No. 657,559. Patented Sept. 11, 1900.

J. E. MOATS.

ROTARY ENGINE.

(Application filed May 26, 1900.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

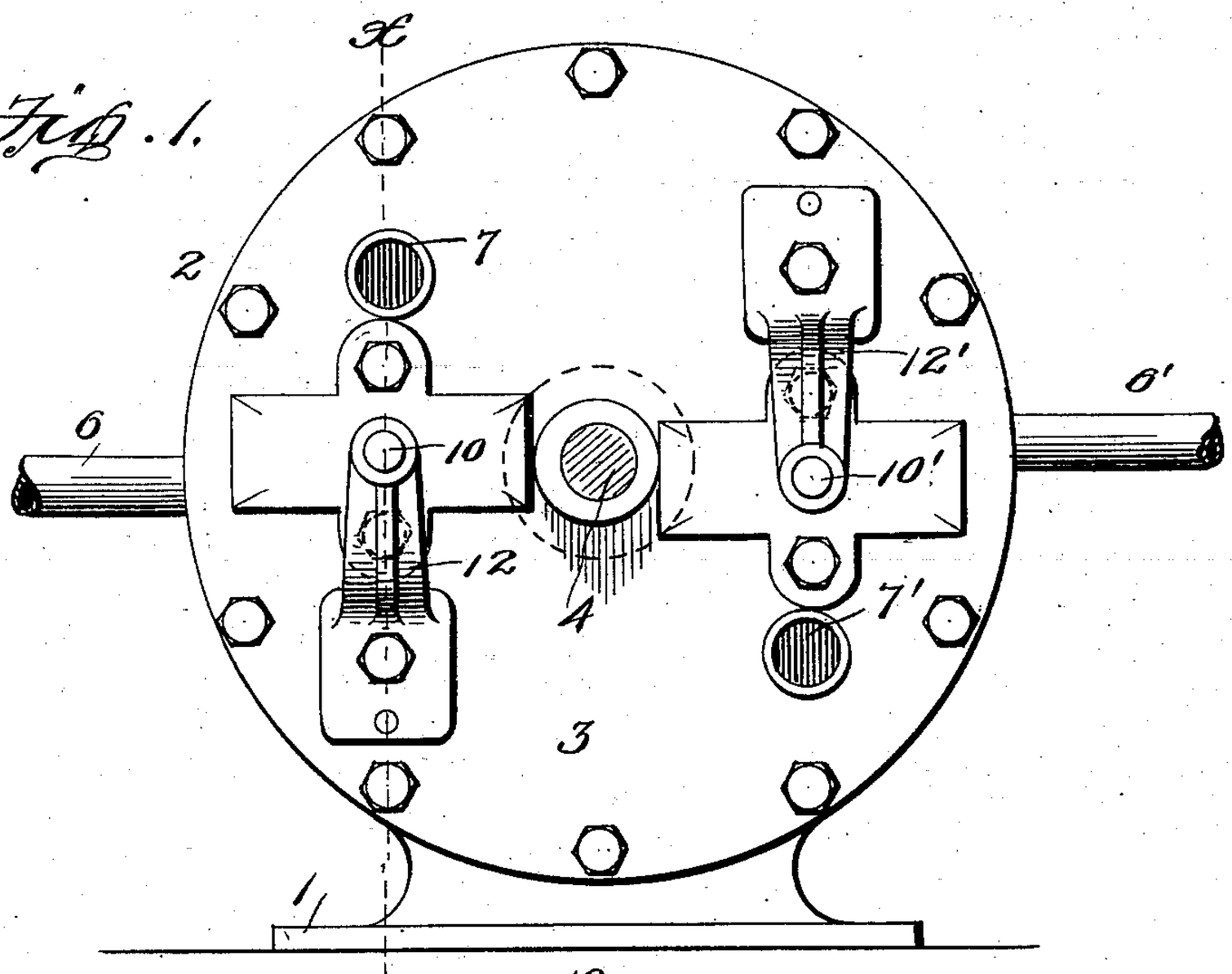
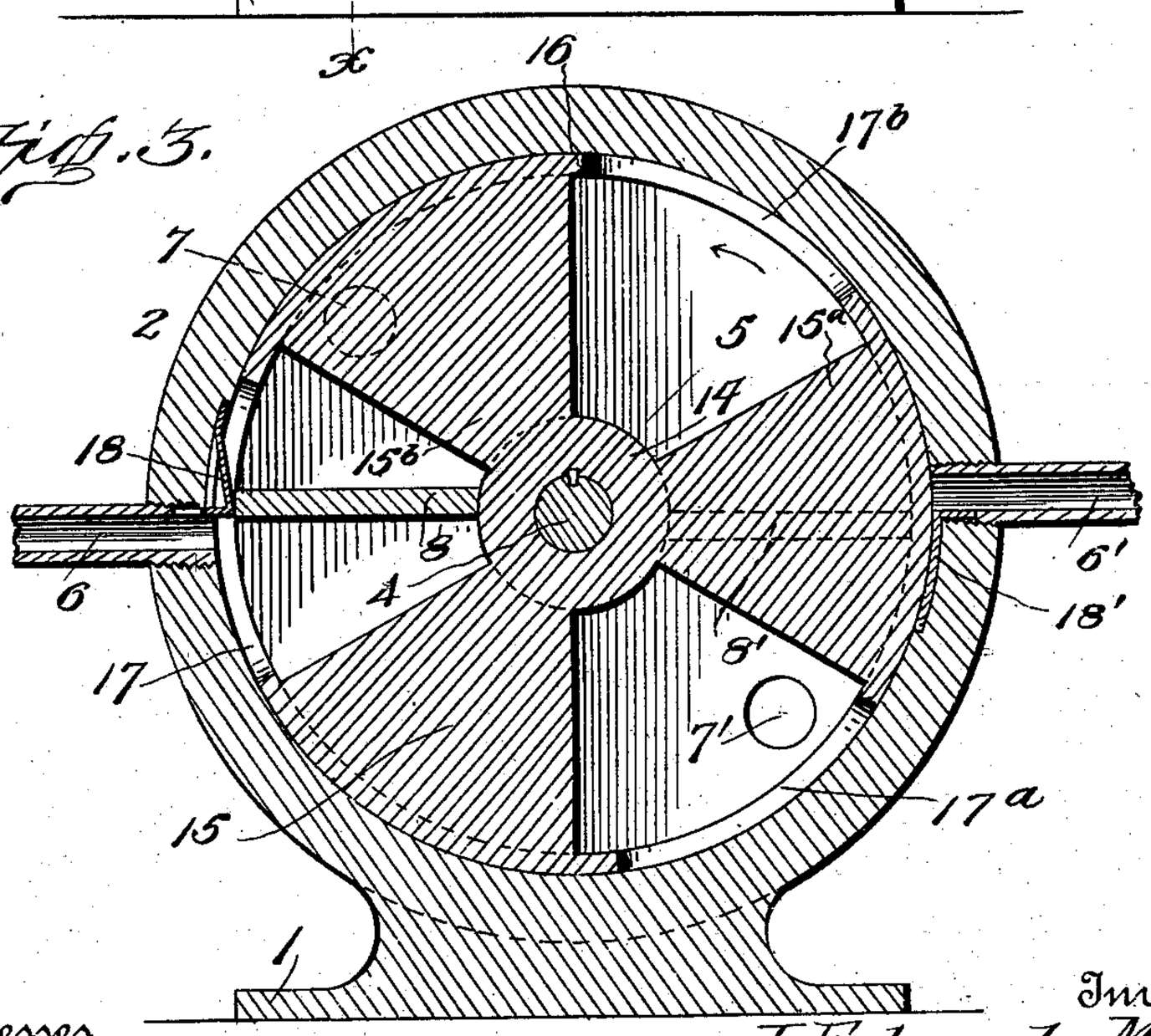


