

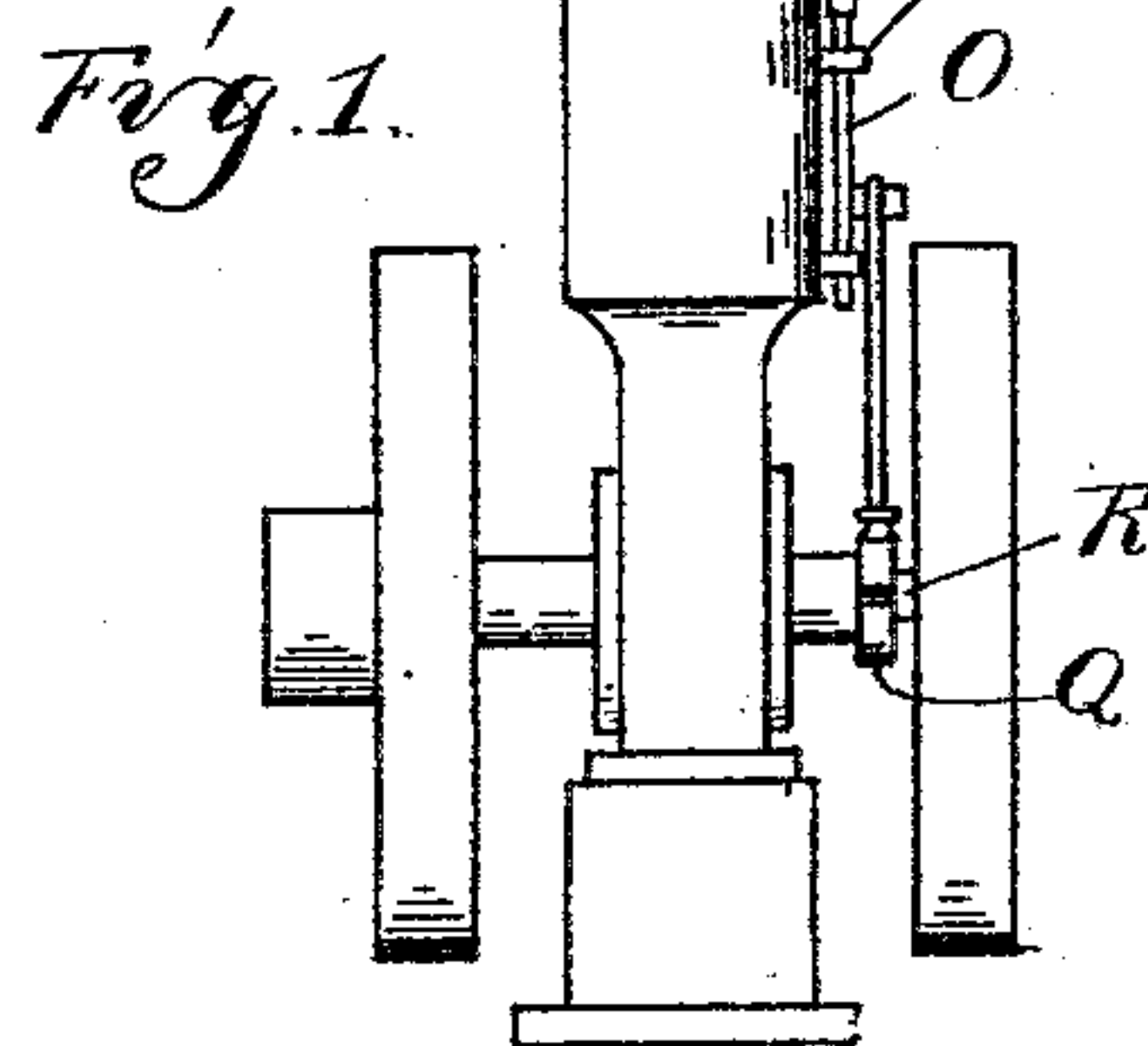
