No. 646,702.

Patented Apr. 3, 1900.

J. KELLER.

ROTARY MOTOR.

(Application filed Aug. 26, 1899.

(No Model.)

4 Sheets—Sheet 1.

fig. 1.

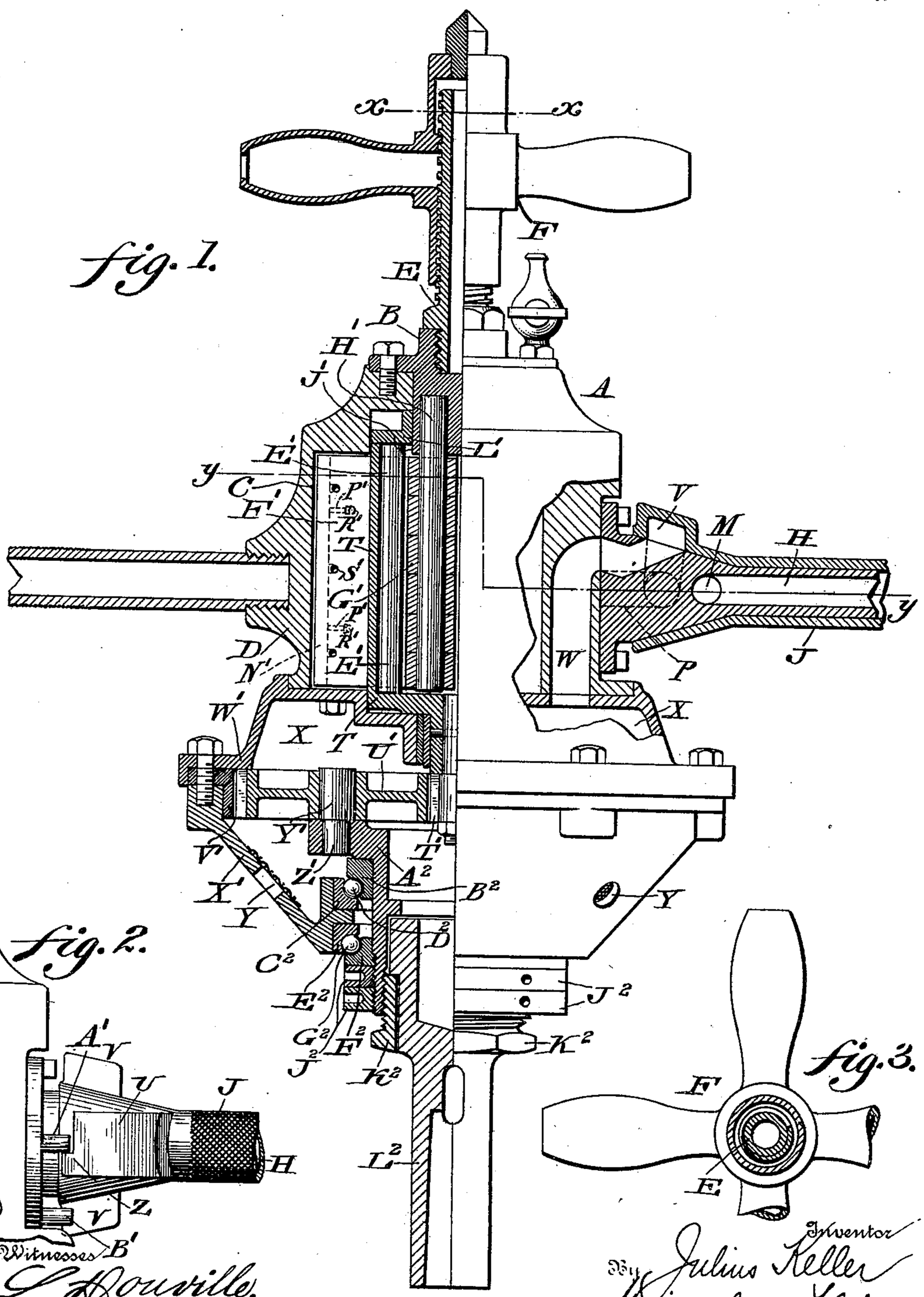

fig. 2.

fig. 3.

