

J. M. SAILER.
ENGINE.

No. 424,505.

Patented Apr. 1, 1890.

Fig. 5.

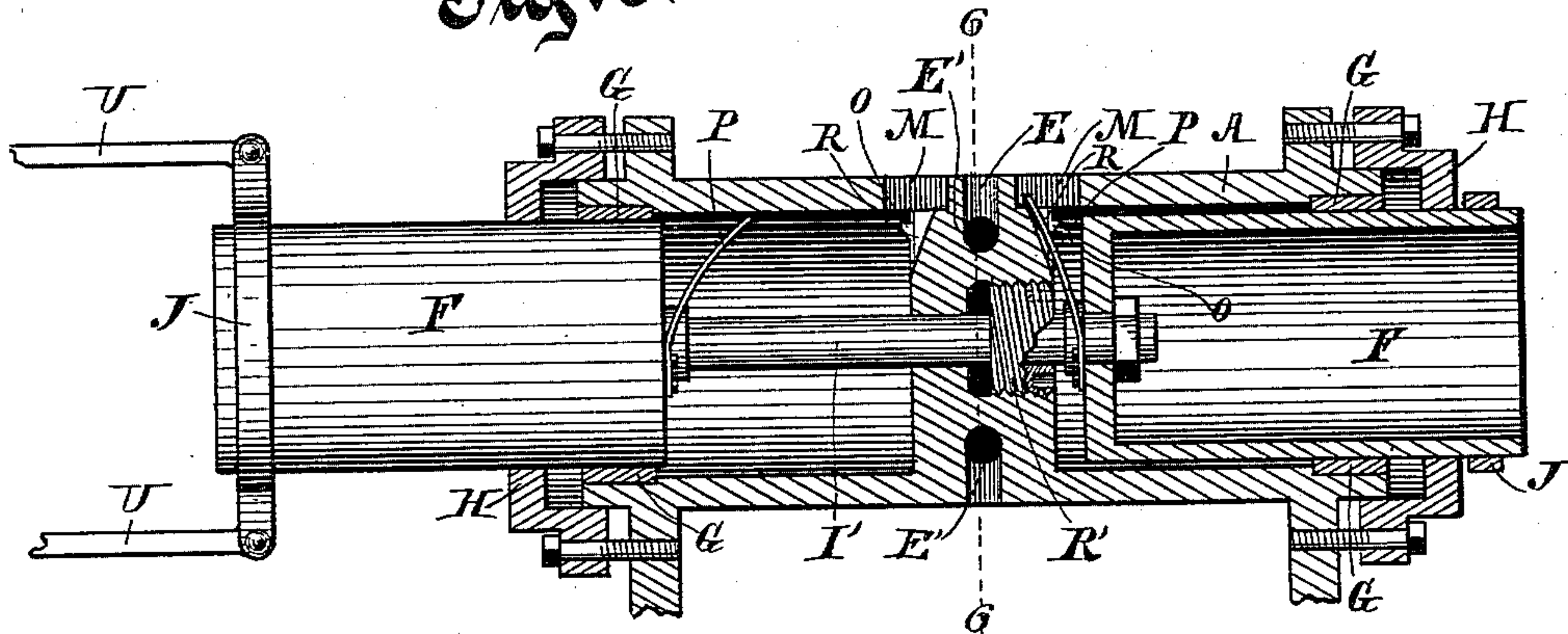


Fig. 6.

