

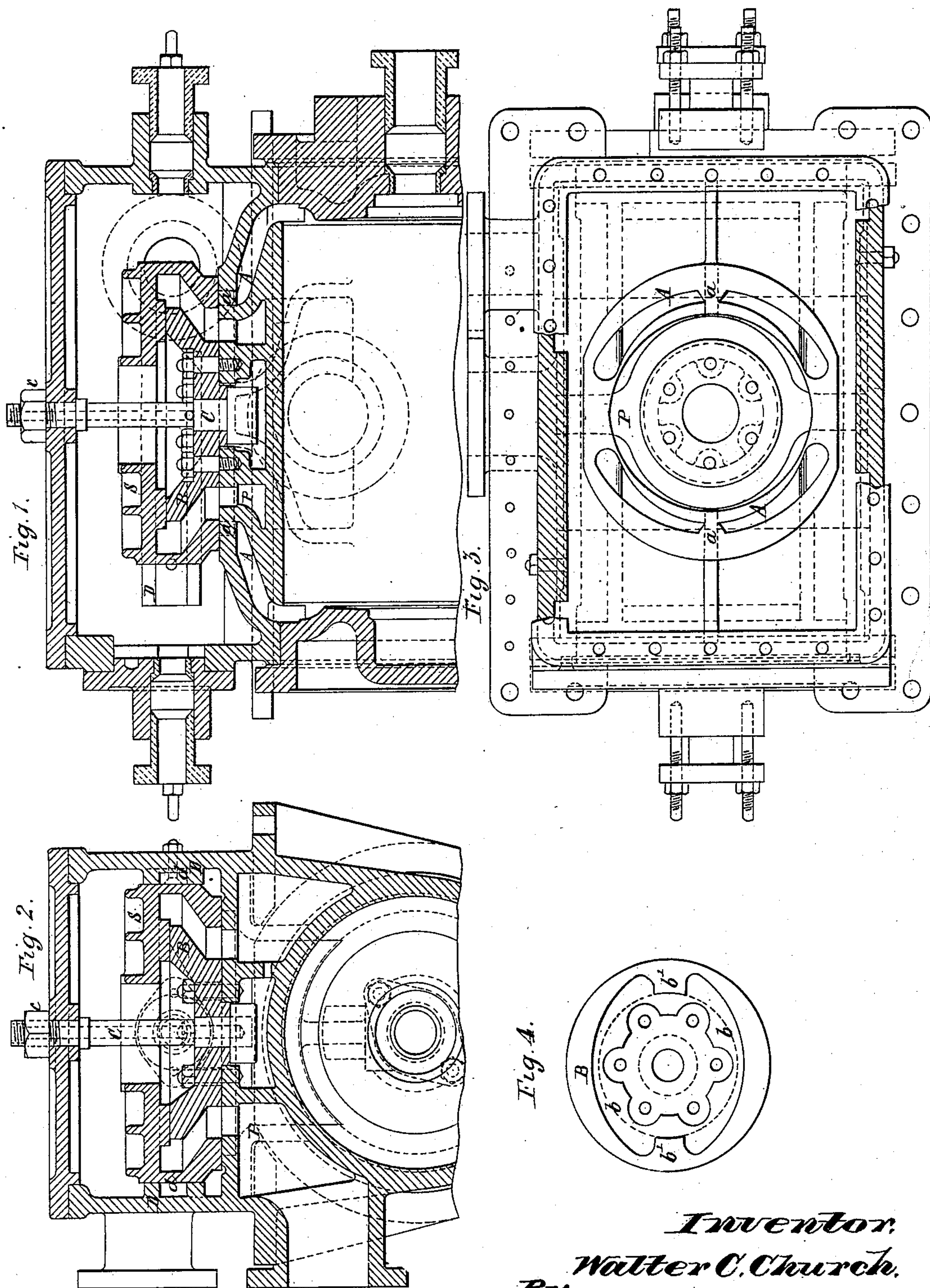
(No Model.)

3 Sheets—Sheet 1.

W. C. CHURCH.  
CIRCULAR SLIDE VALVE.

No. 316,236.

Patented Apr. 21, 1885.



Witnesses,  
J. A. Rutherford  
Robert Everett,

Inventor,  
Walter C. Church.  
By James L. Norris,  
Atty.