Fig. 3.



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(No Model.) 3 Sheets—Sheet 2.

Fig. 2.

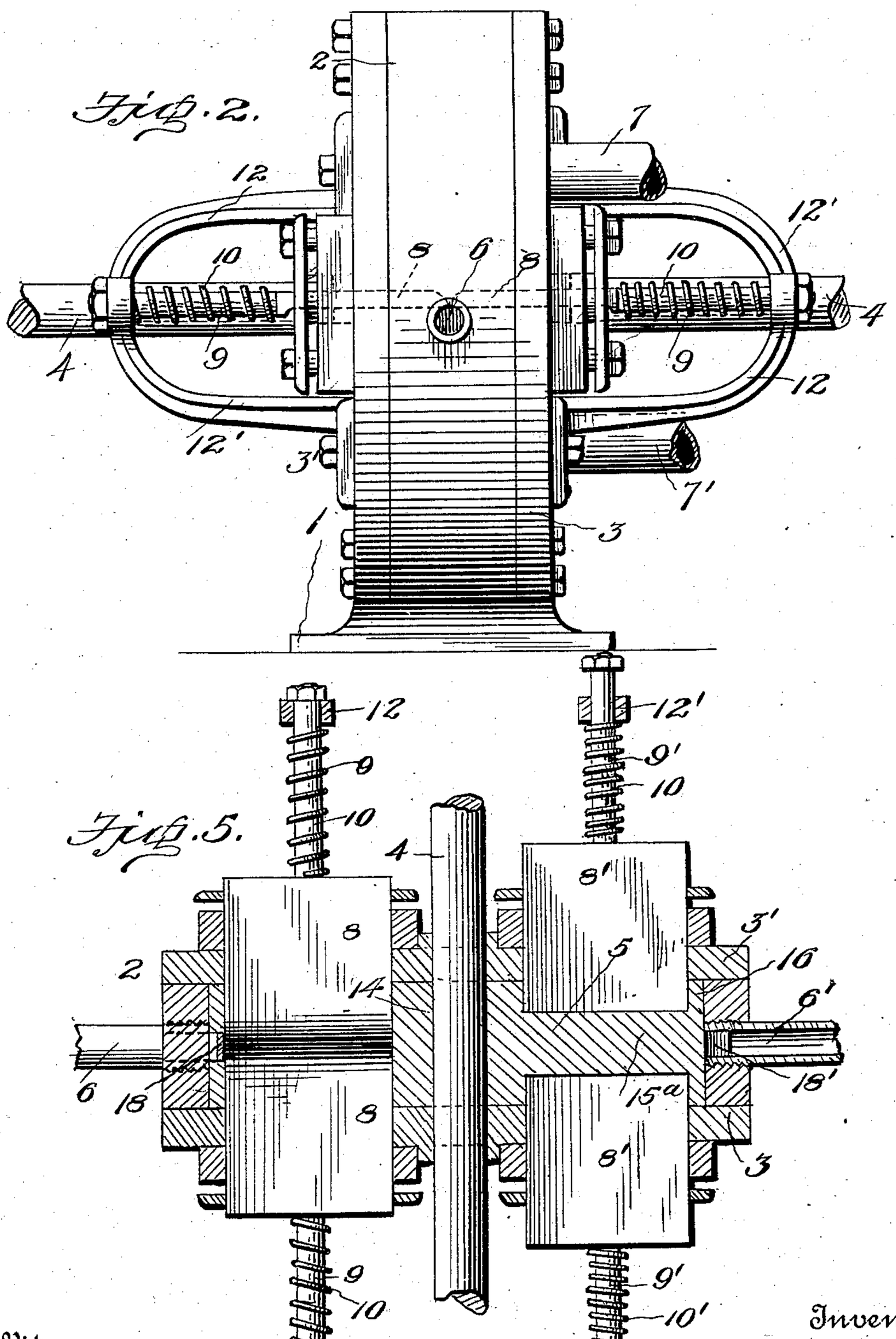

Fig. 5.

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(No Model.) 3 Sheets—Sheet 3.

Fig. 4.