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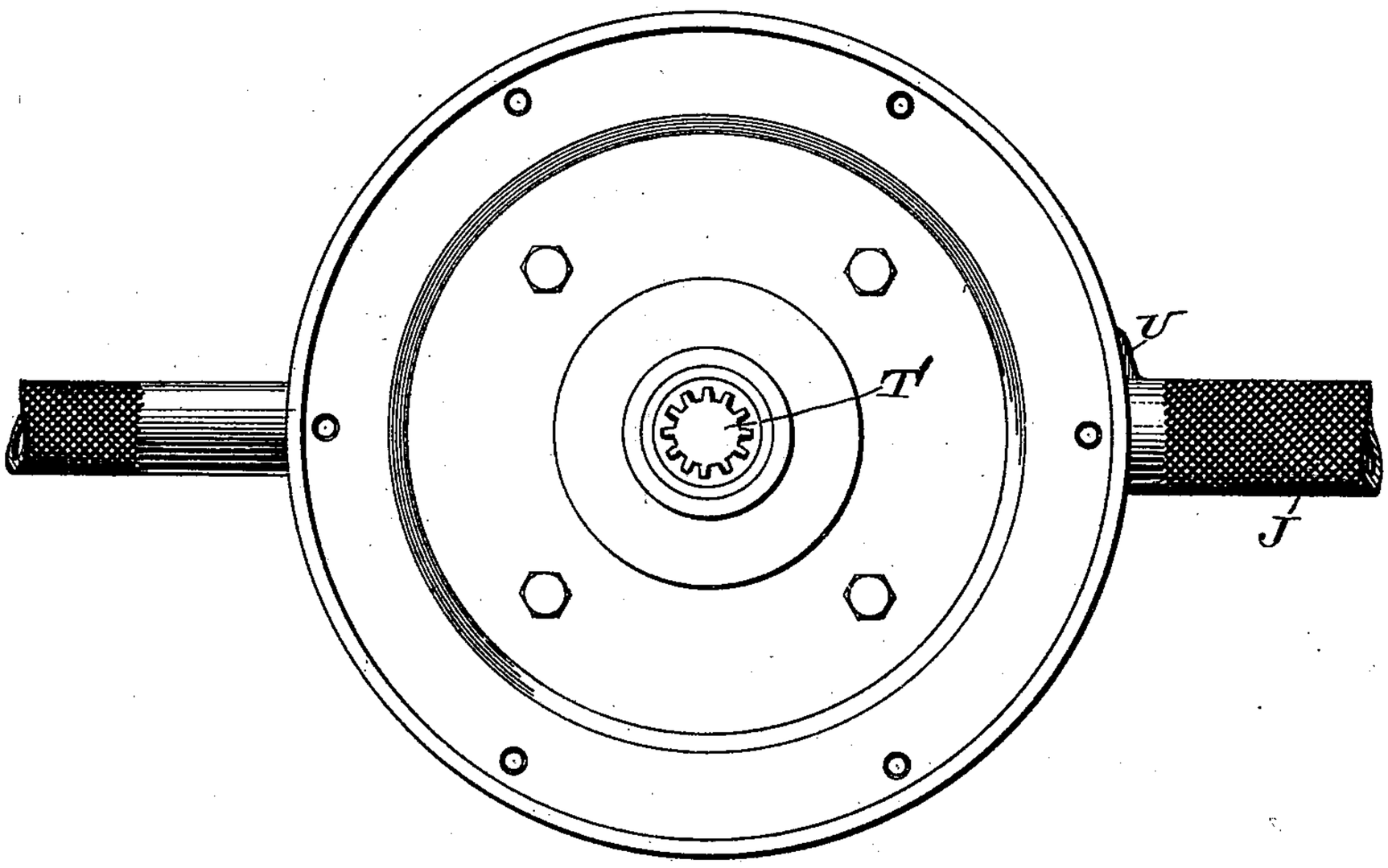
4 Sheets—Sheet 2.

fig. 4.



