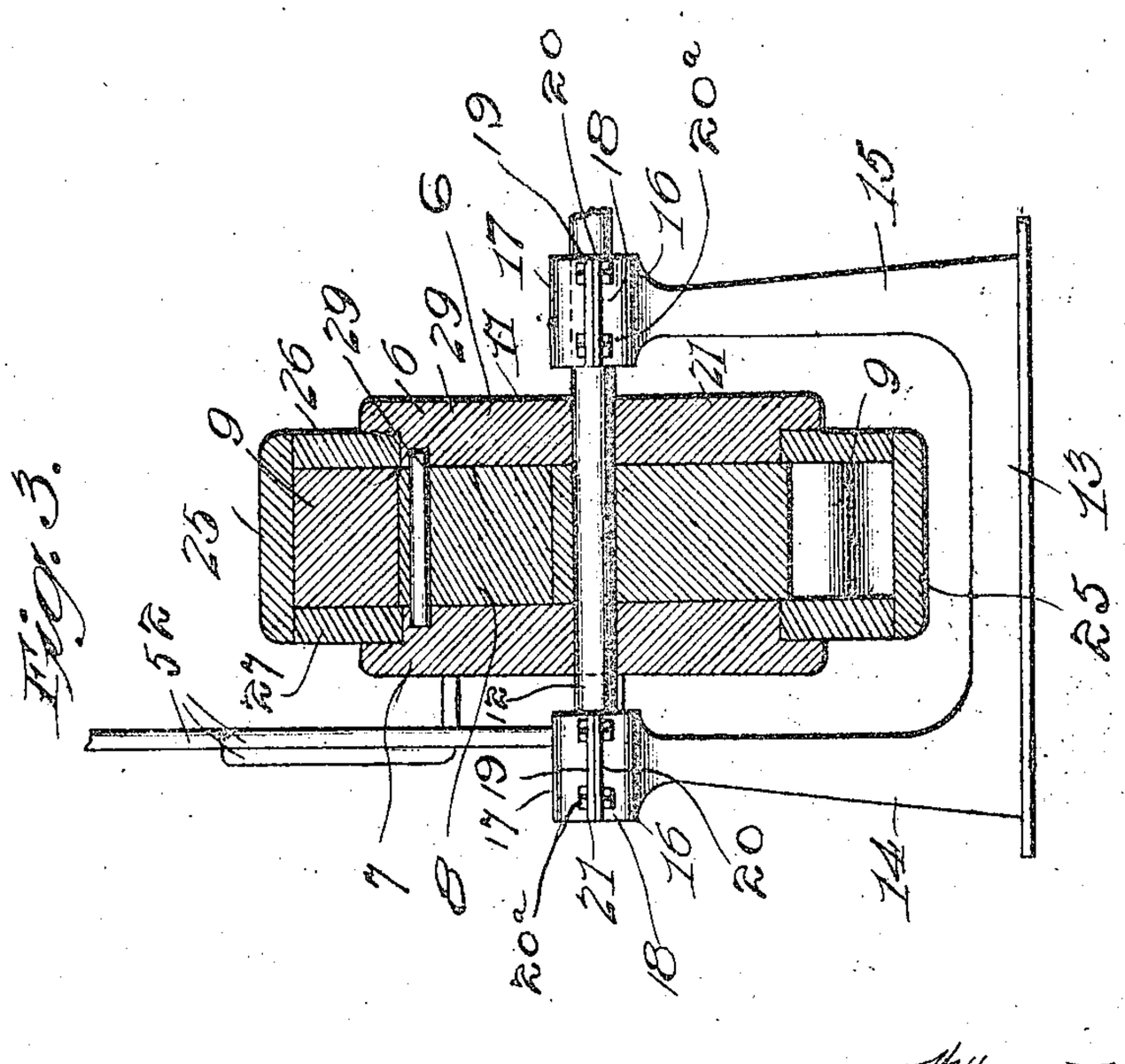

Fig. 3.

