

No. 706,077.

Patented Aug. 5, 1902.

W. J. MASON.
ROTARY ENGINE.

(Application filed Sept. 3, 1901.)

(No Model.)

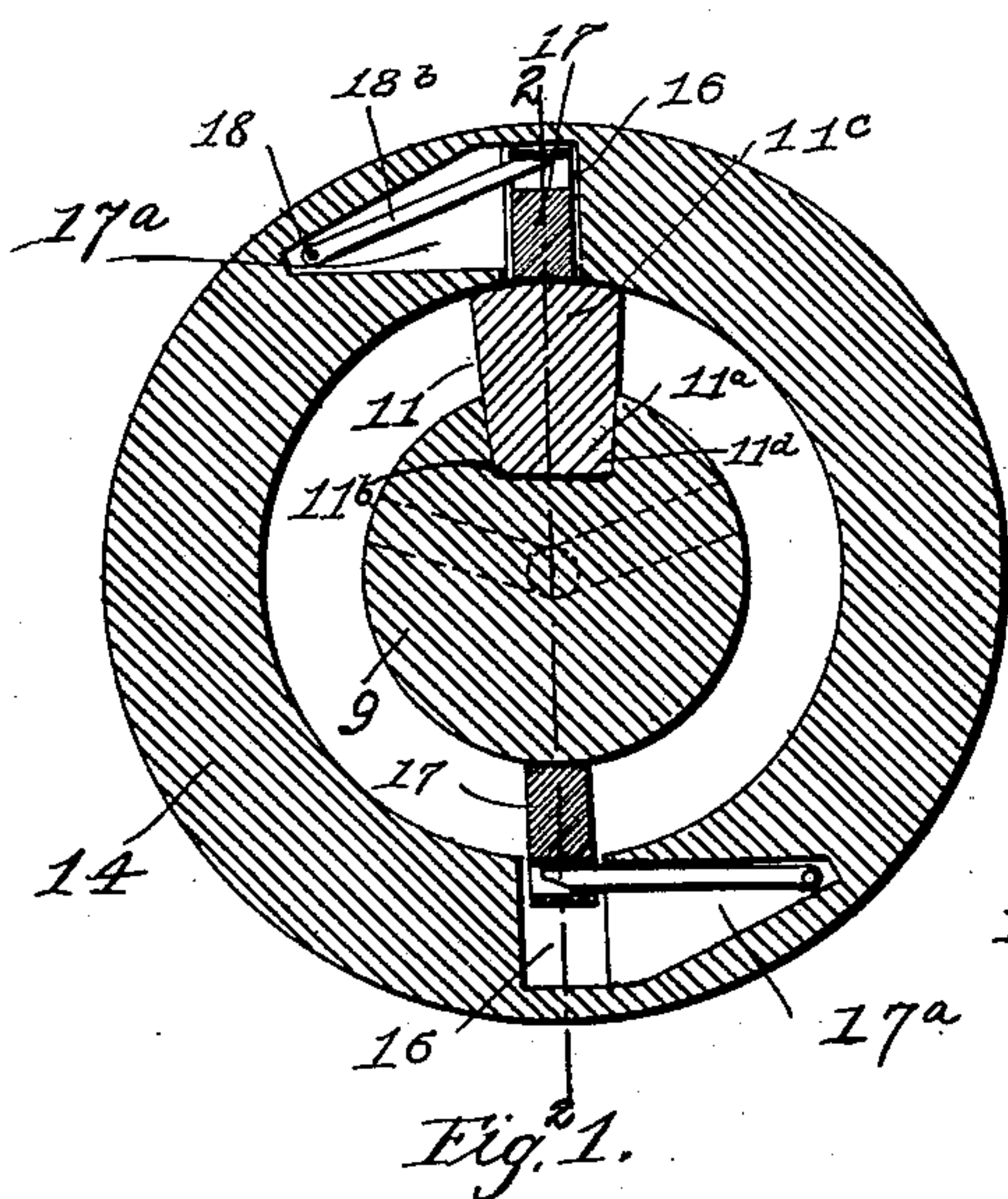


Fig. 1.