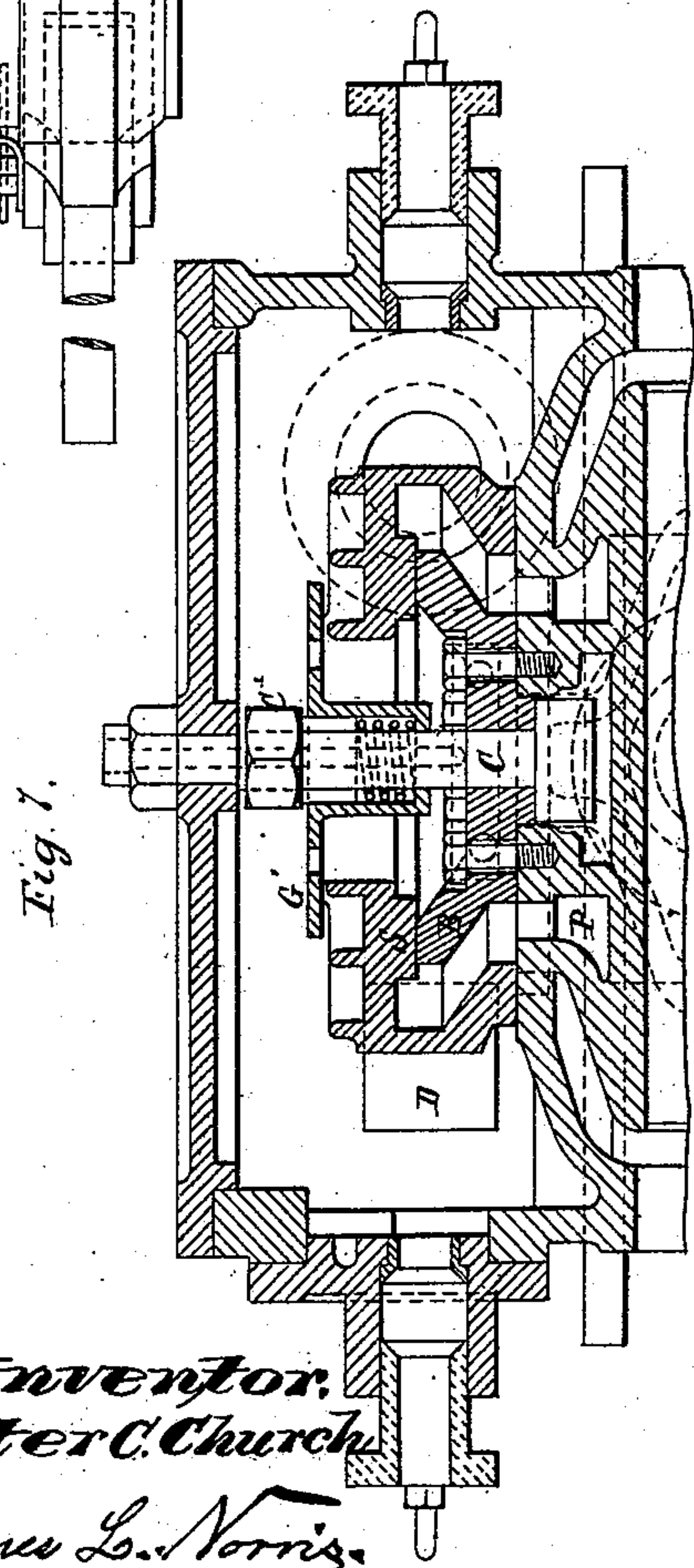
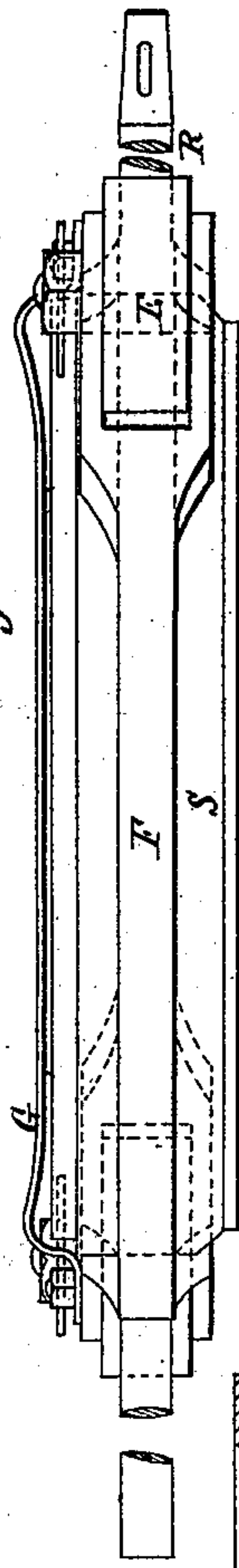