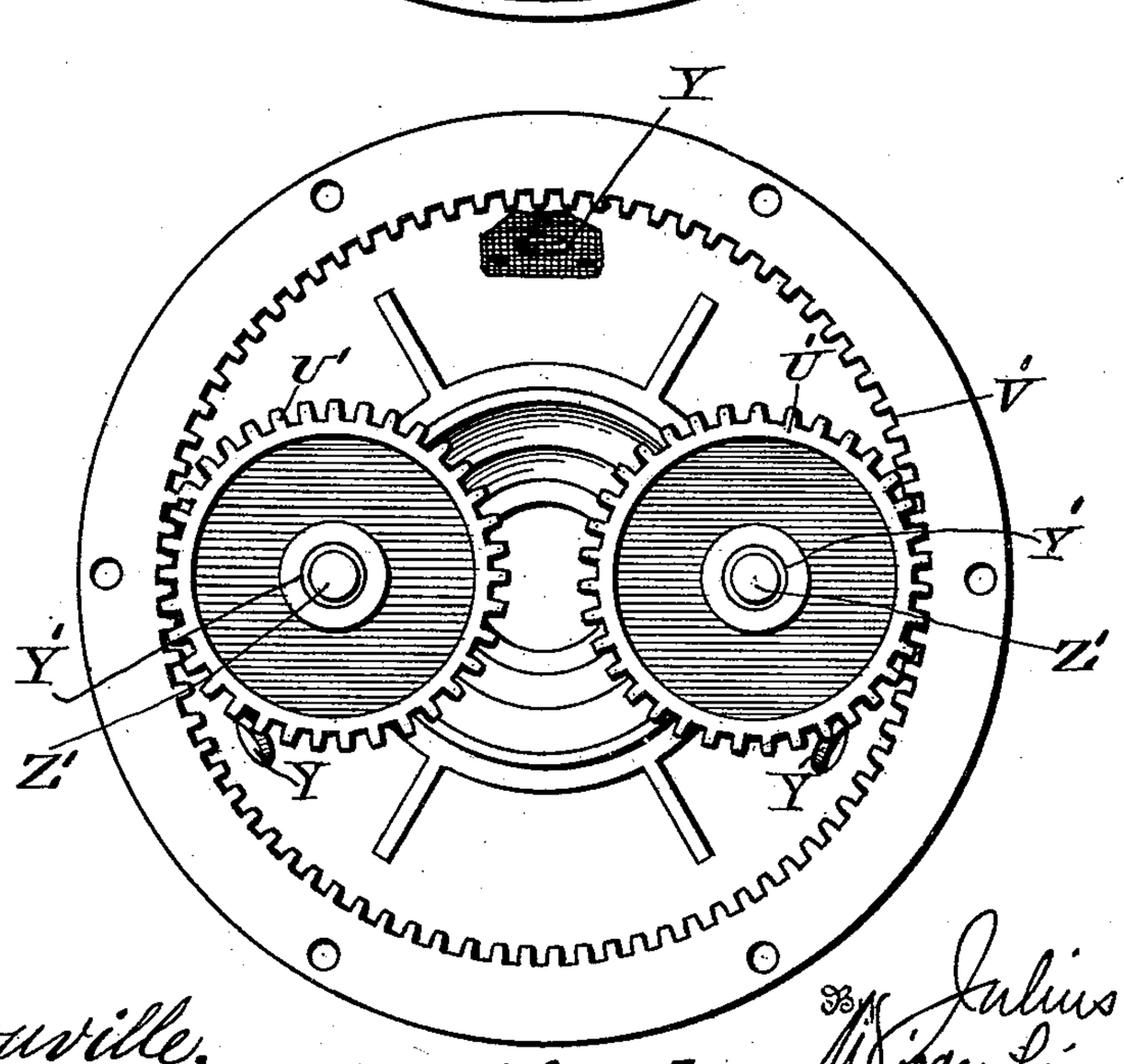


fig. 5.

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(No Model.) 4 Sheets—Sheet 3.

fig. 6.

