

No. 660,010.

Patented Oct. 16, 1900.

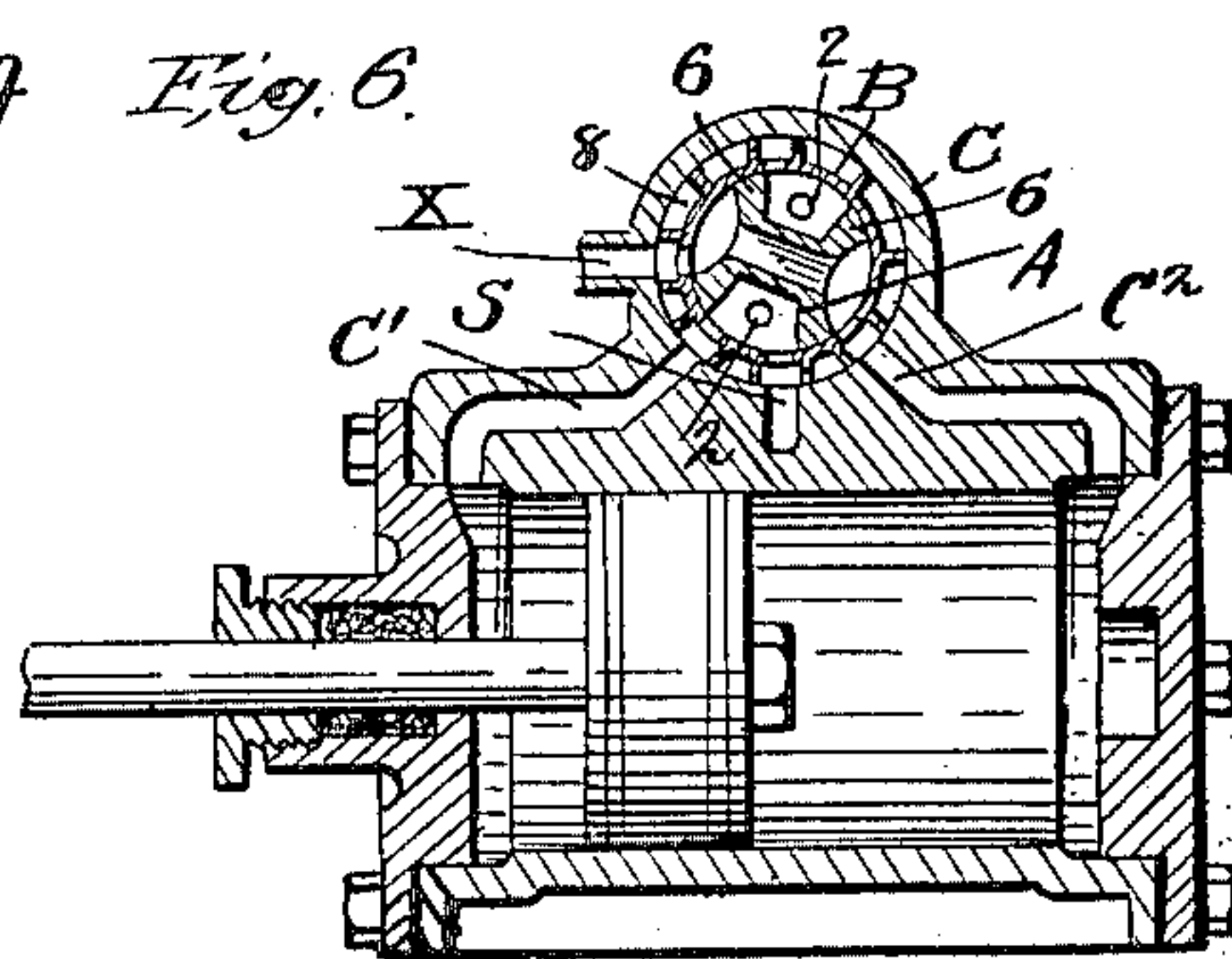