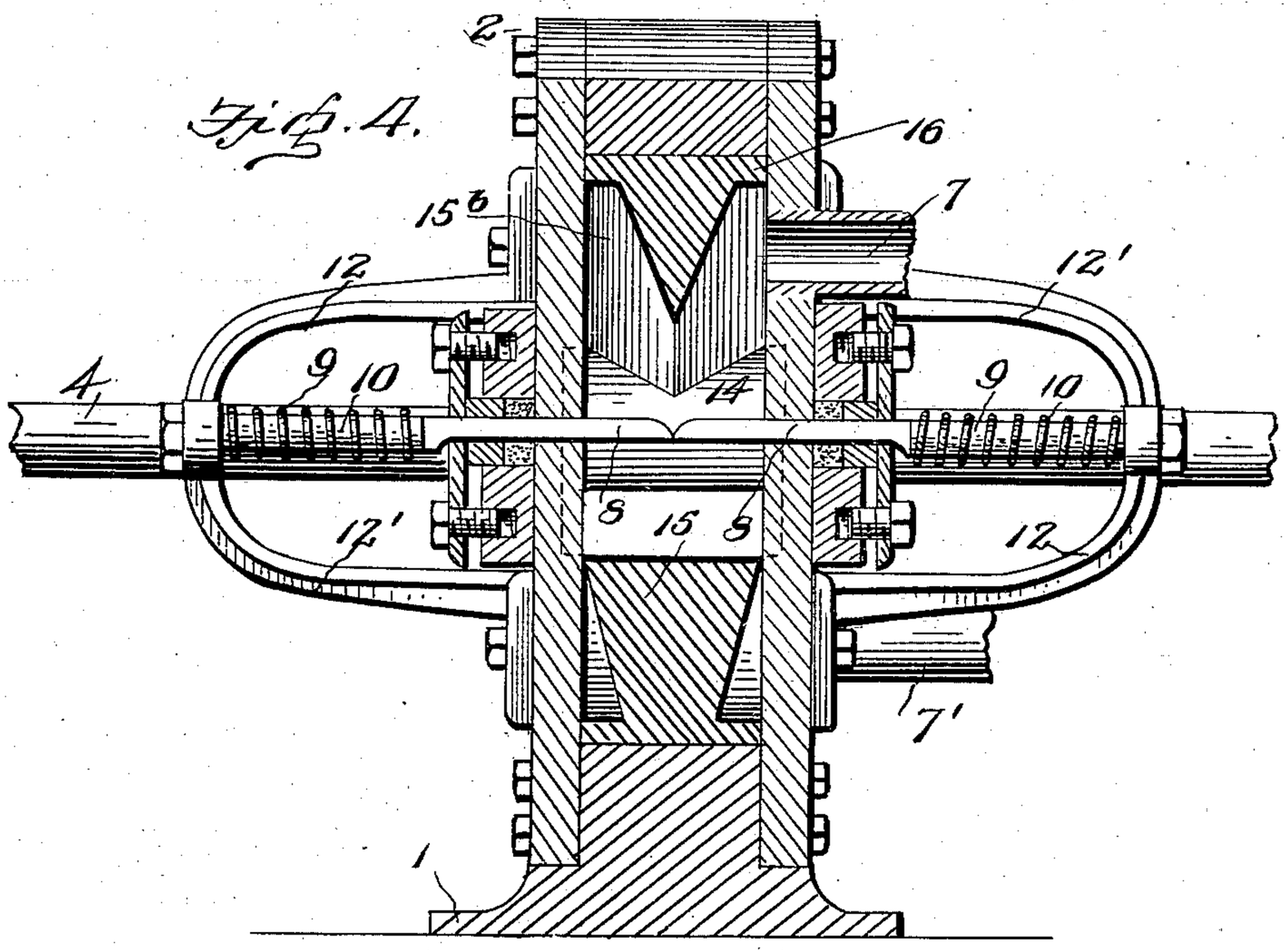
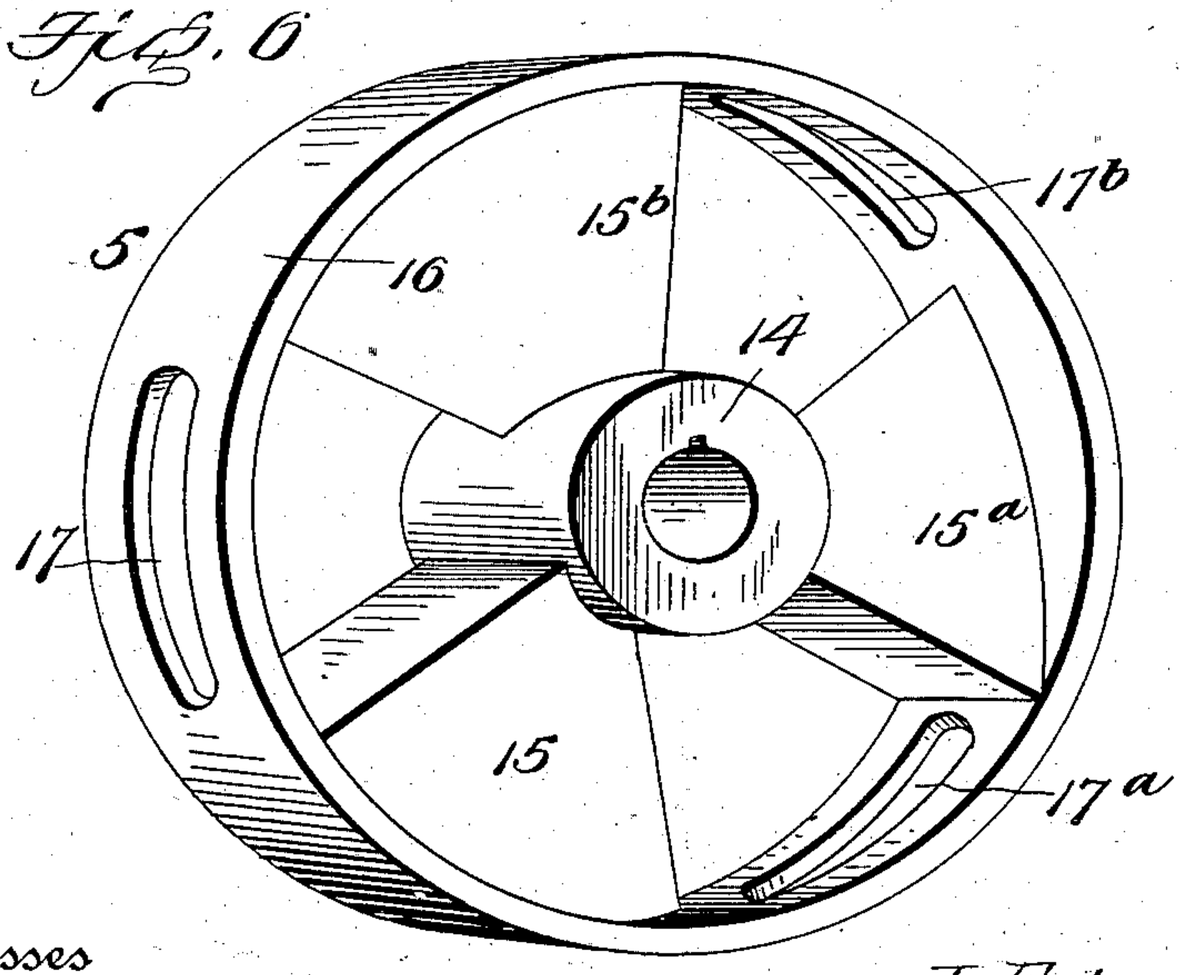


