

(No Model.)

F. J. ROTH.

STEAM ENGINE.

No. 271,741.

Patented Feb. 6, 1883.

FIG. 1.

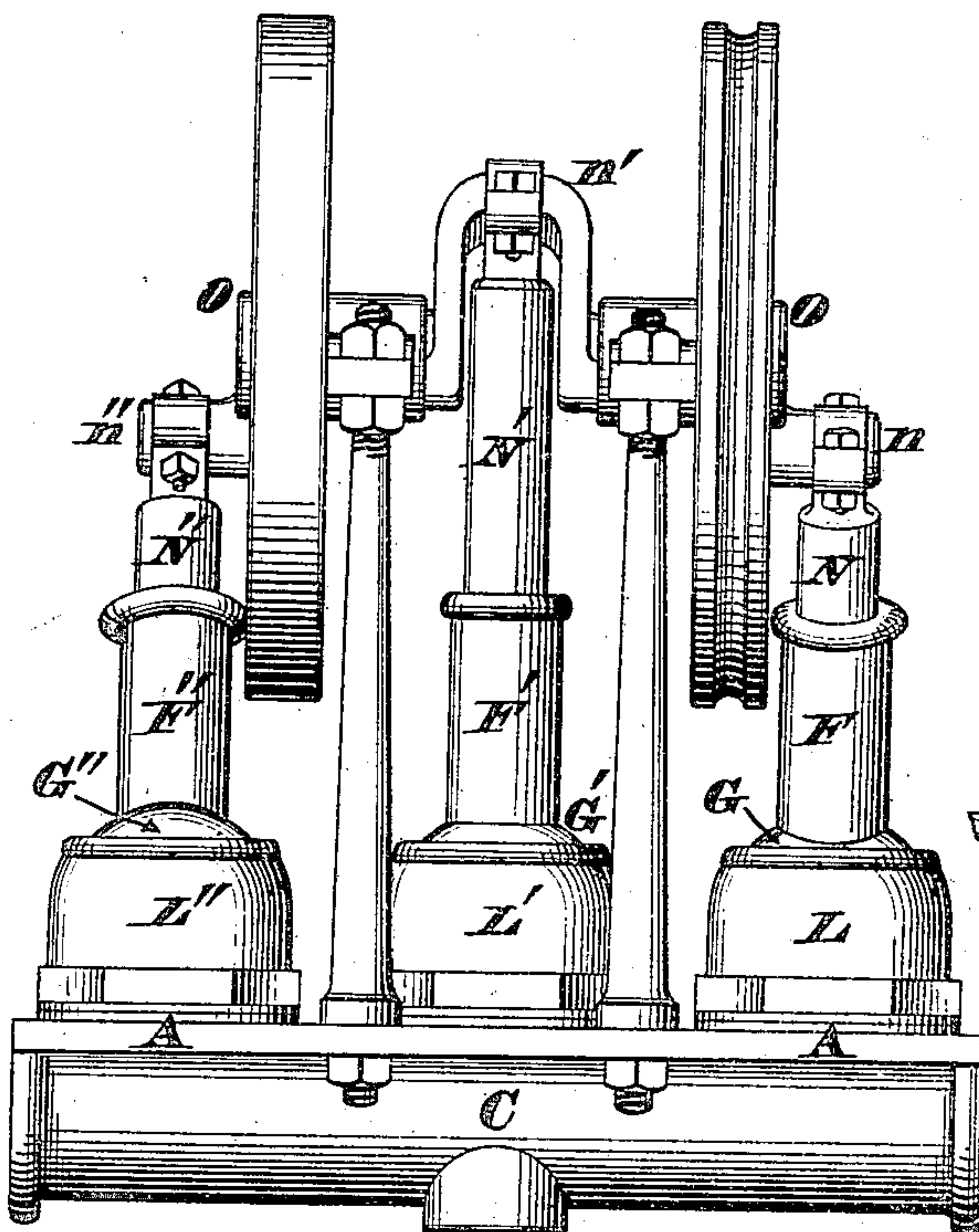


FIG. 2.

