

No. 612,695.

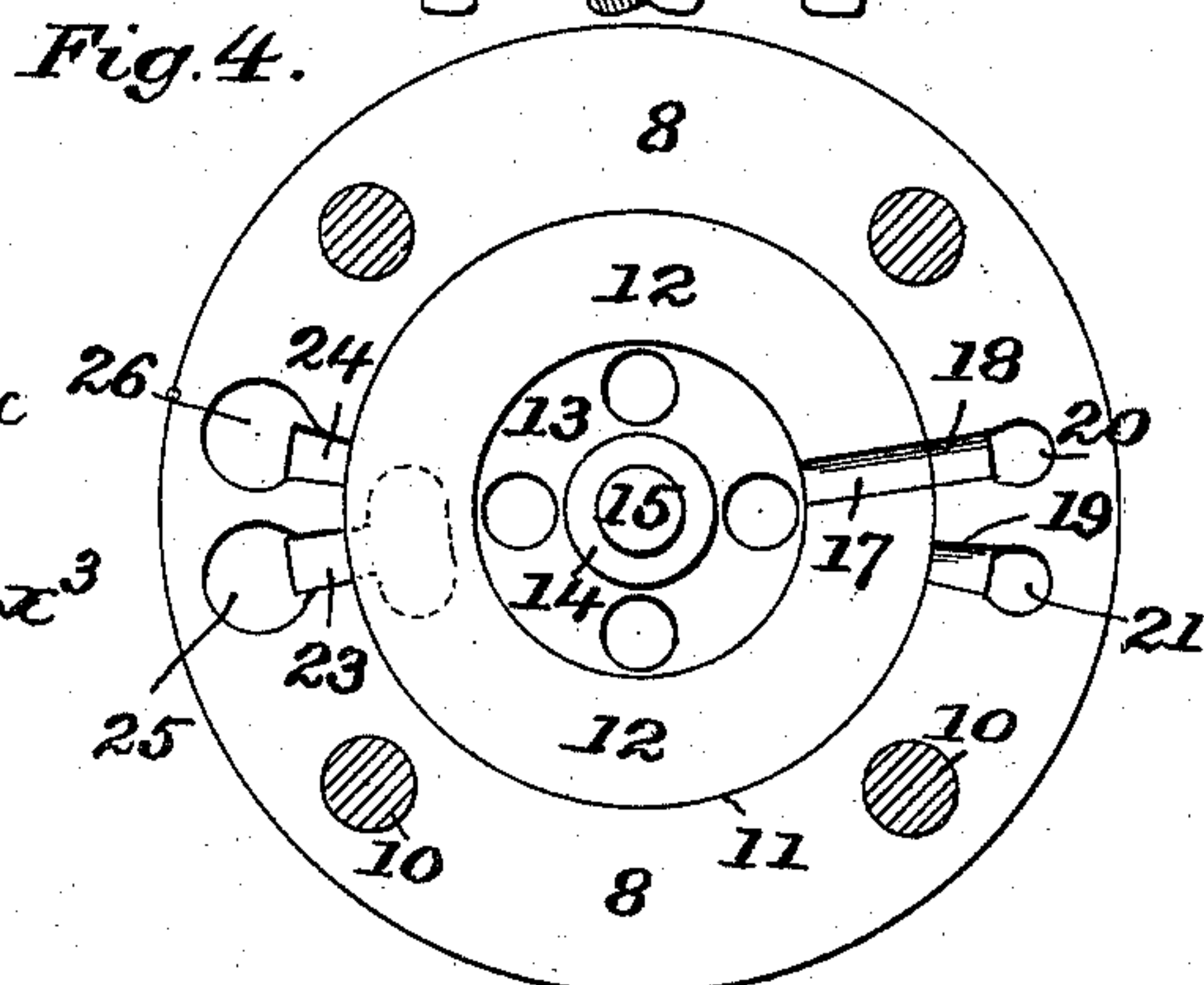