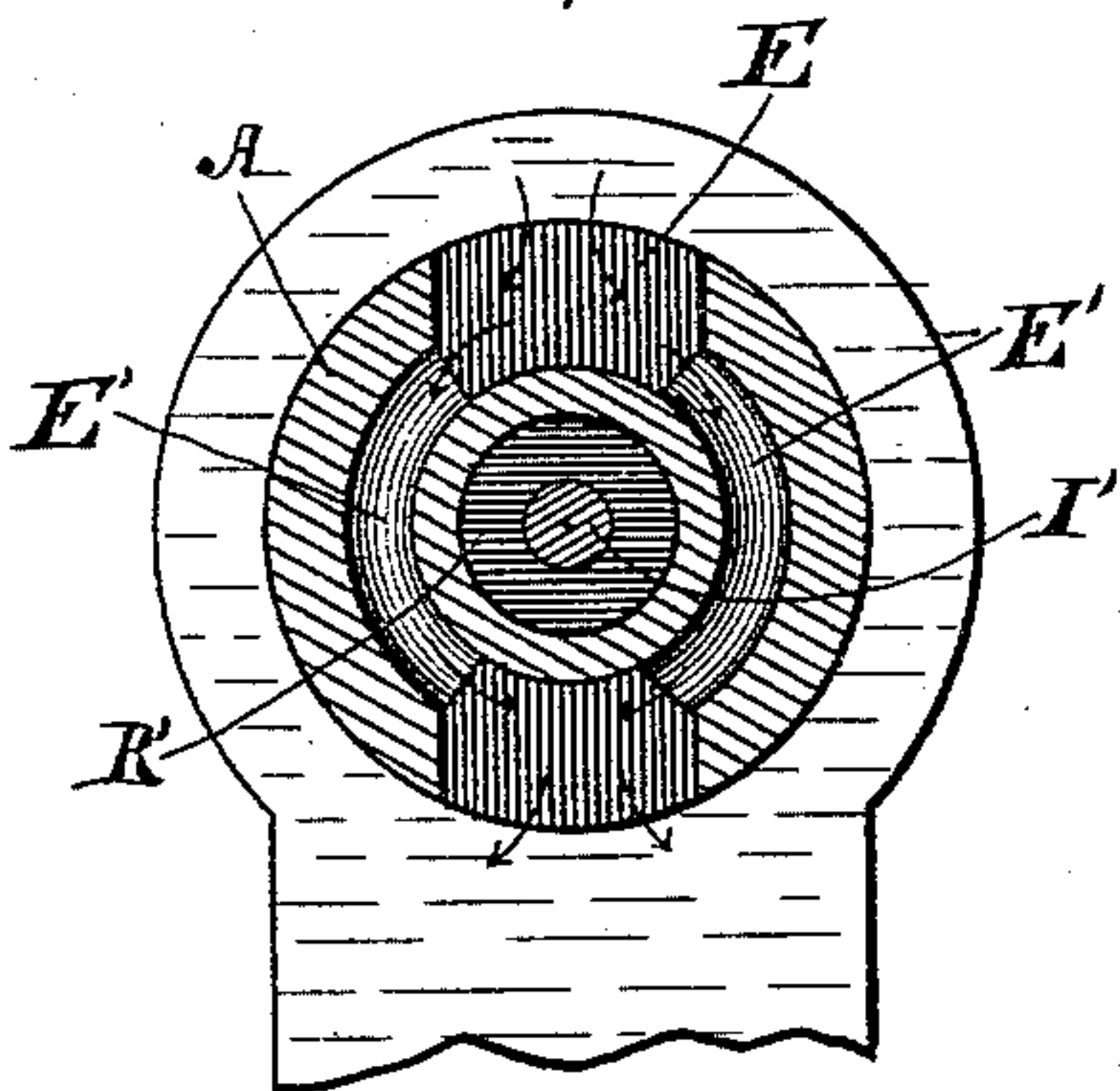


Fig. 7.