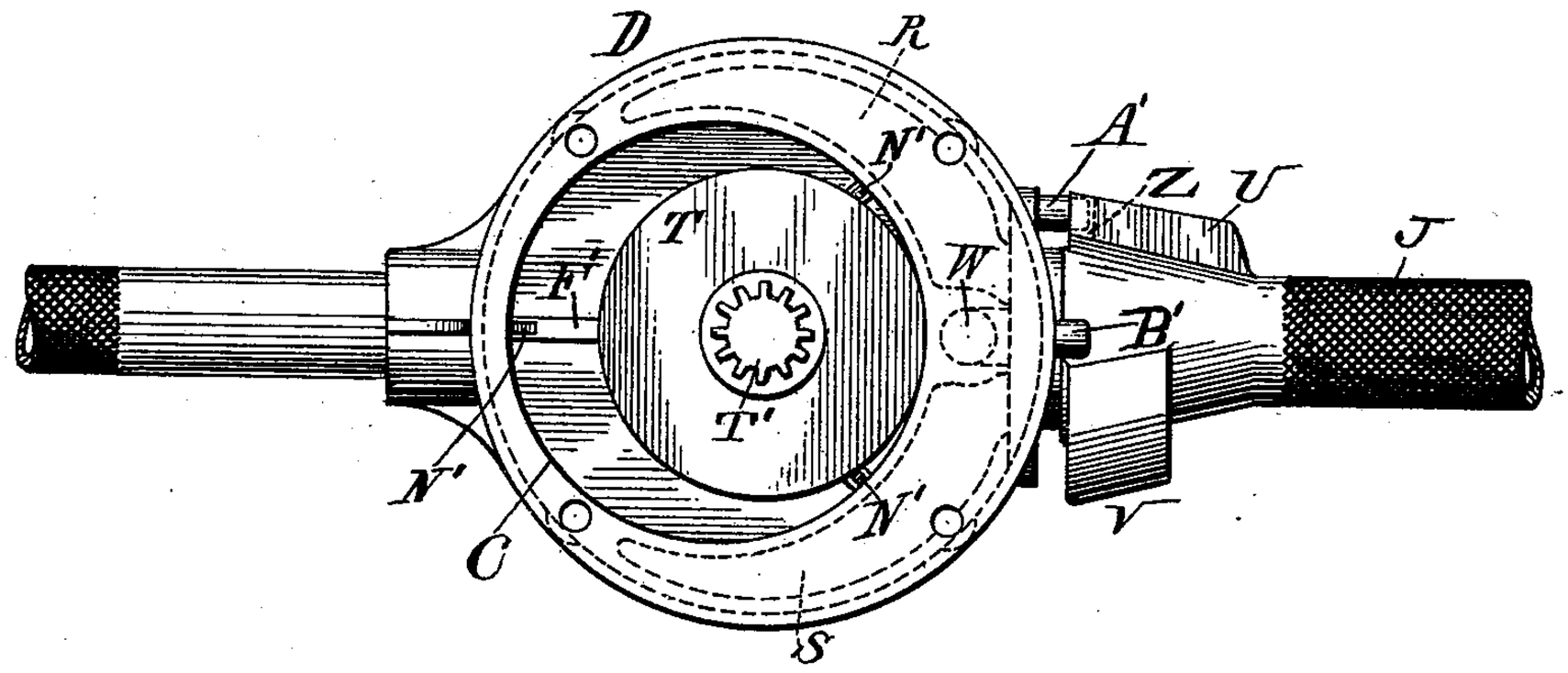


fig. 7.

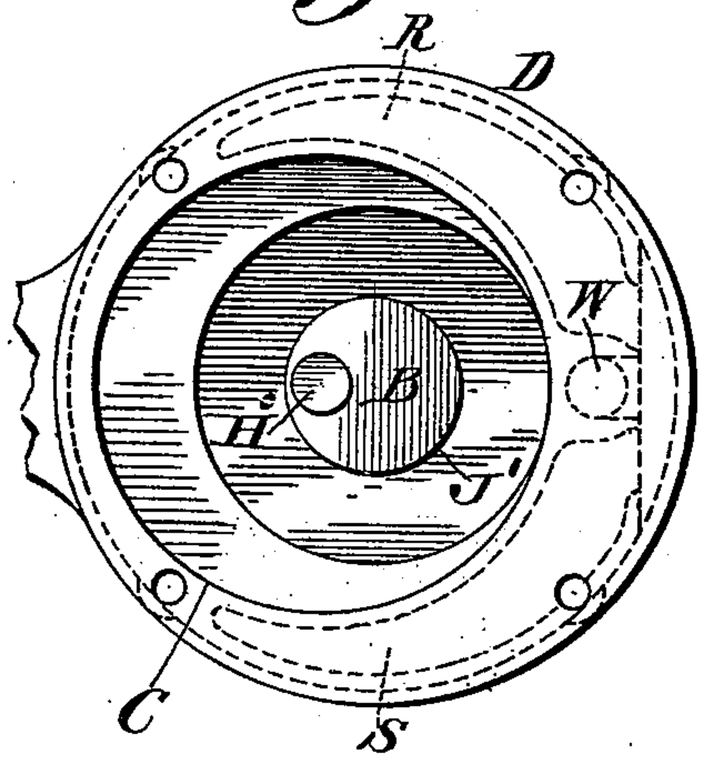
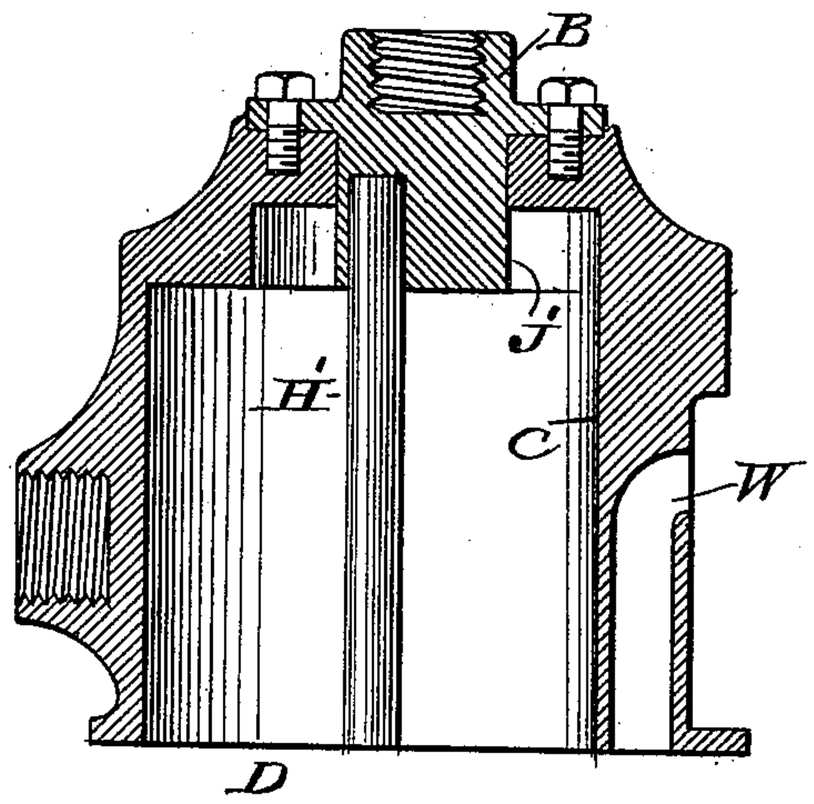


fig. 8.