Fig. 6



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UNITED STATES PATENT OFFICE.

JAMES EDWARD MOATS, OF DALEVILLE, INDIANA.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 657,559, dated September 11, 1900.

Application filed May 26, 1900. Serial No. 18,180. (No model.)

To all whom it may concern:

Be it known that I, JAMES EDWARD MOATS, a citizen of the United States, residing at Daleville, in the county of Delaware and State of Indiana, have invented certain new and useful Improvements in Rotary Engines; and I do 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.

This invention relates to improvements in rotary engines; and one object is to provide an engine of this character which will be extremely simple in construction, having but few parts, and therefore not liable to get out of order.

The further object of this invention is to construct such an engine whereby the maximum amount of power may be derived from the force used to run the engine.

With these and other objects in view the invention consists in the construction and arrangement of parts, as will be hereinafter more fully described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of my improved engine. Fig. 2 is an end view of the same. Fig. 3 is a vertical transverse section of the same. Fig. 4 is a vertical section on the line *x x* of Fig. 1, and Fig. 5 is a horizontal section taken on the line of the drive-shaft. Fig. 6 is a detail view of the piston removed from the cylinder.

In the drawings, 1 denotes the base; 2, the cylinder; 3 and 3′, the cylinder-heads, bolted to the cylinder 2.

4 denotes the drive-shaft, mounted in bearings in the heads 3 3′.

5 denotes the piston, concentrically mounted on the shaft 4 to rotate the same.

The cylinder 2 is provided in its periphery with oppositely-arranged inlet-ports 6 and 6′, located one slightly above and the other below the center of the drive-shaft. The head 3 is provided with the upper and lower exhaust-ports 7 and 7′, connecting directly with the interior of the cylinder.

8 8 denote one pair of horizontally-arranged abutment-blocks mounted to slide through slots formed in the heads 3 and 3′, being suitably packed and made steam-tight in bearing-boxes formed on said heads. The inner edges of the abutment-blocks are normally forced into close contact with each other within the cylinder by means of the springs 9, coiled around stems 10, projecting from the outer edges of said blocks, the free ends of which are slidably mounted in the upper ends of guide-brackets 12, bolted to said heads. The springs 9 are confined between the outer edges of the abutment-blocks and the ends of the guide-brackets 12. The abutment-blocks 8 and 8 are located immediately above the inlet-port 6 and to one side of the drive-shaft. A similar arrangement of blocks 8′ 8′, mounted in packed bearing-boxes and having springs 9′, coiled around stems 10′, slidably mounted in guide-brackets 12′, bolted on the heads 3 3′, and located immediately below the inlet-ports 6′, is provided for the opposite side of the engine.

