

C. H. HUTCHINSON.
No. 119,769.

Improvement in Balance Slide Valves.
Patented Oct. 10, 1871.

Fig. 2.

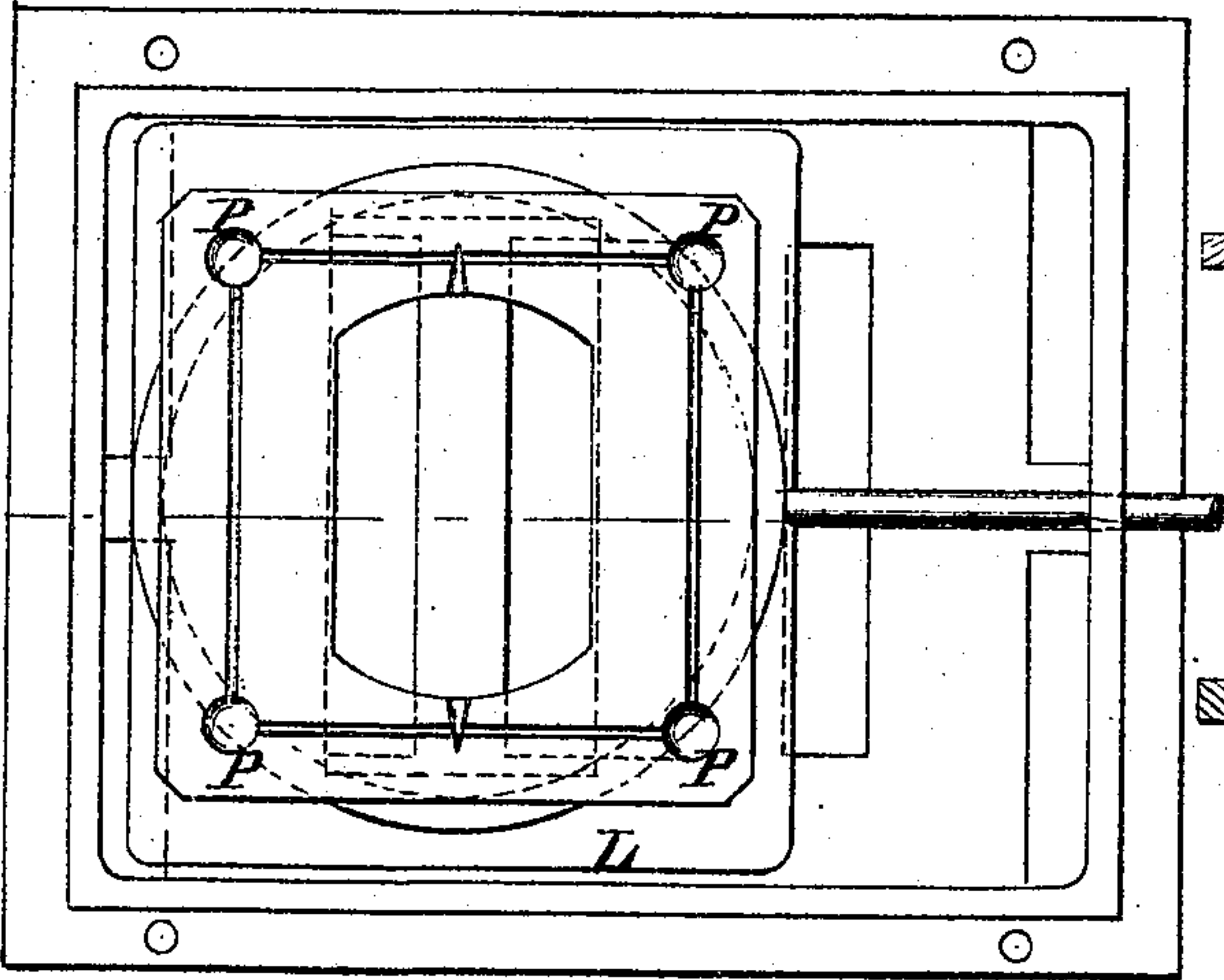


Fig. 1.

