

No. 741,018.

PATENTED OCT. 13, 1903.

H. M. DAILEY.
ROTARY ENGINE.

APPLICATION FILED DEC. 20, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

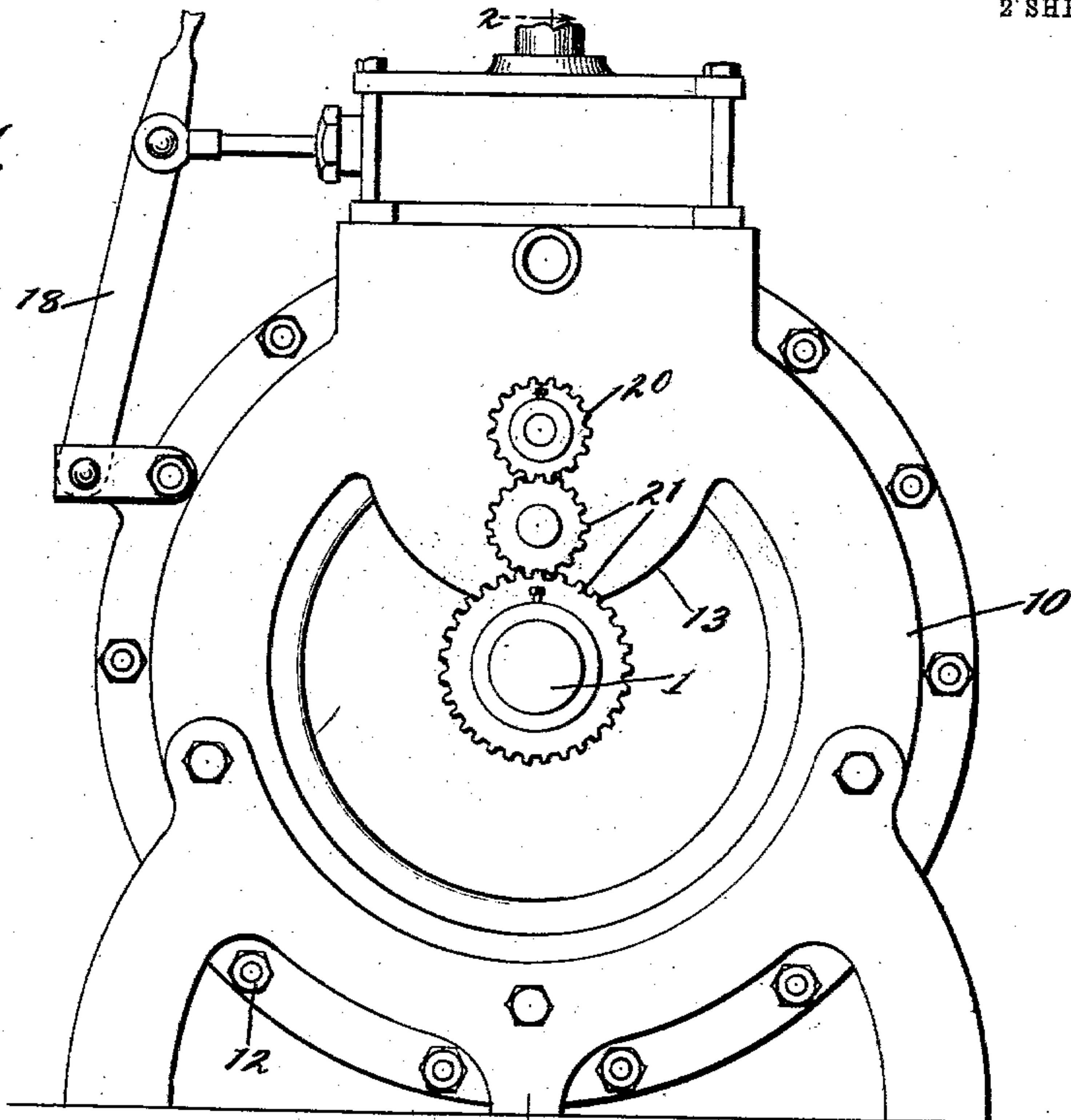
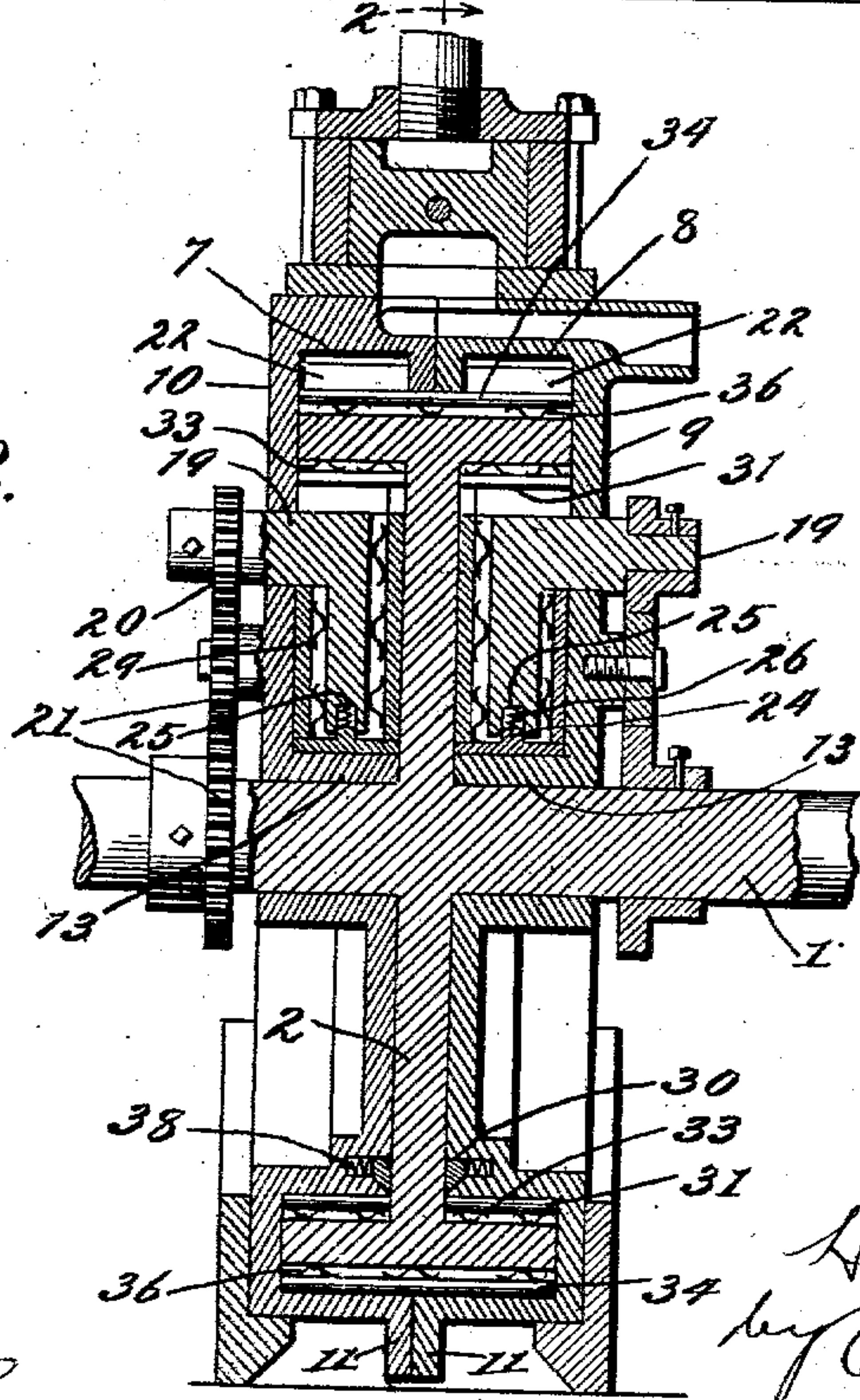


Fig. 2.



