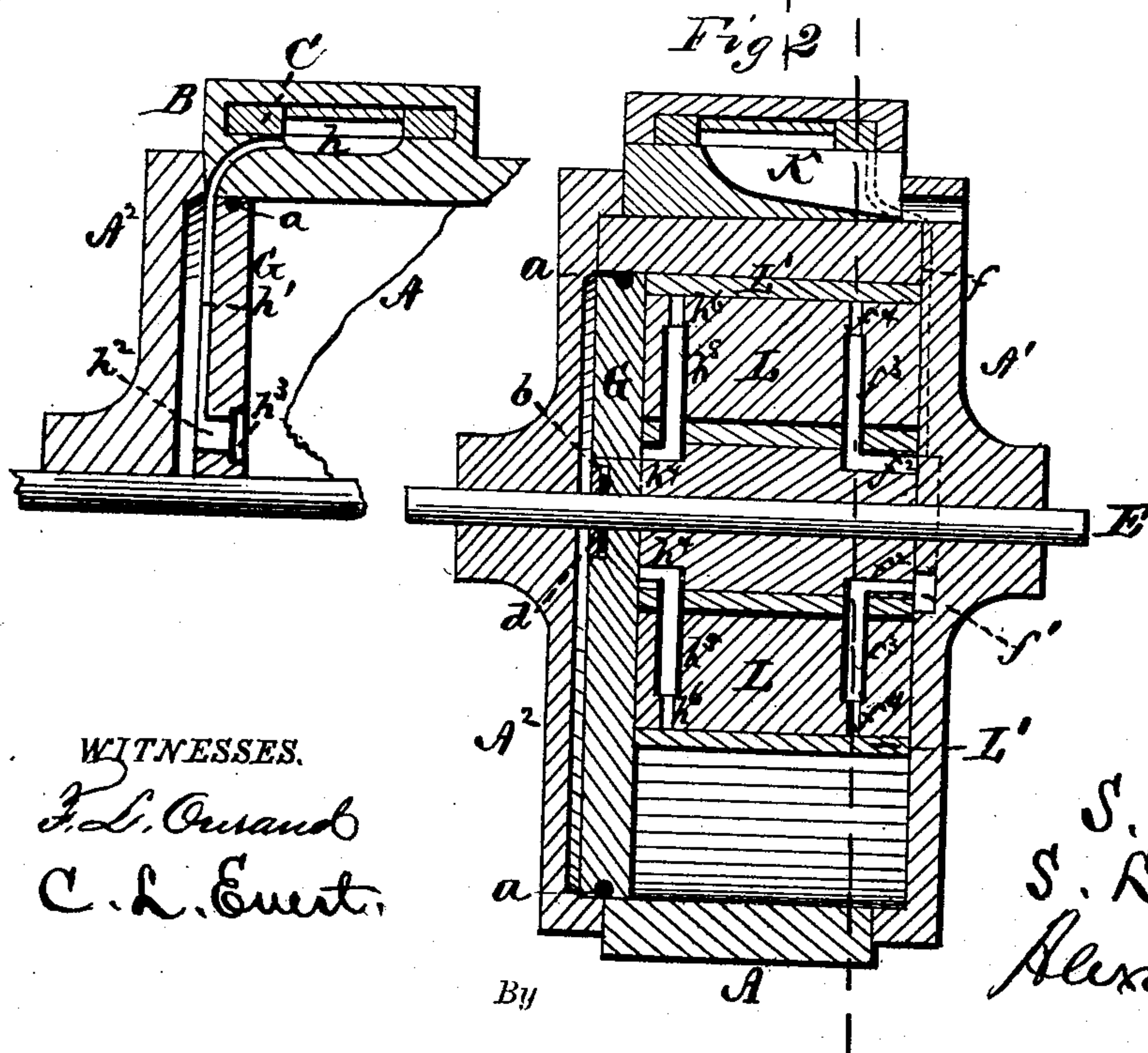
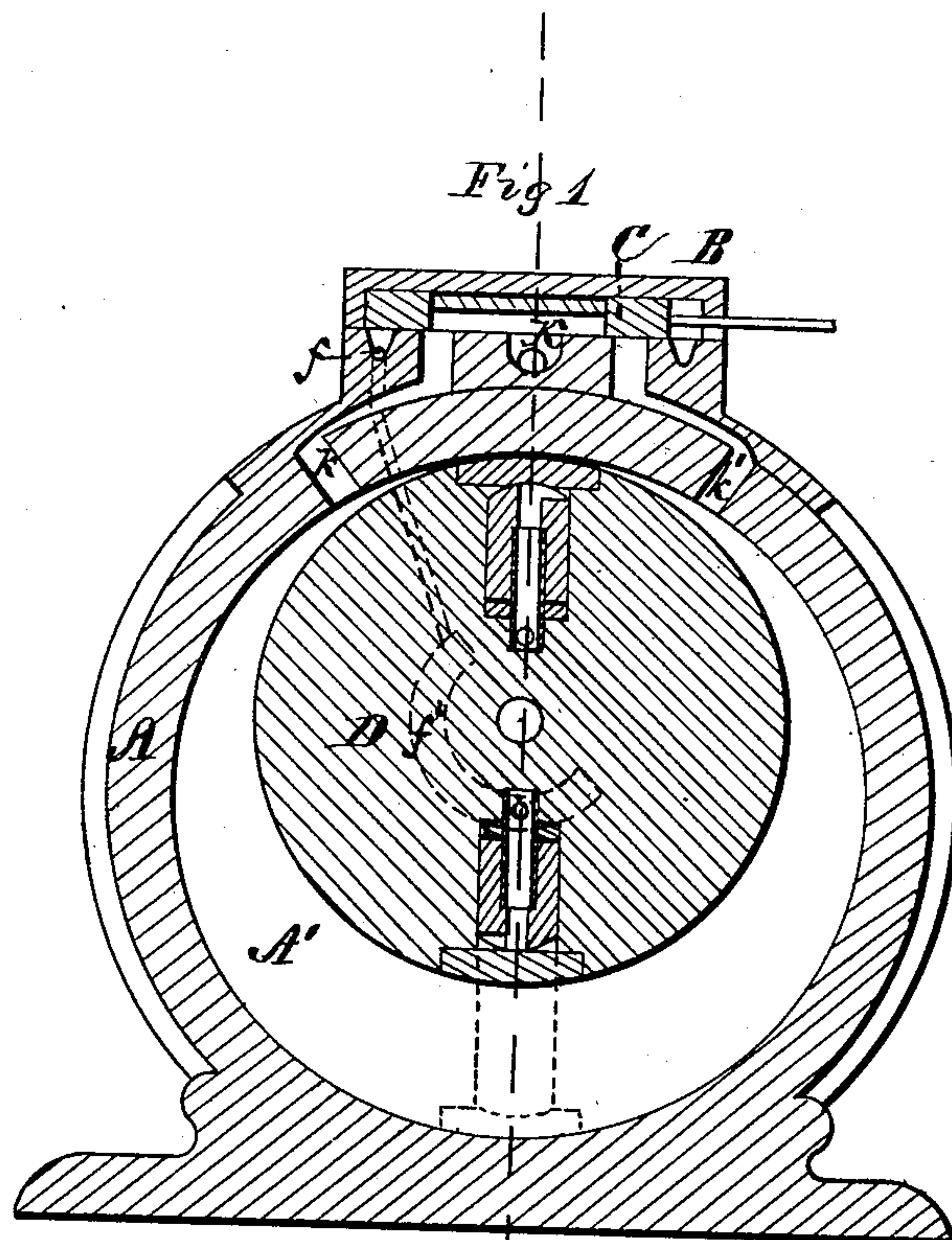