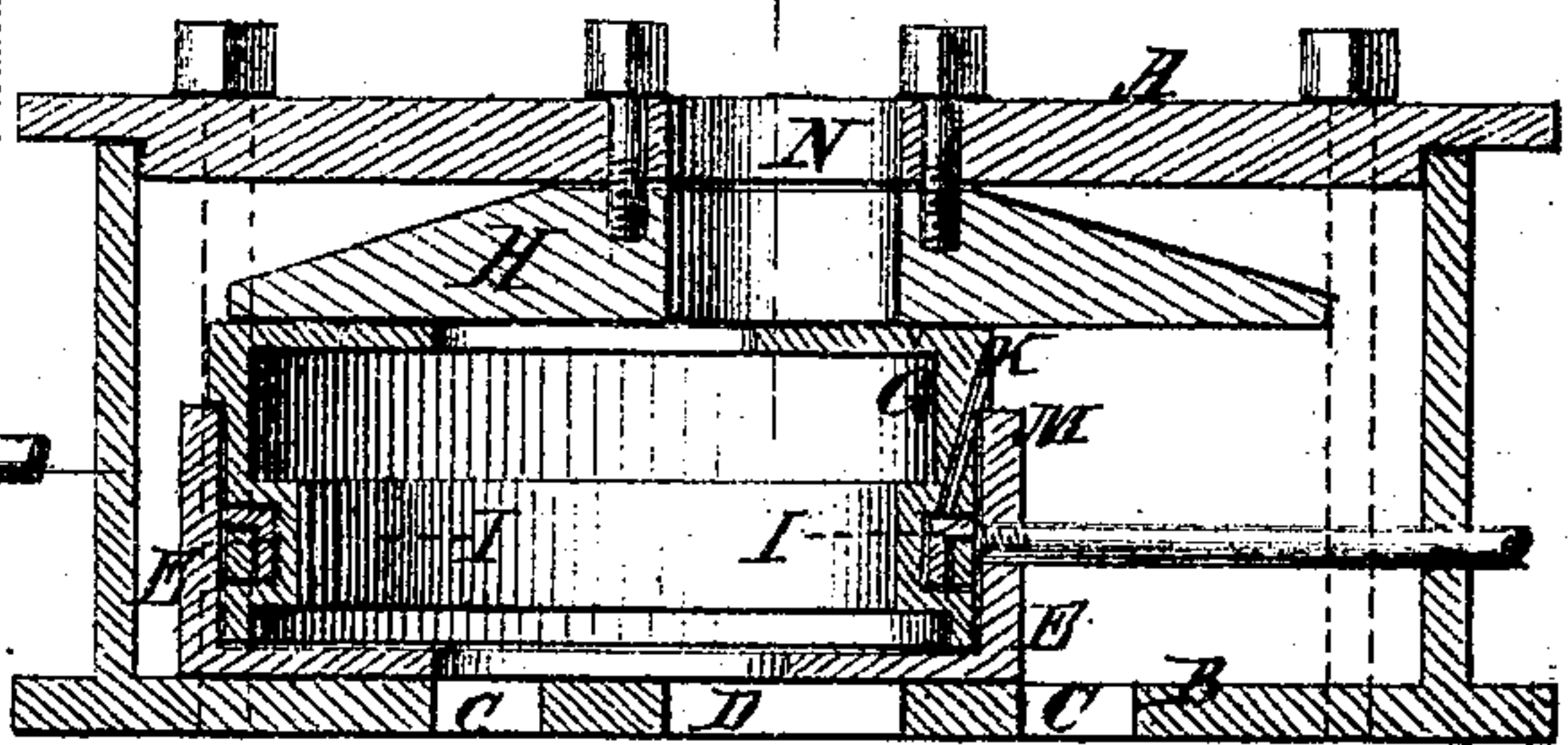


Fig. 3.