Witnesses.

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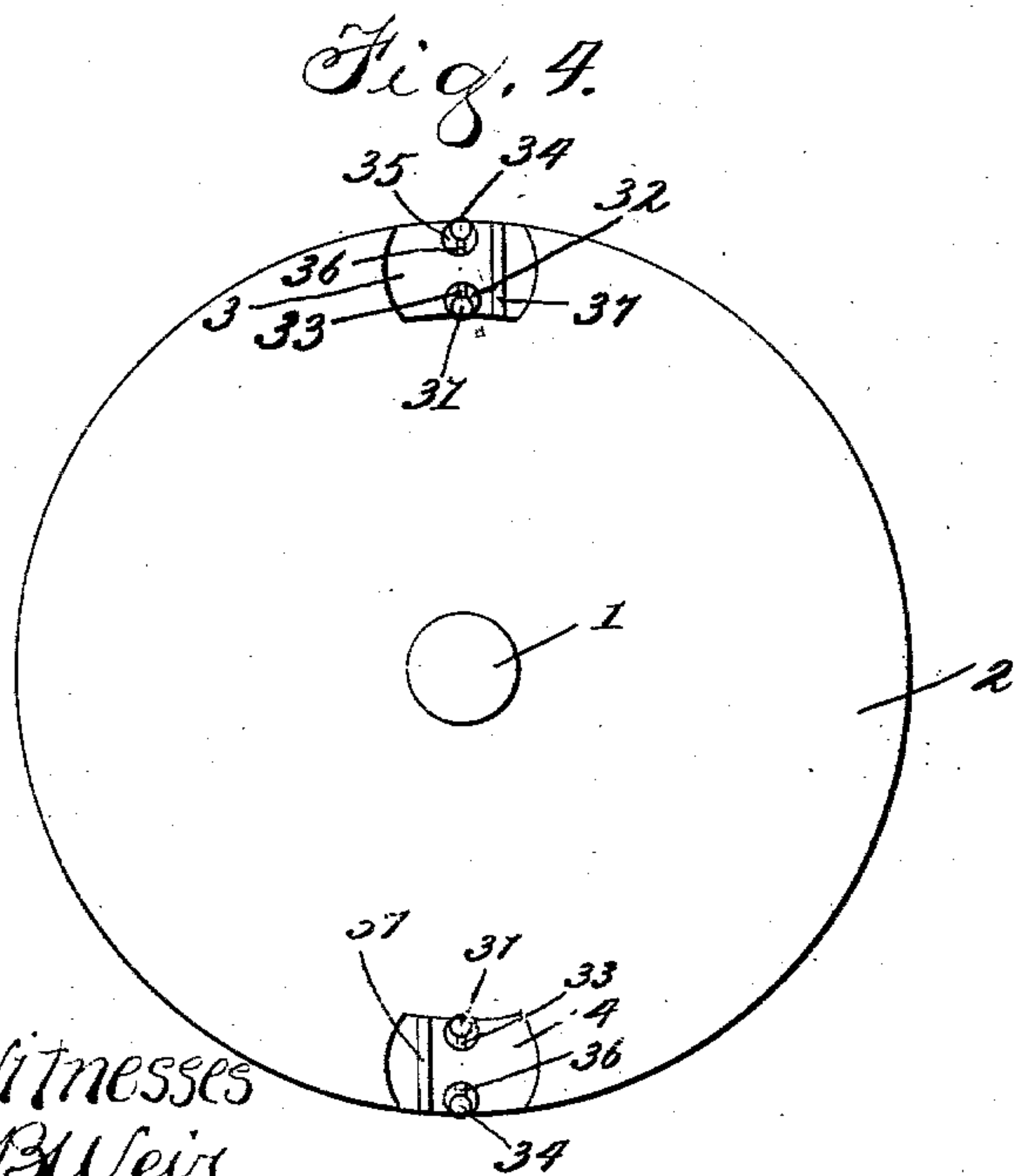
