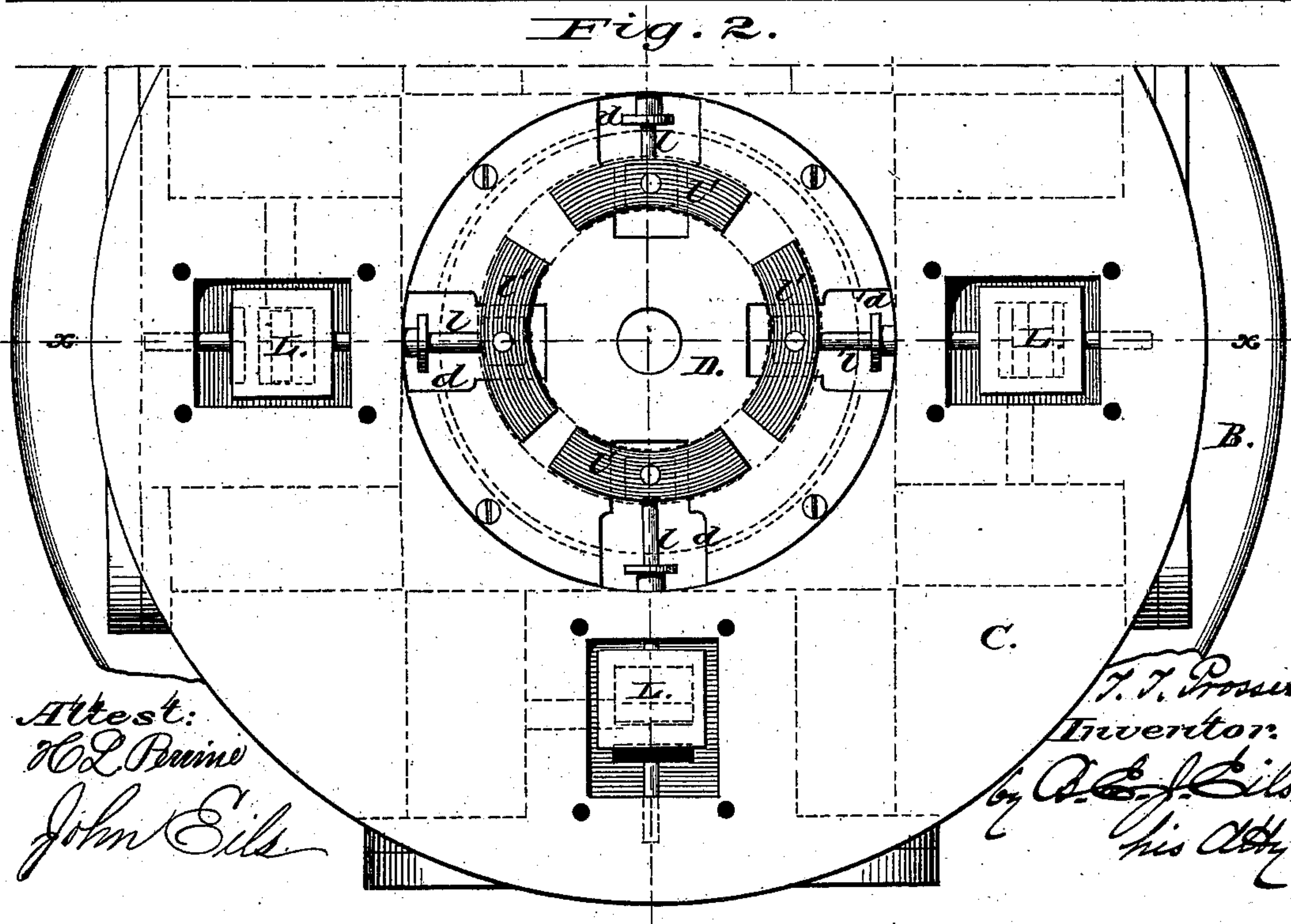