Fig. 5.

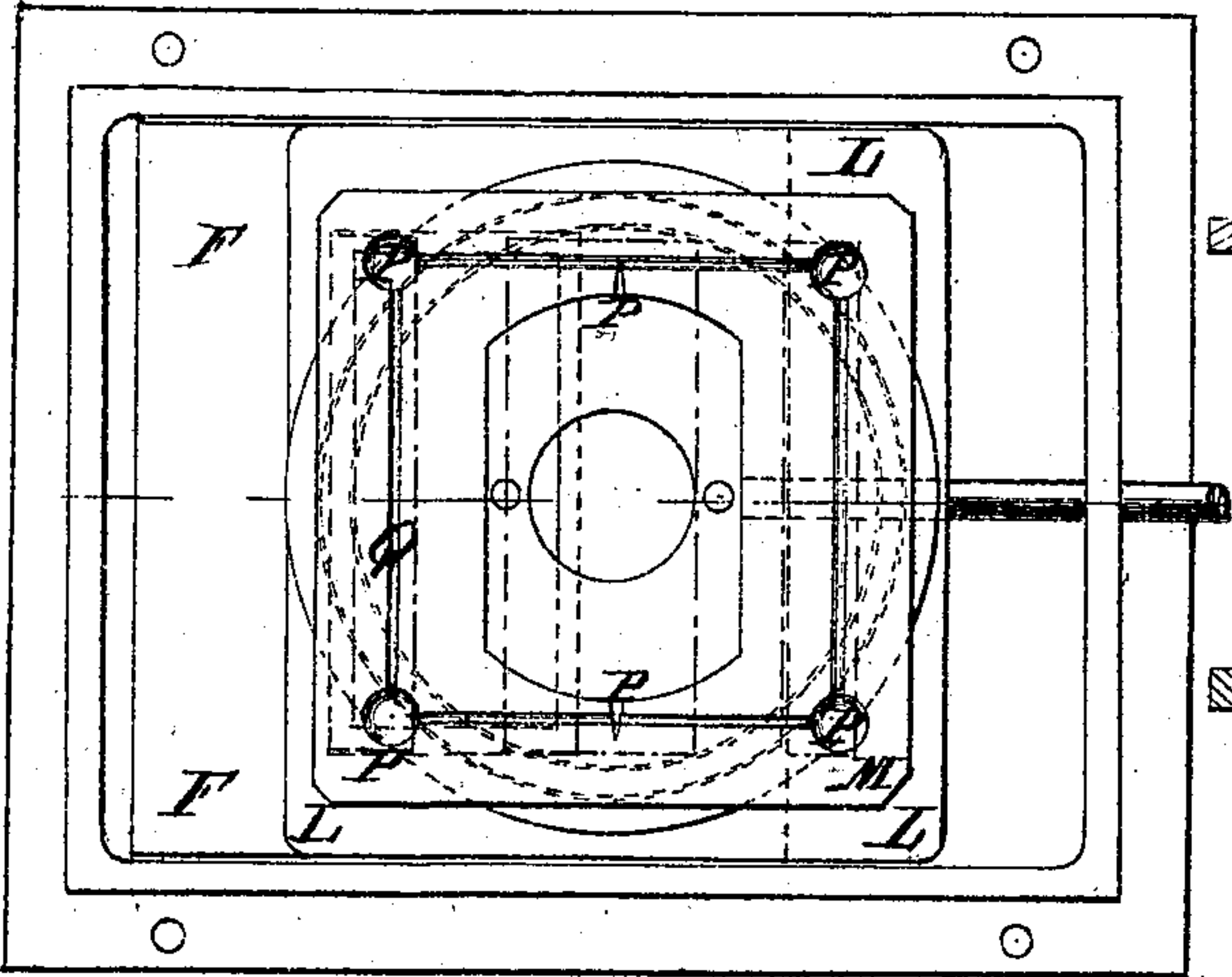


Fig. 4.