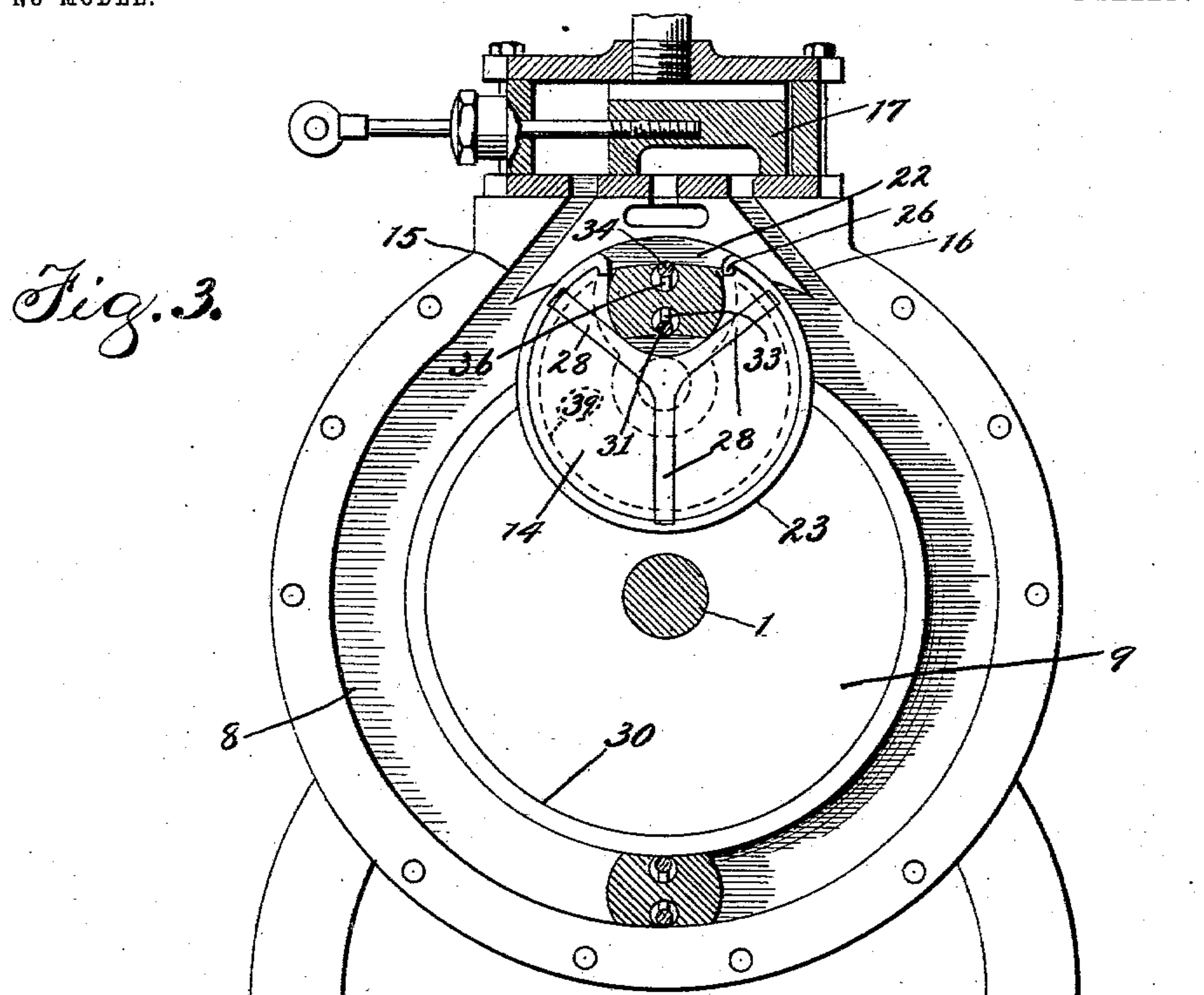
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