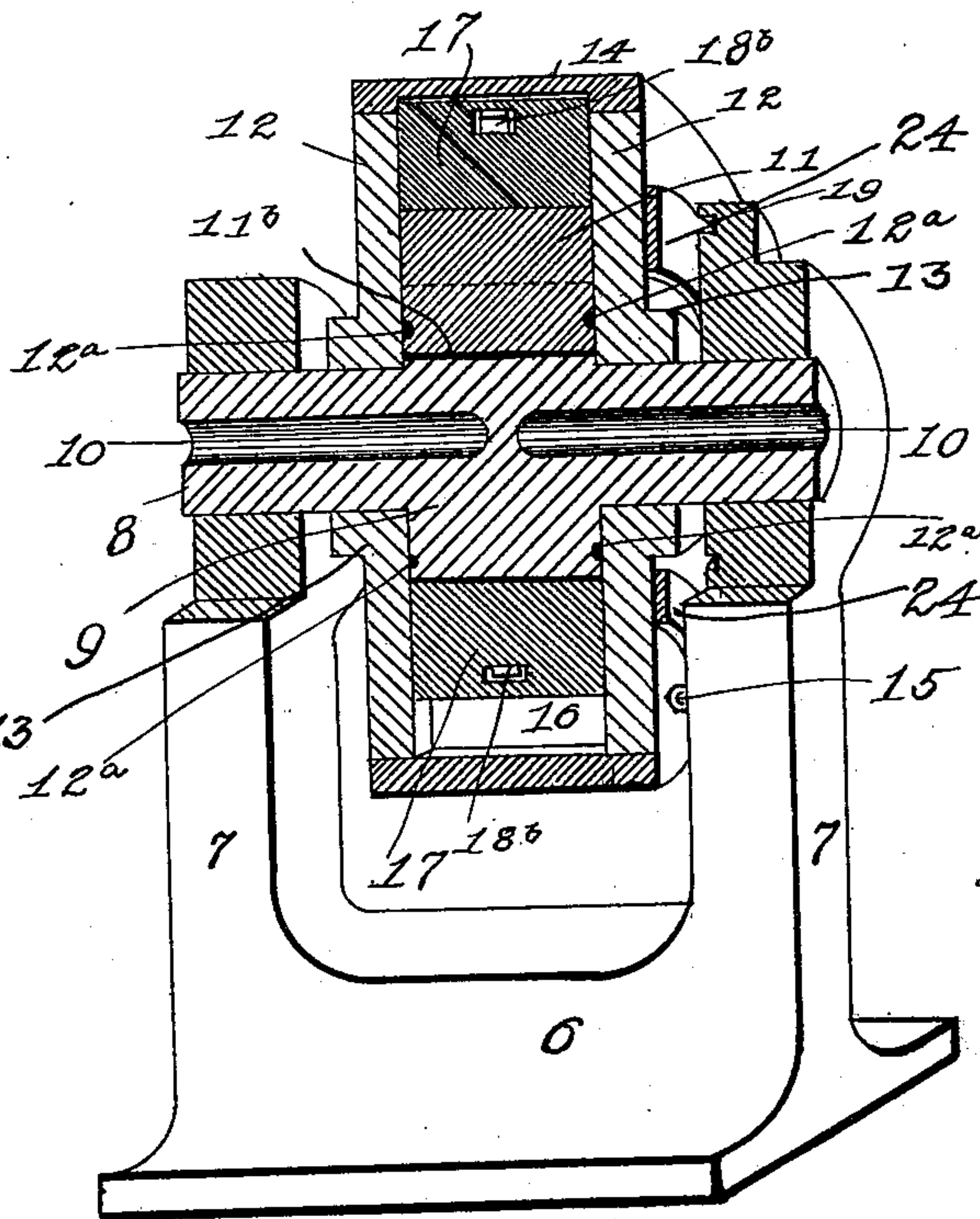


Fig. 2.