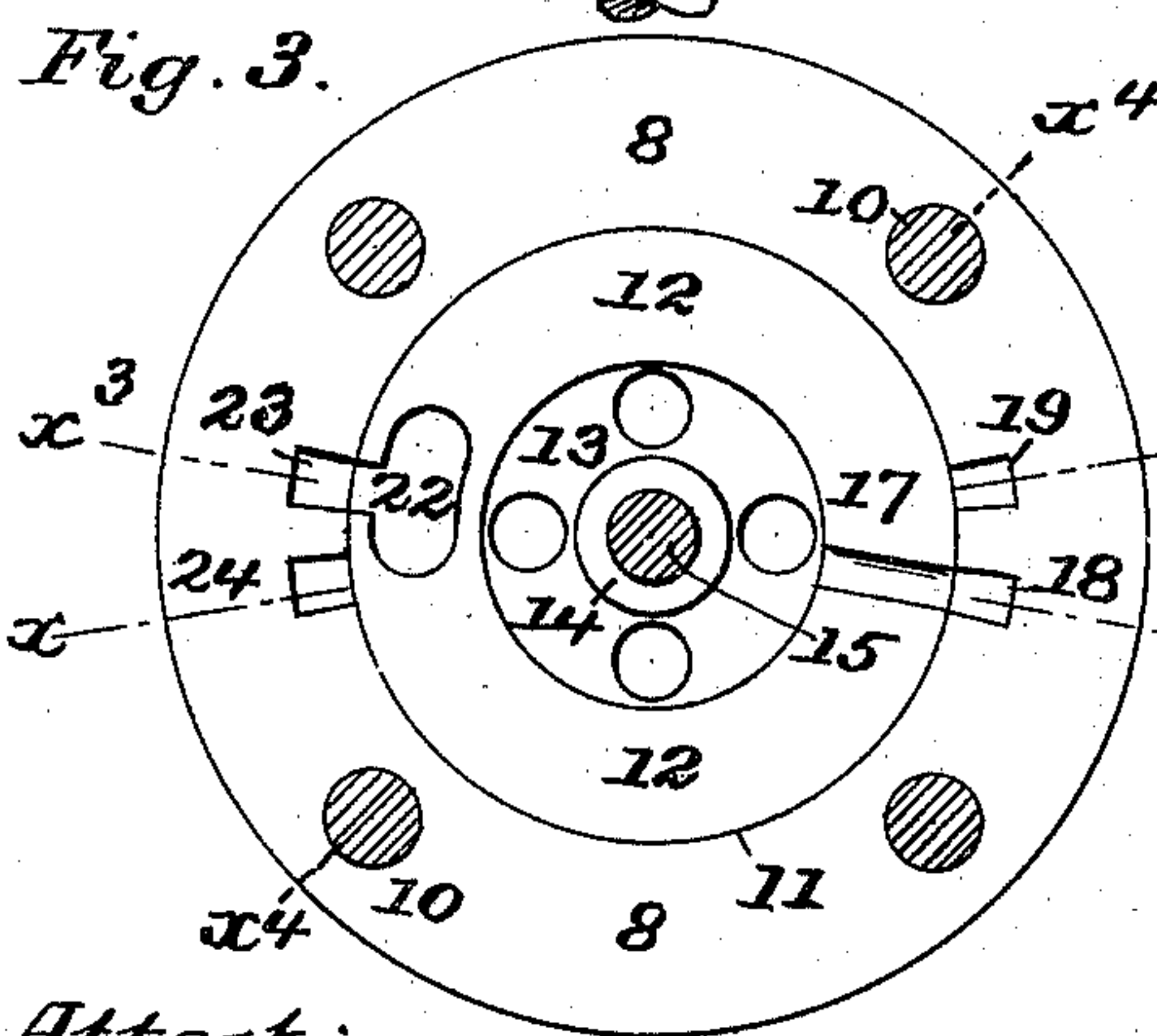
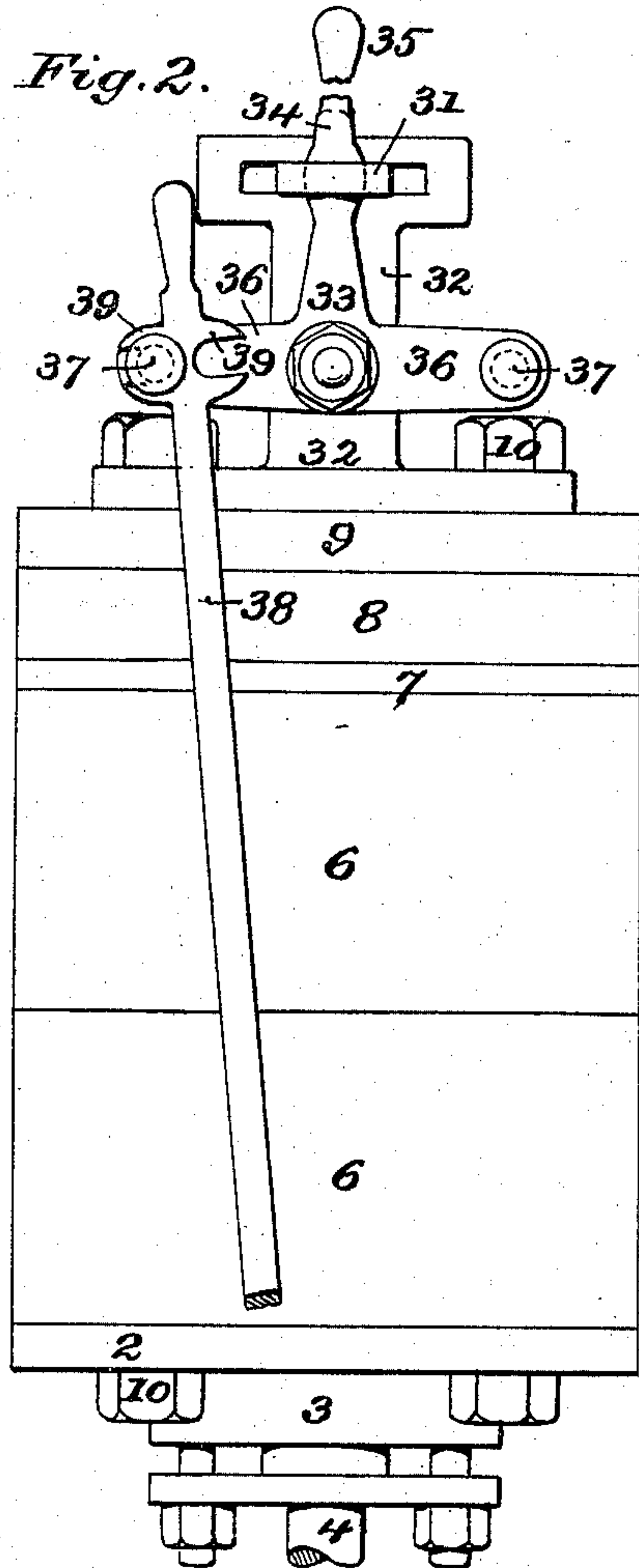