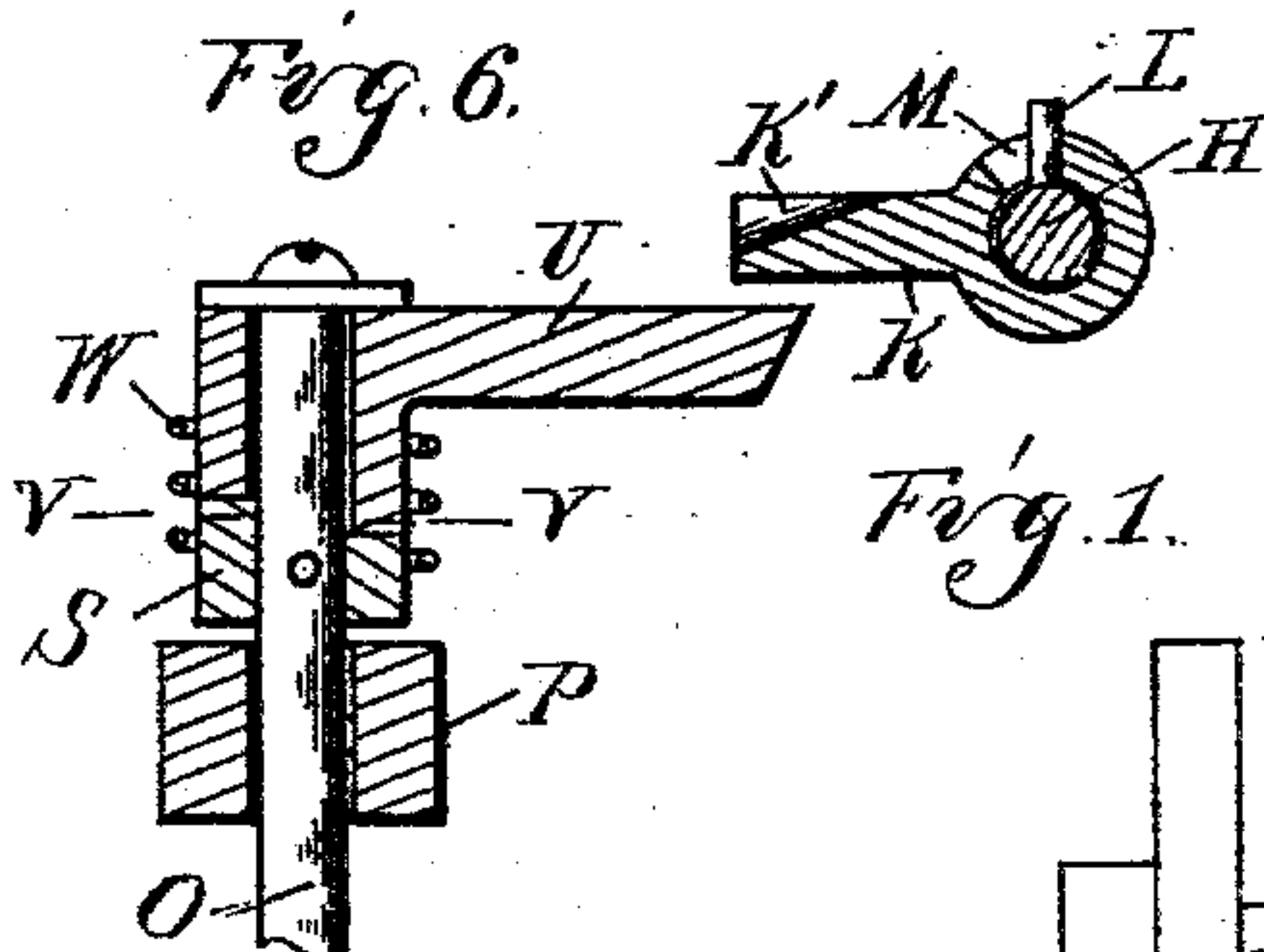