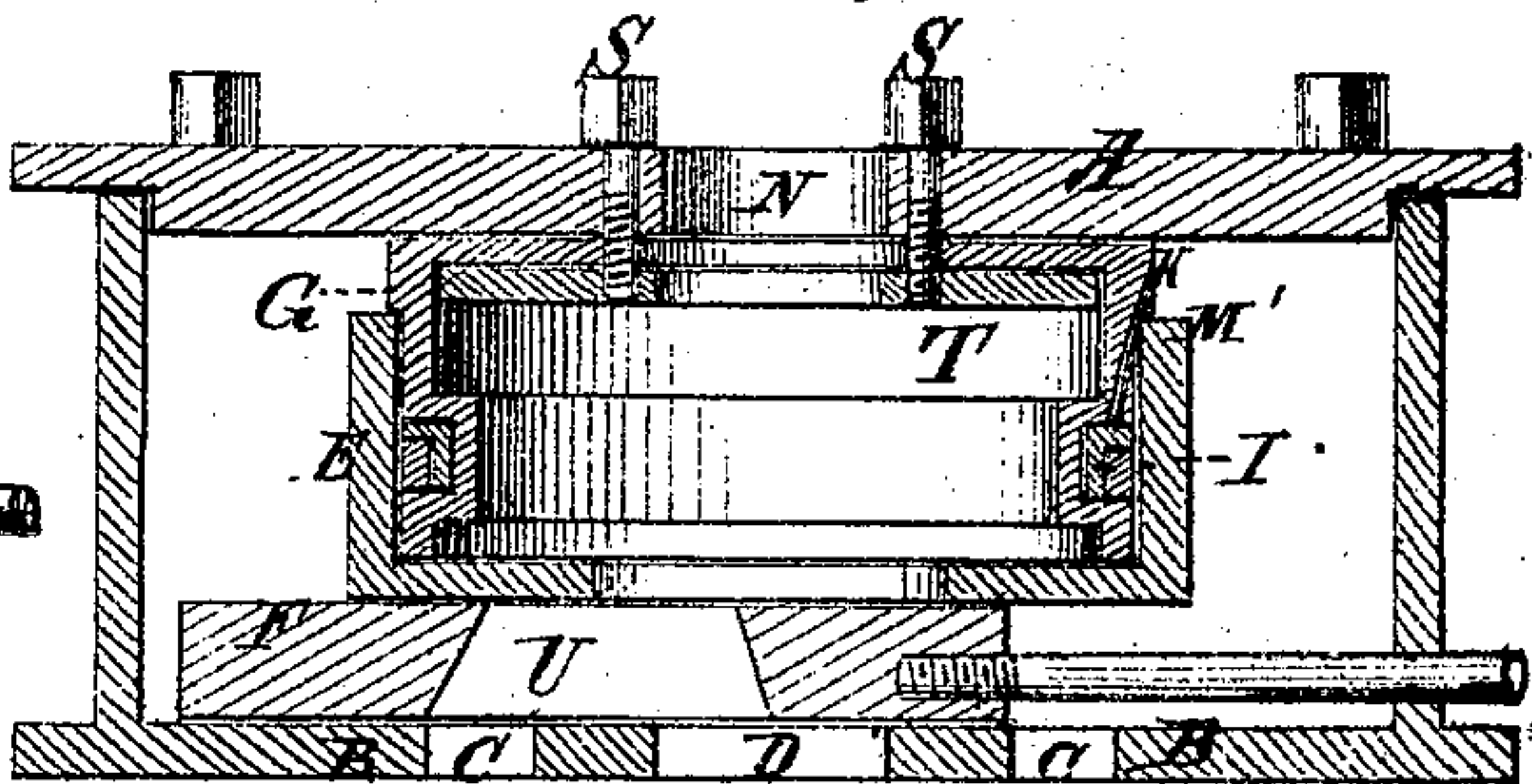


Fig. 6.