Witnesses

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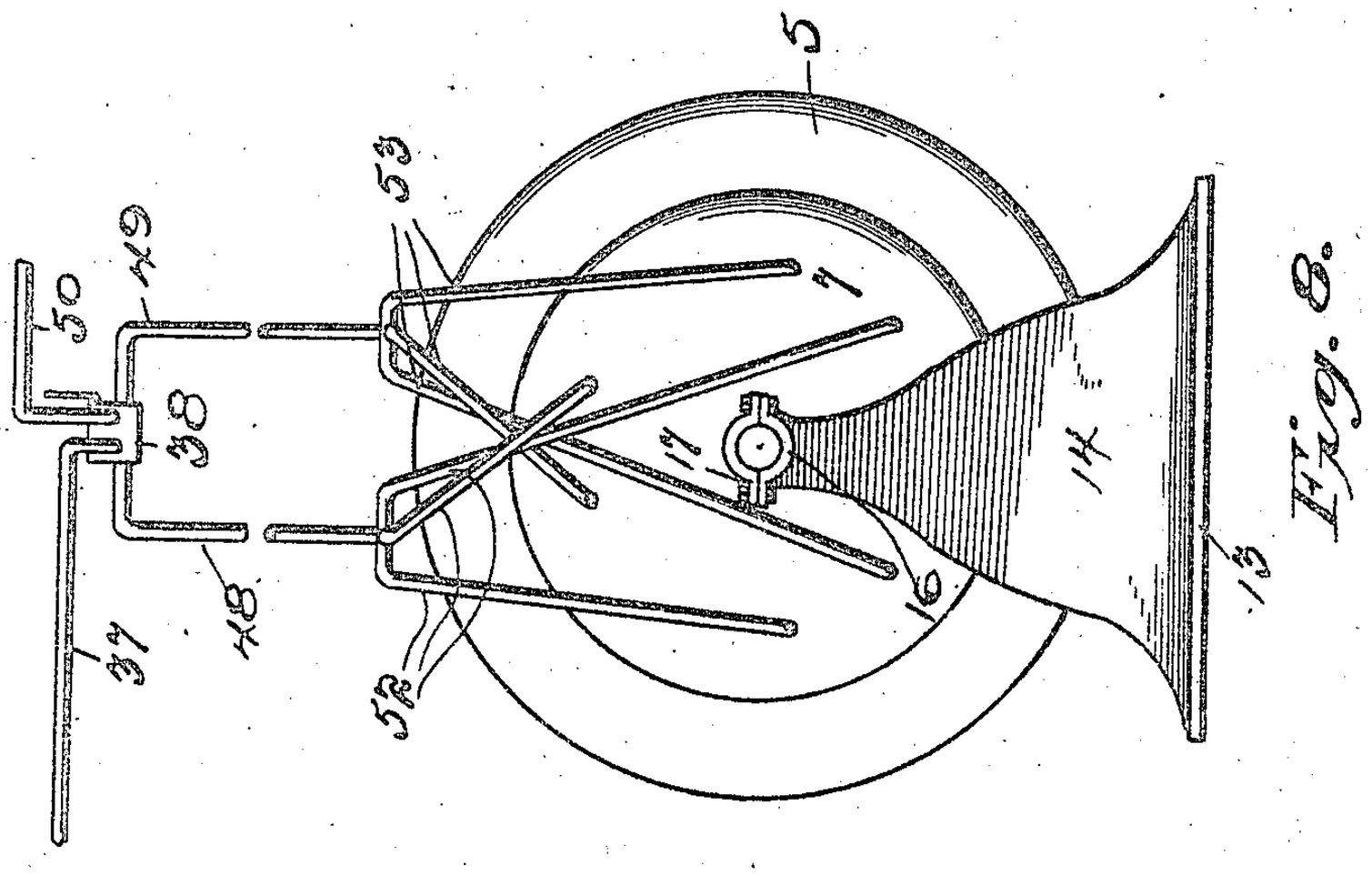

Fig. 8.