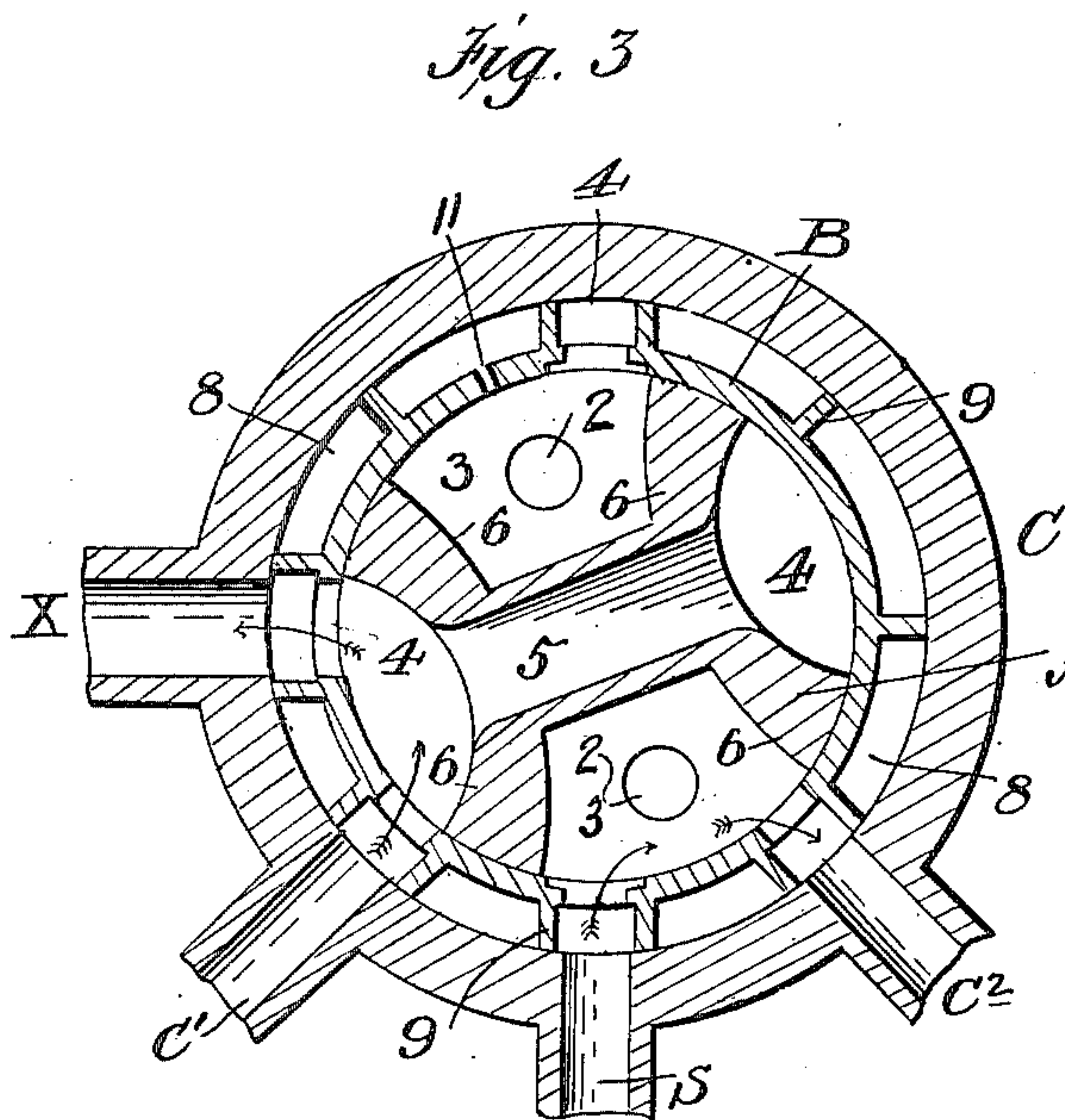
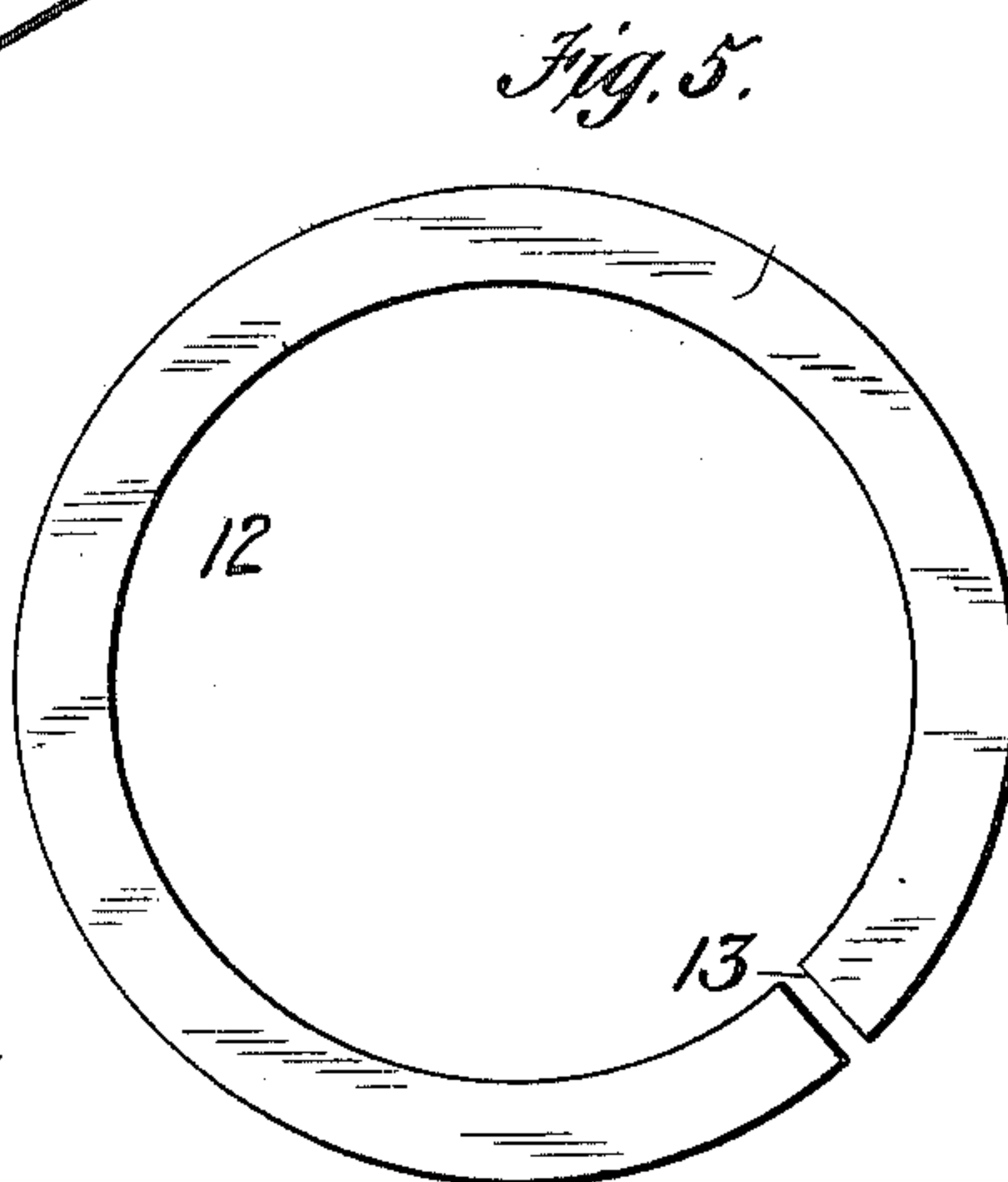
