

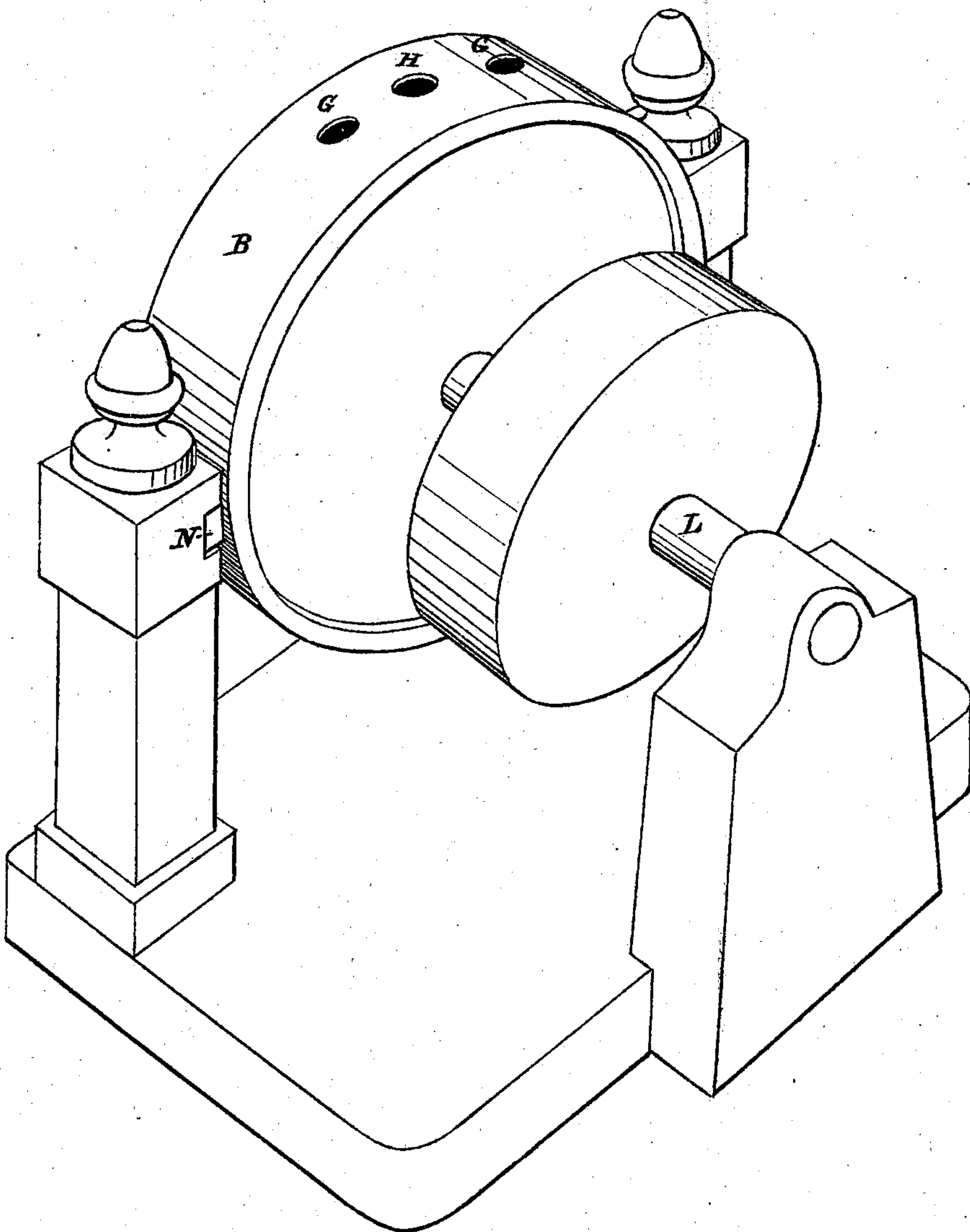
WILLIAM HALL.

Improvement in Rotary Engines.

No. 124,572.

Patented March 12, 1872.