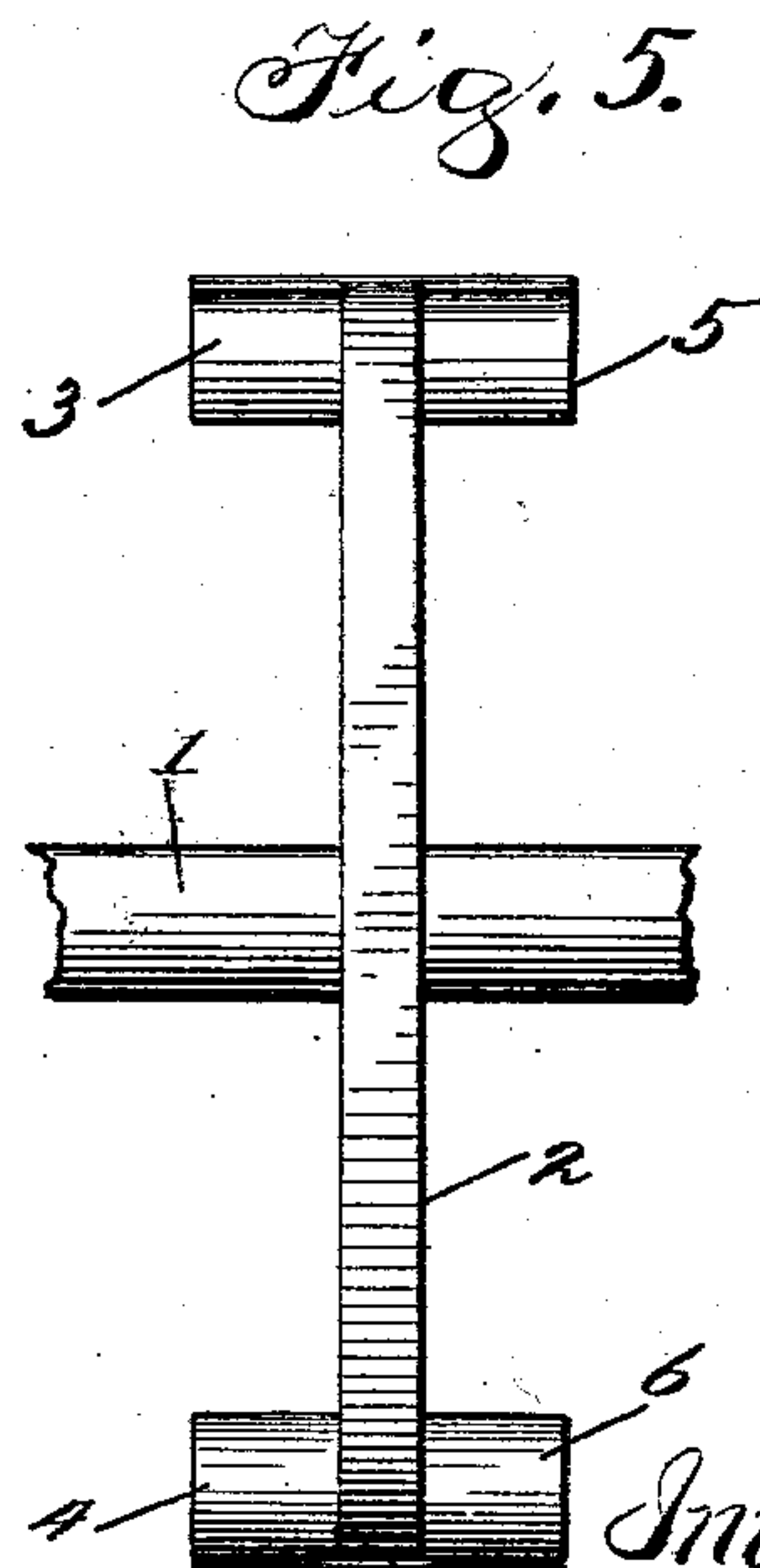
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NO MODEL.