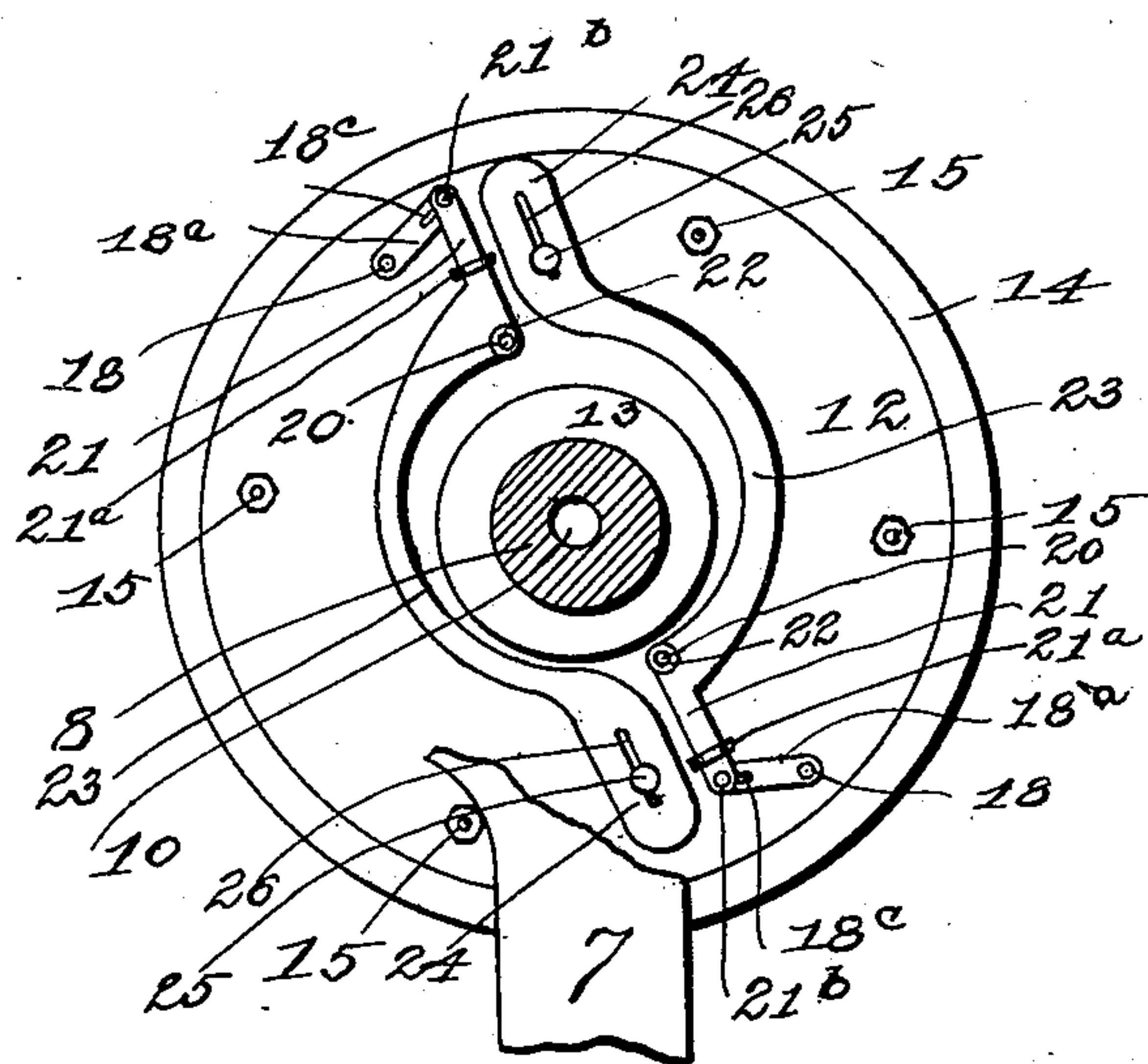


Fig. 3.