**S. GIBSON & S. L. CHENEY.**  
**Rotary-Engines.**

No. 155,078.

Patented Sept. 15, 1874.



WITNESSES.  
*F. L. Ormand*  
*C. L. Ewert.*

INVENTOR  
*S. Gibson*  
*S. L. Cheney.*  
*Alexander Macator.*  
 Attorneys.

S. GIBSON & S. L. CHENEY.  
Rotary-Engines.

No. 155,078.

Patented Sept. 15, 1874.

Fig 3

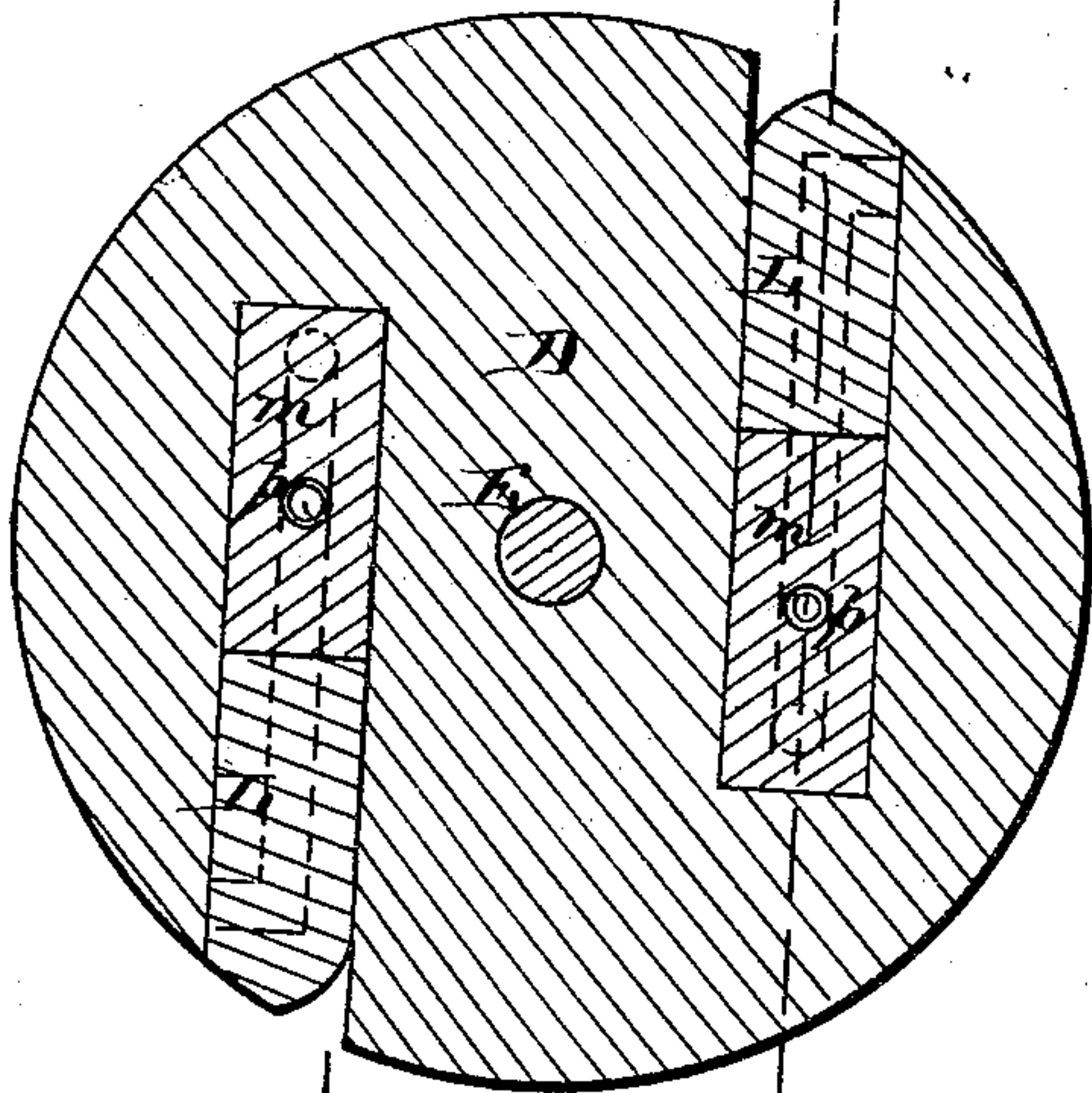


Fig 4

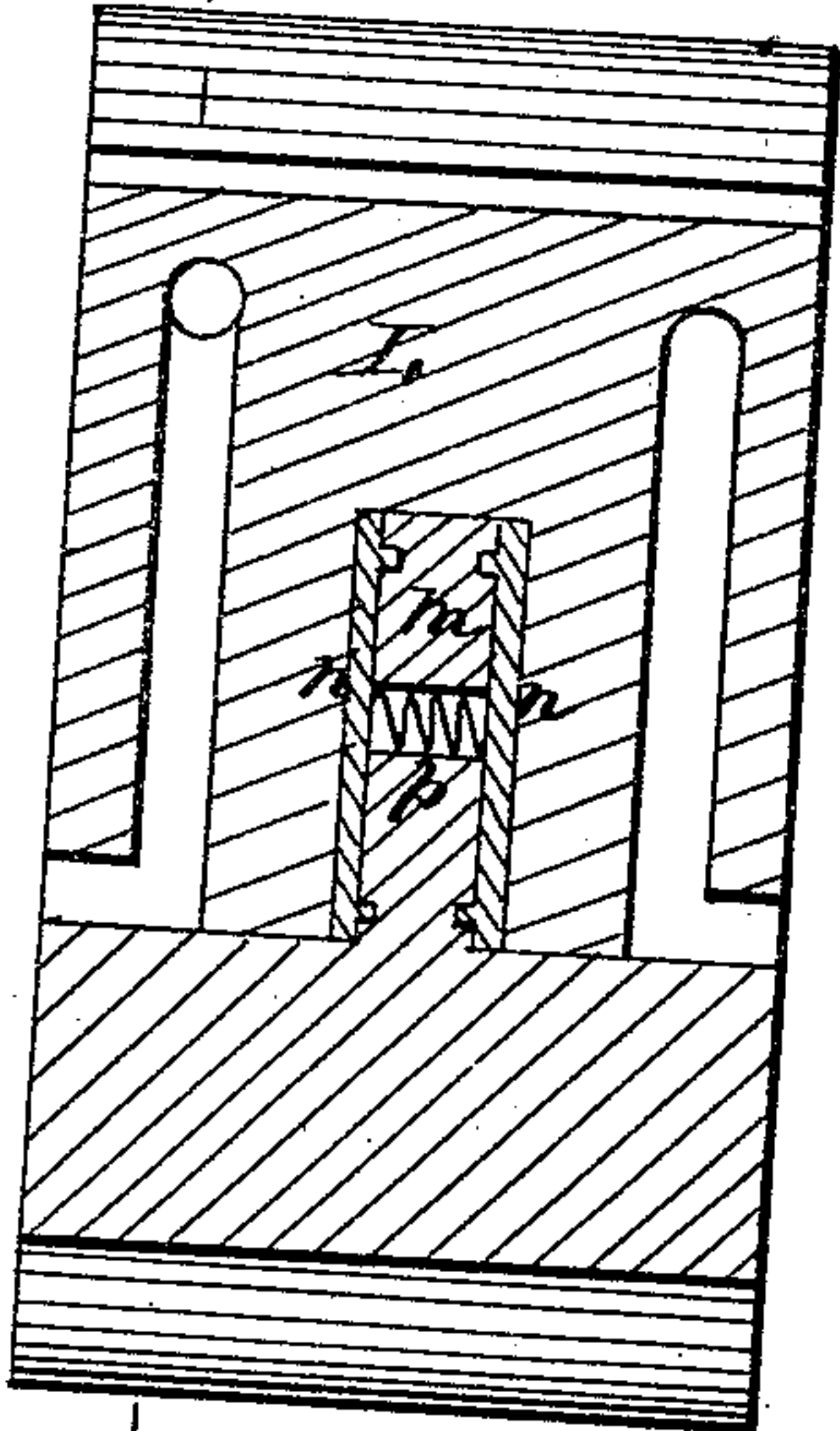
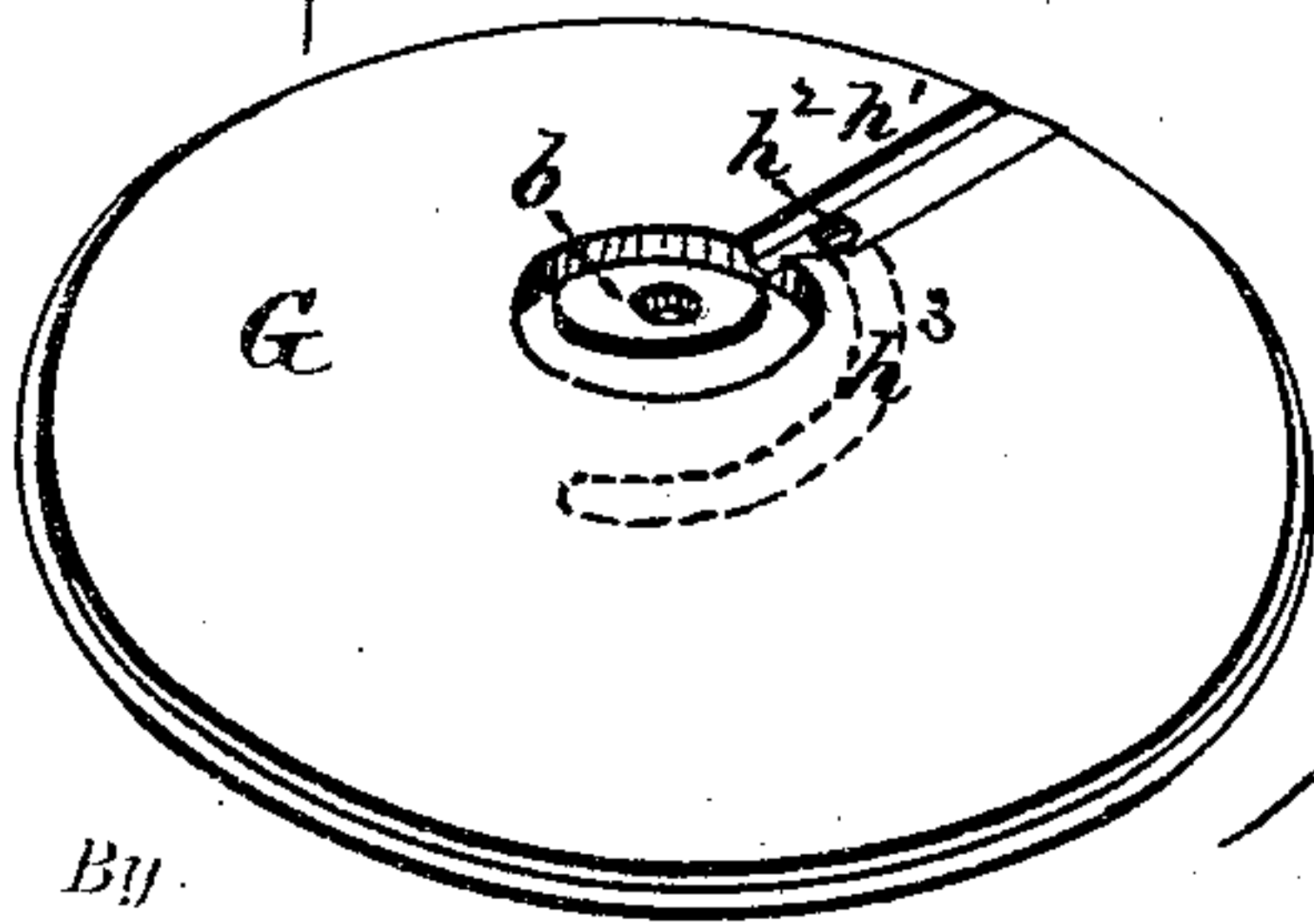