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(Application filed Aug. 26, 1899.)

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4 Sheets—Sheet 4.

fig. 9.

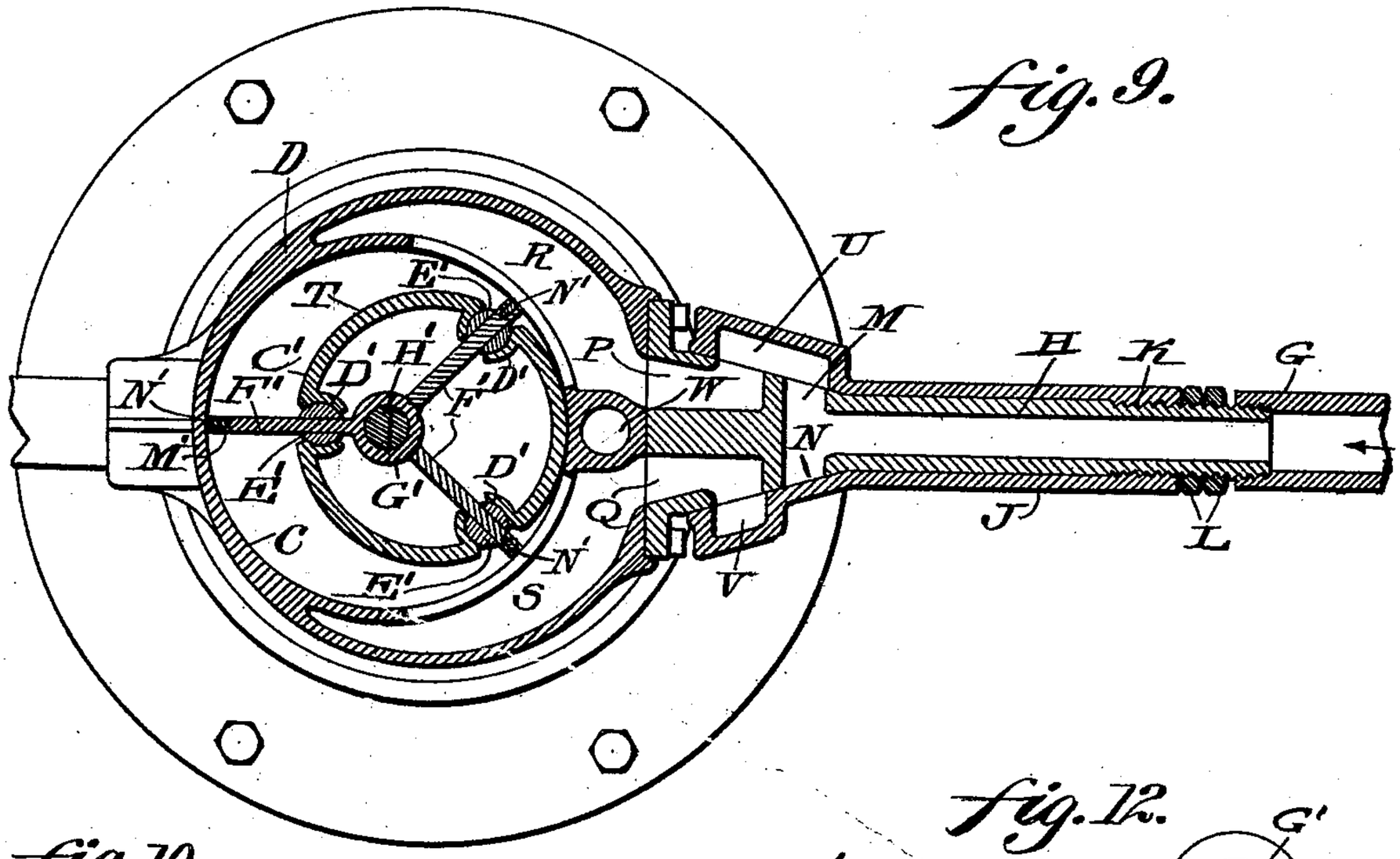


fig. 10.

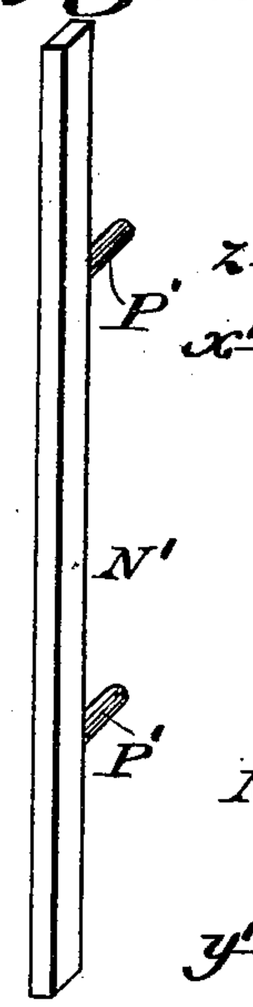


fig. 11.