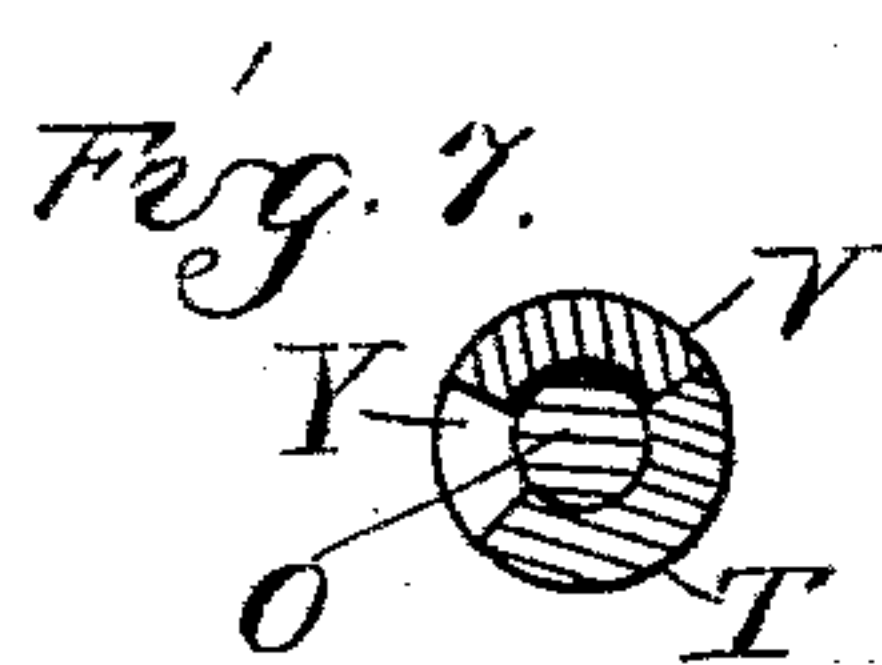
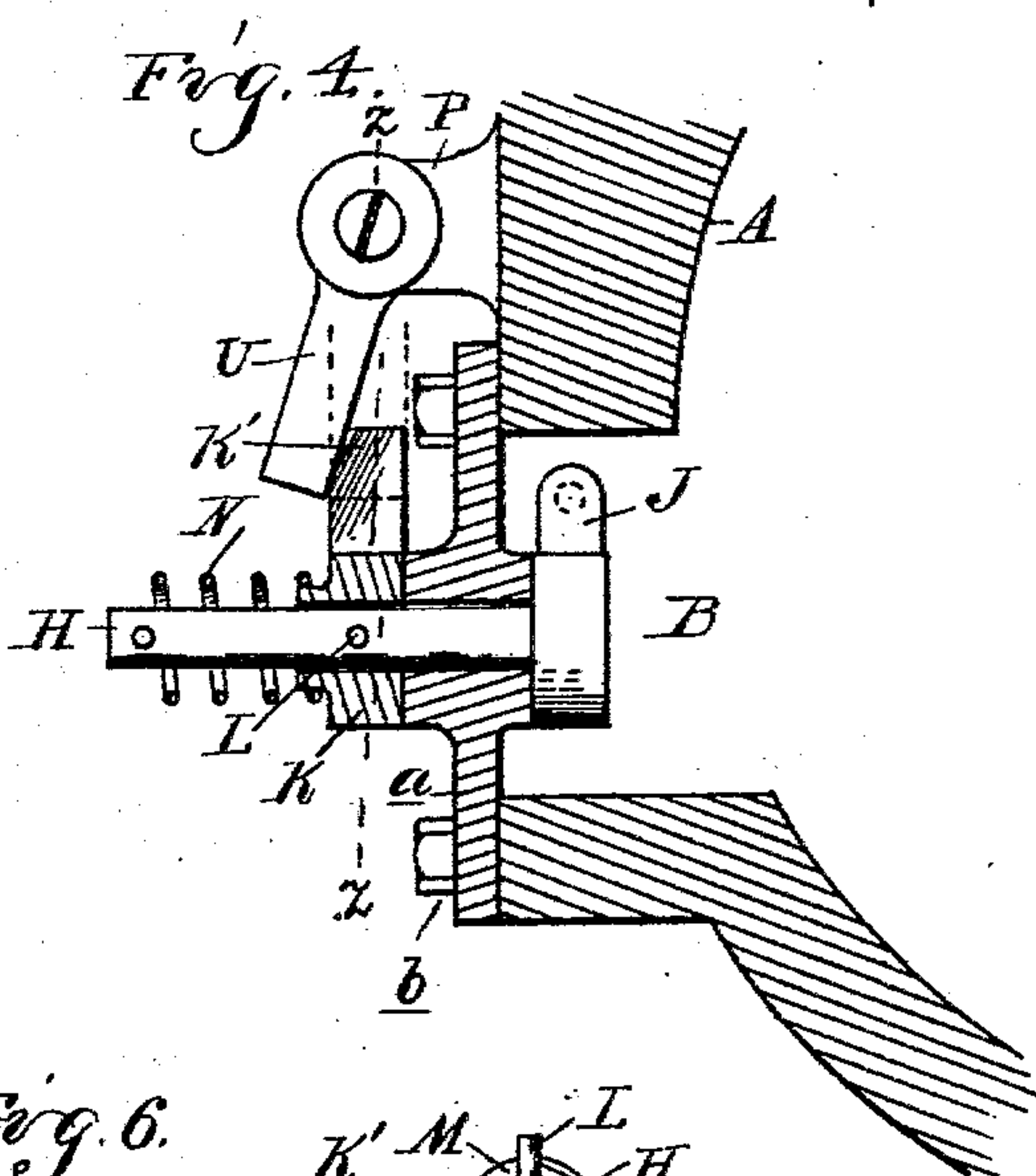