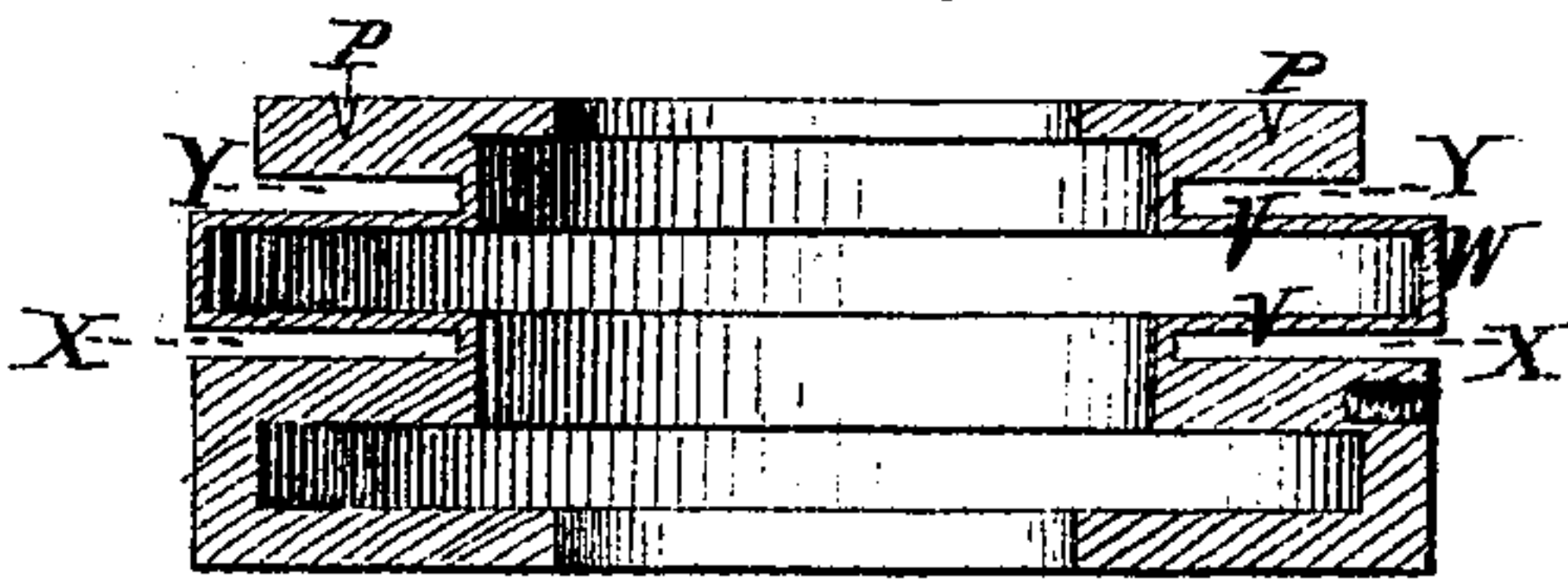
