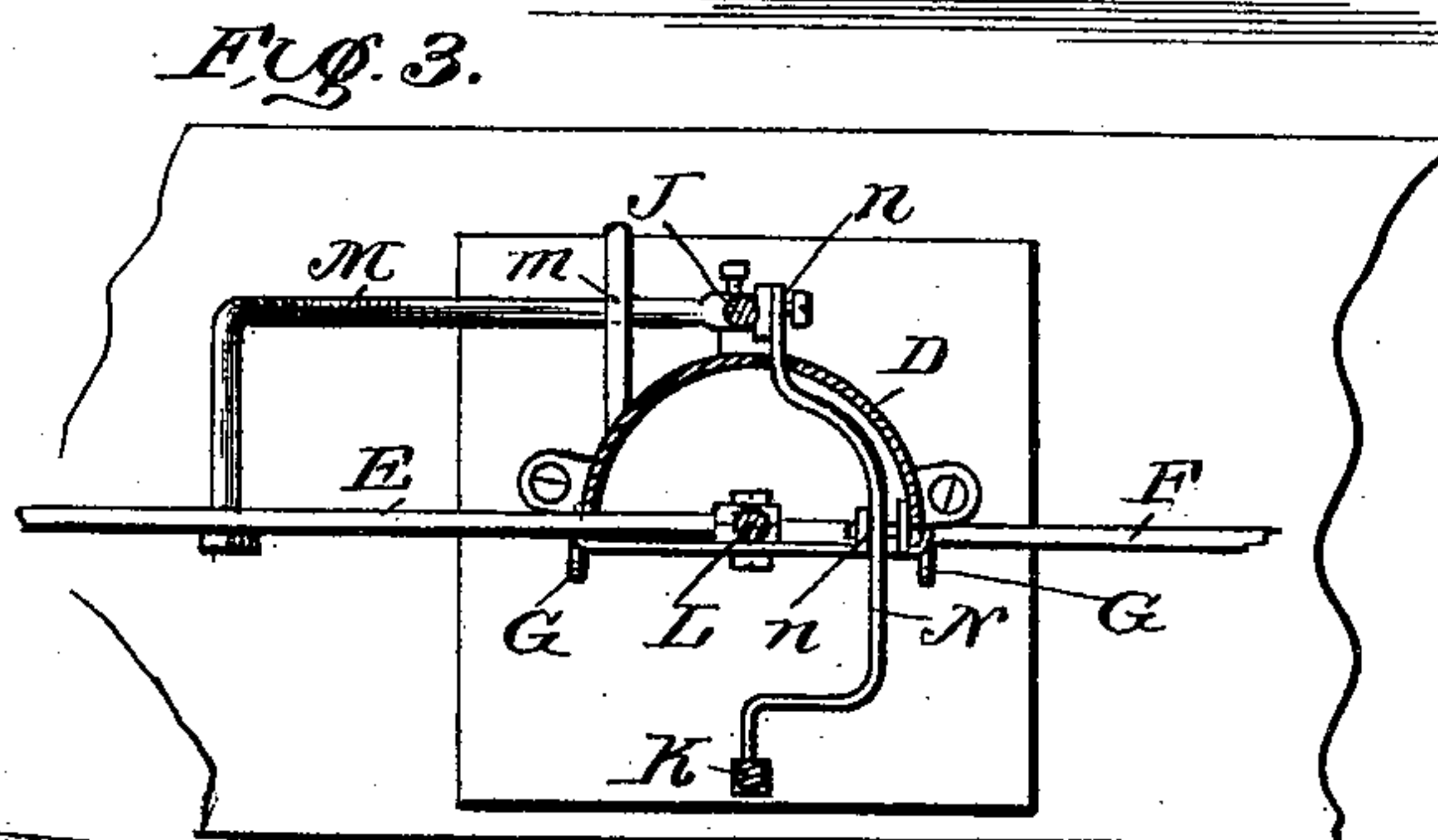