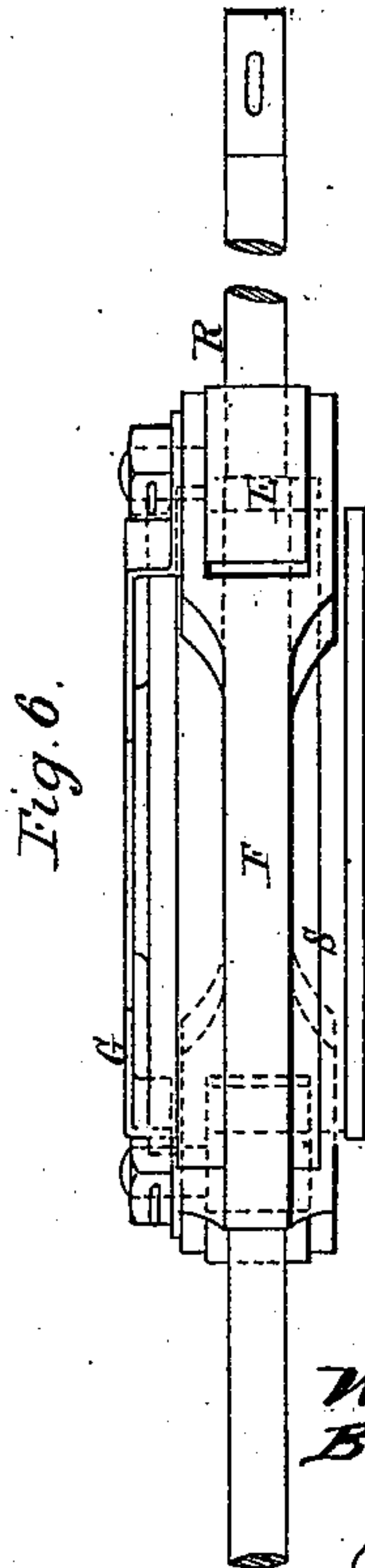
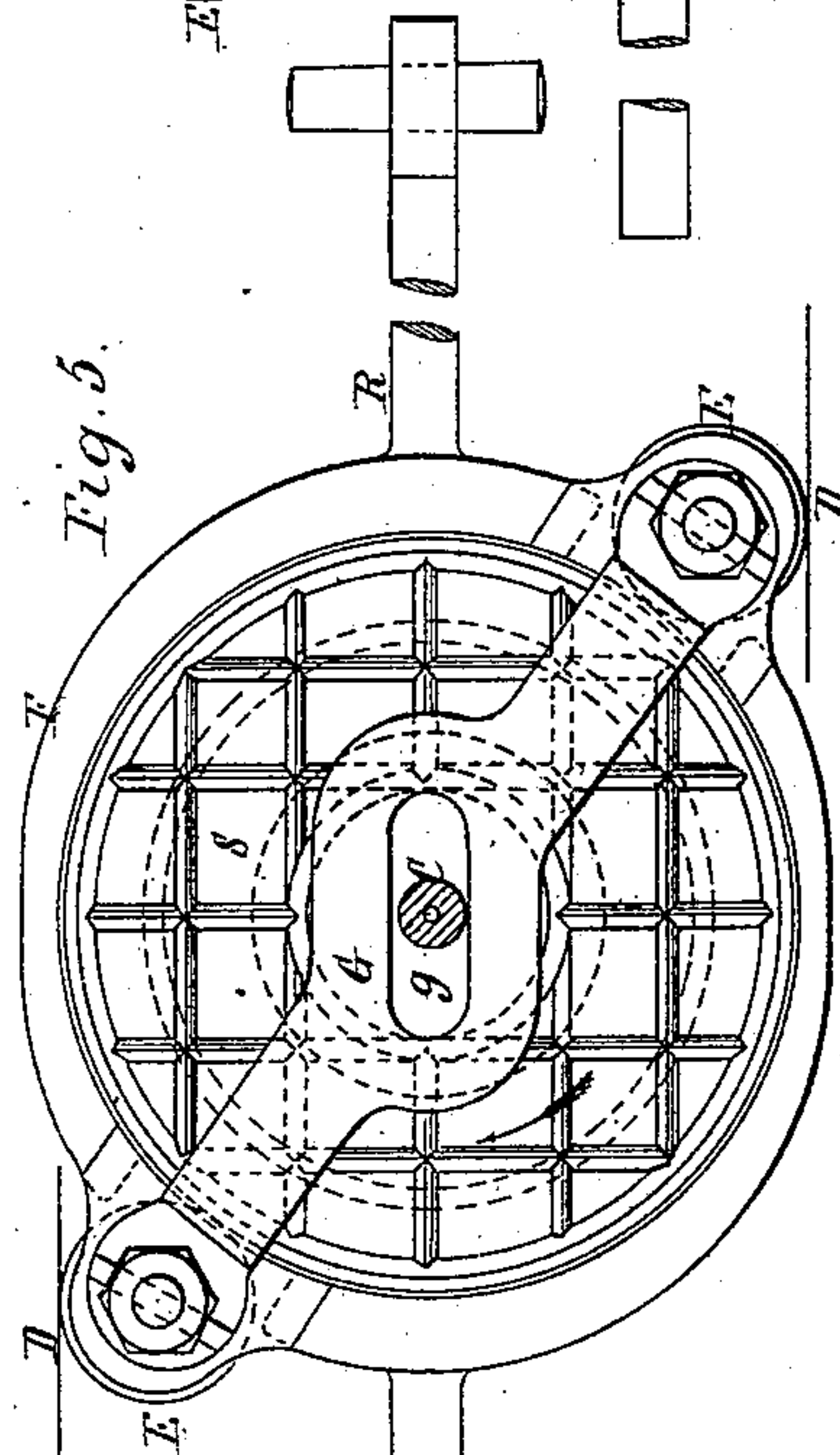
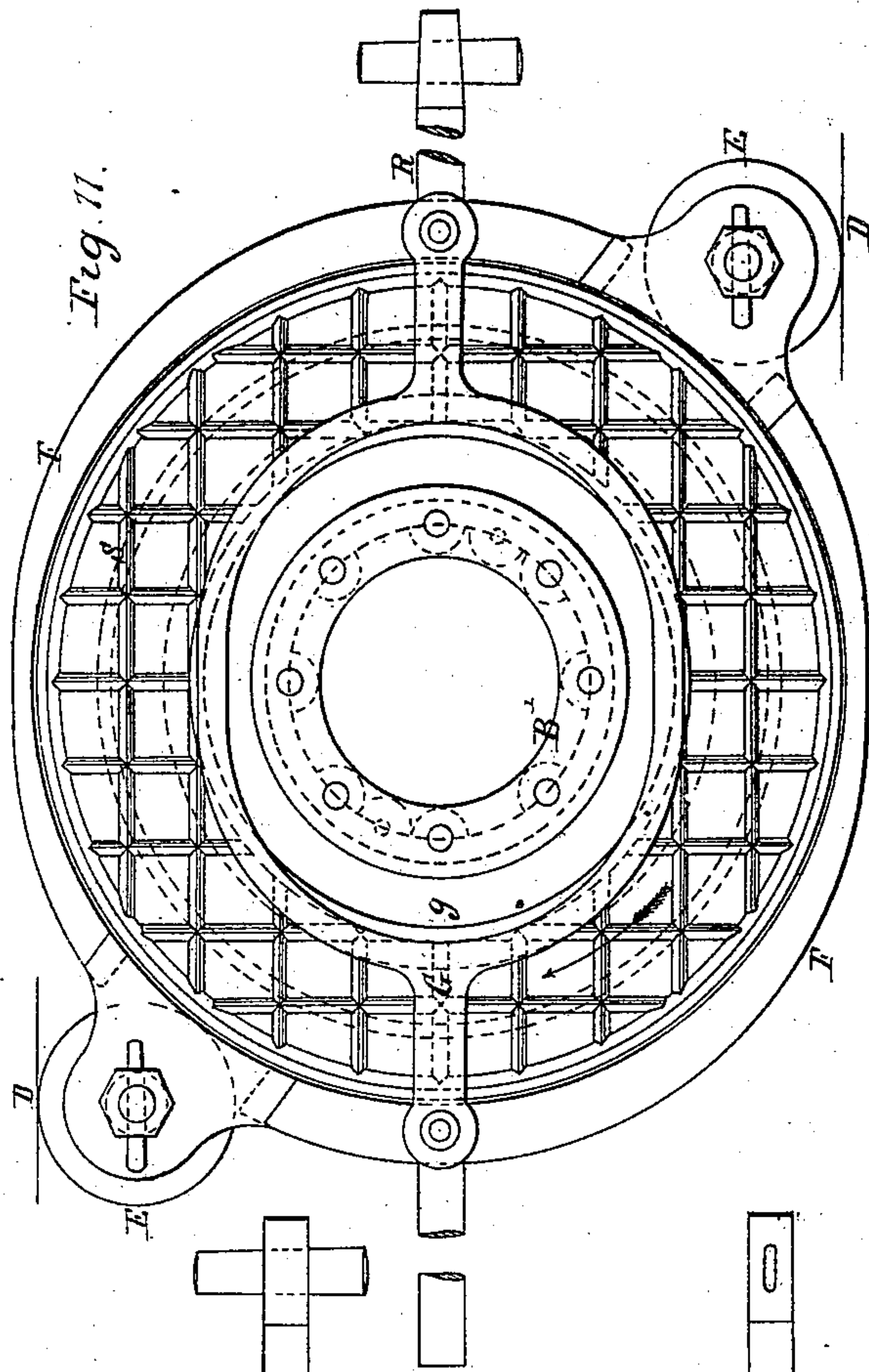
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3 Sheets—Sheet 2.