Fig 5



WITNESSES.  
*J. L. Curran*  
*A. L. Ewert.*

INVENTOR  
*S. Gibson*  
*S. L. Cheney.*  
*Alexander Macdonald*  
Attorneys.



# UNITED STATES PATENT OFFICE.

SAMUEL GIBSON, OF SHREWSBURY, AND SOLON L. CHENEY, OF LANCASTER, PENNSYLVANIA; SAID GIBSON ASSIGNOR TO SAID CHENEY.

## IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. **155,078**, dated September 15, 1874; application filed March 16, 1874.

*To all whom it may concern:*

Be it known that we, SAMUEL GIBSON, of Shrewsbury, York county, and SOLON L. CHENEY, of Lancaster, in the county of Lancaster and in the State of Pennsylvania, have invented certain new and useful Improvements in Rotary Engines; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon, making a part of this specification.

Our invention relates to that class of rotary engines in which a solid wheel provided with movable pistons revolves eccentrically within a stationary casing; and the nature of our invention consists in the construction and arrangement of the pistons with the steam-passages through the same and through the wheel. It also consists in the manner of packing the wheel and shaft; also, in the general construction and arrangement of parts, as will be hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a longitudinal section of our engine through the line *x x* of Fig. 2. Fig. 2 is a transverse section of the same through the line *y y*, Fig. 1. Figs. 3 and 4 are sections, showing a modification in the construction of the wheel and pistons; and Fig. 5 is a perspective view of the interior packing-plate.

A represents a circular casing or cylinder of any suitable dimensions, provided, on its upper side, with a steam-chest, B, having a slide-valve, C. Within the cylinder A is eccentrically placed a solid wheel, D, mounted upon a shaft, E, which passes through the heads A<sup>1</sup> A<sup>2</sup> of the cylinder. Between the cylinder-head A<sup>2</sup> and the wheel D is placed a packing-plate, G, which has a circumferential groove in its edge for the reception of cotton or other suitable packing *a*, to make the joint between said plate and the inner circumference of the cylinder perfectly steam-tight. On the outer side of the plate G, around the shaft E, is made an annular recess, in which is placed a packing-ring, *b*, and an annular plate, *d*, covering said packing-ring in the recess, making the shaft steam-tight where it passes through the