*Fig. 1.*



*Witnesses:*

*James H. Maloney*  
*Alex. M. Johnston*

*Inventor:*

*Wm. Hall.*

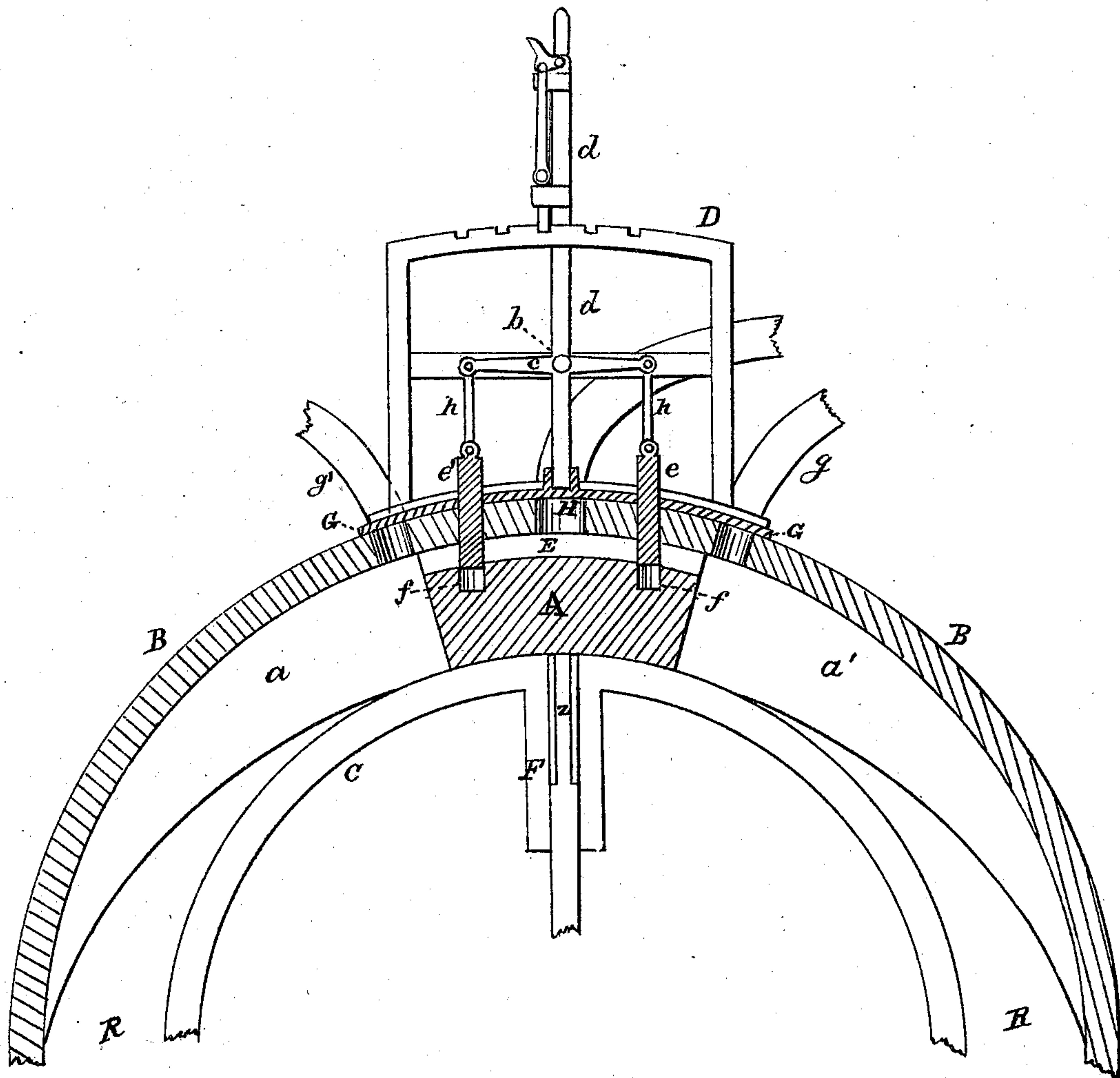
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Fig. 2



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Fig. 3.