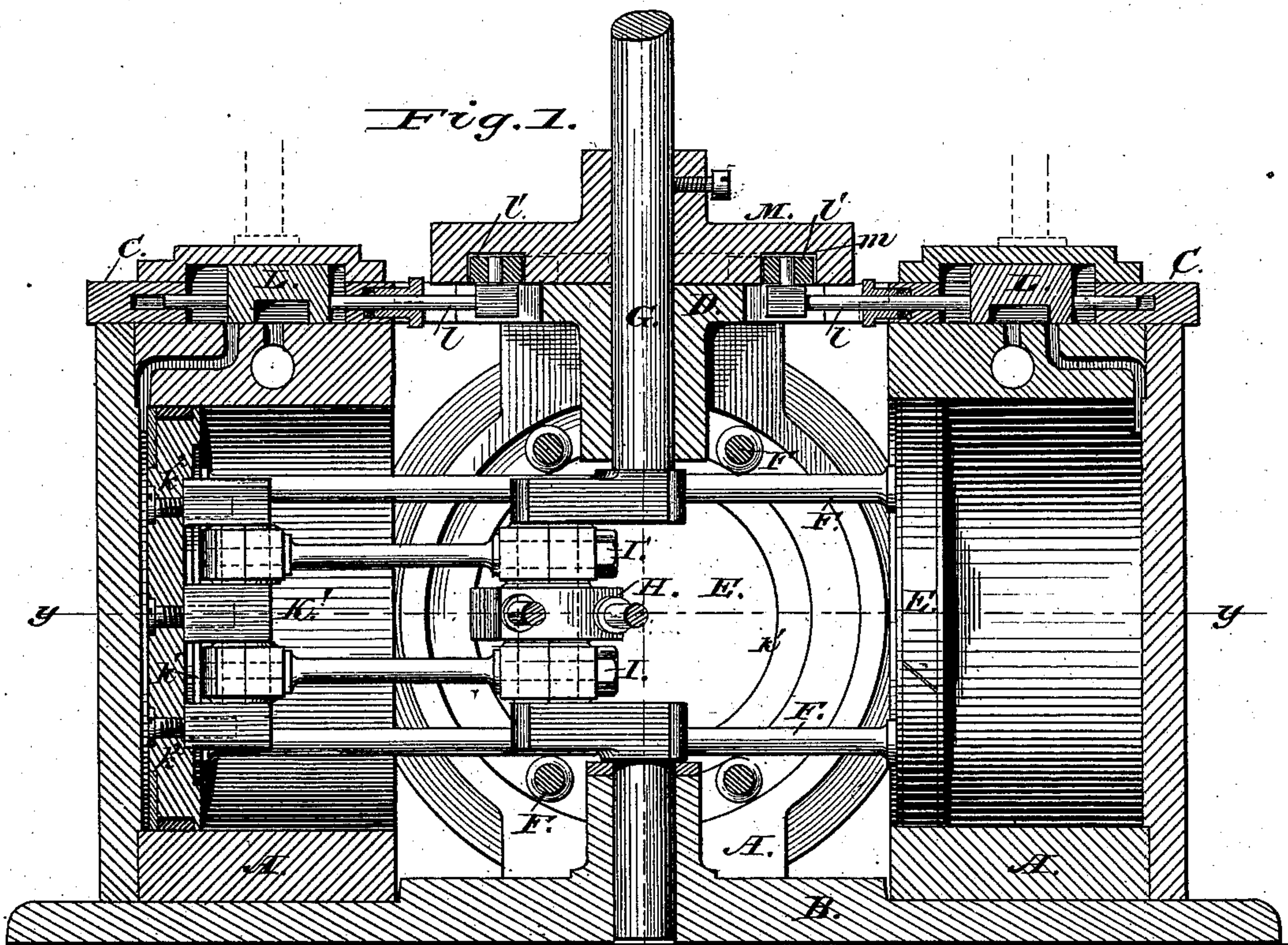