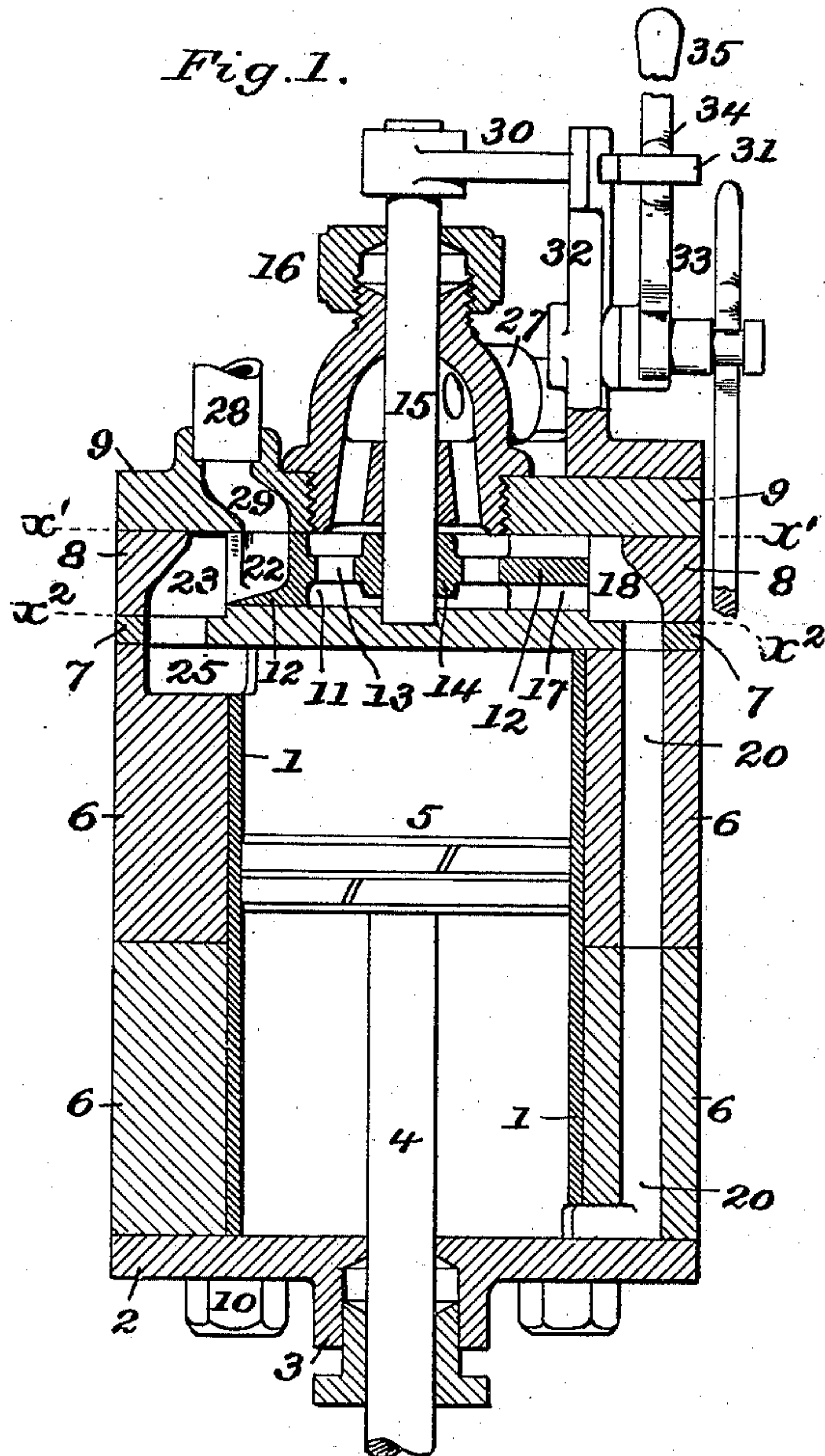
Patented Oct. 18, 1898.