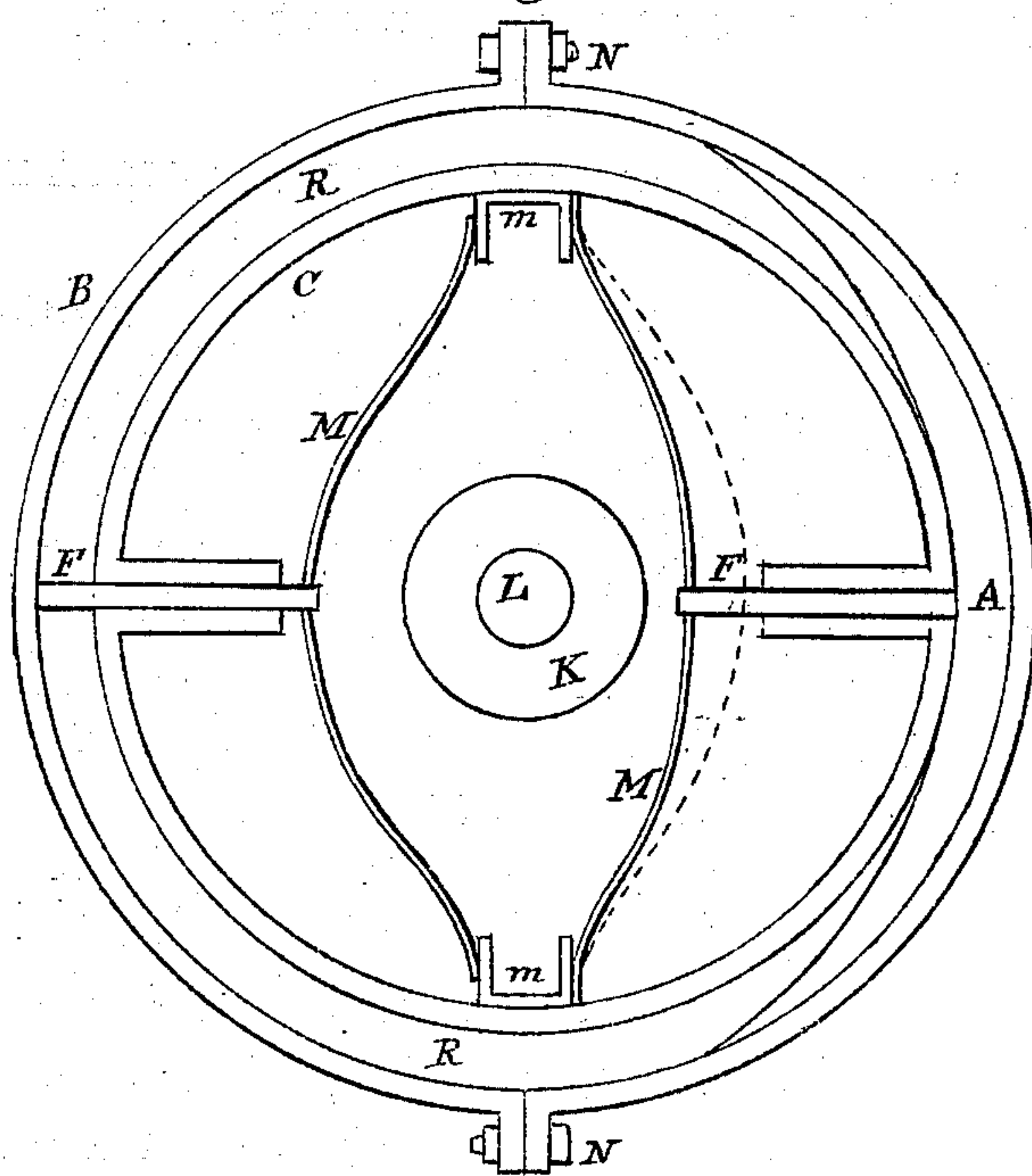


Fig. 4.