T. T. PROSSER.
Steam-Engine.

No. 224,950.

Patented Feb. 24, 1880.



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Fig. 3.

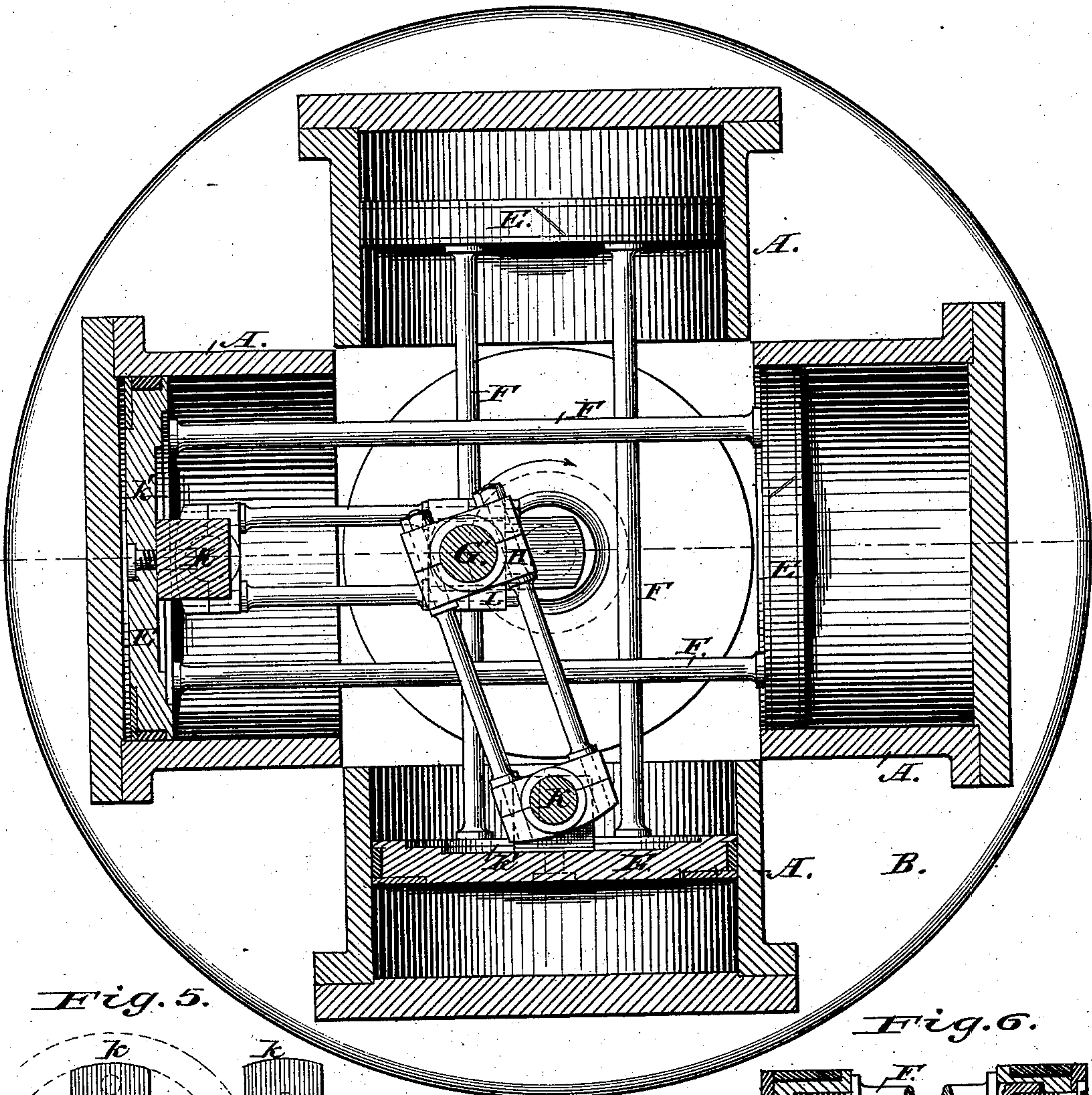
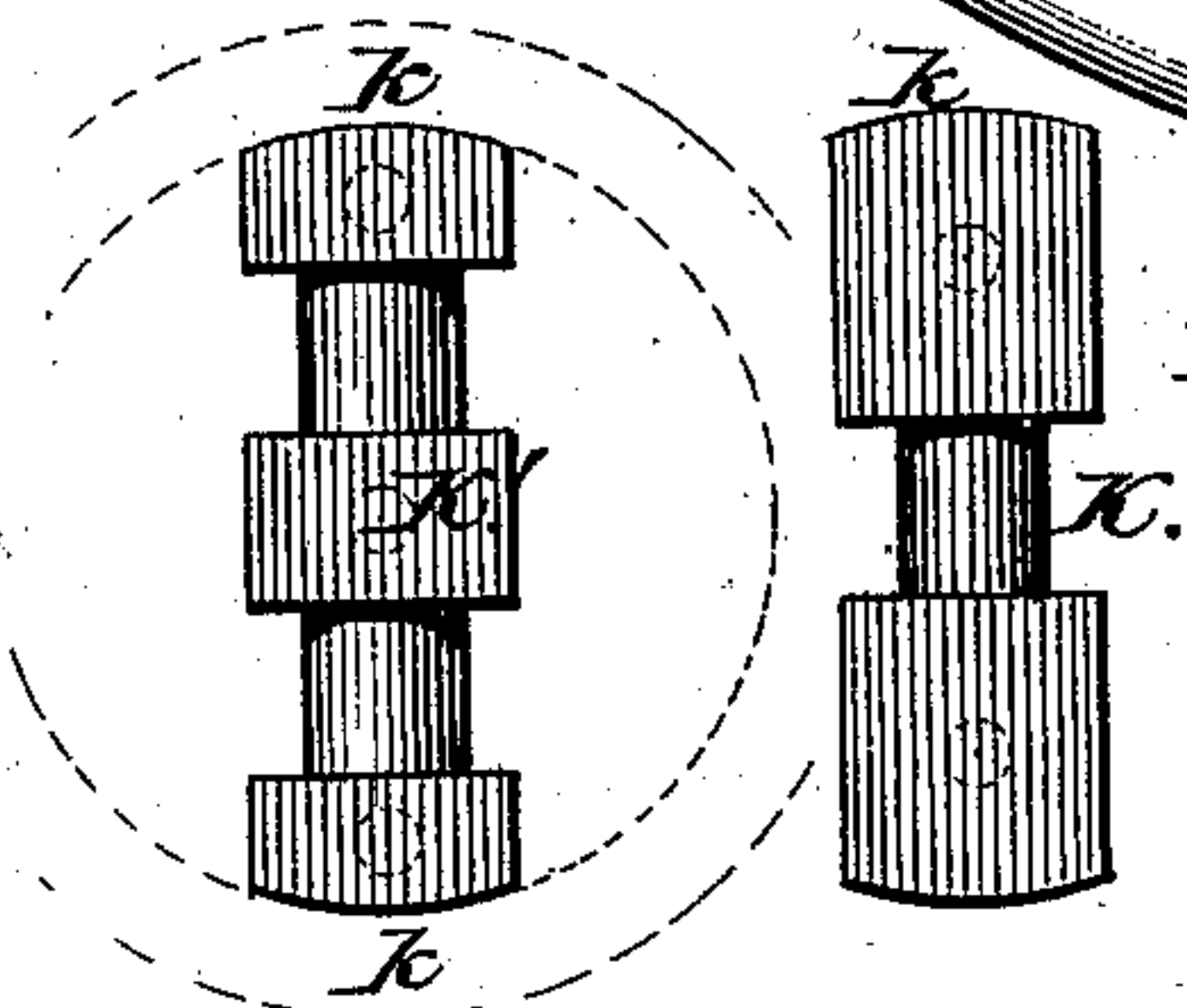