J. P. BACKMAN.  
STEAM ENGINE.

(Application filed Apr. 4, 1898.)

(No Model.)

2 Sheets—Sheet 1.



*Attest:*

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*Inventor:*

*John P. Backman,*  
*by Robert Burns Atty.*

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2 Sheets—Sheet 2.

Fig. 5.

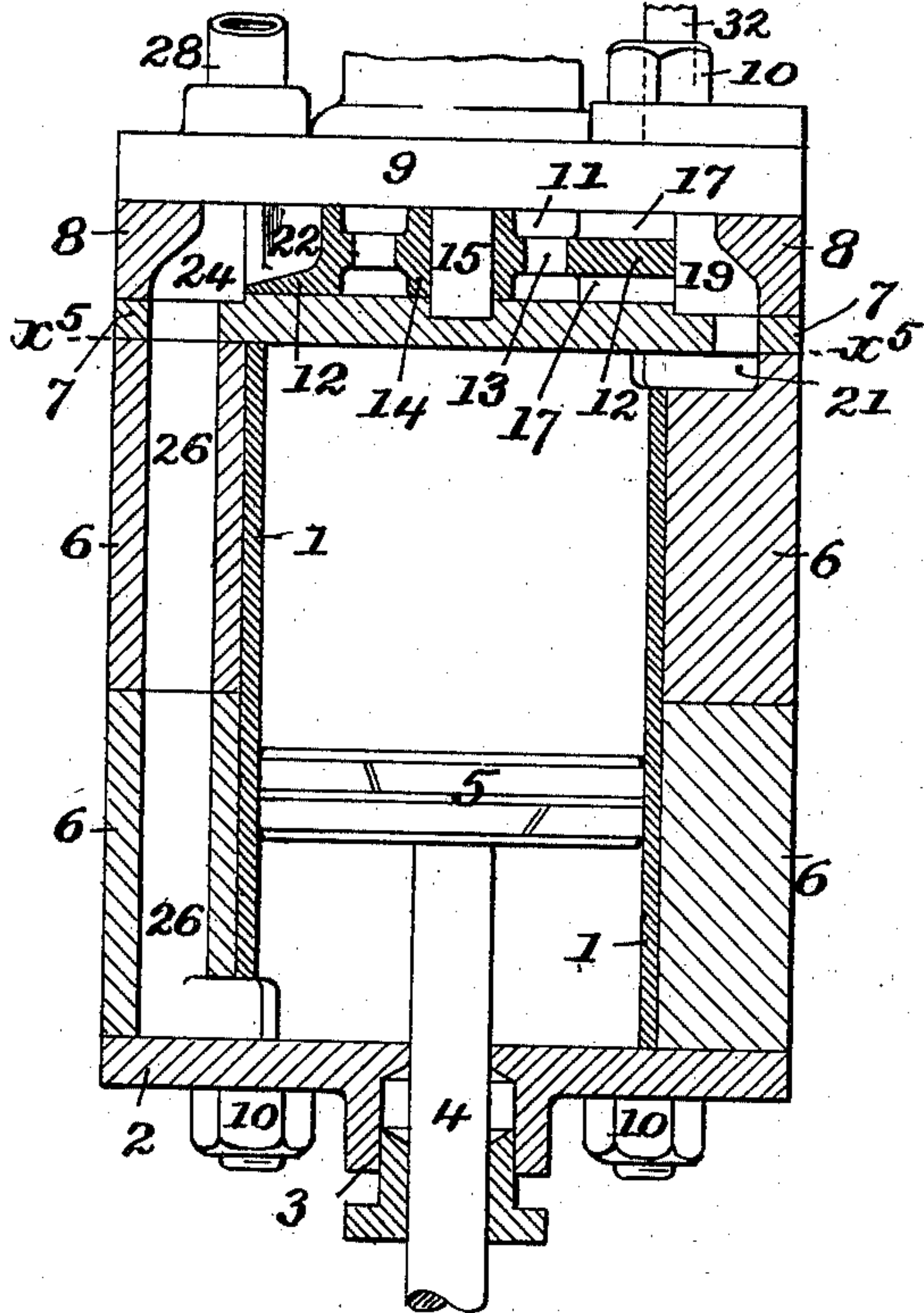


Fig. 6.