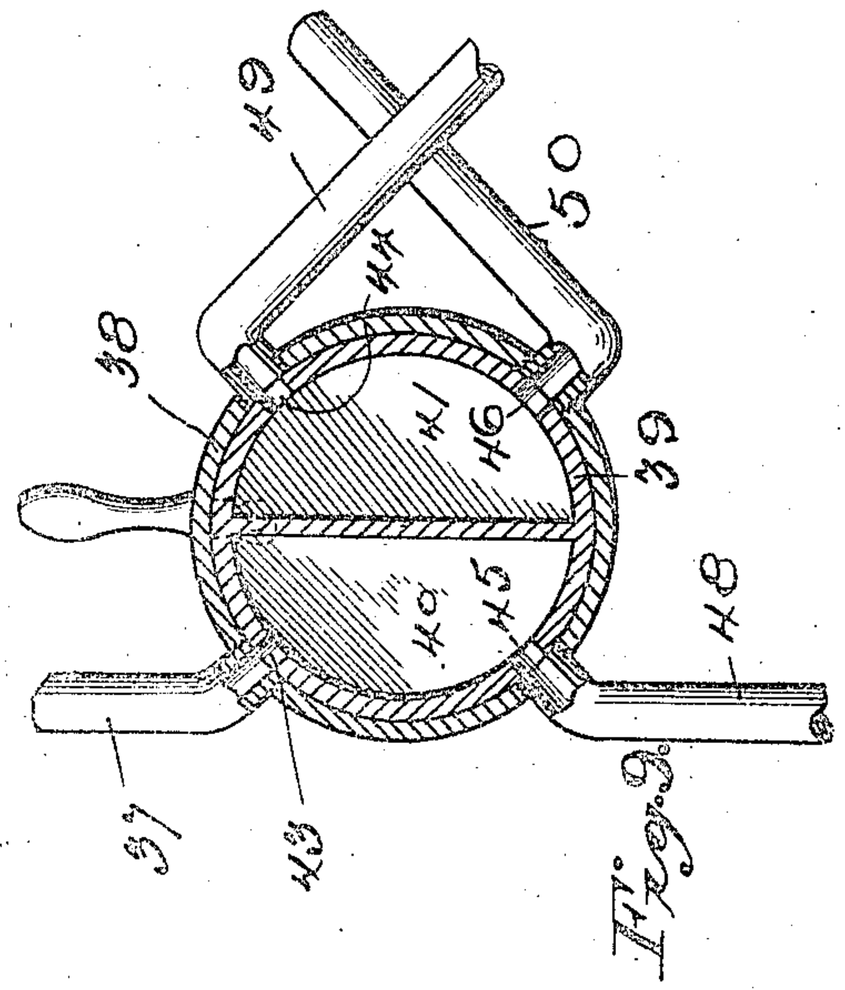

Fig. 9.