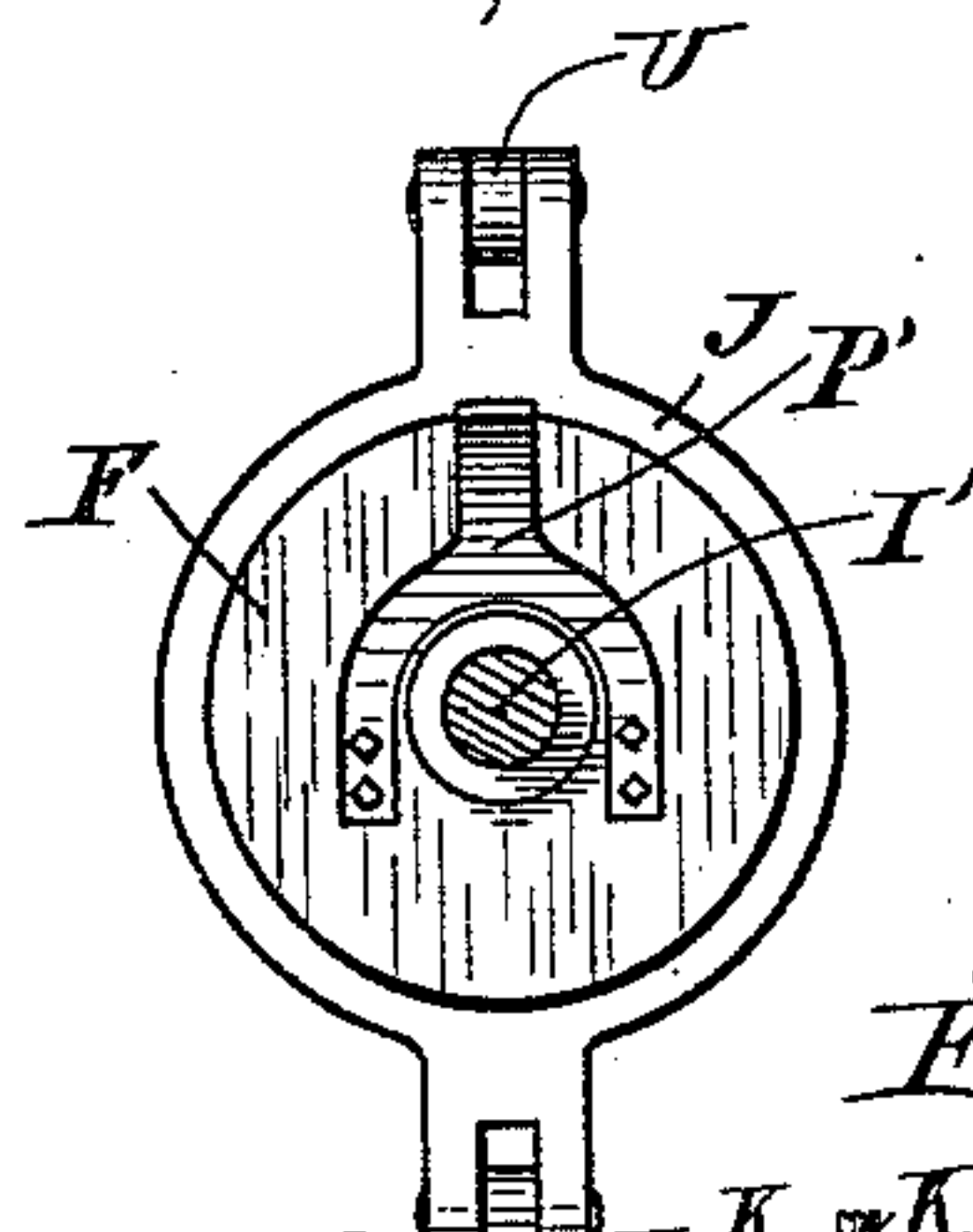


Fig. 1.