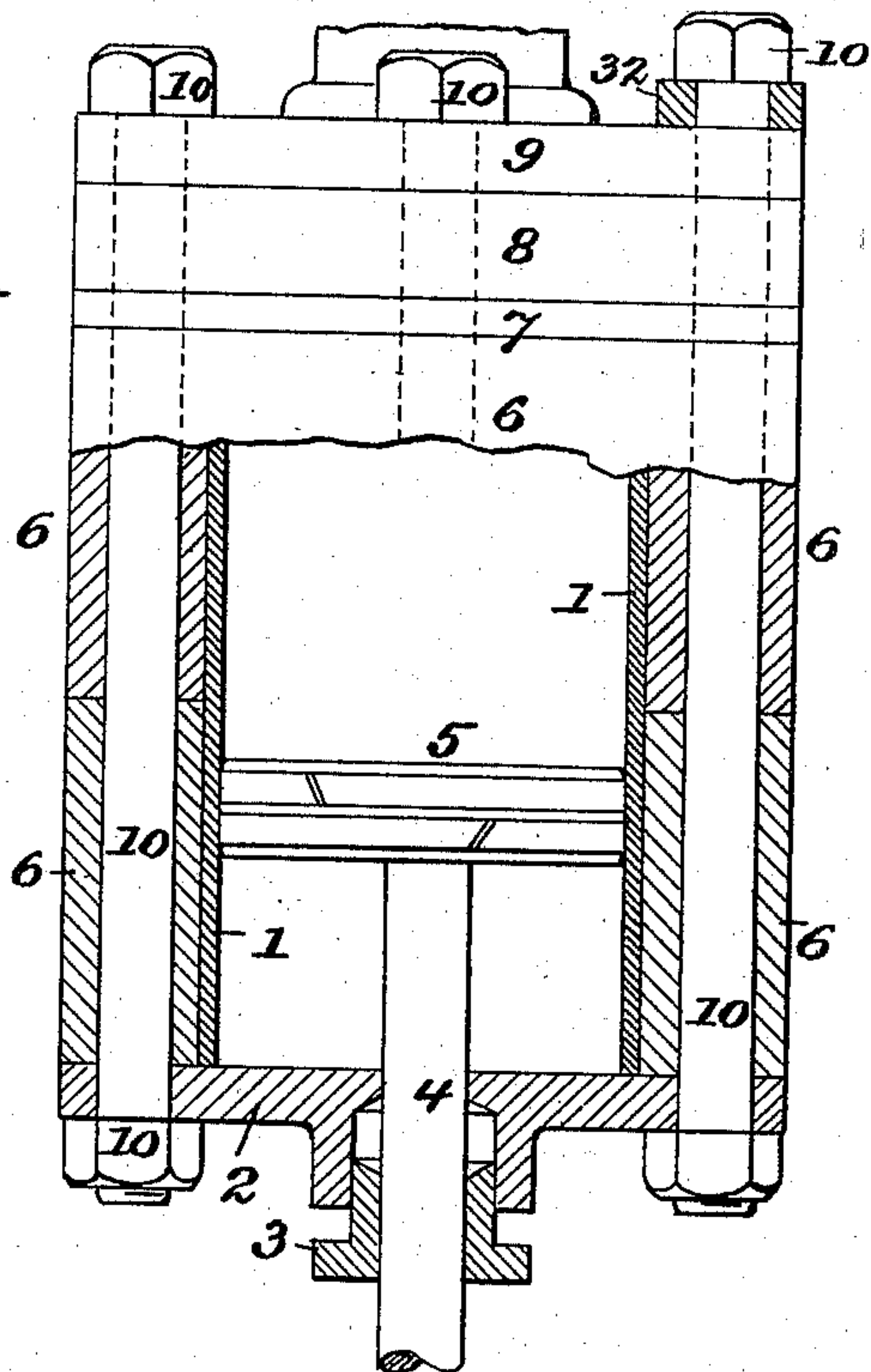


Fig. 7.