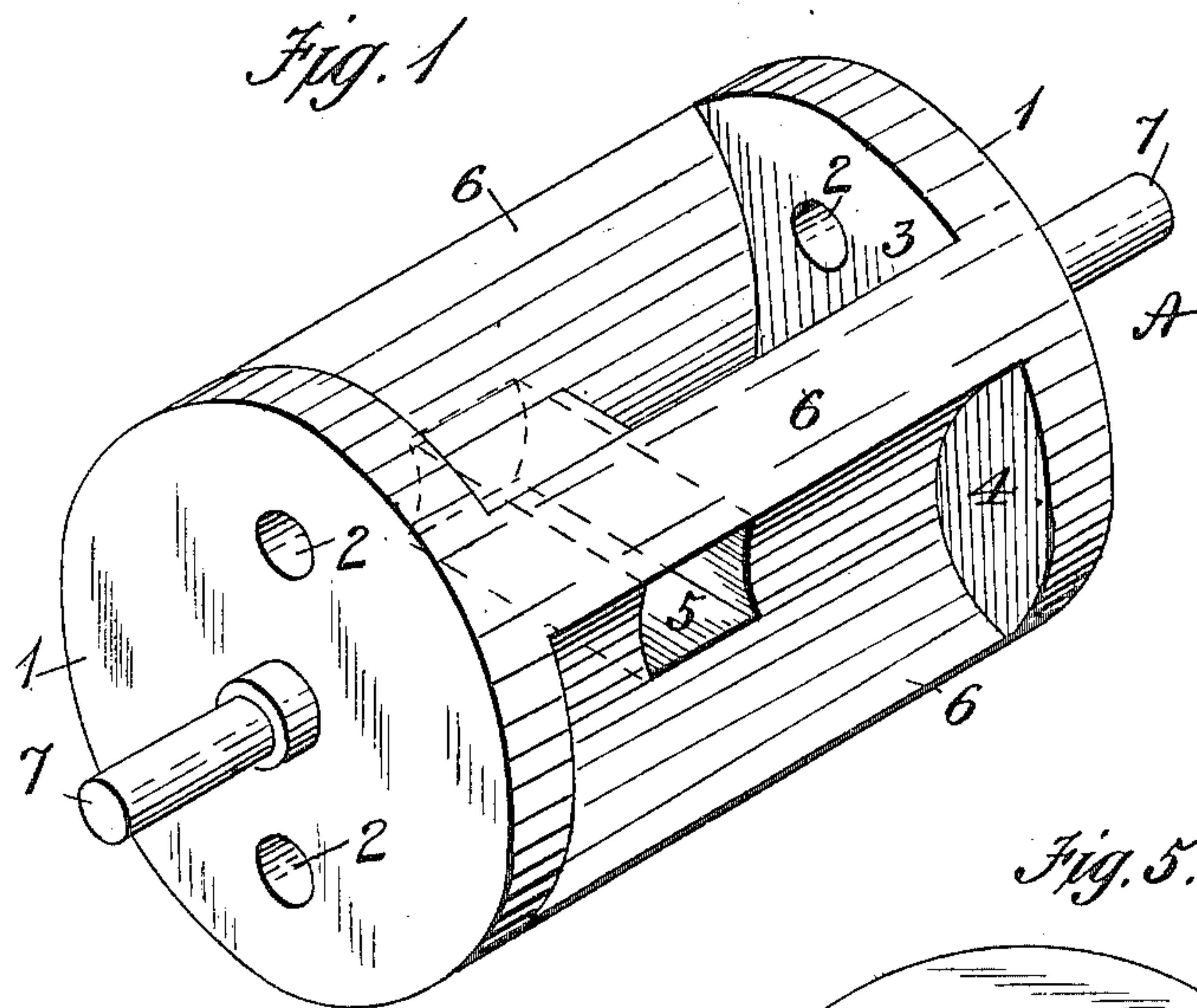
F. L. EZELL.