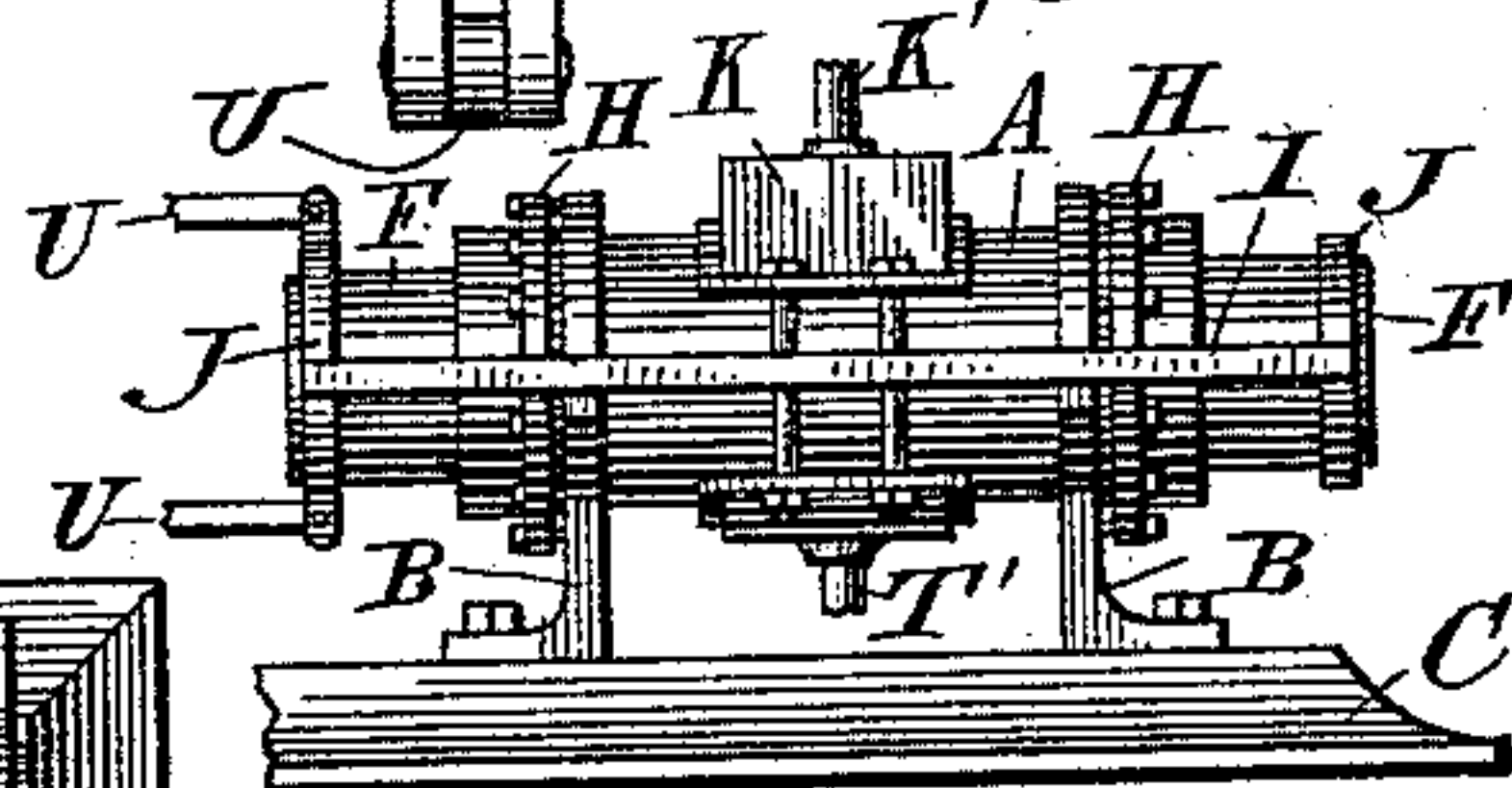
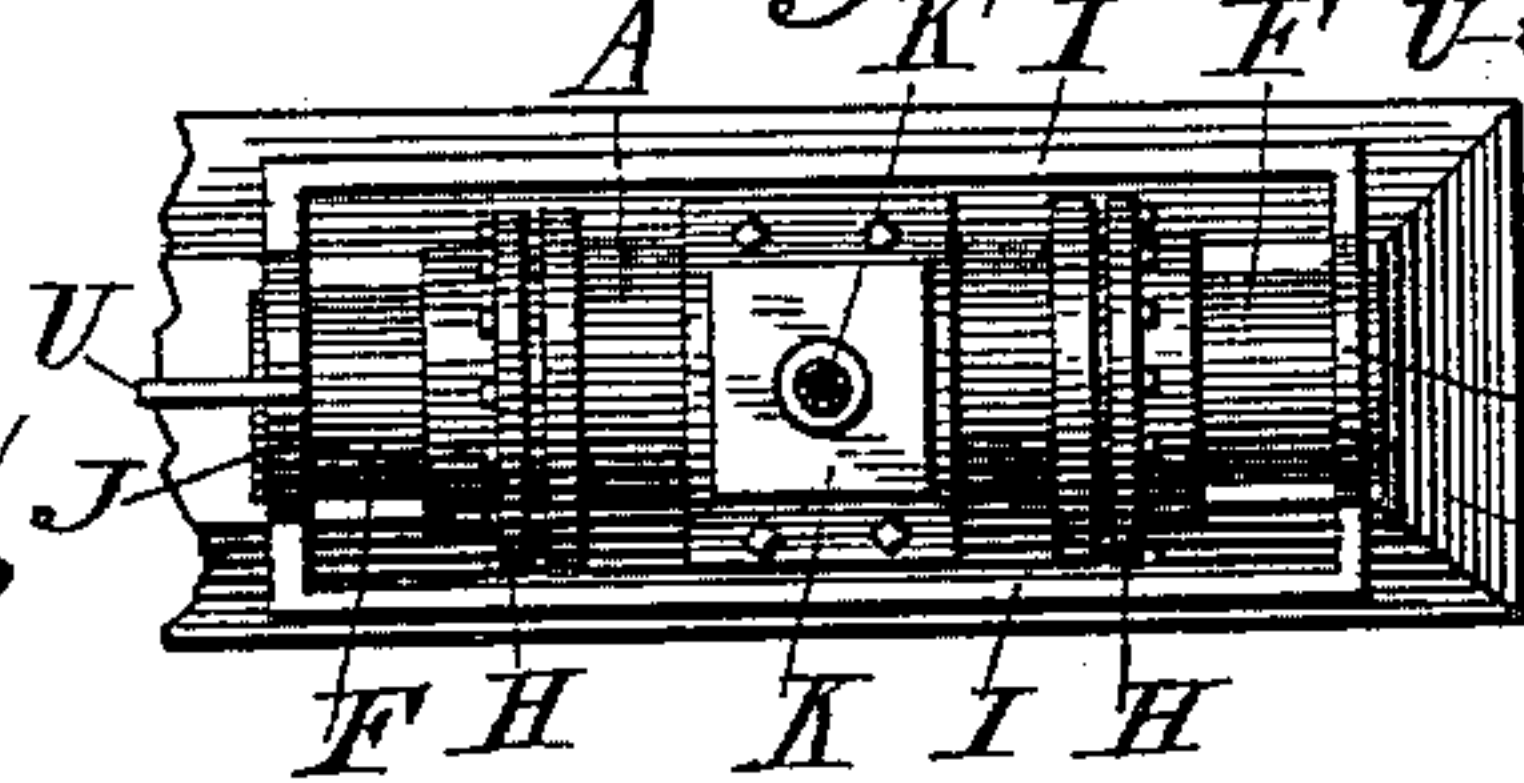


