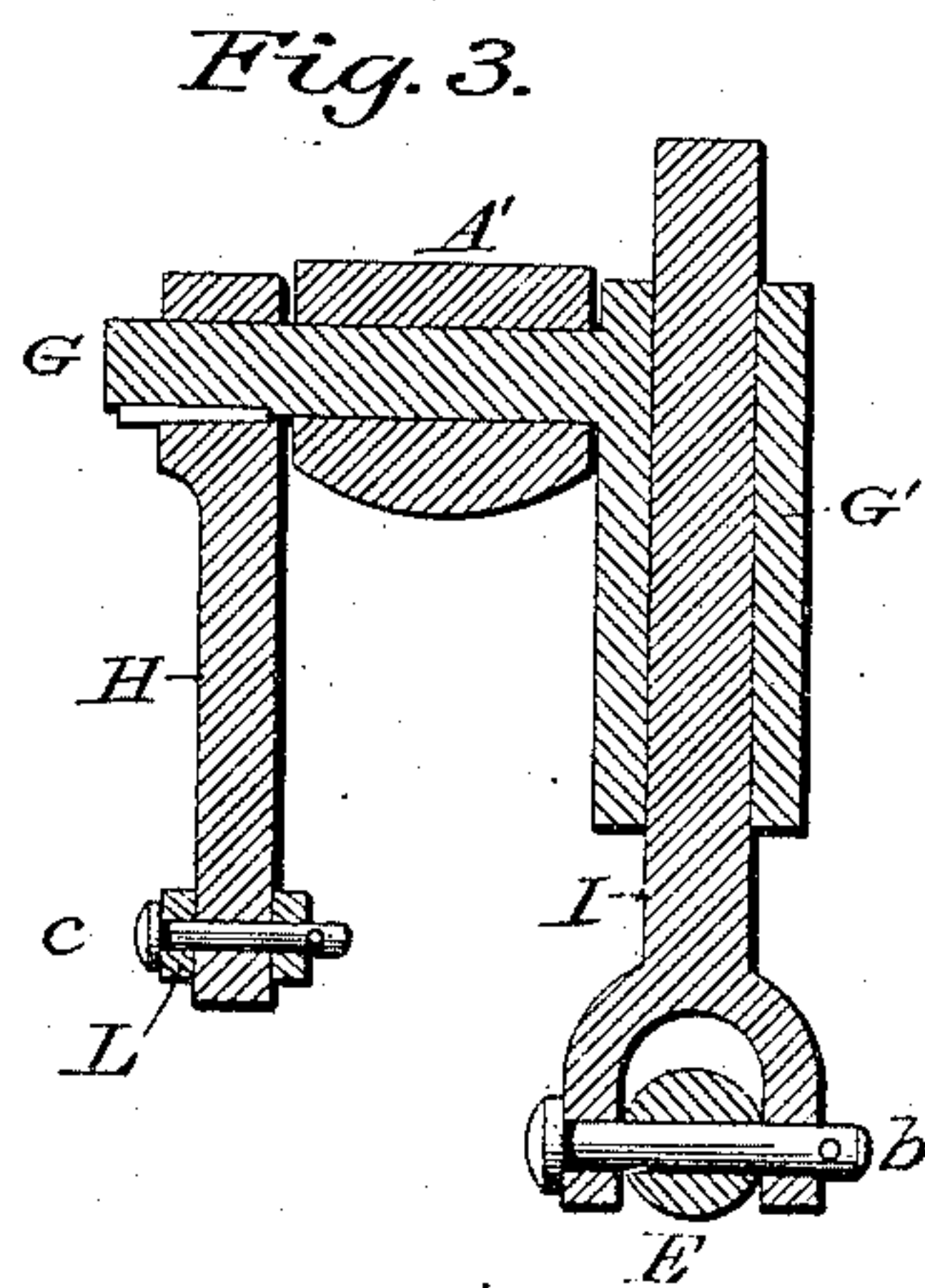