ROCKING VALVE FOR STEAM ENGINES.

(Application filed Apr. 14, 1900.)

·(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

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INVENTOR:

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By *James B. Payer & Co.*
 ATTORNEYS

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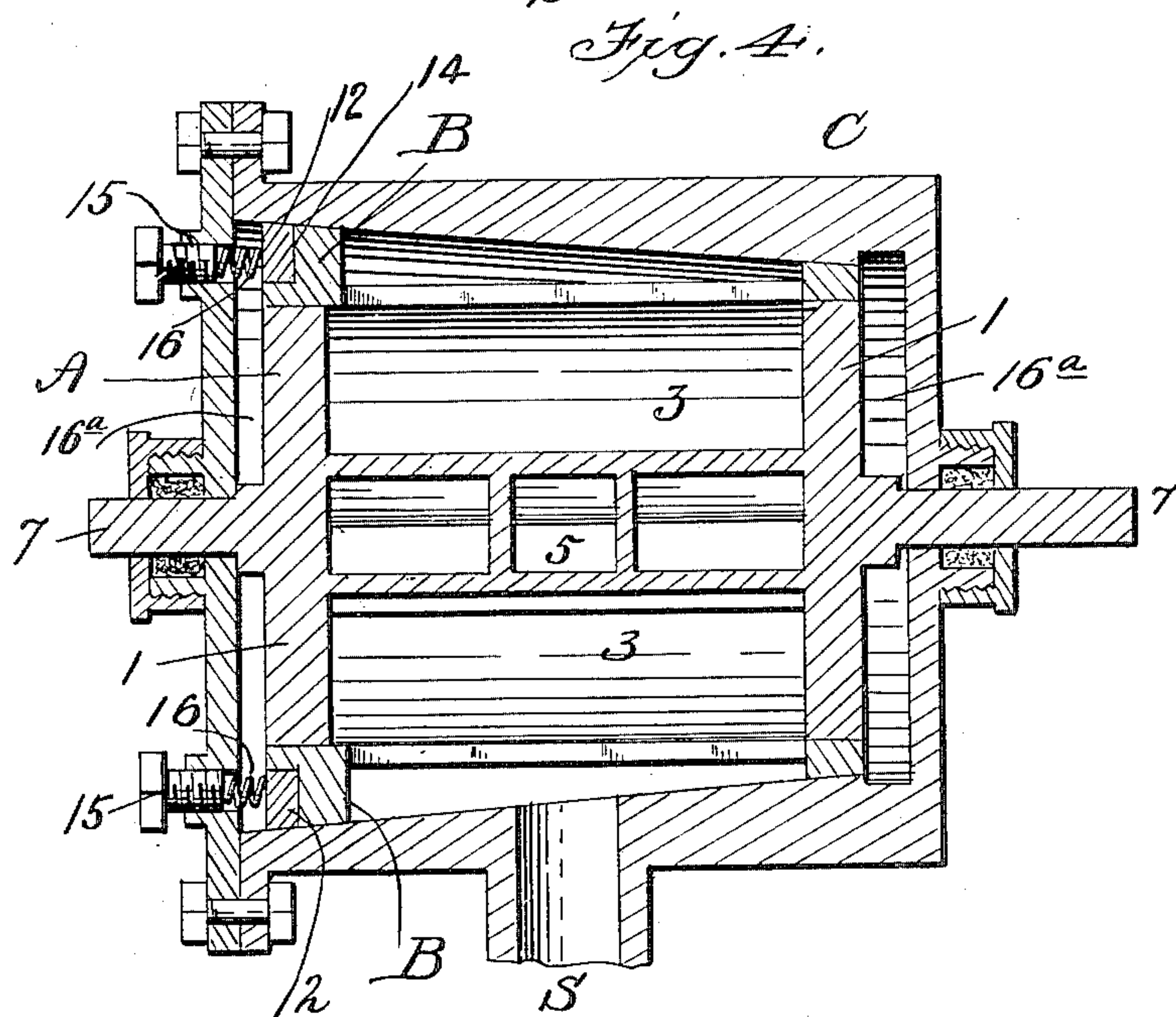
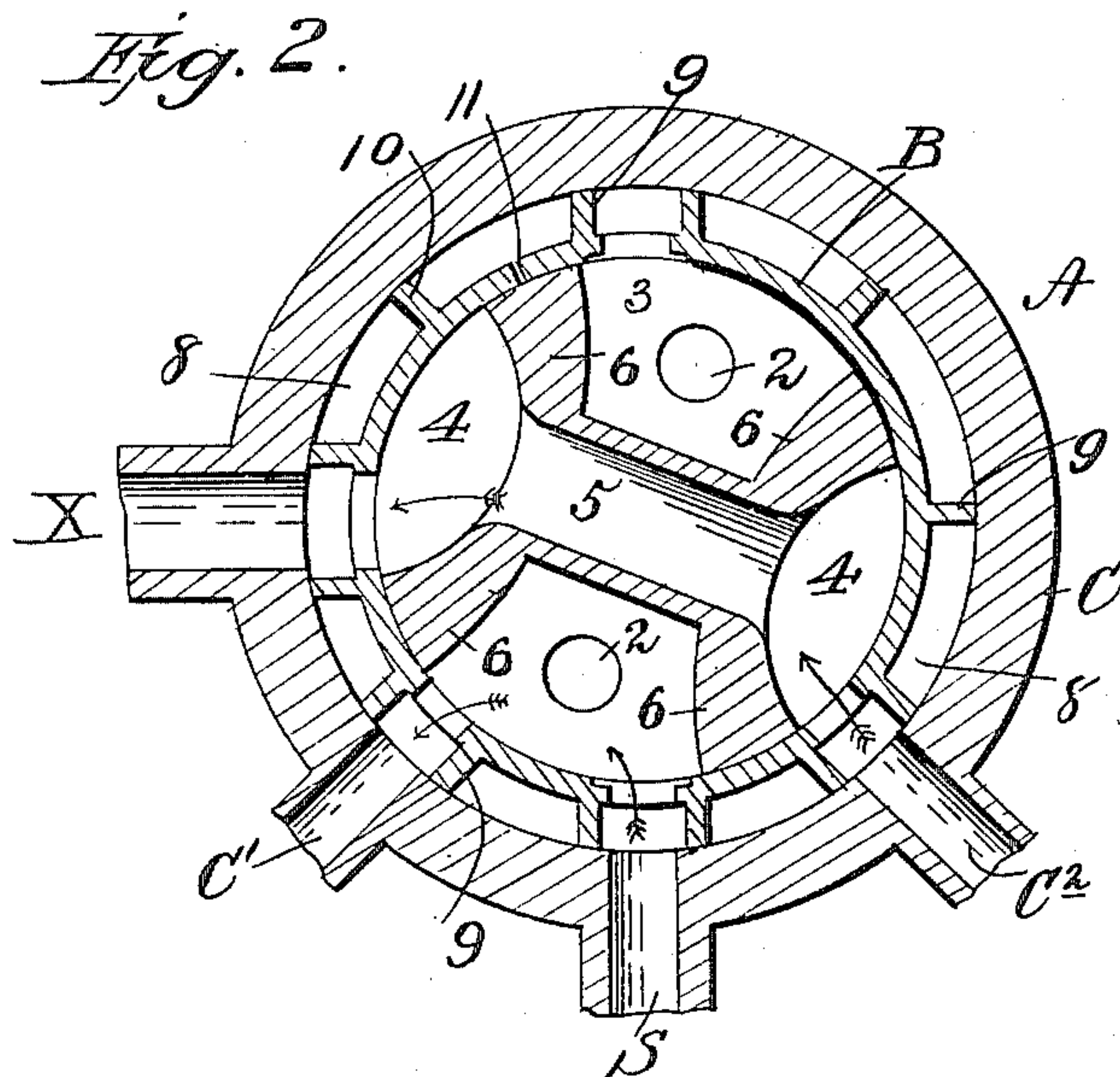
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2 Sheets—Sheet 2.