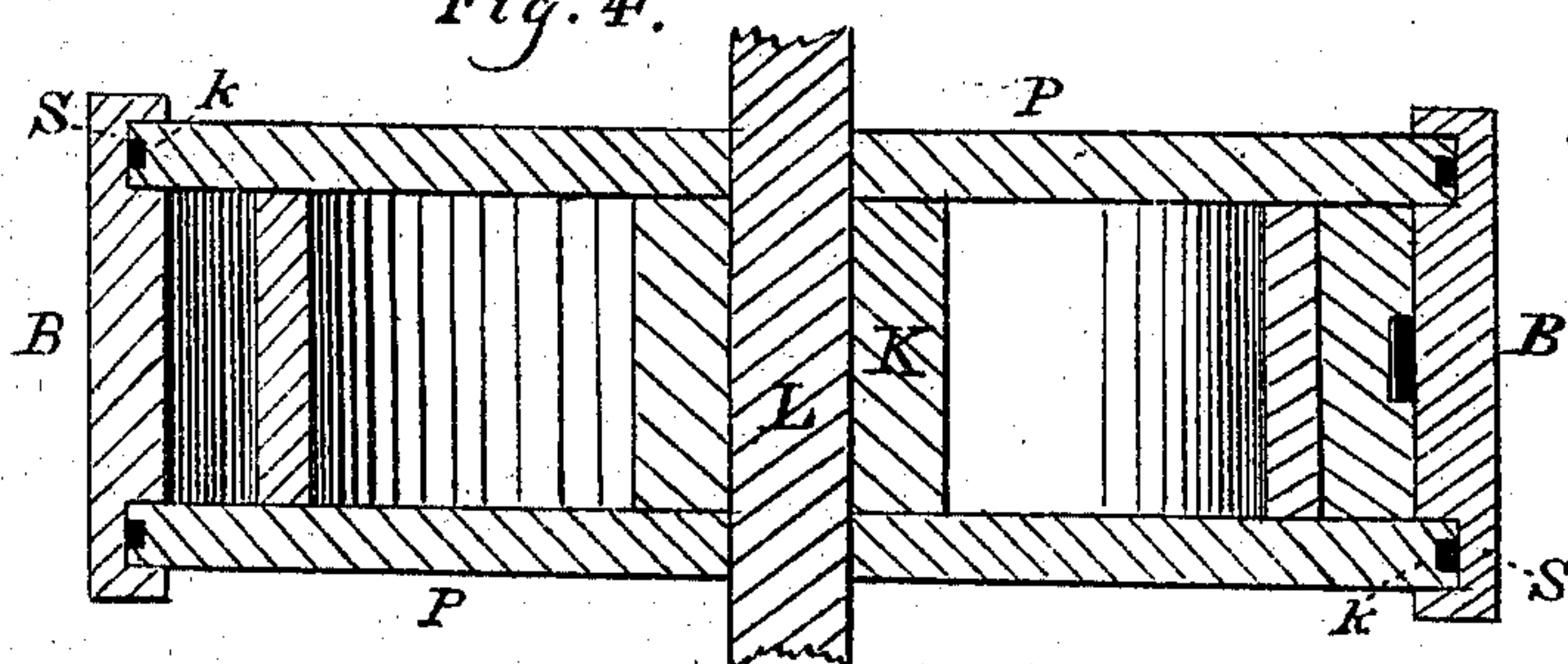
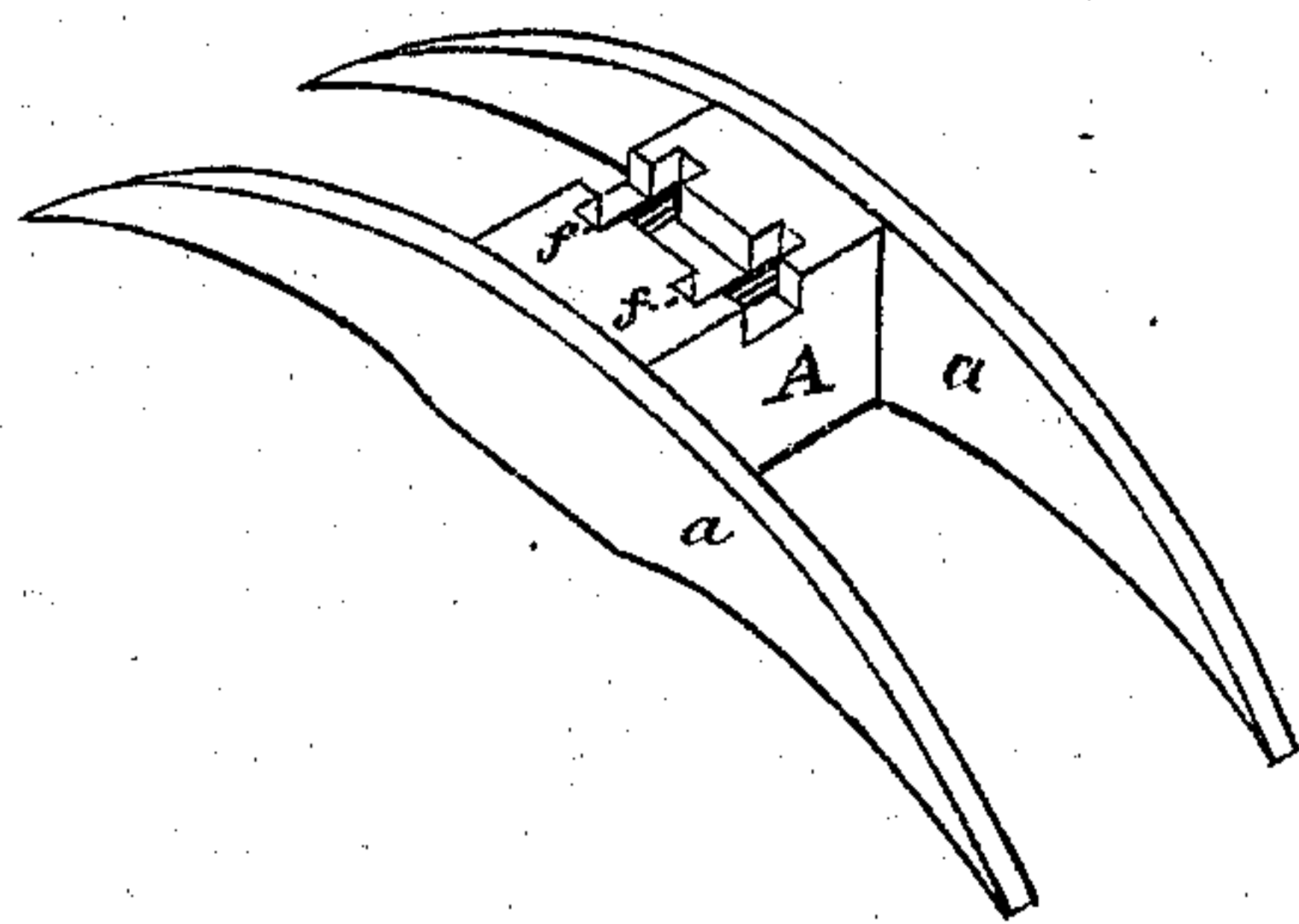