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CIRCULAR SLIDE VALVE.

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Witnesses:  
J. A. Rutherford  
Robert Crockett

Inventor:  
Walter C. Church  
By James L. Norris, Atty.



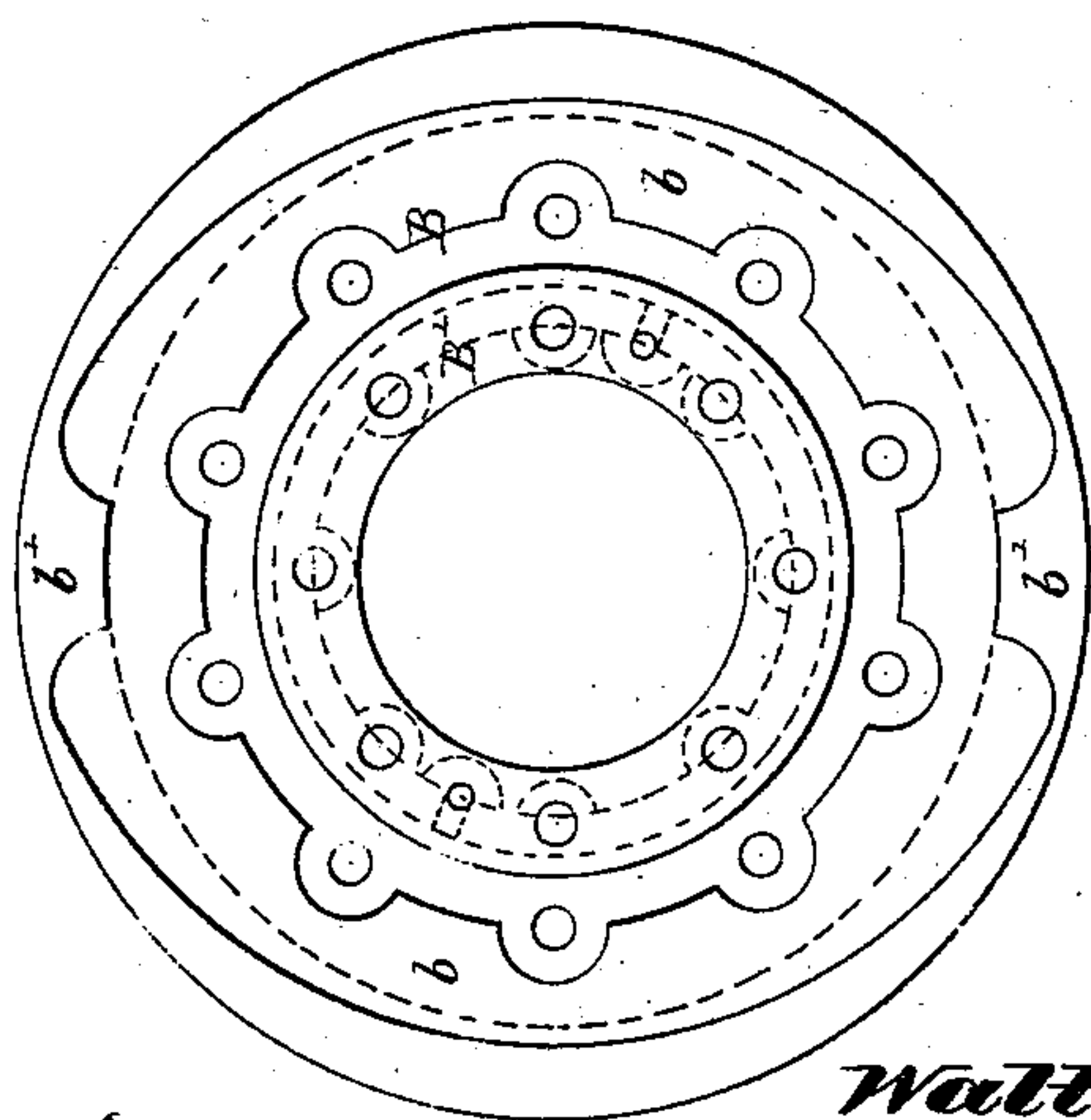
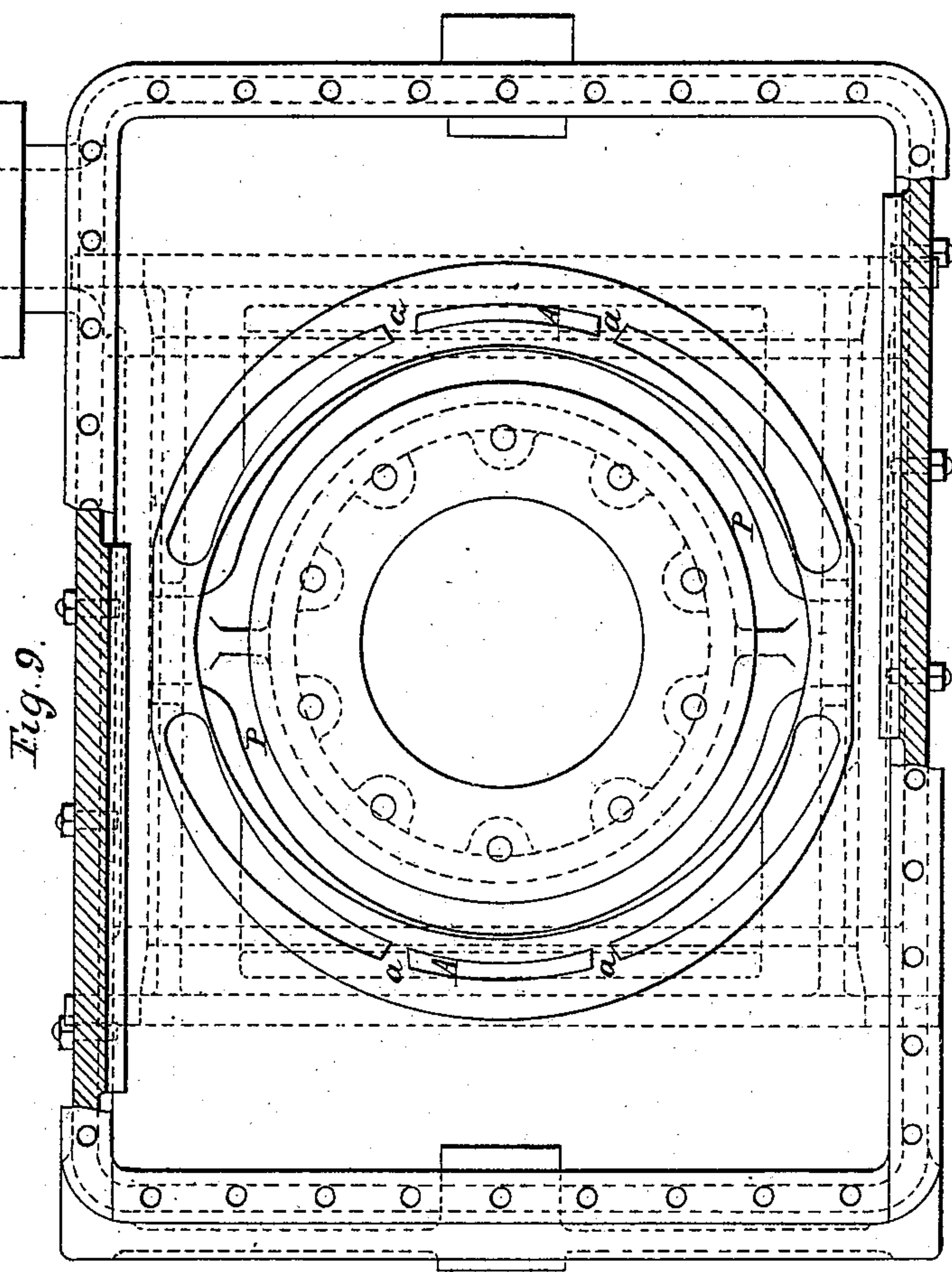
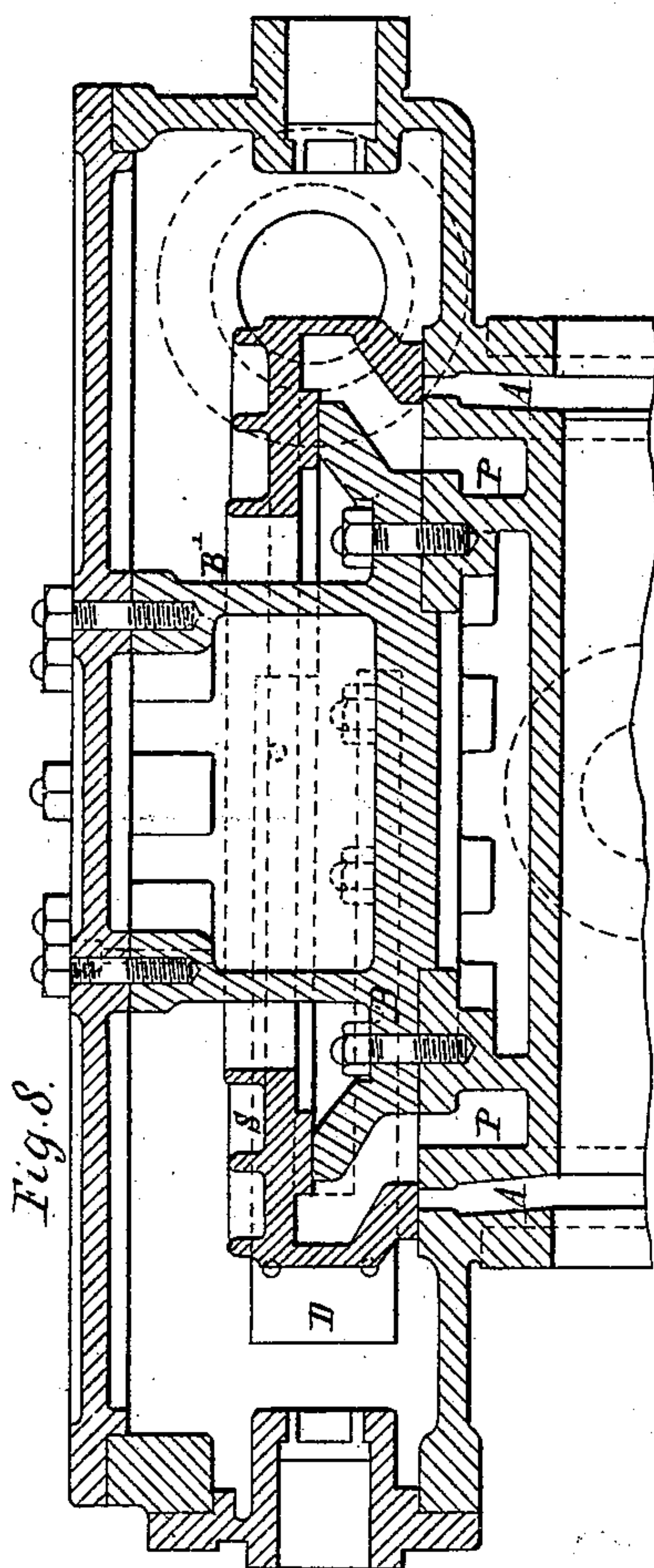
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3 Sheets—Sheet 3.