WITNESSES:

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INVENTOR:

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UNITED STATES PATENT OFFICE.

FRANCIS LAFAYETTE EZELL, OF WILKERSON, TENNESSEE, ASSIGNOR OF
ONE-FIFTH TO ELWIN D. MARTIN, OF SAME PLACE.

ROCKING VALVE FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 660,010, dated October 16, 1900.

Application filed April 14, 1900. Serial No. 12,871. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS LAFAYETTE EZELL, a citizen of the United States, residing at Wilkerson, in the county of Davidson and State of Tennessee, have invented new and useful Improvements in Rocking Valves for Steam-Engines, of which the following is a specification.

My invention relates to improvements in rocking valves for steam-engines.

The object of the invention is to provide an improved device of this character which will completely obviate the great friction, wear, and consequent leakage incident to all valves now in use. This is accomplished by my design of a perfectly-balanced and readily-adjustable valve which requires little steam to operate it and has great lasting qualities. These advantages are all attained by a novel construction and combination of parts to be hereinafter fully described and claimed.

I do not wish to be limited as to details of construction, as my construction may be varied in many particulars without departing from the spirit of the invention.

In the drawings which accompany this specification and of which they form a part, Figure 1 is a perspective view of my valve proper. Fig. 2 is a transverse section of my valve in position in a valve-casing set to admit steam to the forward end of the cylinder. Fig. 3 is a transverse section of the same with the valve set to admit steam to the rear of the piston. Fig. 4 is a longitudinal section through the axis of the valve. Fig. 5 is an elevation of my small packing-ring. Fig. 6 is a transverse section of my valve in connection with a steam-cylinder.

Like characters of reference denote like parts wherever they occur in the drawings.

My valve A is cylindrical in cross-section and either cylindrical or conical in shape. (The drawings show it as being cylindrical.)