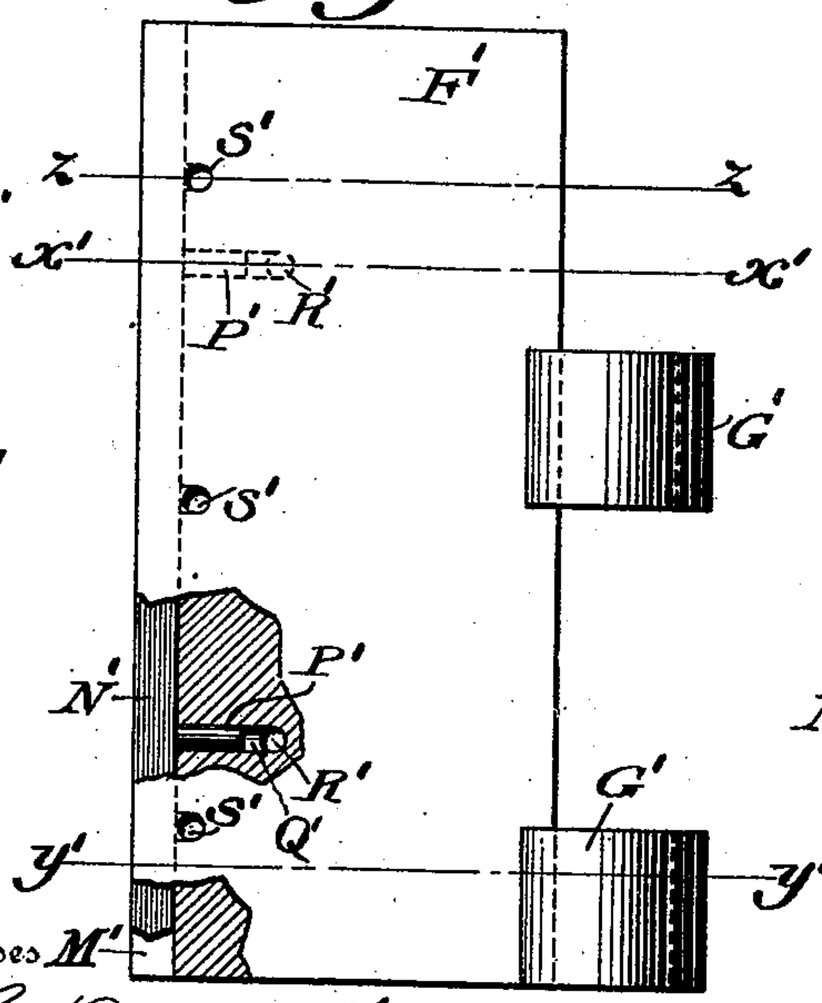


fig. 12.

fig. 13.

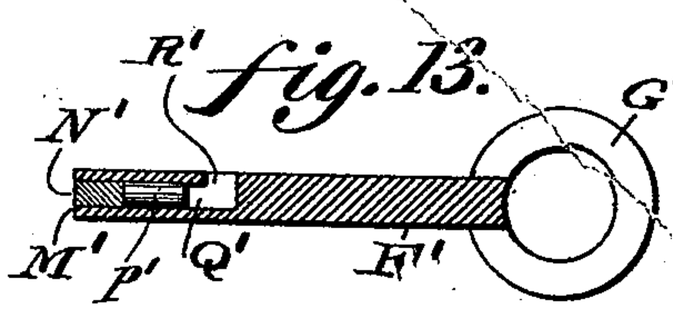
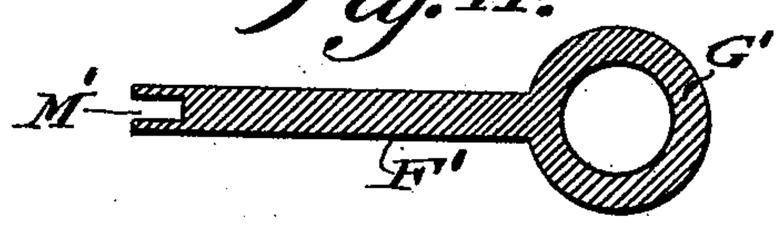


fig. 14.



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UNITED STATES PATENT OFFICE.

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ROTARY MOTOR.

SPECIFICATION forming part of Letters Patent No. 646,702, dated April 3, 1900.

Application filed August 26, 1899. Serial No. 728,540. (No model.)

To all whom it may concern:

Be it known that I, JULIUS KELLER, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Rotary Motors or Drills, which improvement is fully set forth in the following specification and accompanying drawings.