Fig. 2.



Witnesses:

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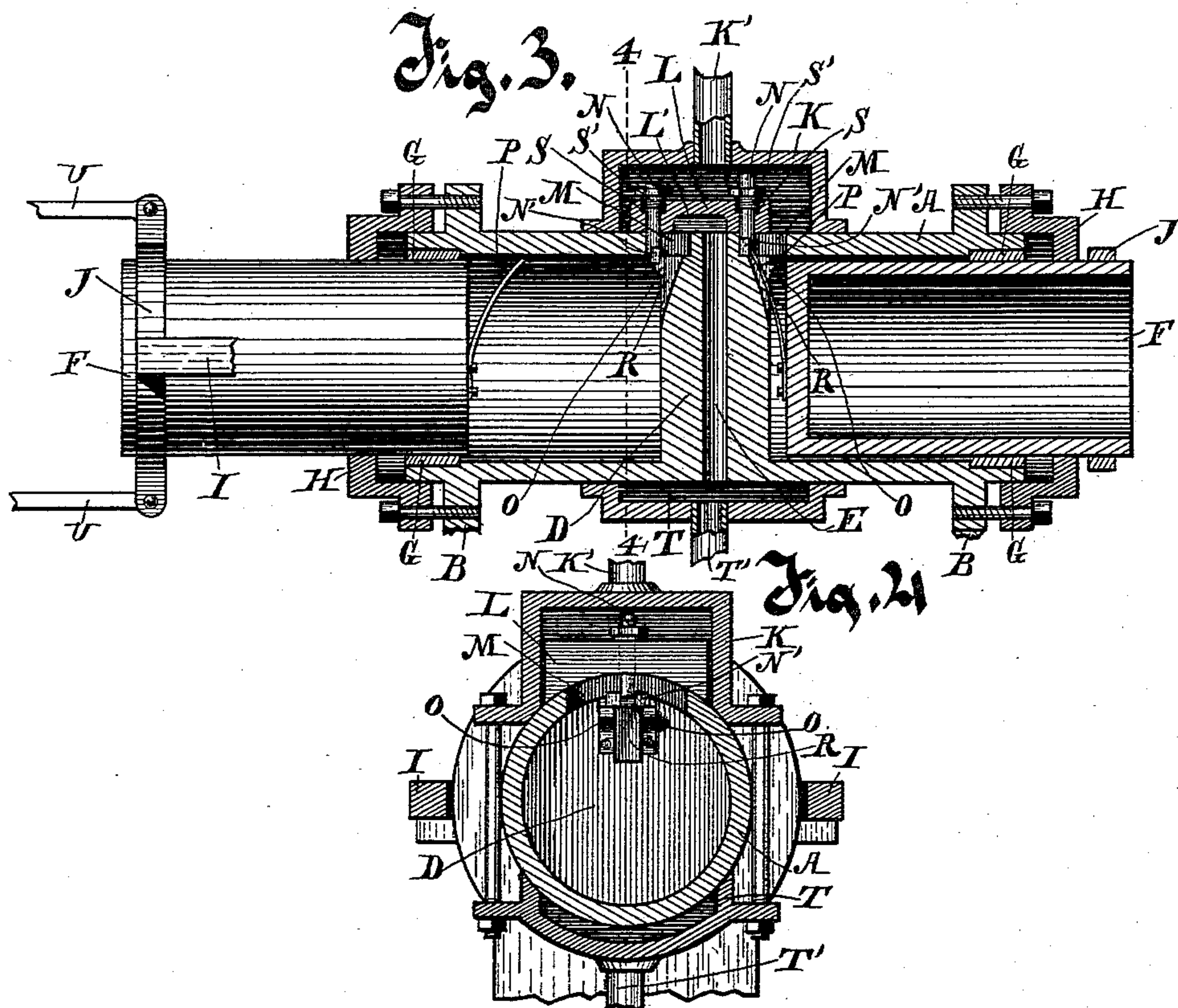
(No Model.)