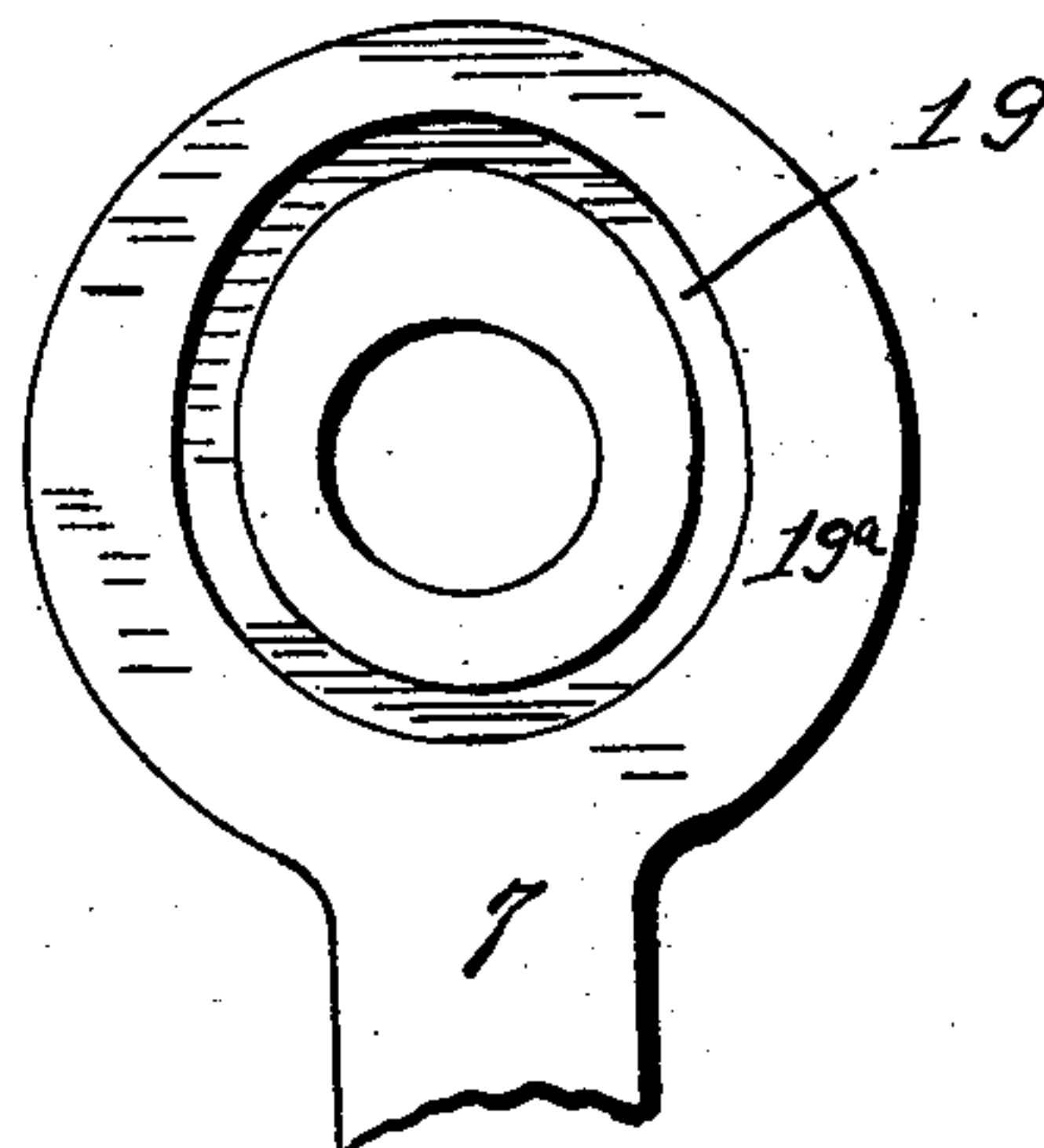


Fig. 4.

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ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 706,077, dated August 5, 1902.

Application filed September 3, 1901. Serial No. 74,135. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. MASON, 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; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to rotary engines, and particularly to such engines having a stationary drum and a revolving cylinder thereon.

The primary object of the invention is to produce a thoroughly-practicable engine of this character with few and simple parts.

A further object concerns the construction of the abutment by the provision of means whereby the steam-pressure in the cylinder will cause a tight bearing without packing.

A further object is to improve the piston action of such engine by the use of steam-tight sliding pistons operated by cranks controlled by a cam-groove, together with means to counterbalance the centrifugal tendency of the pistons due to rotation of the cylinder.

With these and other objects in view my invention is hereinafter described, and is illustrated in the drawings, in which—

Figure 1 is a vertical cross-section of the engine. Fig. 2 is a longitudinal vertical section, partly in perspective, on the line 2 2 of Fig. 1. Fig. 3 is an elevation of the cylinder-head, showing the piston-cranks and the counterbalance; and Fig. 4 is an elevation of the face-plate having the cam-groove therein to control the piston-cranks.

Referring more specifically to the drawings, the bed-plate 6 is provided with standards 7, in which are fixed and supported the stems 8 of the drum 9. The steam enters and exhausts through the passages 10, formed in the drum and the stems thereof. These steam-passages open into the cylinder one on each side of the abutment 11, which acts as an abutment to sustain the pressure of the steam when the cylinder is being driven.

The abutment is loosely seated in a groove or recess 11^a, formed in the drum, and suitable packing 11^b is interposed to render the joint steam-tight. The abutment is slightly wedge-shaped, so that it is wider at the top 11^c than at the bottom 11^d, and the top 11^c forms an arc of a circle concentric with the inner face of the rim 14 of the cylinder with which it contacts. The abutment is made wedge-shaped, so that the pressure of the steam tends to lift it and cause it to press tightly against the rim of the cylinder, whereby a steam-tight contact is formed without the use of packing. The use of packing is objectionable, because it is apt to become caught in the piston-grooves 16 during the revolution of the cylinder. It will be understood also that the abutment is wider circumferentially than the grooves.