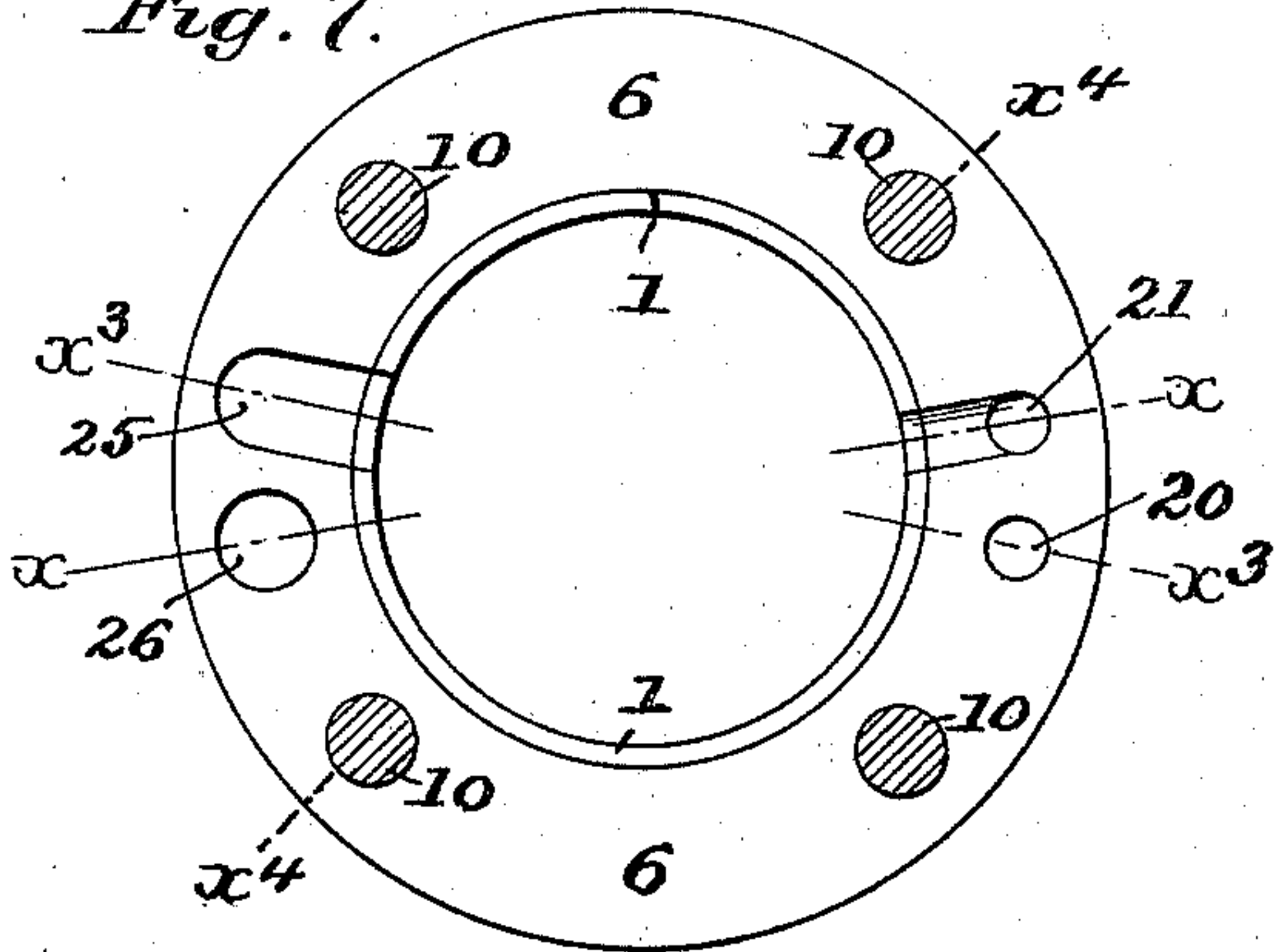
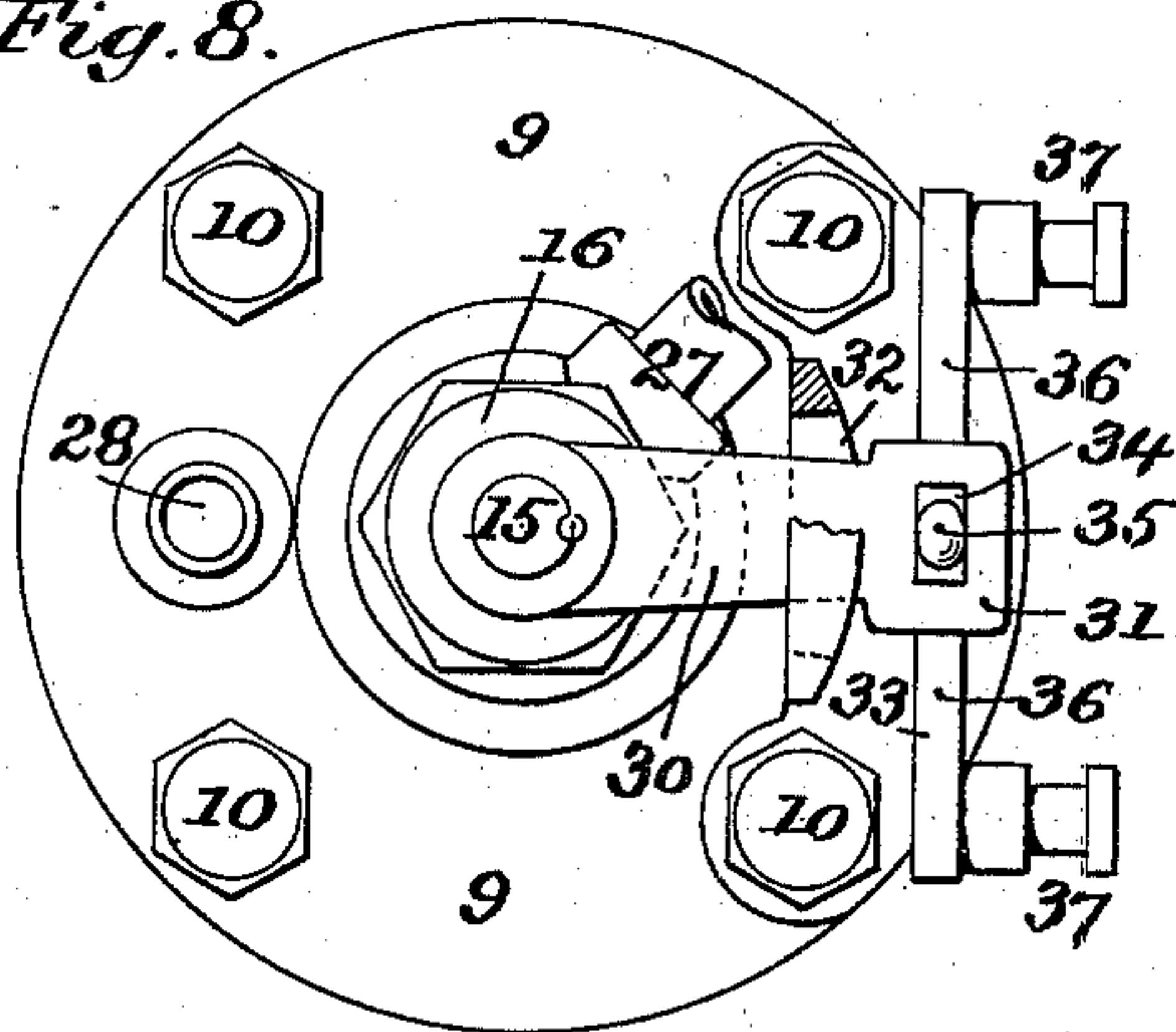