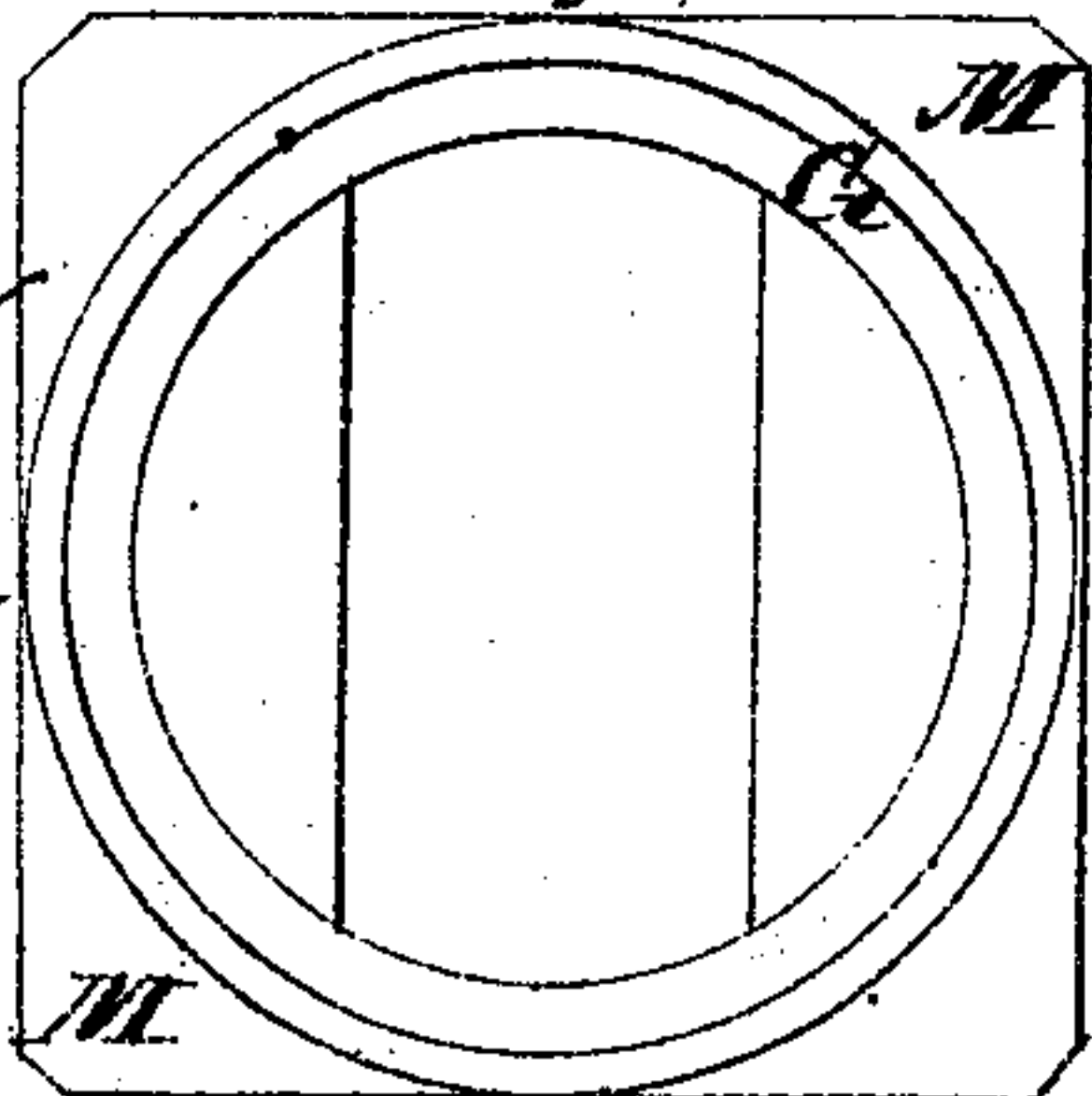