plate G. The plate is to be adjusted by means of suitable set-screws to compensate for and take up any wear of the wheel D. From the steam-chest into the cylinder are two steam-inlet passages, *f* and *h*. The passage *f* passes down through the head A<sup>1</sup>, and into a semi-circular channel, *f*<sup>1</sup>, made in the inner side thereof, concentric with the shaft E. The passage *h* goes through the cylinder, into a channel, *h*<sup>1</sup>, on the outer side of the packing-plate G, from which it passes, through a hole, *h*<sup>2</sup>, into a semicircular channel, *h*<sup>3</sup>, on the inside of said plate, this channel *h*<sup>3</sup> being also concentric with the shaft E. *k k'* are the exhaust-ports from the cylinder to the main exhaust K in the steam-chest. The wheel D has two slots cut radially in opposite sides from end to end, and a suitable distance from the circumference inward toward the center, and in each slot is inserted a piston, L, which fills the slot. In the end of the wheel D, against the head A<sup>1</sup> of the cylinder, are two passages, *f*<sup>2</sup> *f*<sup>2</sup>, which communicate with two radiating tubes, *f*<sup>3</sup> *f*<sup>3</sup>, inserted in the wheel, and extending out into the pistons L L. These tubes communicate with passages *f*<sup>4</sup> in the pistons, which lead out at one side of the piston. In the opposite end of the wheel are two similar passages, *h*<sup>4</sup> *h*<sup>4</sup>, and tubes *h*<sup>5</sup> *h*<sup>5</sup>, communicating with passages *h*<sup>6</sup> *h*<sup>6</sup> in the pistons. These passages lead out at the opposite sides of the pistons from where the passages *f*<sup>4</sup> *f*<sup>4</sup> terminate. Upon the outer end of each piston L is placed a rocking cap, L', which fits in an enlargement (made in the surface of the wheel) of the slot for the piston. The sliding valve C in the steam-chest B is so constructed that the inlet-port *h* and exhaust-port *k* will be open at the same time, and the ports *f* and *k'* closed, and vice versa. When the steam-inlet port *f* is open the steam passes through the same into channel *f*<sup>1</sup>, and through one of the passages *f*<sup>2</sup>, tube *f*<sup>3</sup>, and passage *f*<sup>4</sup>, out at one side of that piston L. The steam forces the piston outward against the inner circumference of the cylinder, so as to form an abutment, against which the steam acts to revolve the wheel D in one direction, and as the wheel turns the piston is pushed inward again by the gradually-decreasing space be-



tween the wheel and cylinder. Shortly after this inward movement of this piston commences its passage  $f^2$  gets away from the channel  $f^1$ , shutting off the steam from said piston, and at the same time the other passage  $f^2$  comes in or against the channel  $f^1$ , and allows the steam to act on and through the other piston, and so on alternately, the steam being exhausted through the port  $k'$ .

By moving the valve C, so as to close the steam-port  $f$  and open the port  $h$ , the steam will pass through the passages connected with said steam-port, and out on the opposite sides of the piston, thereby reversing the motion of the engine.

In Figs. 3 and 4 we have shown a modification of the construction of the pistons. In this case there is a central bridge,  $m$ , in the bottom of the slot, with a packing-plate,  $n$ , on each side, and the inner end of the piston is forked to fit over said bridge and packing-plates, and these plates pressed outward by means of a spring,  $p$ . In this case no tubes are used, but merely passages through the pistons. In one case the tubes, and in the other case the bridges, act as guides for the movement out and in of the pistons.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In combination with the shaft E and wheel D, the laterally-adjustable circular packing-ring G, provided with exterior passage  $h^1$ , aperture  $h^2$ , and interior channel  $h^3$ , all substantially as and for the purposes herein set forth.

2. The arrangement of the inlet-ports  $f$  and  $h$  with the various passages, as described, through each end of the cylinder to the pistons, in combination with the exhaust-ports  $k$   $k'$  and the sliding valve C, for the purpose of reversing the engine by the simple movement of the valve, substantially as herein set forth.

3. The combination of the slotted wheel D, with tubes  $f^3$  and  $h^5$ , with the pistons L L, provided with rocking shoes, and with passages  $f^4$  and  $h^6$ , said pistons being disconnected from the wheel, and sliding out and in on the tubes, which act as guides therefor, substantially as herein set forth.

In testimony that we claim the foregoing we have hereunto set our hands this 5th day of March, 1874.

SAML. GIBSON.

SOLON L. CHENEY.

Witnesses:

J. TYLER POWELL,  
W. A. BOSS.