The piston 5 consists of the hub 14, keyed or otherwise fastened on the drive-shaft 4 and provided with the radial wedge-shaped spokes or arms 15 15^a 15^b, preferably three in number, being joined at their outer ends by the concentric ring or band 16. The band 16 of said piston is provided between the wedge-shaped arms or spokes with elongated inlet openings or ports 17 17^a 17^b, which are adapted upon rotation of the piston to register alternately with the inlet-ports 6 and 6′ of the cylinder. The location of the abutment-blocks is within the ring or band of the piston, forming steam-tight joints between said ring and the hub of said piston and also at their meeting edges, which are held in close contact with each other by the tension of the coiled springs 9 and 9′.

In order to prevent steam from getting behind the abutment-blocks when the elongated port of the piston is passing the inlet-port of the cylinder, I provide flat leaf-springs 18 and 18′, having one end rigidly connected with the head of the cylinder in a recess provided therein for the same, the free end being bent inwardly at a sharp angle, forming a flat face which when sprung into the port of the piston comes into contact with the edge of abutment-blocks and forms a continuation of the abutment, so that no steam will be allowed to pass the said blocks.

In operation, the piston being in the posi-

tion shown in Fig. 2 of the drawings, steam is now entering the port 6 of the cylinder and through the port 17 of the piston. The expansion force of the same being exerted upon the broad edge of the wedge-shaped spoke 15 of the piston and confined by the abutment-blocks 8 and 8′ and spring 18 will cause the said spoke and piston to move forward in the direction of the arrow until said broad edge of the spoke 15 is brought into line with the exhaust-port 7′ of the cylinder. In the meantime the spoke 15^a has forced apart the abutment-blocks 8′ 8′ and passed the same and is receiving the force of steam from the inlet-port 6′ and the piston-port 17^a. The spoke 15^b will by this time be forcing its way between the blocks 8 8 and the steam confined in the space between the spokes 15^a and 15^b will have been exhausted through the port 7. It will thus be seen that the expansive force of the live steam is used to the greatest degree before being exhausted. The abutment-blocks having their contiguous meeting edges slightly beveled or rounded off will allow the sharp edges of the spokes to readily force their way between them and immediately after passing the said blocks will be quickly forced together again before the piston-port reaches the cylinder inlet-port, and at the moment the edges of the elongated piston-ports reach the free ends of the flat springs they will spring into said ports just before they begin to register with the said cylinder-ports and into contact with the abutment-blocks, and by reason of the angularly-bent ends of said springs will form, as previously described, a steam-tight continuation of the abutments.

A suitable governor and balance-wheel (not shown) are provided for in connection with my engine. Steam is alternately admitted to the inlet-ports 6 and 6′.

From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of my engine will be readily understood, and a further description is not deemed necessary.

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

1. In a rotary engine, the combination of a cylinder having therein oppositely-arranged inlet and exhaust ports, a concentric wheel-shaped piston mounted to rotate therein, having wedge-shaped spokes and a hub fixed on the drive-shaft of said engine, inlet-ports arranged in the periphery of said piston, and automatically-closing abutment-blocks located within the path of said spokes, substantially as and for the purpose set forth.

2. In a rotary engine, the combination of a cylinder having in the periphery thereof, oppositely-arranged inlet-ports, and in one head diametrically-arranged exhaust-ports, a drive-shaft, a wheel-shaped piston concentrically mounted on said shaft, a series of radial wedge-shaped spokes mounted within said wheel-shaped piston, a series of ports arranged in the periphery of said piston and between said spokes, and automatically-operated abutment-blocks arranged in pairs on opposite sides of the center of said piston and within the path of said wedge-shaped spokes, substantially as and for the purpose set forth.

3. In a rotary engine, the combination of a base and a cylinder mounted thereon, having in the periphery thereof oppositely-arranged inlet-ports, the diametrically-arranged exhaust-ports, a drive-shaft, a wheel-shaped piston mounted on said shaft to rotate the same, a series of radial wedge-shaped spokes mounted within said piston, a series of elongated inlet-ports arranged in the periphery of said piston between said spokes, springs for preventing leakage through said ports, horizontally-disposed abutment-blocks, arranged in pairs on opposite sides of said piston and within the path of movement of said spokes, having their inner edges held in close contact with each other, and springs for closing said blocks and holding their edges in close contact with each other, said blocks being adapted to be forced apart by said wedge-shaped spokes allowing them to pass, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JAMES EDWARD MOATS.

Witnesses:

JAMES STEWART,

WM. FISCUS.