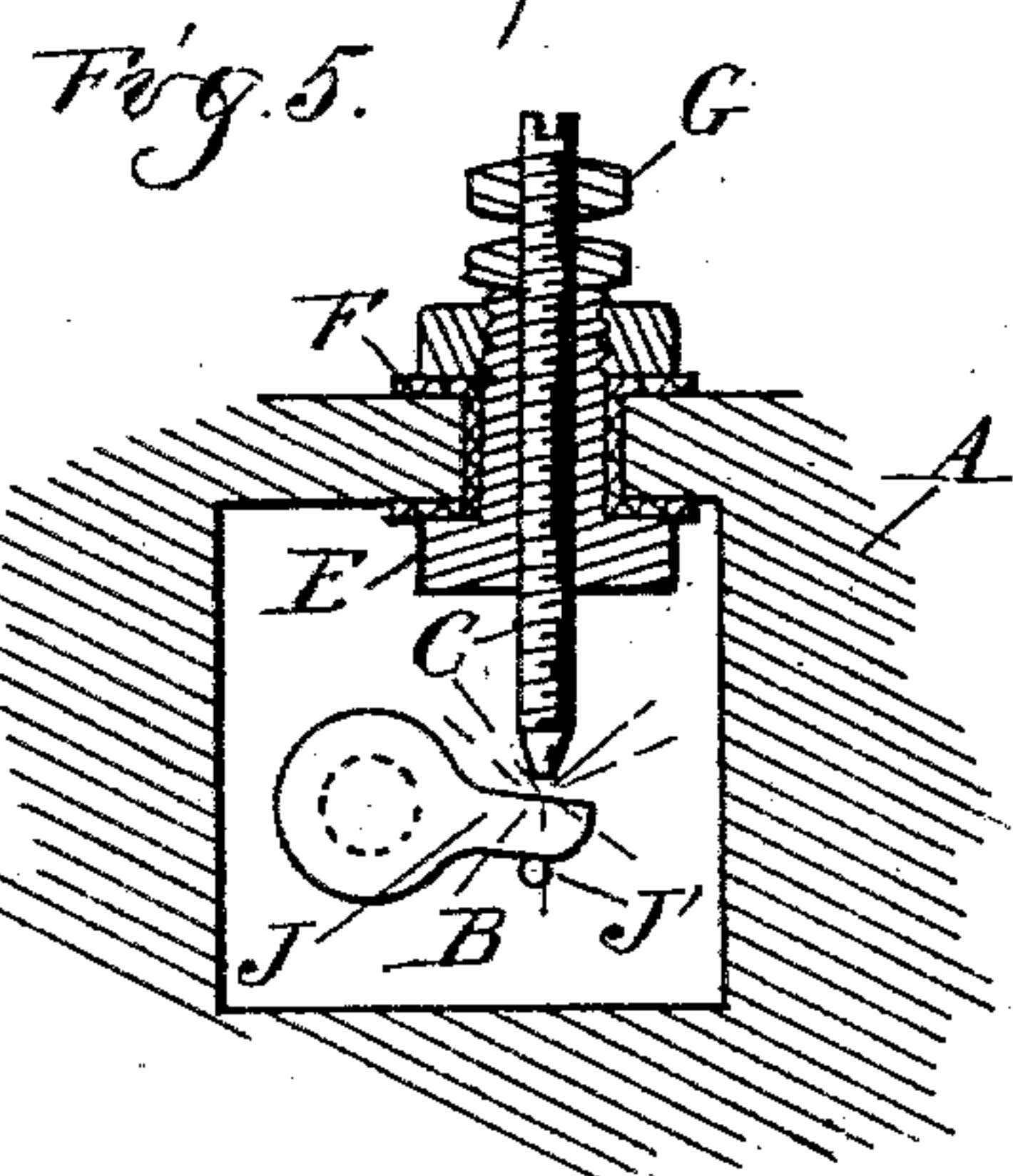