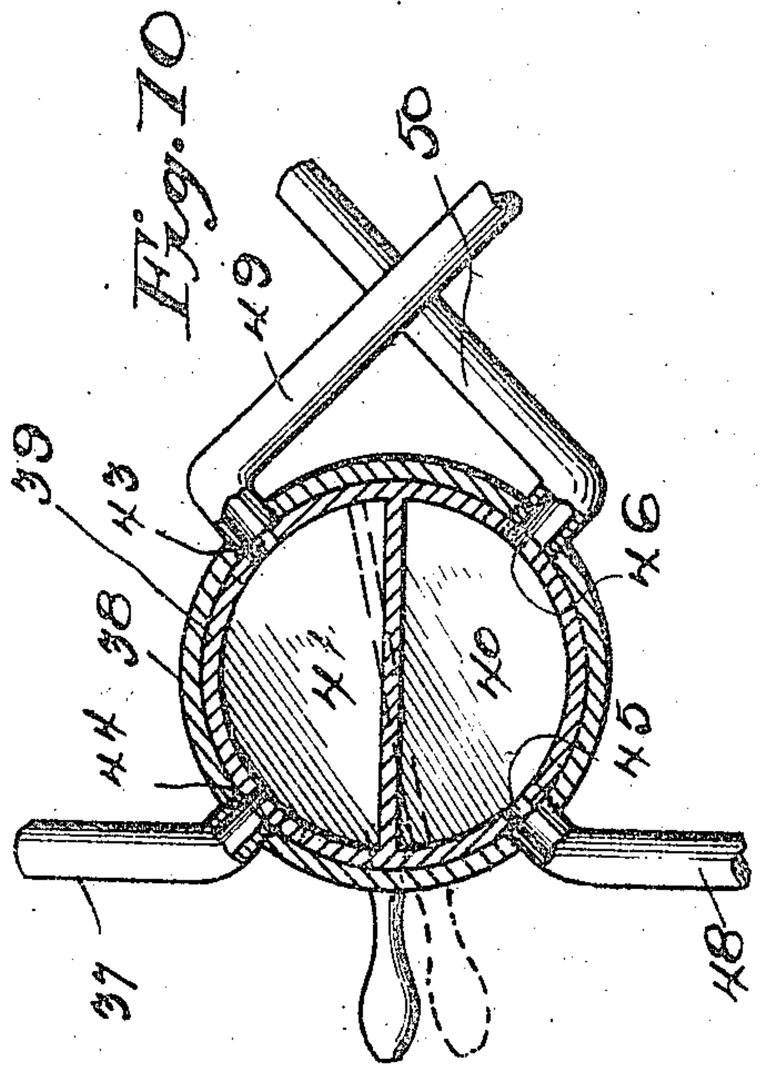

Fig. 10.

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UNITED STATES PATENT OFFICE.

WILLIAM TAYLOR, OF MINOT, NORTH DAKOTA.

ROTARY MOTOR.

949,605. Specification of Letters Patent. Patented Feb. 15, 1910.

Application filed April 14, 1909. Serial No. 489,903.

To all whom it may concern:

Be it known that I, WILLIAM TAYLOR, a citizen of the United States, residing at Minot, in the county of Ward and State of North Dakota, have invented certain new and useful Improvements in Rotary Motors, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to rotary motors and more particularly to that class having concentric stationary disks upon which the cylinder revolves.

One object of the invention is the provision of a stationary disk provided with mechanism which is actuated to admit and cut off steam by a plurality of abutments carried by the cylinder whereby the employment of the usual valve gear, steam chests, &c., usually met with in motors of this kind are eliminated.

Another object is the provision of a novel form of cut-off valve designed to control the intake and exhaust of steam or other fluid.

A further object is the provision of novel mechanism for controlling the operation of the motor whereby the same may be operated in either a forward or reverse movement.

Other objects and advantages of the invention will be apparent from the following detailed description when taken in connection with the accompanying drawings.

It will be understood, of course, that the essential features of the invention involved in carrying out the objects of the invention generally stated above, are susceptible to a wide range of details and structural arrangements, but one preferred and practical embodiment thereof is shown in the accompanying drawings, wherein—

Figure 1 is an end elevation of the improved motor. Fig. 2 is a front elevation taken on line 2—2, Fig. 1. Fig. 3 is a vertical cross-sectional view. Fig. 4 is a top plan view. Fig. 5 is a detail perspective view of one of the valves. Fig. 6 is a similar view of the member attached to the inner face of one of the disks. Fig. 7 is a similar view of one of the abutments. Fig. 8 is a side elevation showing the reversing mechanism. Figs. 9 and 10 are detail sectional views of parts of the reversing mechanism.

The improved motor comprises a rotating cylinder designated by the numeral 5, journaled on a pair of stationary disks 6 and 7. Interposed between the opposed faces of the latter are the rotating valves 8, which are actuated by the abutments 9 depending from the inner surface of the cylinder 5. The intake ports 10 and exhaust ports 11 are formed on and extend through the disk 7 and are adapted to be opened and closed through the rotation of valves 8 by the abutments 9.

The motor may be keyed or otherwise rigidly fastened to a shaft 12 supported by a frame having a bed plate 13 from the opposite ends of which rise the vertical arms 14 and 15 having on their upper ends beds 16 for the reception of said shaft 12, the latter being held against displacement by the clamp plates 17 and 18, having concaved inner faces to conform to the outline of the shaft 12, and further provided with perforated lateral ears 19 which bear on similar ears 20 on the beds 16. Locking bolts 20^a insertible through the openings of the lugs serve to lock the parts together.