Fig. 8.



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# UNITED STATES PATENT OFFICE.

JOHN P. BACKMAN, OF CHICAGO, ILLINOIS.

## STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 612,695, dated October 18, 1898.

Application filed April 4, 1898. Serial No. 676,461. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN P. BACKMAN, 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 Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification.

The present invention relates to steam-engines of the reciprocating-piston type, and more especially to that type in which a semi-rotary steam-valve is employed, with means for reversing the action of the valve, so as to cause a reversal of the motion of the engine, the objects of the present improvements being to provide a simple and efficient valve construction and means for manually reversing the same, as required and as will hereinafter more fully appear and be more particularly pointed out in the claims, a further object being to provide a simple and efficient construction of cylinders for reversible engines that affords portability of the engine in shipping the same to inaccessible points. I attain such objects by the construction and arrangement of parts illustrated in the accompanying drawings, in which—

Figure 1 is a vertical sectional elevation at line  $x x$ , Figs. 3 and 7, of the cylinder, valve, and valve mechanism of a reversible engine, illustrative of the present invention; Fig. 2, a side elevation at right angles to the position of parts shown in Fig. 1; Fig. 3, a horizontal section at line  $x' x'$ , Fig. 1, looking downward; Fig. 4, a horizontal section at line  $x^2 x^2$ , Fig. 1, looking upward; Fig. 5, a sectional elevation at line  $x^3 x^3$ , Figs. 3 and 7; Fig. 6, a sectional elevation at line  $x^4 x^4$ , Figs. 3 and 7; Fig. 7, a horizontal section at line  $x^5 x^5$ , Fig. 5, looking downward; Fig. 8, a top plan of the valve operating and reversing mechanism.

Similar numerals of reference indicate like parts in the several views.

In the present improvement the steam-engine cylinder will comprise a new and novel combination and arrangement of parts, as illustrated in the accompanying drawings, and in which—

1 represents a seamless tubular lining of a

length equal to the extreme movement or stroke of the steam-piston; 2, the usual lower cylinder-head, formed with a stuffing-box 3, through which passes in a steam-tight manner the piston-rod 4 of the steam-piston 5; 6, a series of two or more annular sections constituting the main body of the steam-cylinder and fitting closely upon the tubular lining 1 to constitute a reinforce therefor, as shown, such sections 6 being of a diameter equal to that of the end heads and provided with bolt-holes and steam-passages, as hereinafter described; 7, a circular upper head that fits upon the upper end of the upper section 6 to close the same and at the same time constitute the bottom of the valve-chest; 8, an annular ring fitting on top of the head 7 and constituting the vertical wall of the valve-chest, its concentric inner surface constituting the seat for the semirotary valve of the present invention, as hereinafter described; 9, the main circular upper head that fits upon the upper end of the annular ring 8 to close the upper end of the same and constitute the top head or cover of the valve-chest.