2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

JOHN M. SAILER, OF MILTON JUNCTION, ASSIGNOR TO THE FLEXIBLE ENGINE
AND THRESHING MACHINE COMPANY, OF ROCK COUNTY, WISCONSIN.

ENGINE.

SPECIFICATION forming part of Letters Patent No. 424,505, dated April 1, 1890.

Application filed July 5, 1889. Serial No. 316,631. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. SAILER, of Milton Junction, in the county of Rock and State of Wisconsin, have invented new and useful
5 Improvements in Engines; and I do hereby declare the following to be a full, clear, and exact description of said invention, reference being had to the accompanying drawings, and to the letters of reference marked thereon,
10 which form a part of this specification.

My invention relates to improvements in reciprocating engines.

The object of the invention is to so simplify an engine that it can be constructed with a
15 small amount of mechanism and with as little expense as possible, while securing the complete working power and usefulness of the engine.

In the drawings, Figure 1 is a perspective
20 view of my complete device. Fig. 2 is a plan view of the same device. Fig. 3 is a vertical longitudinal section of the cylinder, steam-chests, and pistons. Fig. 4 is a vertical transverse section of the cylinder and steam-chest
25 on line 4 4 of Fig. 3. Fig. 5 is a central vertical longitudinal section of the cylinder with the pistons therein, showing a modified form of device for connecting the pistons. Fig. 6 is a vertical transverse section of the modified
30 form of engine on line 6 6 of Fig. 5. Fig. 7 is an end view of the piston used in the modified form of engine shown in Fig. 5.

The same letters refer to like parts in all the views.

35 The hollow cylinder A is supported, when the engine is intended for stationary use, conveniently by brackets B B on a base C. The cylinder A is divided centrally by a head D, through which is a transverse duct E. In the
40 cylinder on each side of the head D is a piston F, which pistons may be made solid, but are preferably made hollow for reducing their weight. These pistons have cylindrical side walls, an inner head integral therewith, are
45 of the same diameter as the interior of cylinder A, and are fitted and travel steam-tight in the cylinder by means of the packing G G and such additional packing as may be necessary inserted within the caps H H, which are

secured to the cylinders by means of screw- 50
threaded bolts or other equivalent means. The two pistons F F are of equal and uniform diameter, are longer than the respective chambers of the cylinder in which they travel and project at the two ends of the cylinder beyond 55
the same, and are connected rigidly together conveniently by means of a frame I, secured, respectively, to the outer ends of the two pistons by means of collars J J, which are a part
60 of the frame and are secured fixedly to the pistons. The pistons may be connected together by a rod I', affixed to each and passing steam-tight through the head D. The pistons are located and secured in the frame in the
65 position with relation to each other and to the cylinder indicated in Figs. 3 and 5, so that as one piston is at the inner end of its stroke the other piston would be at the outer end of its stroke.