The disks 6 and 7 are held in spaced relation by means of the drum 21, said drum being preferably a casting having opposite flat faces which bear against the opposed faces of the disks sufficiently close to prevent the escape of steam. The drum consists essentially of a hub portion 22 from which extend the radial arms 23, the latter being preferably three in number and arranged approximately 120 degrees apart. The terminals of the arms 23 are convexed as shown at 24 and the opposite sides of each arm from the edge of the convex surface 24 to the hub 22 curve inwardly and outwardly so that the adjacent corners of any two are connected by a recurved line thereby providing three peripheral cavities in said drum. Said arms extend to points a trifle beyond the joining line of the disks 6 and 7 and cylinder 5 so that their convex surfaces 24 will bear on the ends of the abutments 9. As before stated, the cylinder 5 is journaled o the disks 6 and 7 and may be formed of a single casting or consists, as shown in Fig. 3, of a circular rim plate 25, from the inner face and opposite edges of which extend the annular cheek plates 26 and 27 which fit in annular rabbets formed on the inner faces and adjacent the outer edges of the disks 6 and 7. Depending from the rim plate 25 are the abutments 9, preferably five in number and approximately seventy-two degrees apart. Said abutments are of a length to

bear on the terminals of the arms 23 during the rotation of the cylinder and for that reason their free ends are concaved as shown at 28 in order to provide a snug joint with the convex edges of the arms. The opposite faces of the abutments are flat and bear against the opposed inner faces of the cheap plates 26 and 27, while each of their opposite sides described a compound curve extending from the edge of the concave terminal 28 to the rim plate 25.

The valves 8 are shown to be three in number and are mounted on pivots 29 the ends of which are sunk in the opposed inner face of the disks at points adjacent the inner edge of the rabbet and directly between the adjacent corners of any two of the arms 23. Each valve is formed similar to the drum 21 and consists of a hub 30, having three radial arms 31. Each arm terminates in an enlarged head 32 having a convex terminal 33 and flat ends 34 and 35. The thickness of the valves is approximately the same as the distance between the opposed inner faces of the disks, and the line joining the inner ends of the flat ends 35 curves to the shape of a semi-circle. As shown in Fig. 2, the distance between the remote outer corners of any two of the heads 32 is exactly the same as the distance between the adjacent corners of any two of the arms 23 of the member 21, this construction will permit the convex terminal 33 to follow and bear on the recurved surface between any two arms with sufficient tightness to prevent the escape of steam. The distance from the pivotal point 30 to the convex surface 33 is substantially the same as the distance from the said pivotal point to the inner surface of the rim plate 25, and the distance between points adjacent the bases of the abutments 9 is substantially the same as the distance between adjacent inner corners of any two heads.

The exhaust ports 11 are preferably three in number and disposed intermediate of the pivots 29 and main shaft 12, while the three intake ports 10 alternate with the exhaust ports 11 and are located adjacent the juncture of the disks and cylinder and intermediate of the pivots 30 and one edge of each arm and at an acute angle to said exhaust ports.

The steam or other fluid for the operation of the described engine or motor is delivered through a feed pipe 37 which communicates with a casing 38 in which a rotary hollow valve or plug 39 is mounted, said valve being centrally divided to form two chambers 40—41, each of which is provided with two openings 42—44 and 45—46 adapted to be brought to register with the pipes 37 and 48, and 49 and 50 which communicate with said valve casing. The valve 39 may be rotated by means of the hand lever 51. The pipes 48 and 49 extend from the valve casing to the engine and each terminates in three branches 52—53, the branches 52 being connected with the intake ports 10 and the branches 53 with the exhaust ports 11.

In Figs. 9 and 10 the reversing valve 39 has been shown in detail, and by reference thereto it will be seen that (in Fig. 9) the feed pipe 37 delivers the steam to chamber 40 from which it escapes through pipe 48 to the ports 10 of the engine or motor to drive the same forward. In this position of the valve, the exhaust from the engine will be discharged through ports 11 and pipe 49 to chamber 41 of the valve and discharged therefrom through exhaust pipe 50. In Fig. 10 the valve is shown in its reversing position and by reference thereto it will be observed that steam from the feed pipe 37 enters chamber 41 and is conveyed therefrom through pipe 49 to ports 11 of engine to reverse the same. During this reverse operation of the engine, the steam is exhausted through ports 10, pipe 48, chamber 40 and exhaust pipe 50.