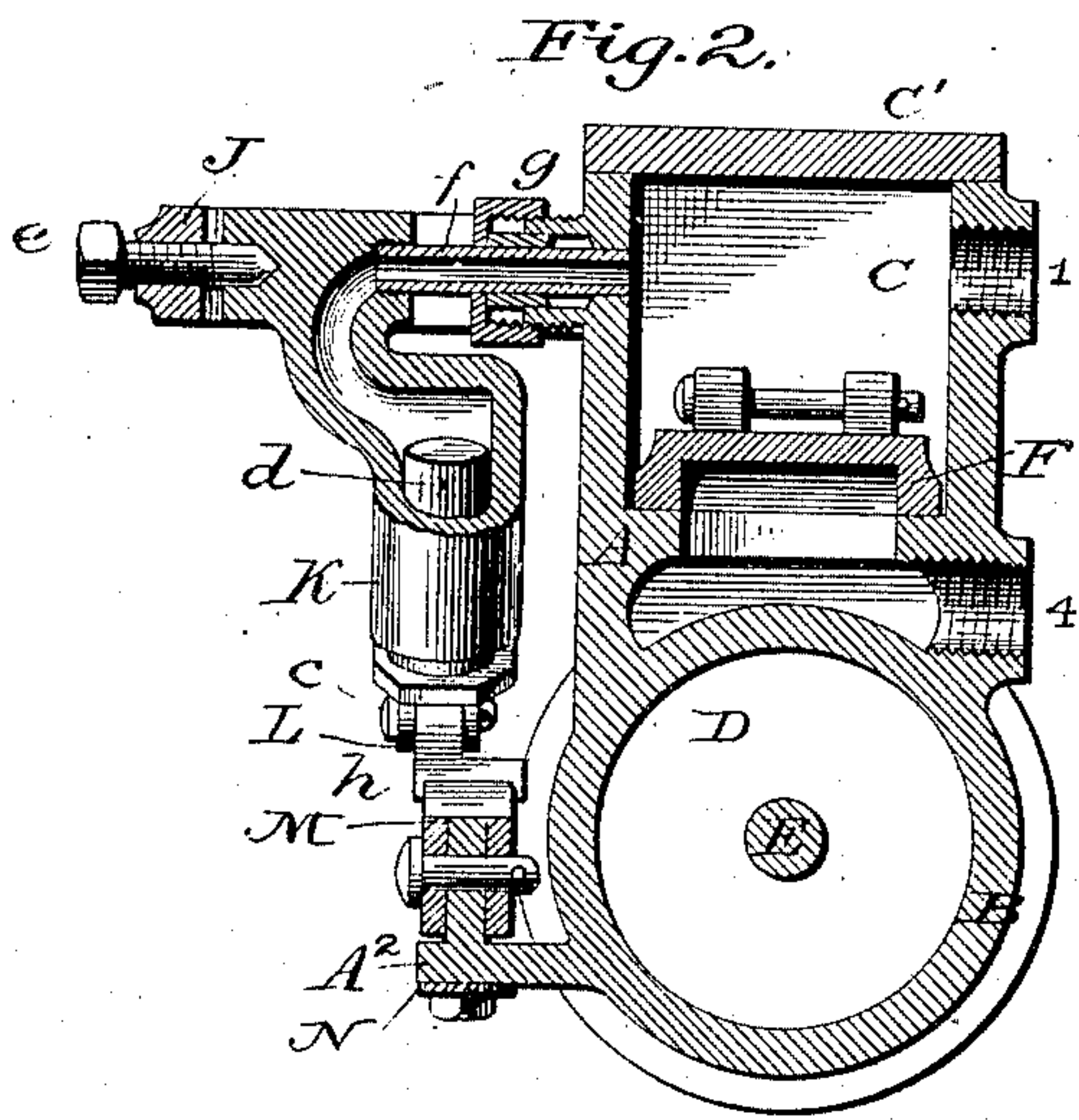