W. C. CHURCH.  
CIRCULAR SLIDE VALVE.

No. 316,236.

Patented Apr. 21, 1885.



Witnesses.

J. A. Rutherford  
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# UNITED STATES PATENT OFFICE.

WALTER CHARLES CHURCH, OF BRIXTON, COUNTY OF SURREY, ASSIGNOR  
TO THE WALTER C. CHURCH ENGINEERING COMPANY, (LIMITED,) OF  
LONDON, ENGLAND.

## CIRCULAR SLIDE-VALVE.

**SPECIFICATION** forming part of Letters Patent No. 316,236, dated April 21, 1885.

Application filed June 10, 1884. (No model.) Patented in England January 31, 1882, No. 476; in France July 26, 1882, No. 150,321; in Belgium July 29, 1882, No. 58,616; in Germany July 30, 1882, No. 21,544, and in Austria October 11, 1882, No. 1,896.

*To all whom it may concern:*

Be it known that I, WALTER CHARLES CHURCH, a citizen of England, residing at Brixton, in the county of Surrey, England, have invented a new and useful Improvement in Circular Slide-Valves and the Ports and Cases thereof, (for which I have obtained patents in Great Britain, No. 476, dated January 31, 1882; in France, dated July 26, 1882, No. 150,321; in Belgium, dated July 29, 1882, No. 58,616; in Germany, dated July 30, 1882, No. 21,544, and in Austria, dated October 11, 1882, No. 1,896,) of which the following is a specification.

In the specification accompanying my application for Letters Patent of even date herewith I describe means of causing circular slide-valves to turn round within the loop or eye of the slide-rod which moves them to and fro, so as to insure equality of wear of the rubbing-surfaces. My present invention relates to the construction of such circular slides and the ports and cases thereof, so as to relieve a great part of the pressure on them, to provide against their edges catching against the edges of the ports, and to prevent the deformation of the cylinders to which they are applied by the pressure within the slide-case, as I will explain, referring to the accompanying drawings.