In the operation of the device, it being understood that the parts occupy the positions shown in Fig. 3, steam enters through the intake ports 10 and passes between the valves to the abutments 9, during this operation the exhaust ports 11 being sealed or cut-off by the valves 8 so that pockets are formed between the arms of said valves 8 and also between said valves 8 and the central member 21 in which the steam expands and impinges against the abutments, forcing the latter to move and rotate said valves 8 until communication is established with ports 11, through which the steam exhausts, while the intake ports are sealed. As soon as the valves 8 uncover the intake ports, communication is cut-off with the exhaust ports, whereupon steam is admitted to the pockets and its force is exerted upon the abutments 9 to rotate the cylinder. The alternate opening and closing of the intake and exhaust ports described above is for the forward movement or rotation of the motor. To reverse the same, the reversing valve is rotated to cause the steam to be delivered through the exhaust ports 11 and thereby act upon the opposite sides of the abutments, the ports 10 in this movement of the motor being the exhaust ports.

The cylinder in this embodiment of the invention has been shown as especially adapted for belt connection with a suitable shaft or the like, but it will of course be understood that the same may be in the form of a gear or the like.

What I claim as my invention is:—

1. A rotary motor comprising a pair of stationary disks having intake and exhaust ports, a drum mounted between said disks and provided with peripheral cavities, a

plurality of valves also interposed between said disks and provided with peripheral cavities, a cylinder journaled on said disks, and abutments carried by said cylinder for actuating said drum and valves to open and close said ports.

2. A rotary motor comprising a pair of stationary disks having intake and exhaust ports, a drum mounted between said disks and provided with peripheral cavities, a plurality of rotary valves also provided with peripheral cavities and arranged in radiating relation to said drums, a cylinder journaled on said disks, and means carried by said cylinder for actuating said valves and drum to open and close said ports.

3. A rotary motor comprising a casing provided with an intake and exhaust port, a drum therein provided with radiating arms which form cavities in the periphery of said drum, a plurality of rotary valves provided with radiating arms which form peripheral cavities in said valves, said valves arranged in radiating relation to said drum and having their arms rotating within the cavities of said drum, a cylinder journaled in said casing, and means carried by said cylinder for actuating said valves and drum to open and close said ports.

4. A rotary motor comprising a casing provided with an inlet and an exhaust port, a drum in said casing and provided with radiating arms the sides of which are curved to form cavities, a plurality of valves arranged in radiating relation to said drum, said valves being provided with radiating arms the curved sides of which form cavities, the arms of said valves rotating in the cavities of said drum, a cylinder journaled in said casing, and abutments carried by said cylinder and adapted to enter the cavities of said valves to rotate the same to open and close said ports.

5. In a rotary motor, the combination with a pair of bearing disks having pivoted valves, one of said disks being provided with exhaust and intake ports, of a cylinder journaled in said disks and having abutments provided with concaved ends to bear on the ends of said valves and curved sides to engage said pivoted valves to operate the latter to open and close said intake and exhaust ports.

6. In a rotary motor, the combination with a pair of stationary disks one of which is provided with intake and exhaust ports, and pivotally mounted valves carried by said disks, of a cylinder journaled on said disks and having abutments provided with concaved ends to bear on said disks and compound curved sides to operate said valves.

7. In a rotary motor, the combination with a pair of stationary disks one of which is provided with intake and exhaust ports, and rotating valves carried by said disks to open and close said ports, of a cylinder journaled on said disks and having a plurality of equally spaced and rigid abutments provided with concaved ends to bear on said disks and compound curved sides to operate said valves.

8. A rotary motor comprising a casing provided with inlet and exhaust ports, a cylinder journaled therein, valves in said casing controlling said ports, an inlet pipe and exhaust pipe connected to said ports, a valve chamber connected to said pipe, said chamber being in communication with a source of steam supply, a hollow valve rotatable within said chamber, and a central partition dividing said valve into two compartments, said compartments being provided with openings adapted to be selectively brought into communication with the supply and exhaust pipes of said chamber.

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

WILLIAM TAYLOR.

Witnesses.
JOHN J. COYLE,
HARRY BRAY.