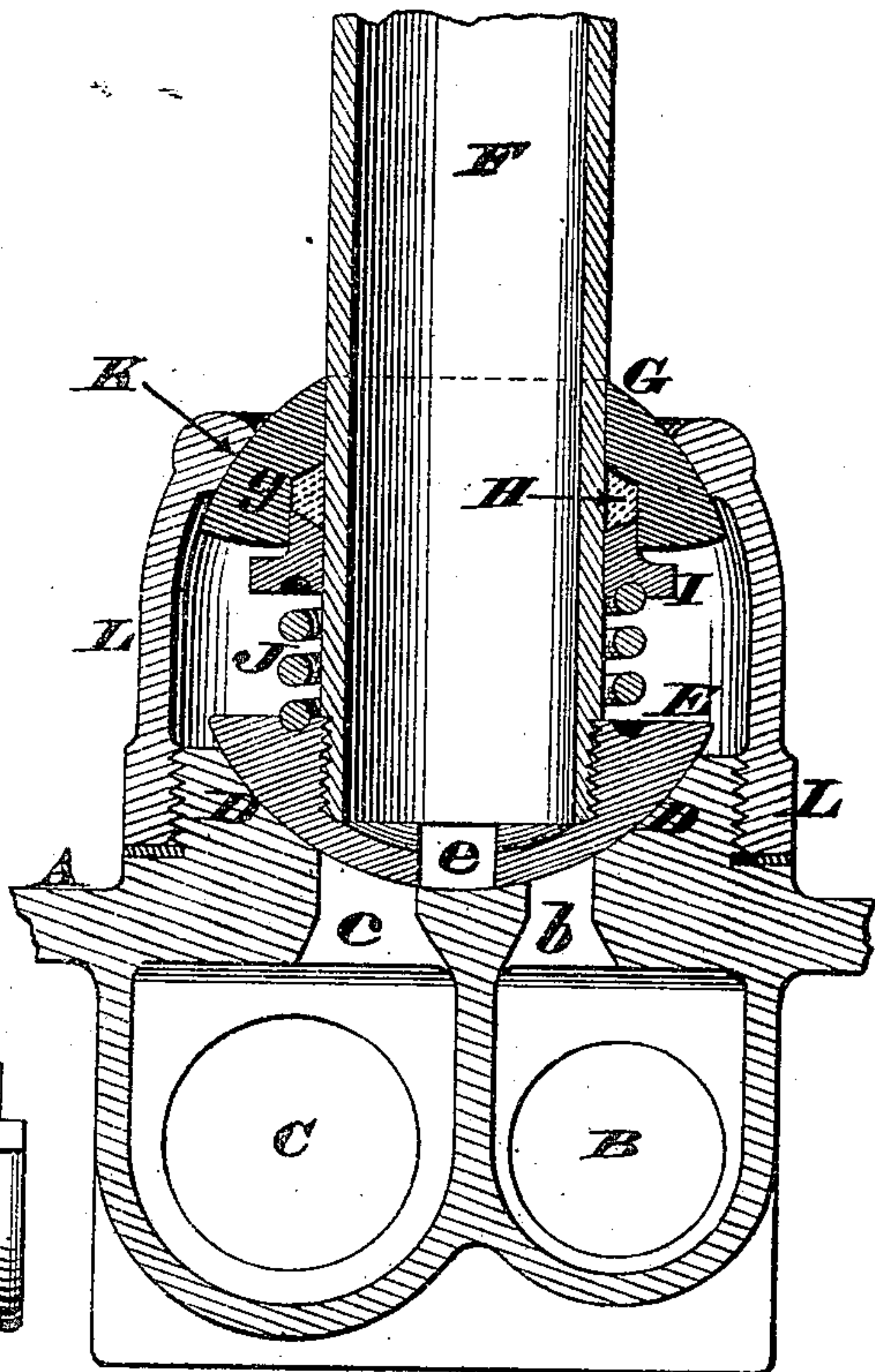


FIG. 3.