A steam-chest K is secured steam-tight 70
upon the cylinder A centrally and is provided with a sliding cut-off valve L, fitted steam-tight, but movable on the outer surface of the cylinder A, and having a recess L' of sufficient length to provide a passage for steam 75
from the ports M M alternately into the eduction-duct E. The ports M M through the cylinder A provide a passage from the steam-chest to each of the chambers in the cylinder A, the ports being located one on each side 80
of the head D. The sliding valve L is of such length that when it is at one end of the steam-chest K a passage is open from one cylinder-chamber through a port M into the eduction-
85 pipe E, while the other port M is not covered by the valve L, but is open from the steam-chest K to the other chamber of the cylinder.

Two sliding bolts N N, one at each end, are fitted steam-tight into the valve L, which bolts are each provided at its lower end with 90
a short rigid cross-bar N' or lateral projections, which, when the valve is in proper position therefor, drop down or are forced inwardly by the steam in the chest K in front of the edge of the head D upon brackets O O, 95
rigid on the head D, whereby the valve L is held in position against endwise movement until the bolt N shall be raised from in front

of the head D. The bolts N N pass through the cylinder A in the ports M M, which are of greater lateral diameter than the bolts, whereby the endwise movement of the sliding valve L is provided for. An outwardly-bent elastic arm P is affixed to the inner surface of the head of each piston, the free end of which arm, as the piston moves inwardly, engages the lower end of the bolt N and raises it from in front of the head D, forcing the bolt and valve L forward, carrying the valve L to the other end of the steam-chest, thereby opening the port nearest the inwardly-moving piston from the chamber into the steam-chest, the port into the opposite chamber being in the meantime closed to the steam in the chest K and opened to the eduction-duct E by the movement of the valve L. A recess R is provided in the head D to permit the movement of the arm P therein, carrying the bolt N, as before described. The bolts N N are made steam-tight in the valve L by means of packing S, held in place by a packing-nut S'.

The eduction-duct E opens into a steam-exhaust chamber T, provided with an exhaust-pipe T'. A steam-supply pipe K' leads into the steam-chest K. Two pitmen U U are pivoted on opposite sides of the piston at one end to one of the collars J and at the other extremity are attached to the mechanism to be driven by the engine.

In the modified form of engine shown in Fig. 5 the frame I, for connecting the two pistons outside of the cylinder, is omitted, and the pistons are connected rigidly together by a connecting-rod I', secured to the heads of the pistons and passing steam-tight through the head D of the cylinder. A packing-nut R' is provided, turning into the head D, whereby with packing underneath the connecting-rod may be made steam-tight, but movable in the head D. In this form of construction the eduction-pipe E is divided into two parts E' E', passing around the aperture for the connecting-rod I'. The arm P', corresponding to the arm P in the other form of engine, is made bifurcate for more convenient

and secure attachment to the head of the piston.

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

1. In an engine, the combination, with a cylinder provided with a central head and a steam-chest affixed centrally to the cylinder having ports opening therefrom into the two chambers of the cylinder, respectively, of a slide-valve in the steam-chest, bolts movable in the valve adapted to lock the valve in position, and an arm affixed to the piston adapted to engage with a bolt in the sliding valve and release and move the valve by the movement of the piston, substantially as described.

2. In an engine, the combination, with a cylinder having a central head provided with a steam-eduction duct and a steam-chest affixed centrally to the cylinder provided with ports opening, respectively, into the two chambers of the cylinder, of a sliding valve within the steam-chest and elastic arms attached to the inner ends of the pistons, respectively, which arms are adapted, as the pistons reciprocate, to slide the valve forward and back, substantially as described.

3. In an engine, the combination, with a cylinder provided with a central head, of a steam sliding valve located and adapted to close alternately the two ports opening from the chambers of the cylinder, sliding bolts in the sliding valve adapted alternately to engage the head of the cylinder and lock the sliding valve in position, and arms attached to the inner ends of the pistons in the chambers of the cylinder, which arms are adapted to engage the locking-bolts and raise them from engagement with the head of the cylinder and also to carry the sliding valve, substantially as described.

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

JOHN M. SAILER.

Witnesses:

C. T. BENEDICT,
ANNA FAUST.