My invention consists of an improved construction of a rotary motor in which provision is made for readily reversing the direction of rotation thereof in a simple and effective manner, said motor having also a cylinder-head set eccentric to the bore of the cylinder and concentric to the axis of the piston and having a pin depending therefrom, said pin being concentric to the bore of the cylinder and eccentric to the piston, whereby said pin acts as a central bearing for the piston-blades.

It also consists of a novel construction of packing-strips seated in the outer edge of the piston-blades, said strips having projections extending into the blades and port-holes on either side of said blades, whereby air-pressure is admitted to hold the packing-strips against the cylinder, thus making a tight and effective packing for the piston when the latter is rotated in either direction.

It further consists of novel details of construction, all as will be hereinafter fully set forth, and particularly pointed out in the claims.

Figure 1 represents a vertical sectional view of a rotary motor embodying my invention, a portion thereof being shown in elevation. Fig. 2 represents a side elevation of a portion of a rotary sleeve employed, showing the stops for limiting the movement thereof. Fig. 3 represents a section on line $x\ x$, Fig. 1. Fig. 4 represents a plan view of the bottom of the motor-casing, showing especially the location of the central pinion employed. Fig. 5 represents a top plan view of the gearing in the lower portion of the motor-casing. Fig. 6 represents a bottom plan view of the motor-casing and its piston. Fig. 7 represents a bottom plan view of the interior of the motor-casing, showing the head and the pin eccentric thereto. Fig. 8 represents a sectional view of the motor-casing, showing the eccentric head therein and a depending pin, which latter is concentric with the motor-cylinder. Fig. 9 represents a section on line $y\ y$, Fig. 1. Fig. 10 represents a perspective view of a packing-strip employed, the same being shown in detached position. Fig. 11 represents a side elevation of one of the piston-blades, a portion of the same being broken away, showing the relative position of the packing-strip and the ports for admitting air-pressure thereto. Figs. 12, 13, and 14 represent sections on line $z\ z$, $x'\ x'$, and $y'\ y'$, Fig. 11.

Similar letters of reference indicate corresponding parts in the figures.

Referring to the drawings, A designates the casing of the motor, the same having the head B at the upper portion thereof and eccentric to the bore C of the cylinder D.

E designates a rod engaging the head B and externally threaded, so as to be engaged by the feeding device F.

G designates an inlet-pipe for the motive fluid, said pipe engaging the inlet-chamber H, whose outer surface is inclosed by the rotatable sleeve or valve J, which latter is threaded at K and adapted to be locked in the desired position by means of the lock-nuts L. The inlet-chamber H is provided with the ports M and N, which lead through the passages P and Q to the chambers R and S at either side of the piston T.

U designates an inlet-passage at one side of the sleeve J, whereby communication is formed between M and P, and V designates an exhaust-passage at the opposite side thereof, whereby an exhaust or outlet is provided from the passage Q to the main exhaust-passage W, which leads to the chamber X, the final exhaust to the atmosphere taking place through the gauze-covered ports Y.

Z designates a projection on the sleeve J, which is adapted to contact with the pins A′ or B′, whereby it will be apparent that the sleeve J can be rotated into either of its extreme positions, so that the ports P and Q may serve as inlet and exhaust passages, or vice versa, according to requirements, the pins A′ and B′ serving to limit the extent of movement of said sleeve in either direction.

The piston T consists of the ring C′, which is provided with the cylindrical walls D′, in which are located the upright bearings E′, which are slotted so as to permit the piston-blades F′ to pass therethrough, said blades projecting from the hubs or bearings G′, which are rotatably mounted on the pin H′, which is located concentric to the bore of the cylinder D, but eccentric to the head B, which latter has the projecting portion J′, which serves as a bearing for the piston-cap L′.

Each of the blades F′ are provided at their outer edges with a recess M′, which extends longitudinally thereof, said recess being adapted for the reception of the packing-strips N′, which latter have the pins or plungers P′ projecting therefrom and entering the recesses Q′, which are provided with openings R′, open at one side of the blades F′, the latter being provided on their opposite sides with the openings S′, wherefrom it will be apparent that the air-pressure on either side of the piston can be utilized to hold the packing-strips N′ against the contiguous wall of the cylinder D.

The lower portion of the piston T carries a pinion T′, which is adapted to intermesh with the idlers U′, which are in mesh with the stationary rack V′, which is in the present instance suitably secured in position between the sections of the casings W′ and X′, respectively.

Y′ designates a pin on which is mounted each of the idlers U′, each pin having a depending portion Z′, which engages the yoke A^2, adjacent which are the thrust-bearings B^2 and C^2, said bearings having the balls D^2 interposed therebetween.

E^2 and F^2 designate thrust-bearings, between which latter are located the balls G^2. The yoke A^2 at its lower portion is threaded internally and externally, the external threads being engaged by the thrust-bearing nuts J^2, while the internally-threaded portion is engaged by the chuck-nut K^2, by means of which latter the chuck L^2 is held in position.