Fig. 5.



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# UNITED STATES PATENT OFFICE.

WILLIAM HALL, OF FREEPORT, ILLINOIS.

## IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. 124,572, dated March 12, 1872.

Specification describing certain Improved Motor and Meter, invented by WILLIAM HALL, of Freeport, county of Stephenson and State of Illinois.

My invention, I may state in general terms, relates to the construction of a meter and motor or engine, which is actuated by either liquids or aeriform bodies, and which imparts direct rotary motion to a shaft.

The first part of my invention relates to the construction of the box or chest which contains and confines the motive power by which the rotary action is given, and the devices by means of which it produces such action. This box consists of two disk-formed plates fixed parallel to each other upon a shaft passed through their centers, and a circular band provided with a groove on each side of its interior periphery for the reception of the peripheries of the two circular plates mentioned, which are to revolve with said shaft. One of these circular plates is provided with a circular plate extending at right angles to its own face across the interior of the box, so as to touch the inner face of the other plate, so as to inclose an annular space between the two circular plates and the inner and outer bands, and this space is to be occupied by the motive power, while that between the inner band and the shaft is to be occupied by the springs and hub hereinafter described. This box, and especially the annular space mentioned, is rendered water and air tight by packing, so as to prevent waste of the power, which may be steam, compressed air, or any of the fluids.

The second part of my invention relates to the arrangement of springs over the shaft in the interior of the inner band, and to the construction of one or more sliding piston-heads, so that they will slide back and forth in grooves in that band, and be held by the springs with a certain amount of force, with their outer ends against the inner surface of the outer band, but will yield endwise in the direction of the shaft in order to pass the cylinder-head hereinafter described, and, after passing it, again resume its proper position in contact with the inner surface of the outer band; the object of this construction being that the motive power, when once admitted into the annular space, shall not escape, except by impelling the

whole device, including the shaft, around, until it finds the exit provided for it. The shaft revolves, of course, in proper bearings provided for it.