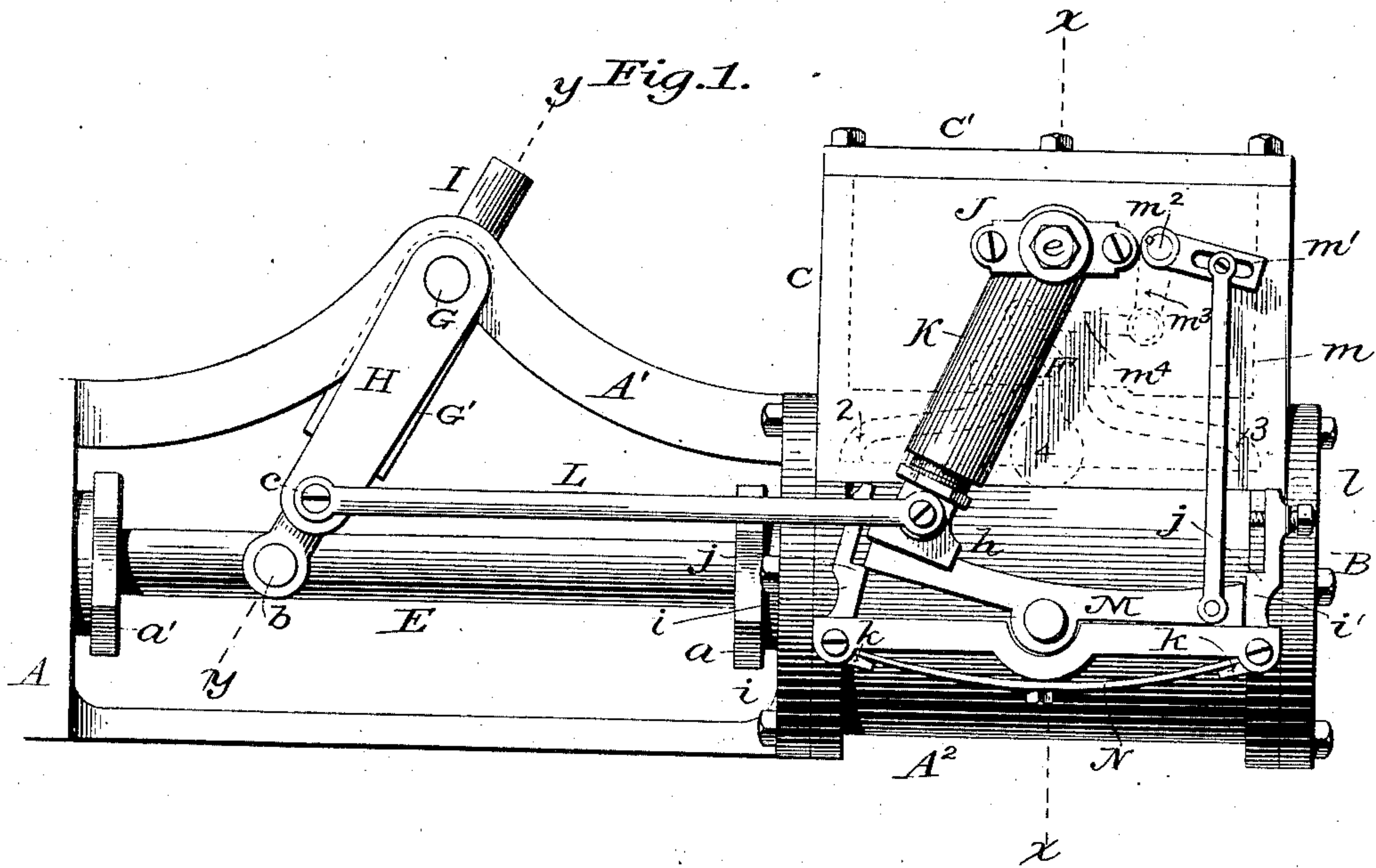