Fig. 5.



Attest:
W. C. Perrine
John Eils.

Fig. 4.

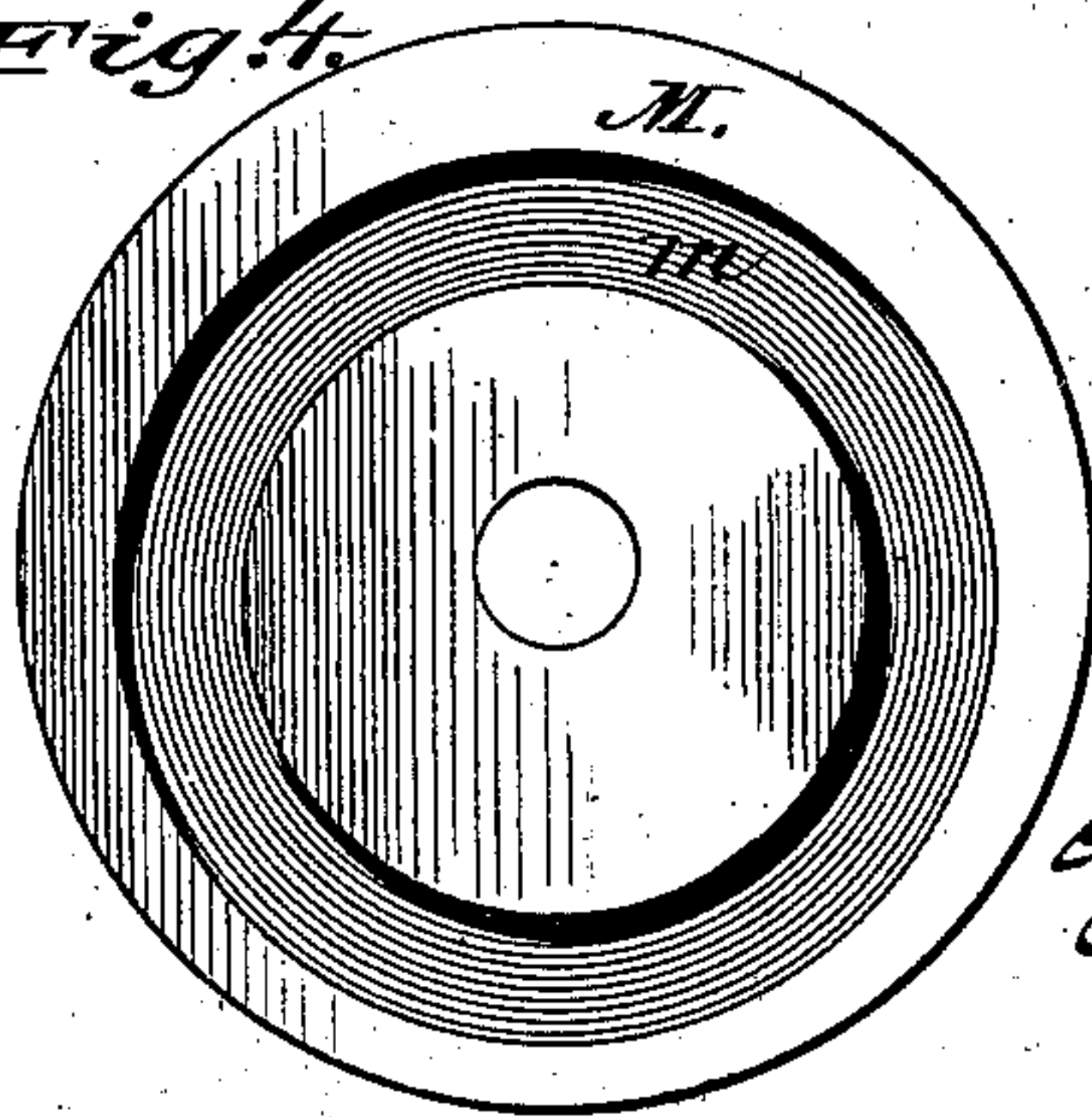
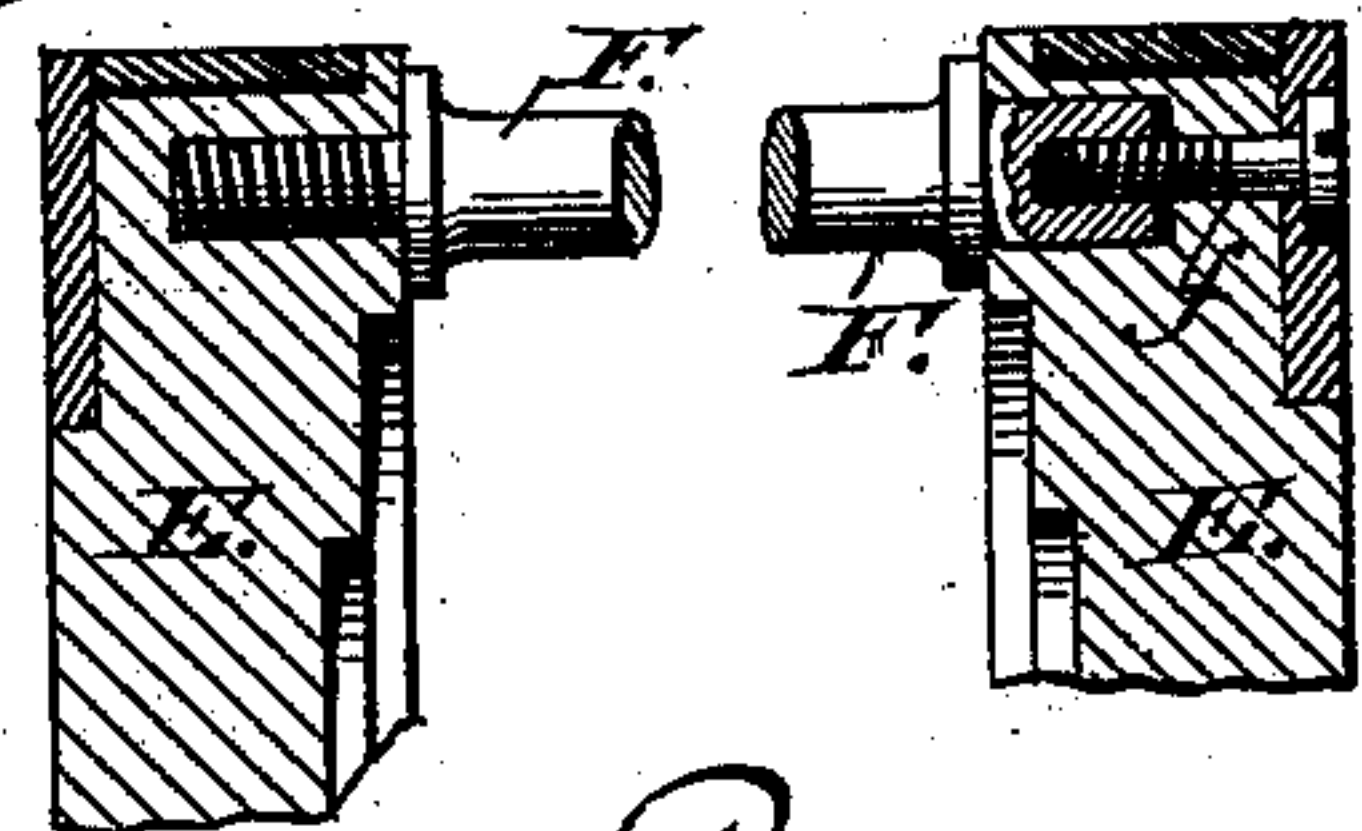