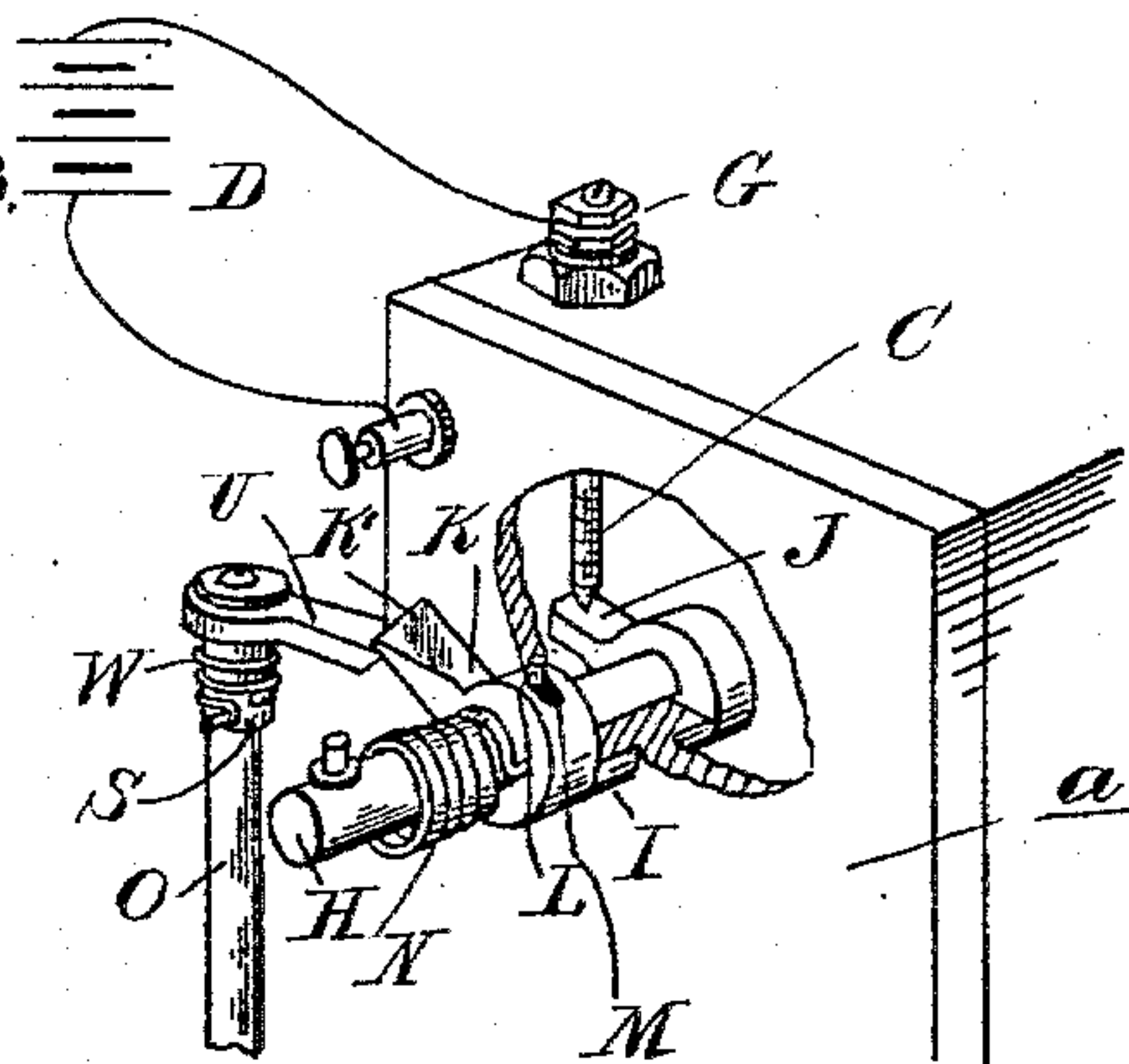