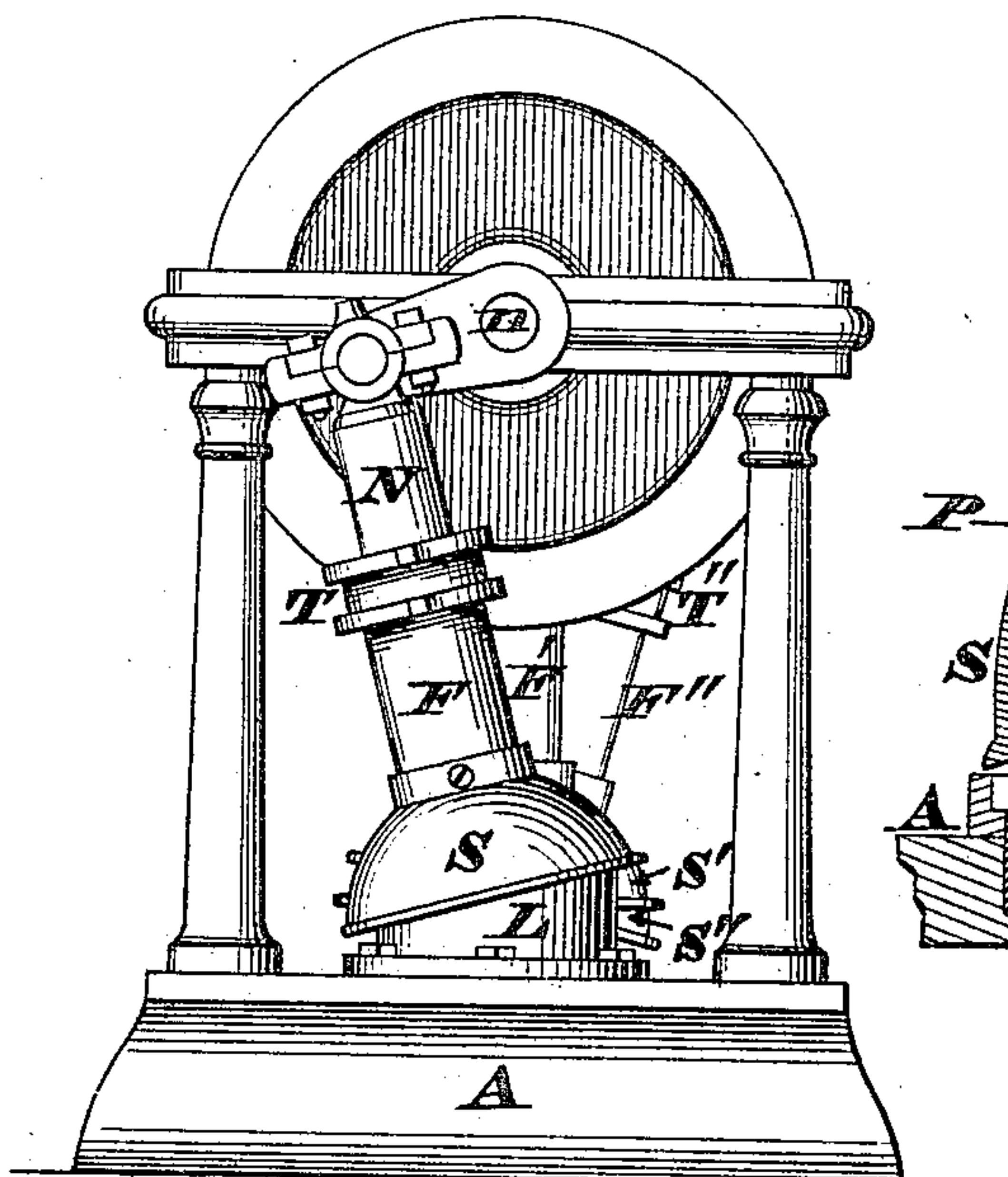