Fig. 7.



Witnesses:

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119,769

UNITED STATES PATENT OFFICE.

CHARLES H. HUTCHINSON, OF CONCORD, NEW HAMPSHIRE.

IMPROVEMENT IN BALANCED SLIDE-VALVES.

Specification forming part of Letters Patent No. 119,769, dated October 10, 1871.

To all whom it may concern:

Be it known that I, CHARLES H. HUTCHINSON, of Concord, in the county of Merrimack and State of New Hampshire, have invented a new and Improved Balanced Slide-Valve; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification.

My invention consists in the improvement of slide-valves, as hereinafter fully described and subsequently pointed out in the claim.

Figure 1 is a longitudinal sectional elevation of improved balanced-valve arrangement as applied when the valve and balancing devices are to reciprocate together. Fig. 2 is a plan of Fig. 1. Fig. 3 is a section of the plate employed for counteracting the warping and springing of the top of the valve-chest. Fig. 4 is a section, showing the arrangement when the balancing devices do not reciprocate with the valve. Fig. 5 is a plan view of Fig. 4. Fig. 6 is a section, showing the manner in which a spring may be used for connecting the balancing-plates instead of the cylinder-and-piston arrangement, and for use in connection with steam-pressure for maintaining steam-tight bearings at the top and bottom of the steam-chest, while limiting the down-pressure of the valve. Fig. 7 is a plan view of the bottom of the upper plate and its cylinder.

Similar letters of reference indicate corresponding parts.

A is the top of the steam-chest, and B the bottom or valve-seat. C represents the live-steam ports, and D the common exhaust-port. This may be used with my improved valve when not exhausting through the top, but is not needed when so exhausting, which I propose to do as a general thing. E is a vertical cylinder, which in one arrangement may be the valve also, and slide on the valve-seat, as indicated in Fig. 1; or, it being stationary, may rest on a valve, F, sliding under it, as in Fig. 4. G is another cylinder fitting into cylinder E, with its face bearing against the under side of the plate H, attached to the under side of the top A of the steam-chest, and provided with ordinary piston-packing I in the part working within cylinder E, to be forced out against the wall of cylinder E by steam let in behind it through a passage, K; or it may be any

approved packing. Both of these cylinders have a rectangular plate or flange at the end fitting against the wall of the steam-chest, as indicated in Figs. 2 and 5, L being the flange of cylinder E and M the flange of cylinder G. The steam-pressure on these flanges is the measure of the force with which they are confined to the seats, and the action is governed thereby, except in the case of the lower cylinder, which also receives pressure on its upper end at M'. The balance of the area of the valve is not subject to pressure, by reason of the steam being excluded from it by the cylinder G and its plate. The pressure of the valve on the valve-seat may therefore be fixed at any given amount by the size of the flange. I propose to make these cylinders hollow, and to provide an opening, N, through the top of the valve-chest for exhausting thereat, and when so arranged the port D will not be required; but, instead, an opening will be made directly up through the valve-cylinders and steam-chest. As the top of the steam-chest is liable to spring upward by an action of the steam, and in such case becomes so warped or cramped that a steam-tight joint cannot be maintained between the face of cylinder G and it, I propose to introduce a plate, H, between them, with a broad face at the under side for said cylinder to work against, and a contracted central upper face to form the point of connection with the steam-chest top and its center, which allows it to rise and fall with the steam-chest top without warping.

I have found, in practice, that where the area of the upper surface of the flange or face of cylinder G, working against the upper wall of the steam-chest, is about equal to the area of the under side subject to steam-pressure, the cylinder is liable to dance or vibrate rapidly by the steam working between it and the steam-chest, or it may be from other causes; but, whatever the cause may be, I have found a sure remedy therefor in reducing the area of the surface of the upper part bearing on the top of the steam-chest, and this I propose to do by making the cavities P therein, which cavities I connect by channels Q, and provide these channels with one or more passages, R, always open to the exhaust to maintain a vacuum in said cavities.

In case the valve F is used the said cylinders will not reciprocate, but will be secured to the top A of the valve-chest by bolts S and a disk,

T, as in Fig. 4, or by any other suitable means. The said valve will have an opening, V, for the escape of the steam to the passage N.

Instead of fitting these cylinders together by steam-packing, as in Figs. 1 and 4, I may connect them by a spring consisting of two disks or wide flat rings, V, joined at the periphery by a narrow ring, W, and produce the same results, regulating the pressure by the amount of the surfaces X and Y for the steam to act upon.

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

1. The combination, with shield H, of the cylinder G having a square flange, M, and working directly against the under side thereof, as and for the purposes specified.

2. The arrangement of fixed cylinders E G and slide-valve F in a steam-chest, when all are constructed as shown in Fig. 4 of drawing, and for the purpose specified.

CHARLES H. HUTCHINSON.

Witnesses:

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