2 SHEETS—SHEET 2.



Witnesses
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UNITED STATES PATENT OFFICE.

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ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 741,018, dated October 13, 1903.

Application filed December 20, 1902. Serial No. 135,952. (No model.)

To all whom it may concern:

Be it known that I, HERBERT M. DAILEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Rotary Engines, of which the following is a full, clear, and exact specification.

My invention relates to that type of rotary engines employing a rotary abutment which rotates in concert with a series of revolving pistons that successively fit into a recess in the side of the abutment as they arrive at the point in the cycle or stroke between the inlet and exhaust ports; and my invention has for its primary object to provide an improved, simple, and economical engine in which the rotating abutment shall have but one recess for thus receiving the pistons and permitting them to pass, whereby the abutment may be rotated continuously, the amount of steam or pressure transferred by the abutment from the inlet to the exhaust side of the casing reduced to the minimum, and the entire surface or periphery of the abutment, excepting that part in which the single recess is formed, may be utilized as a packing-surface for preventing the steam from crossing over directly from the inlet to the exhaust.

With these ends in view my invention consists in certain features of novelty in the construction, combination, and arrangement of parts by which the said object and certain other objects, hereinafter appearing, are attained, all as fully described with reference to the accompanying drawings, and more particularly pointed out in the claims.

In the said drawings, Figure 1 is a side elevation of my improved engine. Fig. 2 is a vertical section thereof on the line 2-2, Fig. 1. Fig. 3 is a side elevation with one side of the casing removed and pistons, shaft, and steam-chest shown in vertical section. Fig. 4 is a side elevation or face view of the piston-disk with the pistons thereon, and Fig. 5 is an edge view thereof.

1 is the main shaft, upon which is formed or secured a disk 2, projecting, preferably, from both sides of which are four pistons 3 4 5 6, two on each side, set approximately on

the half or diametrically opposite each other. These pistons project laterally from the faces of the disk into two steam ways or races 7 8, the outer flat wall and the two concentric walls of each of which are formed in or constituted by one-half of a two-part casing, the parts or members 9 10 of which are provided with exterior flanges 11, secured together by bolts 12 or other suitable means, while the inner flat wall of each of the steamways 7 8 is constituted by one face of the piston-disk 2, which is fitted accurately between the casing members 9 10 and against which said casing members are contracted, excepting where the annular piston-races 7 8 are formed and excepting also where the lower half or side of a circular recess 13 is formed for receiving the aforesaid rotary abutment 14, one of which is arranged on each side of the disk 2, as better shown in Fig. 2. Each of these abutments 14 is arranged across one of the piston-races 7 8, the upper and lower sides of the abutment being recessed or let into the inner and outer concentric walls of the race in the triangular space between the main shaft 1 and the two parts 15 16, which serve alternately as inlet and exhaust ports under the control of a suitable slide-valve 17, operated at will by a handle 18. One face of each abutment is held flat against the face of the disk 2 and the other face against one of the casing members 9 10, and each abutment is formed with a concentric stud-shaft 19, suitably journaled in one of the casing members and carrying at its outer end a pinion 20, which is geared to the main shaft 1 by a train of gears 21, bearing such relative proportion to each other that the abutment will make one revolution each time one of the pistons arrives at a point in the piston-race between the parts and will at the same time travel at the same rate of speed as the piston travels, so that the abutment will receive the piston and permit it to pass, while intercepting the direct passage of steam from the inlet to the exhaust. In order that the abutment may thus receive the piston and permit it to pass, it is provided with a single peripheral recess 22, which is preferably U-shaped, while the lateral sides of the piston are struck on arcs complementary in form to the bottom of the