(No Model.)

G. ABRAMS & N. NILSON.
VALVE GEAR FOR STEAM ENGINES.

No. 316,433.

Patented Apr. 28, 1885.



Witnesses:

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UNITED STATES PATENT OFFICE.

GUSTAV ABRAMS AND NILS NILSON, OF DASSEL, MINNESOTA.

VALVE-GEAR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 316,433, dated April 28, 1885.

Application filed February 14, 1885. (No model.)

To all whom it may concern:

Be it known that we, GUSTAV ABRAMS and NILS NILSON, of Dassel, in the county of Meeker and State of Minnesota, have invented certain new and useful Improvements in Valve-Gear for Steam-Engines, of which the following is a specification.

Our invention relates to valve-gear for steam engines and pumps; and it consists in a novel construction of the same, as hereinafter fully set forth and claimed.

In the drawings, Figure 1 represents a portion of a steam-pump showing our improvements applied thereto. Fig. 2 is a section on the line xx of Fig. 1, and Fig. 3 a section on the line yy of Fig. 1.

A indicates the framing of an engine or steam-pump, as the case may be, at one end of which are the cylinder B and steam-chest C, the former adapted to receive the piston D and its piston-rod E, and the latter to receive the ordinary D-shaped slide-valve F, all of which parts are of the usual construction.

The cylinder B is provided with a stuffing-box, a , through which piston-rod E passes, while the outer end of the latter, in case of a pump, as shown in the drawings, passes through a similar box, a' , into the pump-cylinder, as shown in Fig. 1. The steam-chest C is provided with steam-inlet 1 on the rear side, as shown in Fig. 1, also with steam-ports 2 and 3, and outlet 4, as is usual. The cylinder B and steam-chest C are preferably cast in one piece with the framing A, as shown.

In the framing A, above the piston-rod E, is journaled a rock-shaft, G, provided with tubular head or arm G' at right angles to its axis of oscillation.

To one end of the arm G is keyed or otherwise firmly secured a radial arm, H, while through the tubular head or arm G' slides a rod, I, having a forked lower end adapted to straddle the piston-rod E, as shown in Figs. 1 and 3, and connected therewith by a pin, b , passing transversely through the same.

Upon the side of the steam-chest, midway between the ends, is a bracket, J, which may be cast thereon or bolted thereto, as preferred. This bracket J is adapted to receive the upper end of an oscillating steam-cylinder, K, a set-screw, e , serving to center the cylinder in the bracket J, while the pipe f , extending from

the cylinder to the steam-chest, serves a similar purpose, besides affording a communication between the steam-chest and oscillating cylinder. Pipe f is screwed into the oscillating cylinder K, as shown in Fig. 2, and is smooth throughout the remainder of its length, so as to form a journal for the cylinder to oscillate upon, a suitable packing-gland, g , being provided to prevent any escape of steam.

The lower end of arm H is jointed by a pin, c , to one end of the connecting rod or pitman L, which has its other end attached to the outer end of piston d of the cylinder K, as shown in Figs. 1 and 2.

The lower end of the piston d of cylinder K is provided with a shoe, h , which slides upon a rocking lever, M, pivoted midway between its ends to a ledge or projecting rib, A^2 , cast upon or bolted to the steam-cylinder B, as more clearly shown in Fig. 2. At each end of the rocking lever, but separate therefrom, are dogs or latches $i i'$, pivoted to the ledge or rib A^2 , or to the side of the cylinder B, in the same vertical plane as the rocking arm M, said dogs or latches being each provided with a shoulder, j , and tail k , as shown in Fig. 1.

N indicates a flat spring secured to the ledge or rib A^2 , and having its ends arranged to bear upon the tails k of the latches $i i'$, and thus to throw the latches inward to engage with the ends of the rocking lever M when not prevented by other mechanism. The latches or dogs $i i'$ are provided at their upper ends above the shoulders j with set-screws l , adapted to be struck by the shoe h in its travel back and forth upon the rocking lever M. These screws permit adjustment to compensate for wear of the shoe or screws, and to insure the proper tripping of the latches.

At one end of the lever M is pivoted or attached a rod, m , which extends upward, and is attached to a shorter rocking arm, m' , rigidly secured upon a shaft or arbor, m^2 , journaled in the wall of the steam-chest, as shown in Fig. 1, said shaft m^2 being connected by an arm, m^3 , and link m^4 with the slide-valve F, said arm and link being inclosed within the steam-chest, while the arms m and m' are outside of the same.