The operation is as follows: When the parts are in the position seen in Fig. 9, it will be apparent that the compressed air or other fluid entering the passage H will pass thence through the passages M, U, and P into the chamber R, and thence to the interior of the cylinder. The motive fluid is now pressing against the left-hand piston-blade, whereupon the piston will turn from left to right, as will be readily understood, the exhaust taking place through the passage S, ports Q V, and passage W. The piston shell or cylinder C′ consequently has a rotary motion imparted thereto, the cap of said piston having its bearing against the lower depending portion of the head B, it being apparent that the pinion T′ will revolve in unison therewith, the rotation of said pinion causing the idlers U′ to be also rotated by reason of their engagement with the stationary rack V′ and the rotation of said idlers being transmitted to the chuck L^2 by the intermediate mechanism, as will be apparent to those skilled in the art. Upon turning the sleeve J in an opposite direction to the other position than that shown in Fig. 9, the limit of movement thereof being determined by the abutments or pins A′ B′, it will be apparent that the direction of the flow of the motive fluid will be changed, the same entering the port Q and exhausting through the port P, whereby the direction of rotation is reversed, as is evident.

In a contemporaneously-pending application filed by me October 25, 1899, bearing Serial No. 734,712, I have shown, described, and claimed a novel construction of reversing-valve of somewhat similar construction to the reversing-valve shown herein, and to which I have made no claim in this application.

It will be apparent that slight changes may be made by those skilled in the art which will come within the scope of my invention, and I do not therefore desire to be limited in every instance to the exact construction I have herein shown and described.

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

1. In a rotary motor, a cylinder having an inlet-chamber, right and left air-chambers adapted to serve as inlet and exhaust passages, and a rotatable sleeve mounted on said inlet-chamber and adapted to reverse the inlet and exhaust of the motive fluid, said sleeve having on one side an exhaust-passage adapted to form communication between one of said chambers and the main exhaust-passage, while the other side of said sleeve has a passage forming a communication between said inlet-chamber and the other of said air-chambers.

2. In a rotary motor, the combination of a cylinder, a casing therefor, a cylinder-head set eccentric to the bore of the cylinder and concentric to the axis of the piston contained therewithin, said head projecting within the piston and acting as a bearing for the cap of said piston, the latter having blades with recesses therein, packing-strips seated in said recesses, pins projecting from said packing-strips into said blades, means for admitting pressure upon the ends of said pins from one side of said piston and means for admitting pressure on the edges of said blades from the opposite side of said piston.

3. The combination of a cylinder, a head set eccentric to the bore of the cylinder, a piston within said cylinder, said head being eccentric to the axis of said piston, a pin depending from said head, said pin being concentric to the bore of the cylinder and eccentric to the piston and acting as a central bearing for the piston-blades, the latter having recesses therein, packing-strips seated in said recesses, pins projecting from said packing-strips into said blades, means for admitting pressure upon the ends of said pins from one side of said piston and means for admitting

pressure on the edges of said blades from the opposite side of said piston.

4. In a rotary motor, a piston consisting of blades, recesses in the ends of said blades, packing-strips set in said recesses, pins projecting from said packing-strips into said blades, means for admitting pressure upon the ends of said pins from one side of said piston and means for admitting pressure upon the inner edges of said blades from the opposite side of said piston.

5. In a rotary motor, an inlet-chamber, a rotary sleeve mounted thereon, inlet and exhaust passages for said motor, ports in said sleeve for permitting the inlet and exhaust of the motive fluid in either direction to said motor, said fluid passing through said sleeve in each direction in both the normal and reversed positions thereof, a projection on said sleeve and abutments for limiting the movement of said sleeve.

6. In a rotary motor, an inlet-chamber, a movable member or sleeve mounted thereon, inlet and exhaust passages for said motor, and ports in said member for permitting the inlet and exhaust of the motive fluid in either direction relative to said motor, said fluid passing through said member in each direction in both the normal and reversed positions thereof.

7. In a rotary motor, an inlet-chamber, a sleeve movably mounted thereon, inlet and exhaust passages for said motor, ports in said sleeve for permitting the inlet and exhaust of the motive fluid in either direction, relative to said motor, said fluid passing through said sleeve in each direction in both the normal and reversed positions thereof, and means for locking said sleeve in the desired position relative to said motor.

8. In a rotary motor, an inlet-chamber, a sleeve movably mounted thereon, inlet and exhaust passages for said motor, ports in said sleeve for permitting the inlet and exhaust of the motive fluid in either direction, relative to said motor, said fluid passing through said sleeve in each direction in both the normal and reversed positions thereof, and means for locking said sleeve in the desired position relative to said motor, in combination with means for limiting the movement of said sleeve in either direction.

JULIUS KELLER.

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