The third part of my invention relates to the construction of a cylinder-head, which is fastened to the inner surface of the outer band before described, directly over the axle, and provided with inlet and exit openings for the force employed, and also with two crescent-shaped guide-plates to conduct the outer ends of the sliding piston-heads under and beyond its under surface without the jumping and jarring motion which would otherwise take place; and this cylinder-head, in combination with certain levers, valves, and openings, enables the operator to reverse the motion of the engine at will, and to do this instantaneously, as will be more fully described and shown hereinafter.

In the accompanying drawing, Figure 1 represents a perspective view of an engine embracing my improvements in its construction, without the devices which belong on the top thereof. Fig. 2 represents a part of a vertical central transverse section of the upper portion of the complete engine. Fig. 3 represents a vertical cross-section of the body of the engine, showing the two cylinder-plates, the sliding piston-heads, shaft, hub, &c. Fig. 4 represents a central cross-section of the box, hub, and shaft; and Fig. 5 represents a detail perspective view of the cylinder-head and its crescent-shaped guide-plates.

B is the outer cylinder-plate, composed of two parts, flanged and bolted together at N N. C is the inner cylinder-plate, and R the annular space between these two plates, and P P the side plates of the cylinder, and S S S S are the grooves in the plate B for the peripheries of these side plates. *k k k k* are grooves in the peripheries of the side plates P P for suitable elastic packing to render their joints air and water tight. K is the hub, and L the shaft. The inner cylinder-plate C is fixed upon the face of one of the side plates P P, and the whole structure within the outer plate B and the cylinder-head A and its guide-plates *a a* revolves with the shaft L in its bearings in the frame upon which the outer plate B of the cylinder is fastened. M M are springs,



seated as shown, and F F are the sliding piston-heads in position on their wings or grooves in the inside cylinder-plate C. These piston-heads should be provided with suitable elastic packing upon their sides and edges to prevent the escape of the force employed. The cylinder-head is shown in Fig. 2 with its guide-plates *a a*, but a detail view showing all its parts is shown in Fig. 5. E is the reception-chamber for the force, and H is the inlet for the same; and *f f* are the sockets for the gates or valves *e e*. *e* is a cross-lever, by which they are worked through the connecting-rods *h h*. The vertical lever *d* is pivoted at *b*, and its upper end slides back and forth against the notched cross-piece of the lever-frame D. G is a slide valve, to open and close the exhaust or discharge pipes *g g*. It is fastened upon the lower end of the lever *d*, as shown, and slides upon the upper surface of plate B. The lever *d*, with its coacting parts, is not my invention; but it is in common use upon locomotive steam-engines, except the lower end of lever that moves the valve-plate G.

Having reference now to Fig. 2, it will be obvious that upon forcing the upper end of the lever to the right the slide-valve G will be moved to the left, and close exhaust *g'*, and gate *e'* will be raised out of its socket, and the forcing fluid will rush under it into the annular space R, and thence against the nearest sliding piston-head, and set the shaft in motion from right to left, and, simultaneously with this action, the sliding valve G opens exhaust *g* on the right, and closes the fluid-inlet

on the same side. But, on the other hand, by forcing the lever *d* to the left, the exhaust *g* will be closed, and the fluid admitted by the gate *e*, and the action of the engine will be reversed, so as to revolve from the left to the right. When, however, the lever *d* stands vertically all the parts are closed and the engine is at rest.

#### Claims.

What I claim as my invention is—

1. The grooved outer plate B, the side plates P P, and the inner plate C, composing the annular cylinder, constructed substantially as and for the purpose described.

2. The combination of the springs M M and seats *m m* inside of the cylinder-plate C and the sliding piston-heads F F, constructed and arranged substantially as and for the purpose described.

3. The combination of the sliding valve-plate G, the lever *d*, the cross-lever *e*, connecting-rods *h h*, and gates *e' e*, constructed and operated substantially in the manner and for the purposes set forth and described.

4. In combination with the devices composing the above clause of claim number three, the cylinder-head A, having the crescent-shaped guide-plates *a a*, arranged and constructed substantially as and for the purposes described and set forth.

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Witnesses:

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