recess, so that as the piston enters the recess it will occupy as much of the recess as possible, thereby reducing to the minimum any unoccupied space for catching steam and conveying the same from the inlet to the exhaust side of the engine. The remainder of the periphery of the abutment is cylindrical and accurately fits its recess or socket 13 in the casing, and in order that it may be better packed to prevent the direct passage of steam its periphery is preferably provided with a flexible packing-ring or shoe 23, which extends entirely around the same from the edges of the recess 22 and is as broad as the peripheral surface of the abutment, as shown in Fig. 2. The inner side of this ring or shoe 23 may be provided with a flange or tongue 24, fitting into a peripheral groove 25 in the abutment against suitable springs or cushions 26, which tend to force the shoe or packing-ring 23 outwardly into close contact with the circular wall of the socket in which the abutment rotates. The two ends of the ring or shoe 23 are flanged inwardly, as shown at 27, to prevent independent rotary movement of the shoe or ring on the abutment. The two flat faces of the abutment are preferably ground to fit accurately against the disk 2 and the outer wall of the casing, so as to form steam-tight joints; but, if desired, both of these faces may be provided with a Y-shaped packing-bar 28 set therein, with its prongs or branches extending on either side of the recess 22 and pressed outwardly by suitable springs 29.

Each of the casing members is provided with a packing-ring 30, set into the inner face thereof and extending around the shaft 1 from one side of the abutment to the other, with its outer edge or periphery flush with the inner concentric wall of the piston-race, as better shown in Fig. 3; but the outer edge of this packing-ring 30 is beveled, as shown in Fig. 2, so as to be flush with said concentric wall of the piston-race, without moving any of the surface thereof on which the piston-packing travels. The inner surface of the piston which travels on this wall of the piston-race may be packed in any suitable way, but preferably by means of a cylindrical packing-bar 31, which, as shown in Fig. 2, conjoins with the beveled edge of the packing-ring 30 and is arranged in a cylindrical socket 32 in the piston and pressed outwardly through the open side of the socket by suitable springs 33, the socket being of larger radius than the bar, whereby the bar will be capable of rotating as it wears away. The outer face of the pis-

ton may be packed by a similar bar 34, arranged in a similar socket 35 and pressed outwardly by similar springs 36; but the bar 34 and socket 35 preferably extend entirely across the two pistons and the disk 2, as shown in Fig. 2. The ends of the pistons may be packed by suitable bars 37 of ordinary construction and arrangement. The packing-rings 30 may be pressed inwardly by suitable springs 38.

The abutments 14 are approximately one-half the diameter of the piston-disk and are revolved or rotated continuously in concert with said disk by the gears, as before explained, and in order that the vibration that might otherwise be caused by thus revolving the abutment with its side recessed may be reduced to the minimum and the abutment balanced the interior of the abutment may be cored out, as indicated by the dotted lines 39 in Fig. 3, a sufficient extent to compensate for the recess 22.

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

1. In a rotary engine the combination of a two-part casing, each part of which has three walls of a piston-race formed therein, a piston-disk fitting between said parts of said casing and having pistons projecting laterally therefrom into said piston-races, rotary abutments having their inner faces fitted directly against said disk within the arc described by said pistons and their outer faces provided with outwardly-projecting shafts journaled in the parts of said casing, the peripheries of said abutments having recesses for receiving said pistons, and gearing connecting said shafts with said disk, substantially as set forth.

2. In a rotary engine the combination of a piston-disk, pistons projecting laterally from both sides thereof, piston-races in which said pistons travel, rotary abutments arranged on opposite sides of said disk and having opposed flat faces resting directly thereagainst, shafts projecting from the outer faces of said abutments and having their centers located within the circle described by the pistons, said abutments having recesses for receiving said pistons, and means for revolving said abutments in concert with said disk, substantially as set forth.

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Witnesses:

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