The numeral 1 designates integral circular portions having perforations 2 therein. These perforations extend into compartments 3 and are supplied to allow a small quantity of steam to escape into the valve-chamber for a purpose to be hereinafter described. Compartments 3 are formed within the metal and extend about one-third of the way through.

They are used for the purpose of making connection between two ports or to straddle and close one of the ports. Compartments 4 are formed in the same manner as compartments 3 and are of equal dimensions. They are, however, connected with each other by a transverse passage 5 of suitable dimensions. This compartment, formed by the combination of compartments 4 with passage 5, is used to connect either of the cylinder-ports with the exhaust-port. Segmental portions 6, included between compartments 3 and 4, serve as partitions and fit the casing steam-tight. Spindles 7 are attached to or formed integral with portions 1. Said spindles are journaled in the valve-casing C, and one of them is connected when in operation to the main shaft by means of the usual means of crank and eccentric.

Packing-ring B is fitted around the valve A and inside of valve-casing C. Said packing-ring is conical on the outside and conforms to the shape of the valve A on the inside. It has ports C', C², X, and S piercing its sides, which correspond to ports in casing C. Ring B has grooves 8 extending longitudinally and traversing its entire length. These grooves 8 are parallel to the inner bore of ring B, thus making portions 9 the same thickness throughout. Said portions 9 are of such thickness as to render ring B flexible. Ribs 10 intermediate to grooves 8 conform to the inside of casing C, which they snugly fit. A slot 11 traverses the ring from end to end. This slot enables the ring to be sprung and placed in position surrounding the valve A.

Casing C is conically shaped on the inside and of any convenient shape outside. It is perfectly turned and is circular in transverse cross-section. Four ports C', C², S, and X pierce its walls. Port S communicates with the steam source, and port X is the exhaust-port. Port C' communicates with the front compartment of the cylinder and port C² with the rear compartment of the cylinder. In Fig. 5 a second packing-ring 12 is shown, which has a slot 13. This packing-ring 12 is shown in Fig. 4 in position seated in a recess 14 in the larger end of ring B. Said ring 12 neatly fits casing C and is held in place by set-screws 15, mounted in casing C and pro-

vided with springs 16. These screws 15 can also be used to take up wear and to regulate the pressure between ring B and the valve A, since there are intervening spaces 16 at each end which allow a motion of B endwise. Spaces 16 also allow access to the outside of ring 12 to the steam which comes through perforations 2. The pressure of this steam helps to make the valve tight and also greatly lessens friction and wear.

In operation one of the spindles 7 is connected by means of a crank and eccentric to the main shaft of the engine. The valve being set in the position shown in Fig. 2, steam is admitted through port S. The steam passes through port S, thence through compartment 3, and thence through port C into the forward end of the cylinder. The piston is forced backward and air in the rear of the piston is forced out, traversing in turn port C², compartment 4, passage 5, the other compartment 4; and port X. The piston now having reached the rear end of the cylinder, the valve is brought into the position shown in Fig. 4 and steam flows through port S into compartment 3 and thence into the rear compartment of the cylinder and the piston returned to the forward end of the cylinder, forcing the steam in the forward compartment out, traversing in turn port C', compartment 4, and port X.

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

1. In combination with a rocking valve having four compartments two of which communicate by means of a transverse passage, a

longitudinally-grooved packing-ring fitting the valve and being conical on the outside, a packing-ring seated in a recess in the larger end of the said grooved packing-ring, this latter packing-ring being held by set-screws secured in the valve-casing, and a valve-casing, substantially as described.

2. In combination with a rocking valve, a longitudinally-grooved packing-ring fitting said valve and conically shaped on the outer side to fit a valve-casing; a second packing-ring seated in a recess in the larger end of the said grooved packing-ring, set-screws mounted in the valve-casing and bearing against said second packing-ring, and a valve-casing, substantially as described.

3. In combination with a rocking valve having longitudinal perforations traversing its end portions and communicating with a compartment of said valve, a packing-ring fitting said valve which is conically shaped on the outside, a valve-casing fitting said packing-ring with intervening spaces at both ends between said packing-ring and the valve casing, a second packing-ring mounted in the intervening space at the larger end of said packing-ring and bearing against it, and set-screws bearing against the said second packing-ring, substantially as described.

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

FRANCIS LAFAYETTE EZELL.

Witnesses:

G. E. MATLOCK,
W. W. BIGGERS.