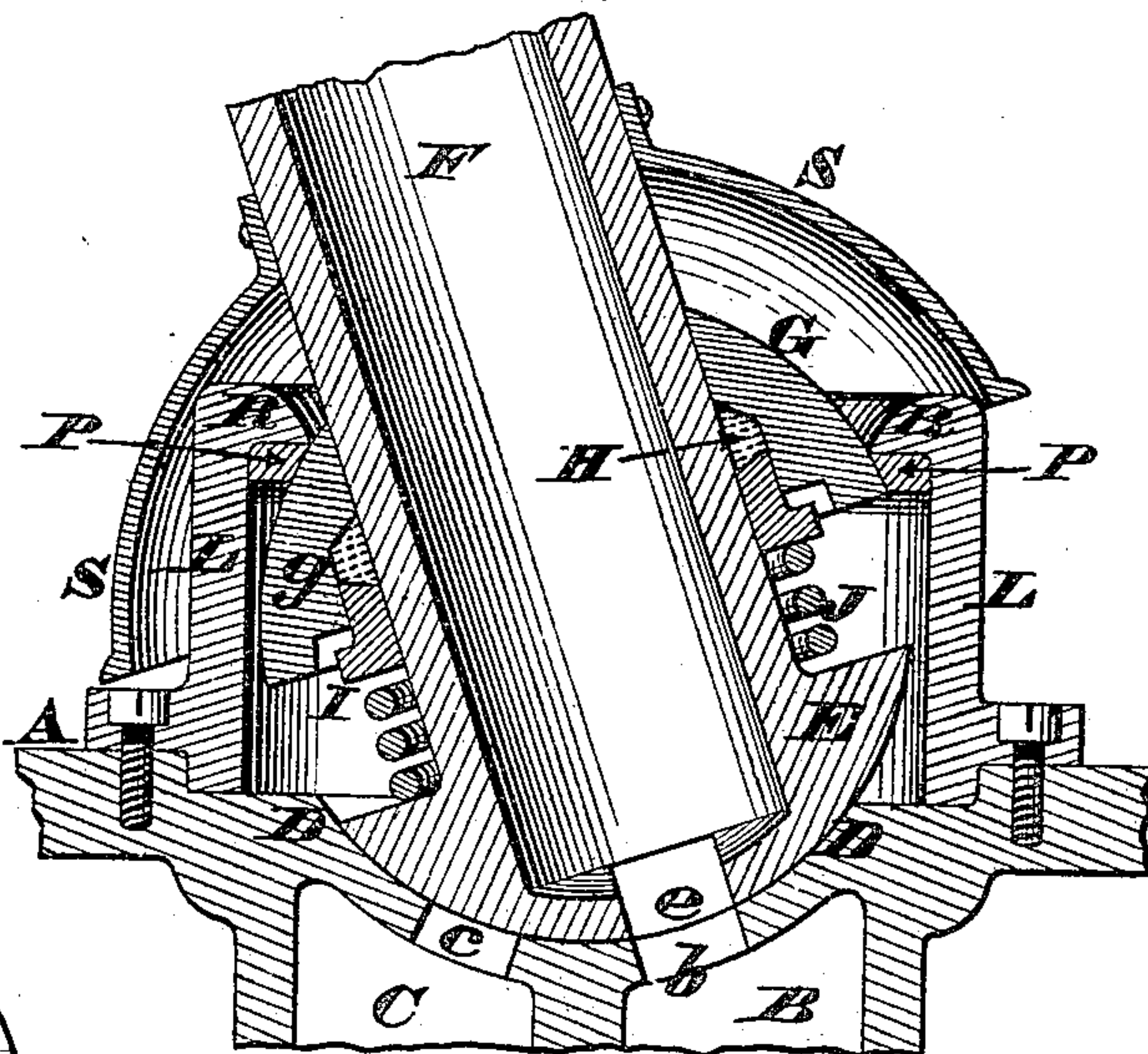