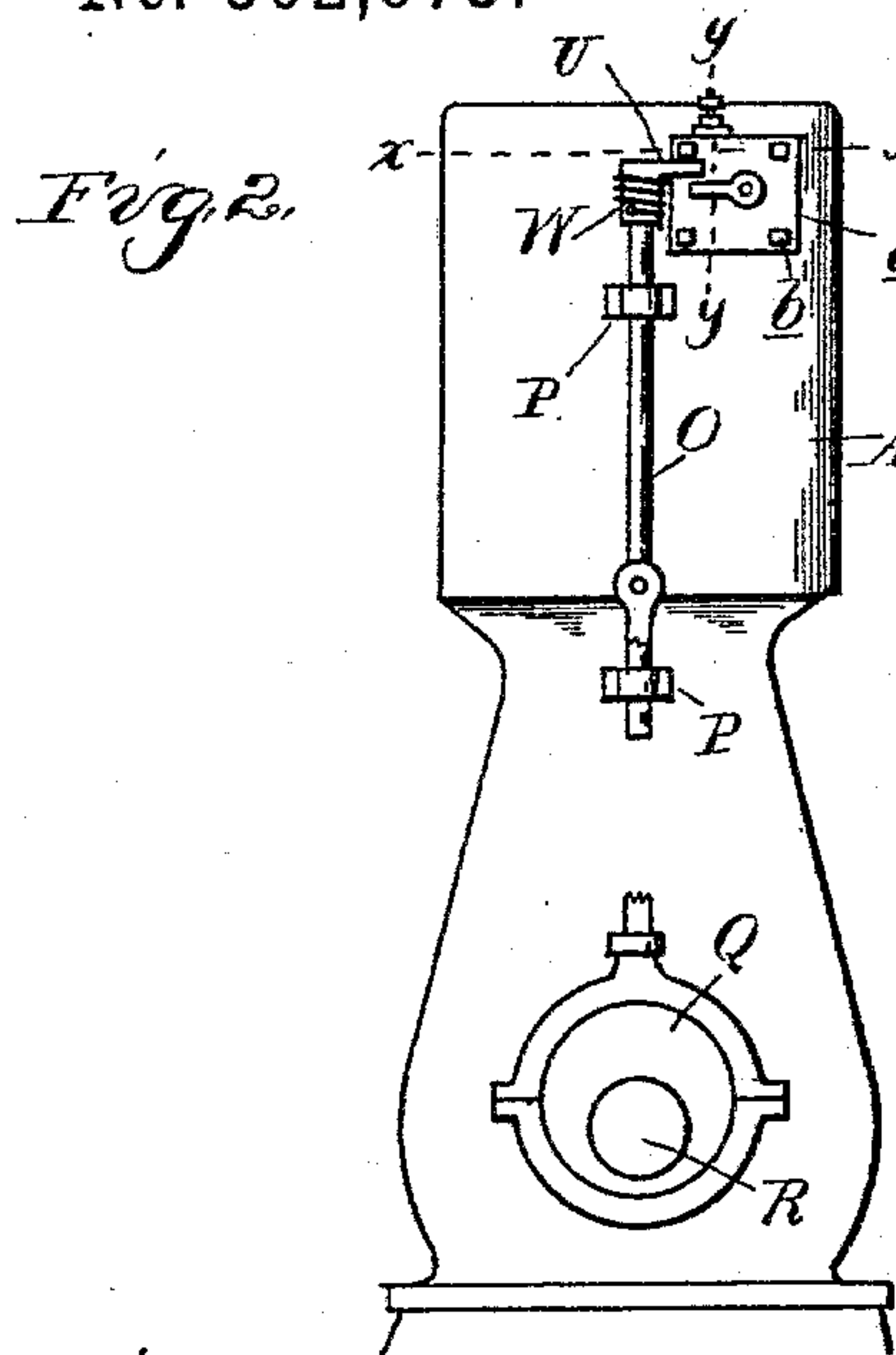
(No Model.)