In the drawings, the piston is shown as having reached nearly the limit of its stroke to

the left, and the completion of its movement will cause the piston-rod E to move the arm H and pitman J, and consequently the oscillating cylinder K, in the same direction. The oscillation of the cylinder K will cause its shoe *h*, attached to piston *b* or its piston-rod, to come into contact with the screw *l* in the upper end of latch or dog *i*, and throw the latter backward so that rocking lever M will be free to ride off the shoulder *k*. Steam in the cylinder K now forces the piston *b* down, and thus rocks lever M upon its pivot and elevates its other end, which engages with the shoulder *k* on the latch *i'*. This movement of the lever M, transmitted through rod *m* and arms *m'* *m''* and link *m'''* to the slide-valve F, causes a reversal of the position of said valve, which then admits steam through port 2, and permits the dead steam to exhaust through ports 3 and 4. Just before the piston D completes its stroke to the right the shoe *h*, sliding upon the rocking lever M, comes into contact with the screw *l* in the latch or dog *i'*, and the operation before described will be repeated.

There is a constant pressure exerted by the piston *d* upon rocking lever M, as the oscillating cylinder is at all times in communication with the steam-chest.

While in the drawings the invention is shown as applied to a pumping-engine, it is to be understood that it can be equally well applied to other styles.

Having thus described our invention, what we claim is—

1. In combination with a steam-engine and its slide or controlling valve, a pivoted lever connected with and serving to actuate the valve-latches for holding the lever in a fixed position for a stated period, an oscillating cylinder in communication with the steam-chest or supply, and connected with the piston-rod of the engine, and a piston movable within said cylinder, provided with a block to strike and release the latches alternately, and adapted to rock the lever controlling the valve by reason of the steam-pressure upon it.

2. In combination with the slide or reversing valve of an engine, an oscillating cylinder communicating with the chest or supply thereof, and a piston movable within the cylinder and adapted to shift or throw the valve, substantially as explained.

3. In combination with an engine and its slide or controlling valve, an oscillating cylinder communicating with the fluid-reservoir, and a piston movable within said cylinder, connected with the piston-rod, and arranged, substantially as described and shown, to actuate the valve, as set forth.

4. In an engine, the combination, with the slide-valve, of a rocking lever, M, connected with said valve and adapted to impart motion thereto, a latch at each end of said lever

to hold said ends alternately in an elevated position, an oscillating cylinder communicating with the steam-supply, and a piston having a shoe adapted to slide upon the rocking lever connected with the piston-rod and adapted, by reason of its movement therewith, to trip the latches, and by reason of the steam-pressure upon it to rock or tip the lever and throw the valve, all substantially as set forth.

5. In a steam-engine, the combination of a cylinder, a piston and its rod, a steam-chest, a slide-valve therein, an oscillating cylinder communicating with the steam-chest and provided with a piston having a block at its outer end, a rocking arm connected with the piston-rod of the engine and with the piston of the oscillating cylinder, a rocking lever pivoted to the side of the engine and connected with the slide-valve thereof, and spring-latches at the ends of the rocking lever, all combined and arranged to operate as set forth.

6. In a steam-engine provided with valve-controlling mechanism, substantially such as described and shown, a pipe, *f*, communicating with the steam-chest and with the oscillating cylinder, and adapted to serve as a pivot for the latter, as set forth.

7. In a steam-engine provided with valve-controlling mechanism such as shown and described, and with an oscillating steam-cylinder for operating the same, bracket J, set-screw *e*, pipe *f*, and packing *g*.

8. In combination with cylinder B, piston D, and its rod E, steam-chest C, slide-valve F, arranged therein, oscillating cylinder K, piston *d* within said cylinder, rocking lever M, connected with the slide-valve, a spring-latch at each end of the rocking lever, arm I, connecting the piston-rod and rocking arm G, and arm H, connected with the piston *d* and adapted to impart motion thereto and to its cylinder K.

9. In an engine provided with valve-controlling mechanism such as described and shown, the combination of frame A', rocking arm G, provided with tubular arm G', and arm H, rod I, mounted in said tubular arm G' and connected with the piston-rod of the engine, as set forth.

10. In an engine provided with valve-controlling mechanism such as described and shown, the combination of frame or ledge A', rocking lever M, pivoted spring-latches at each end of the rocking lever provided with set-screws *l*, oscillating steam-cylinder K, provided with piston *d*, and shoe *h*, adapted to slide freely upon the rocking lever and to rock the same, as set forth.

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