Fig. 6.



T. T. Prosser
Inventor.
by J. E. Eils
his Atty

UNITED STATES PATENT OFFICE.

TREAT T. PROSSER, OF CHICAGO, ILLINOIS.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 224,950, dated February 24, 1880.

Application filed January 27, 1880

To all whom it may concern:

Be it known that I, TREAT T. PROSSER, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Steam-Engines, of which the following is a specification.

This invention relates to that class of compound reciprocating steam or other gas-engines in which four single-acting cylinders are arranged radially around a crank-shaft in coincident pairs, which stand at right angles to each other.

My improvement consists in connecting one pair of pistons to the crank by a single axially-disposed pitman and the other pair by two pitmen, both attached to the same piston at points equidistant from the center thereof, in consequence of which arrangement the power of the pistons will be transmitted to the crank-shaft in such a manner as to equalize the strain on the journals of the latter.

It further consists in the construction and mode of attachment of the noddle-pins by which the pitmen are respectively connected to the pistons.

It further consists in constructing one of the plates which are used for connecting the several cylinders with a detachable center piece, on removing which the crank-shaft can be taken out, and ready access can be had to the pitmen and their adjuncts.

It further consists in a novel manner of securing the pistons to their stay-rods, admitting of a ready connection or disconnection.

In the annexed drawings, Figure 1 is a sectional elevation of my improved reciprocating engine. Fig. 2 is a plan view of a portion of the same. Fig. 3 is a horizontal section thereof. Figs. 4 to 6 are detail views, hereinafter more particularly referred to.

The same letters of reference are used in all the figures in the designation of identical parts.

The four cylinders A, arranged as best seen in Fig. 3, are bolted to the base-plate B, and are also rigidly connected together on top by a plate, C, of annular form, the central opening of which is covered by a removable center piece, D. The cylinders are closed by heads at their outer ends, but open at their inner ends. The pistons E of each coincident pair of cylinders are permanently secured to-

gether by four stay-rods, F, one end of which is screwed into a tap in one of the pistons, while its other end enters a socket in the opposite piston, and is secured by a screw-bolt, *f*, in the manner clearly shown in Fig. 6. The pistons may thus be readily separated by simply unscrewing the bolts *f*.

The crank-shaft G is placed centrally between the four cylinders, having a bearing in the plate B on one side of its crank G', and another bearing in the hub of the removable center-piece, D, on the other side of the crank. One piston of each coincident pair is connected with the wrist of crank G', and in order to avoid torsional and canting strains three pitmen, H, I, and I', are used for this purpose. The pitman H occupies a central position on the wrist of the crank, and is centrally connected to its piston. The pitmen I and I' are arranged to connect with their piston at points equidistant from the center of the same, and, extending parallelly to the crank, are coupled to the wrist thereof on opposite sides of pitman H, as best seen in Fig. 1.

The pitmen take hold of noddle-pins K and K', secured to the respective pistons. These noddle-pins, arranged transversely across the exposed faces of the pistons, are turned so that their ends *k* will be segments of a circle, in order that they may fit circular recesses *k'*, formed in the pistons. This will not only center them, but will also give them great steadiness. The pin K, adapted for pitman H, has a single central bearing, while the pin K', intended for pitmen I and I', has two bearings, all as best shown in Fig. 5. The bosses of these pins are snugly fitted to the bottoms of the recesses *k'* in the pistons, and are secured by tap-bolts *k*², screwed into them through the pistons.

The ports of the four cylinders are covered by steam-chests, and are controlled by four slide-valves, L, the stems *l* of which extend through stuffing-boxes in radial directions under a disk, M, secured to the crank-shaft above the center piece, D. The exterior end of each valve-stem *l* carries a swiveling segment, *l'*, which enters an eccentric groove, *m*, in the disk M. The eccentricity of this groove *m* (best seen in Fig. 4) is such as to give the proper throw to the valves, which are operated to open and close

the ports of the several cylinders in regular succession. In this instance the groove *m* is circular; but in case a variable valve-motion is desired it will have the required irregular contour, and the anti-friction rollers will then be substituted for the segments. The valve-stems project into openings *d* in the edge of the center piece, so that the latter can be removed without disturbing the valve-stems and adjuncts.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The compound four-cylinder engine, substantially as described, in which one pair of pistons is connected to a central crank-shaft by a single axially-disposed pitman, and the other pair of pistons by two parallel pitmen, both attached to the same piston at points equidistant from the center of the same.

2. The noddle-pin having segmental ends, and fitted in a circular seat in the piston, substantially as and for the purpose specified.

3. The combination, substantially as specified, of the plate B, the cylinders, the annular plate C, and the removable center piece, D.

4. The combination, substantially as specified, of the piston, the stay-rods, and the screws *f*.

In testimony whereof I have signed my name to the foregoing specification in the presence of two subscribing witnesses.

TREAT T. PROSSER.

Witnesses:

B. E. J. EILS,
JOHN EILS.