FIG. 4.



Attest,
John W. Layman,
John C. Fiedler

Inventor,
Frank J. Roth
by James H. Layman
Atty.

UNITED STATES PATENT OFFICE.

FRANK J. ROTH, OF CINCINNATI, OHIO, ASSIGNOR OF ONE-HALF TO JOHN KAUFFMAN, OF SAME PLACE.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 271,741, dated February 6, 1883.

Application filed October 9, 1882. (No model.)

To all whom it may concern:

Be it known that I, FRANK J. ROTH, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Steam-Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

In my improved engine the cylinder oscillates either from the upper or lower end, and has a convex head that plays within a concave seat in the bed-plate, said head and seat being provided with suitable ports to admit and exhaust the steam which acts on the piston only while the latter is receding from said head, thereby dispensing with a special valve or other contrivance for governing the motion of the engine, as hereinafter more fully described, and pointed out in the claims.

In the annexed drawings, Figure 1 is a side elevation of one form of my improved oscillating steam-engine. Fig. 2 is an enlarged axial section through the bearings of one of the cylinders of the same. Fig. 3 is an end elevation of a modification of the engine. Fig. 4 is an enlarged axial section through the bearings of one of the cylinders of said modified construction.

In order to render my engine as compact as possible, and to simplify its construction, I prefer casting the bed-plate A with two separate channels, B and C, for the live and exhaust steam, respectively, said channels being screw-threaded to admit the necessary pipe-connections at either end or in the center, as may be most convenient. Furthermore, this bed-plate has a concave seat or bearing, D, to receive the convex head E of cylinder F, which head may be screwed or bolted to said cylinder, as seen in Fig. 2; or it may be integral therewith, as represented in Fig. 4; or said head may be otherwise applied to the steam-cylinder, but in every case it must be pierced or slotted at *e* to communicate alternately with the inlet-port *b* and exhaust-port *c*. Fitting snugly around cylinder F is another head, G, the spherical or crowning portion of which is of the same radius as the concave head E, previously alluded to. The inner end of head G is chambered at *g* to admit suitable packing, H, the latter being held in position by an ordinary gland, I.

J is a helical spring, surrounding the cylinder F and interposed between the head E and said gland I. The crowning portion of head G plays within a suitable bearing, K, at one end of a housing, L, whose other end is either screwed or bolted to bed-plate A.

Piston N of cylinder F is coupled directly to the crank *n* of shaft O, which latter may carry any suitable form of fly, band, or gear wheel for communicating motion to machinery, &c.

It is evident that a steam-engine constructed as above described would operate only as the piston recedes from the head E *e*, and hence it would be necessary to employ at least two cylinders to secure a regular motion. A better construction, however, would be afforded by using three cylinders, as seen at F F' F'' in Fig. 1, the cranks *n n' n''* being disposed at angles of one hundred and twenty degrees with reference to each other. These cylinders would of course have their respective heads G G' G'', pistons N N' N'', housings L L' L'', and would in every other respect be identical with the construction seen in Fig. 2. In fact, all these parts of the engine are made from one set of patterns and are interchangeable.

When either cylinder is in the position seen in Fig. 4 steam enters the same through the coincident ports *b e*, thereby driving the piston away from head E; but as soon said piston completes its stroke the rotation of the fly-wheel shaft causes said cylinder to oscillate or swing over to an opposite position. Consequently the cylinder-port *e* is now in communication with the exhaust-port *c*, and allows the steam from said cylinder to be discharged through the channel C.

It is evident that three cylinders arranged in the manner just described will insure the utmost uniformity of motion and without causing a great amount of wear; but any play of the parts is automatically taken up by the coiled spring J, which has a constant tendency to force the heads E and G away from each other. By simply elevating the housing L ready access will be had to all the working parts, either for inspection or repairs or for packing the stuffing-box *g*.

In the construction seen in Figs. 1 and 2, the concave seat D is located above the bed-plate A; but in Fig. 4 said seat is shown sunk below

the level of said plate. This latter arrangement is preferred, because it allows the bed-plate to be planed with the greatest facility, thereby reducing the cost of the engine. Furthermore, in Fig. 4 the head G bears against a ring, P, fitted between said head and an inwardly-projecting flange, R, of the housing L. In this illustration, and also in Fig. 3, the cylinder has attached to it a dome-shaped hood, S, that incloses the housing L, and prevents dust, &c., entering the working parts of the engine.

A very cheap construction of the engine might dispense with stuffing-boxes at the outer ends of the cylinders F, as the length of bearing of pistons N will render them practically steam-tight; but such boxes may be applied, as shown at T T' in Fig. 3.

In another modification the head G may be cast with the cylinder F, and the end of the latter be seated in a chamber of the convex head E, which head could have the stuffing-box g H I applied thereto; or the cylinders may be inverted so as to constitute a pendulous engine, in which event the channels B C and seat D would be formed in the supporting-frame. Finally, whichever construction is

adopted, it will be seen that the pierced head E e, in connection with the ports b c of seat D, obviates the necessity of valves of any kind for admitting steam into the cylinder and exhausting it therefrom. 30

I claim as my invention—

1. The combination, in an oscillating steam-engine, of concave seat D, ports c b, convex head E e, cylinder F, and head G, which latter bears against the seat K of housing L, substantially as herein described. 35

2. In combination with an oscillating steam-engine, having the heads E e and G, arranged in the manner described, the helical spring J, interposed between the head E e and the gland I, for the purpose described. 40

3. In combination with an oscillating steam-engine, the hood S, attached to the cylinder F, and inclosing the housing L and its attachments, as herein described. 45

In testimony whereof I affix my signature in presence of two witnesses.

FRANK J. ROTH.

Witnesses:

JAMES H. LAYMAN,
SAML. S. CARPENTER.