F. M. SPAULDING.

ELECTRIC IGNITER FOR GAS OR HYDROCARBON ENGINES.

No. 562,673.

Patented June 23, 1896.



Witnesses
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UNITED STATES PATENT OFFICE.

FRANK M. SPAULDING, OF KALAMAZOO, MICHIGAN, ASSIGNOR OF ONE-
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ELECTRIC IGNITER FOR GAS OR HYDROCARBON ENGINES.

SPECIFICATION forming part of Letters Patent No. 562,673, dated June 23, 1896.

Application filed September 9, 1895. Serial No. 561,976. (No model.)

To all whom it may concern:

Be it known that I, FRANK M. SPAULDING, a citizen of the United States, residing at Kalamazoo, in the county of Kalamazoo and State of Michigan, have invented certain new and useful Improvements in Electric Igniters for Gas or Hydrocarbon Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates particularly to the improved construction and arrangement of the means employed for actuating the movable contact by the movement of the engine, all as more fully hereinafter described, in connection with the accompanying drawings, in which—

Figure 1 is a diagram front elevation of a gas-engine to which my improved electrical igniter is applied. Fig. 2 is a diagram side elevation of the cylindrical and actuating mechanism of the igniter. Fig. 3 is a detached perspective view of the actuating mechanism as in operation. Fig. 4 is a horizontal section on line *xx*, Fig. 2. Fig. 5 is a vertical section on line *yy* in Fig. 2. Fig. 6 is a vertical cross-section on line *zz* in Fig. 4; and Fig. 7 is a horizontal section on line *vv*, Fig. 6.

A is the cylinder in which the combustion of gas or other motive agent takes place. B is a space communicating therewith, and inclosing the electrodes. C is a metallic body passing into said space through the inclosing wall and constituting the terminal of one pole of an electric battery D. The body C is insulated and is removably and adjustably secured in any suitable manner, such as by means of a metal bushing E, surrounded by an insulating material F, the body C being screw-threaded through the bushing and having suitable lock-nuts G.

H is a stub-shaft reaching into the space B, a suitable guide-bearing I being formed in the wall through which it passes.

J is an arm secured to the inclosed end of the shaft and adapted to contact with its free end with the body C, said arm constituting the other terminal of the electrical battery D.

J' is a stop supporting the arm J in proximity to the body C.