Figure 1 is a longitudinal section, and Fig. 2 a transverse section, of part of a cylinder, with a circular slide and its case, according to my invention. Fig. 3 is a plan showing the ports governed by the circular slide. Fig. 4 is a plan of the central bearing-piece for relieving pressure on the slide. Fig. 5 is a plan, and Fig. 6 is a side view, of the slide and the loop or eye of the slide-rod which embraces it. Fig. 7 is a longitudinal section showing a modified arrangement for keeping the slide against the cylinder-face. Fig. 8 is a longitudinal section showing a modified form of tie for the case of a large slide. Fig. 9 is a plan showing the ports governed by the slide. Fig. 10 is a plan of the central bearing-piece for relieving pressure on the slide. Fig. 11 is a plan, and Fig. 12 a side view, of the slide and the loop or eye of the slide-rod.

In all the figures similar parts are marked by similar reference-letters.

A A are the crescent-shaped ports, over which the slide travels. In order to support the edges of the slide as they move over the ports, and to prevent them from deflecting, so as to catch against the edges of the ports, I introduce in each port a central rib, *a*, as shown in Fig. 3; or when the ports are of considerable size I introduce two such ribs *a a*, as shown in Fig. 9, or a greater number in very large ports.

In order to relieve the slide from a considerable part of the pressure forcing it against the cylinder-face, I provide a central bearing-piece, B, projecting up from the cylinder and spreading out in mushroom form, presenting on its upper face a surface, on which works a facing within the back of the slide S. The piece B has its upper surface made with a somewhat elliptically-shaped hollow, *b*, with two central side parts of the surface at *b' b'*, widened out, as shown in Figs. 4 and 10, to present greater surface where the rubbing is most constant, and thus insure greater uniformity of wear. The bearing-piece B is bolted to the side of the cylinder, engaging under it, as shown in Figs. 1, 2, and 7, the head of a strong bolt, C, which extends up through a central hole of the slide and through a hole in the cover of the slide-case, on which is screwed a nut, *c*. The bolt C acts as a tie, connecting the cover of the slide to the cylinder, so that the downward pressure within the slide-case, which tends to deform the cylinder by pressing it inward, is counteracted by the upward pressure on the cover of the slide-case.

Instead of a single bolt C, several such bolts may be employed; or the bearing-piece B may be made with a tubular part, B', extending upward and bolted to the cover of the slide-case, as shown in Fig. 8.

As described in the specification accompanying my application filed February 5, 1885, Serial No. 155,008, the eye or loop F of the slide-rod has mounted on it two diagonally-opposite rollers, E, which roll against straight faces D within the slide-case, and bear against



the periphery of the slide, causing it to turn a little round, always in the same direction at every reciprocation. As shown in Figs. 1, 2, and 8, I form in the surfaces D grooves *d*, into which enter the sides of the loop or eye F, portions of which are made straight, so that the loop or eye being thus guided is prevented from exerting any twisting action on the slide in case external parts of the slide-rod R should be subjected to torsive strain. As shown in Figs. 5 and 6, I connect the pins of the rollers E E by a spring-guard, G, which presses on the middle of the back of the slide, keeping it steadily bearing against the cylinder-face. This guard is made with a slotted hole, *g*, to clear bolt C as the slide reciprocates.

As shown in Fig. 7, instead of the spring-guard G, a disk, G', is fitted on the bolt C, this disk being pressed down by a helical spring adjustable by a nut, C'. As shown in Figs. 11 and 12, the spring-guard G is bolted to the loop or eye F where the rods R join it, and is made with an elongated hole, *g*, sufficiently large to clear the tubular tie B'.

Having thus described the nature of my invention and the best means I know of carrying it into practical operation, I hereby de-

clare that I make no general claim to circular slides made to rotate as they reciprocate governing crescent-shaped ports; nor do I claim, generally, a projecting bearing-piece for supporting the backs of such slides; but

I claim in respect to such slides and the ports and cases thereof—

1. The elliptically-shaped hollow *b*, with widened parts *b' b'*, formed in the bearing-piece B, substantially as described.

2. The tie-bolt C, connecting the stationary cover of the slide-case to the body of the cylinder, substantially as and for the purpose set forth.

3. The slotted disk G', in combination with the helical spring and the adjusting-nut C' on the central tie-bolt, C, for the purpose of holding the slide down on its facing, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 6th day of May, A. D. 1884.

W. C. CHURCH.

Witnesses:

JNO. P. M. MILLARD,  
J. WATT.