The cylinder is formed of two head-plates 12, having axial projections 13, forming a hub, and a rim 14, to which the head-plates are secured, as by bolts 15. The rim is adapted to receive a belt and form a pulley to transmit the power. Packing-rings 12^a are interposed between the rim and head-plates and between the drum and head-plates.

The rim of the cylinder is provided with grooves 16, containing the radially-slidable pistons 17. Each of these pistons is operated by an arm 18^b, mounted upon the inner end of a rock-shaft 18, which extends without the cylinder. Each arm works in a recess 17^a, which communicates with the piston-groove and engages the sliding piston to reciprocate the same according to motion given the arm by means of the cam-groove 19, in which runs a pin 20, connected by a rod 21 to the lever 18^a, secured to the outer end of the rock-shaft 18. The pin 20 is provided with an antifric-tion-roller 22. A strap 21^a serves to guide the motion of the rod 21. The rod 21 is connected to the lever 18^a by a pivot-pin 21^b, which is adapted to slide in a slot 18^c in the lever.

The inner end of each rod 21 is provided with a bowed arm 23, which spans the hub of the cylinder and connects with a counterbalance-weight 24, which is located diametrically opposite the piston, so that in the revolution of the cylinder the centrifugal tendency of the piston is counterbalanced. The

headed pin 25, extending through the slot 26 and into the cylinder-head, serves to retain the weight in position while permitting the necessary radial movement thereof.

5 The cam-groove 19 is formed in a face-plate 19^a, which may be secured to or made integral with one of the standards 7. The groove is concentric with the axis of the cylinder, except at the point where the pistons are lifted
10 to pass the abutment, as will be understood.

The pistons are pressed against the walls of the grooves on three sides by the pressure of the steam, and the arms are set to press the fourth sides tight against the drum during
15 that portion of the revolution when the pistons are in contact with the drum, so that a steam-tight bearing is formed without packing. The steam-passages act either as inlet or exhaust, as the engine may be reversed by
20 reversing the course of the steam through it. Also the counterbalance-weights can be so adjusted relative to the weight of the pistons that they will move easily and smoothly and without jar or vibration even when the engine
25 is running at high speed.

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

1. In a rotary engine, a rotatable cylinder
30 having pistons, means to operate the pistons, a stationary drum within the cylinder having inlet and exhaust passages, and a radially-slidable abutment seated in the drum and adapted to be forced by steam-pressure
35 into contact with the cylinder.

2. In a rotary engine, a rotatable cylinder, a stationary drum within the cylinder, inlet and exhaust ports, suitable pistons and means to operate the same, and a wedge-
40 shaped radially-slidable abutment loosely seated in a recess in the drum and adapted to be forced by steam-pressure into contact with the cylinder.

3. In a rotary engine, a rotatable cylinder, a stationary drum within the cylinder hav- 45 ing a radially-slidable abutment projecting into contact with the cylinder, pistons carried by the cylinder and means to operate the same, and inlet and exhaust passages in the drum. 50

4. In a rotary engine, in combination with a rotatable cylinder having grooves therein to receive pistons, and a stationary drum with- 55 in the cylinder having inlet and exhaust passages, of a radially-movable abutment on the drum in contact with the cylinder, the contact-face of the abutment being of greater width, circumferentially, than the said grooves.

5. In a rotary engine, a rotatable cylinder, 60 a stationary drum in the same, a radially-movable abutment carried by the drum, radially-slidable pistons carried by the cylinder and adapted to retreat into recesses therein, arms to operate the pistons having rock- 65 shafts extending without the cylinder, levers connected to the shafts and cam mechanism to actuate the levers.

6. In a rotary engine, a rotatable cylinder a stationary drum within the same, a radially- 70 movable abutment carried by the drum, radially-slidable pistons carried by the cylinder and adapted to retreat into recesses therein, arms to operate the pistons having rock-shafts 75 extending without the cylinder, levers connected to the shafts, and bowed arms connected to the levers, said arms having weighted ends diametrically opposite the pistons, a face-plate having a cam-groove and pins run- 80 ning therein connected to the levers.

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

WILLIAM J. MASON.

Witnesses:

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