K is another arm loosely sleeved upon the shaft H on the outside. It engages with the shaft by means of a stop-pin L, which passes through an elongated slot M in the arm, and thereby permits it to have a certain amount of lost motion on the shaft. The free end of this arm K is beveled off, as shown at K'.

N is a coil-spring, the tension of which urges the arm into contact with the stop-pin L to take up the lost motion.

O is a sliding rod secured in fixed guide-bearings P. It is reciprocatingly actuated in harmony with the movement of the piston through an eccentric Q on the shaft R of the engine.

S is a fixed collar on the sliding rod O. It is provided upon its upper face with a segmental shoulder T.

U is an arm sleeved upon the sliding rod. It is provided upon its under side with a segmental shoulder V, which is complementary to the segmental shoulder T on the collar, and forms in connection with it a stop which limits the rotary motion of the arm U on the bar O to the arc of the segment Y.

W is a spring, the tension of which urges the arm U to engage with its shoulder V against the shoulder T in such a manner as to hold the arm U normally in the path of the arm K.

In practice, the parts being arranged as shown and described, the operation is intended to be as follows: The revolution of the engine-shaft imparts to the slide O a reciprocating movement in harmony with the piston, and thereby, at the upstroke of the piston, the arm U (which is held by its spring W in the path of the arm K) impinges against the underside of the arm K, and thereby rocks the shaft H and carries the arm J into contact with the body C, thus closing the electric circuit and increasing the tension of the spring N. By the further upward movement of the slide O the arm U parts engagement with the arm K, and at the instant the latter is thus released the tension of the spring N causes the arm K to fly back, and the end of the slot M striking against the pin L, the arm K thereby imparts to the shaft H a sudden blow and produces a sudden separation between the electrodes and causes the spark to

appear. The slide O, in harmony with the piston, is now carried on its downward stroke, and the arm U will again strike against the arm K, but on the top thereof; but as the arm K is now held fast by the pin L resting against the end of the slot M, it will throw off the arm U to one side, owing to the action of the bevel K', and thus permit the arm U to again pass underneath in position for the next operation.

10 In this operation of the parts, the spring N not only has the function of turning the shaft H in its bearing, but it also draws it endwise and thus produces a certain friction which holds the arm J in position against the stop J' after the spark is produced, and thus holds the electrodes normally apart. It will also be seen that it is immaterial whether the arm K or the arm U has the bevel which causes the latter to turn aside at the downward movement of the slide O.

My construction has the advantage of being extremely simple, it works to perfection, and it is not liable to get out of order, besides its adjustment is easily accomplished. I preferably close the chamber B on the outside by a plate *a*, secured by bolts *b*. If these bolts are taken out, the parts can readily be exposed and examined at will.

What I claim as my invention is—

30 1. In an electric igniter for engines, the combination with the igniting-chamber, of a fixed electrode projecting into said chamber, a rock-shaft extending into said chamber through a guide-bearing, the movable electrode carried by the rock-shaft in proximity

to the fixed electrode, a rock-arm sleeved upon said shaft, a stop on said shaft adapted to hold said rock-arm from rotating in one direction, a spring on said shaft adapted to urge the rock-arm against said stop, an arm reciprocatingly carried by the movement of the engine in the plane of the aforesaid rock-arm and adapted to engage therewith and carry it in one direction, and then release it, and means whereby said arm is thrown out of engagement with said rock-arm when it is moving in the opposite direction, substantially as described.

2. In an electric igniter for engines, the combination with the igniting-chamber, of the fixed electrode C, the rock-shaft H carrying the movable electrode J in proximity to the fixed electrode, the rock-arm K, sleeved upon the rock-shaft, the stop L, which limits the movement of the rock-arm on said shaft, the spring N urging the rock-arm against said stop and adapted to hold said shaft by friction, the sliding bar O reciprocatingly operated by the engine, the arm U carried by said sliding bar and having a lost motion thereon, the spring W for taking up said lost motion, and the bevel K' on the arm K, substantially as described.

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

FRANK M. SPAULDING.

Witnesses:

O. F. BARTHEL,
D. M. HULBERT.