The above-described parts are held together in a substantial and yet readily-detachable manner by means of a series of bolts 10, passing through suitable orifices in the different parts, as illustrated in Figs. 3, 4, 6, 7, and 8 of the drawings.

11 is the valve of the present invention, formed with an annular rim portion 12, of a height equal to that of the valve-chest, and a thin perforated centrally-arranged web portion 13, connecting the rim portion 12 to the hub portion 14.

15 is the centrally-arranged valve-stem passing out of the valve-chest in a steam-tight manner through a packing-gland 16 in the upper head 9, as shown.

17 are counterpart upper and lower live-steam ports or passages radially formed in the rim portion 12 of the valve 11 and adapted to register in the movement of the valve with the pair of live-steam ports 18 and 19 in the annular ring 8 and which ports communicate, respectively, with the upper and lower live-steam passages 20 and 21, formed in the different cylinder parts heretofore described, and as illustrated in the drawings.

22 is the exhaust-port of the valve and



formed in the rim portion thereof, with its peripheral opening adapted to register in the movement of the valve with the pair of exhaust-steam ports 23 24 in the annular ring 5 8 and which ports communicate, respectively, with the upper and lower exhaust-steam passages 25 and 26 of the cylinder, as shown in the drawings.

27 is the live-steam supply-pipe communicating with the valve-chest, as shown.

28 is the exhaust-pipe, the port 29 of which is formed in the upper head 9 and in line with the exhaust-port 22 of the valve 11, as shown.

15 With the above-described construction a very evenly balanced valve is provided and one that is adapted for continued use with but little wear.

30 is a valve-operating arm secured to the upper end of the valve-stem 15 and having at its outer end an enlargement 31, that is slotted for engagement with an operating-lever, hereinafter described.

32 is a bracket or standard secured to the top portion of the steam-cylinder, with its upper end slotted horizontally to form a guide and support for the outer end of the valve-operating arm 30.

33 is a T-shaped lever pivoted to the bracket or standard 32, its upright arm 34 being adapted to engage in the slotted enlargement 31 of the valve-operating arm, so as to have operative engagement therewith, and such arm will usually be extended upward, so as to form a hand-lever 35 for use by the engineer in manipulating the valve by hand, while the horizontal arms 36 of said lever are provided with projecting studs 37 at their outer ends.

38 is the upper portion of the eccentric-rod, that is operated in any usual manner from an eccentric on the engine-shaft. In the present improvement the upper end of such rod is formed with opposite hook-shaped parts 39, that are adapted to engage, respectively, the projecting studs 37 of the lever 33, so that by the engagement of the eccentric-rod with one or the other of said studs the engine will be caused to run in a corresponding direction.

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

1. A steam-engine cylinder, comprising a tubular lining of a length equal to the extreme stroke of the piston, a series of closely- 55 arranged annular rings, fitting the outside of the tubular lining to constitute the main body of the cylinder, and formed with longitudinal live and exhaust steam passages, and end heads formed with corresponding live and 60 exhaust steam passages, substantially as set forth.

2. In a steam-engine, the combination with the cylinder, of a head 7 closing the upper end of the same, an annular ring 8, arranged 65 upon said head, and forming a valve-chamber, a head 9 closing the upper end of the valve-chamber, a semirotary valve arranged within said valve-chamber, and formed with a rim portion of a height equal to the valve- 70 chamber, exhaust ports and passages formed in the valve and annular ring, and means for operating the valve, substantially as set forth.

3. In a steam-engine, the combination with the cylinder, of a head 7 closing the upper 75 end of the same, an annular ring 6, arranged upon said head, and forming a valve-chamber, a semirotary valve arranged within said valve-chamber, the same comprising a rim portion having a height equal to that of the 80 valve-chamber, a central perforated web, and hub portion engaging the valve-operating stem, the rim portion being formed with live and exhaust ports as described, that register with similar ports formed in the annular 85 ring portion of the valve-chest, and means for operating the valve, substantially as described.

4. In a steam-engine, the combination of a steam-cylinder valve-chest, and semirotary 90 valve, of the valve-stem 15, valve-operating arm 30, bracket or standard 32, T-shaped lever 33, having a vertical arm 34, engaging the arm 30, and horizontal arms 36, provided with projecting studs 37, and an eccentric- 95 rod 38 provided with opposite hook-shaped parts 39, substantially as set forth.

In testimony whereof witness my hand this 25th day of March, 1898.

JOHN P. BACKMAN.

In presence of—

M. CLAREUS,

ROBERT BURNS.