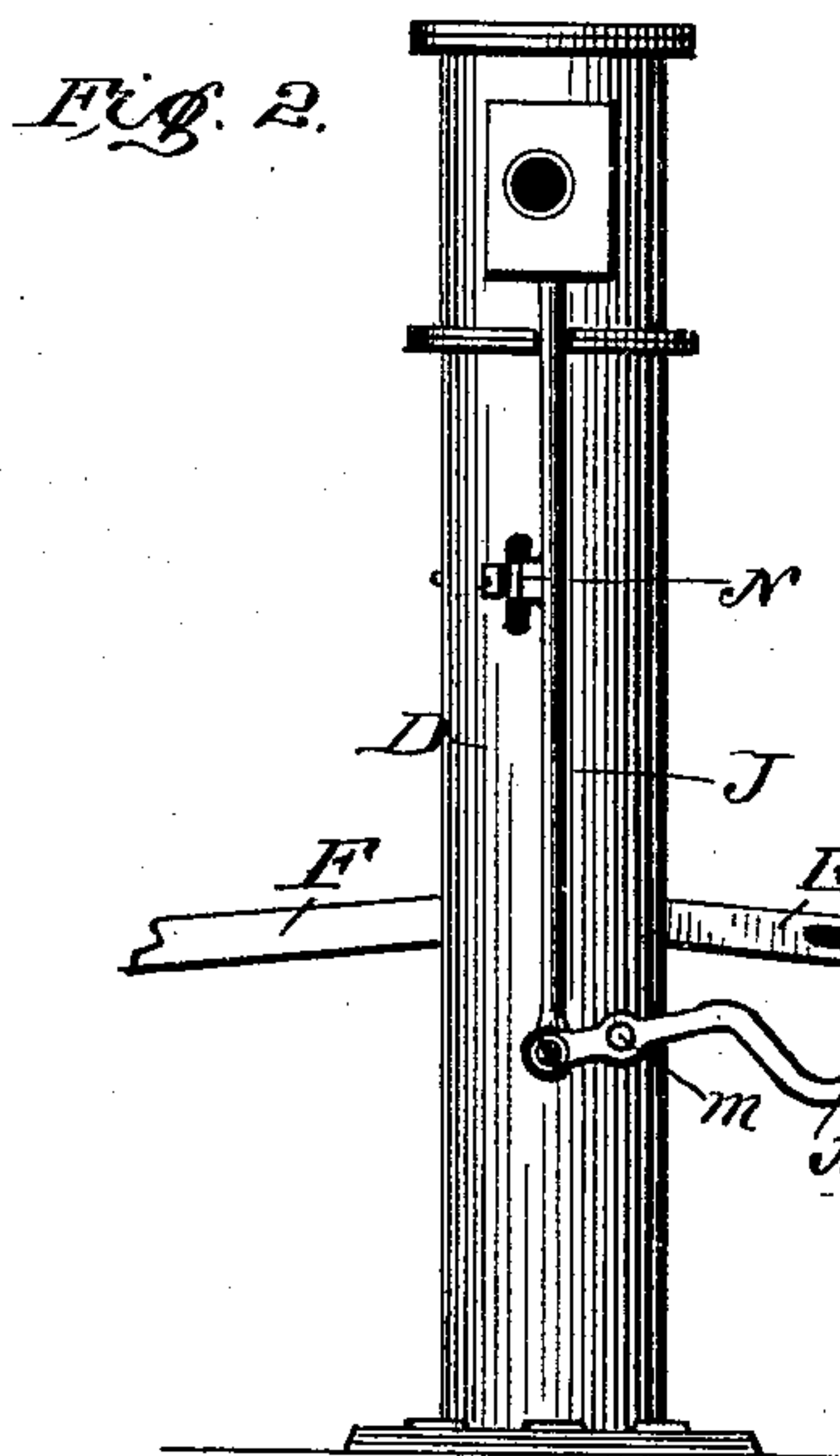
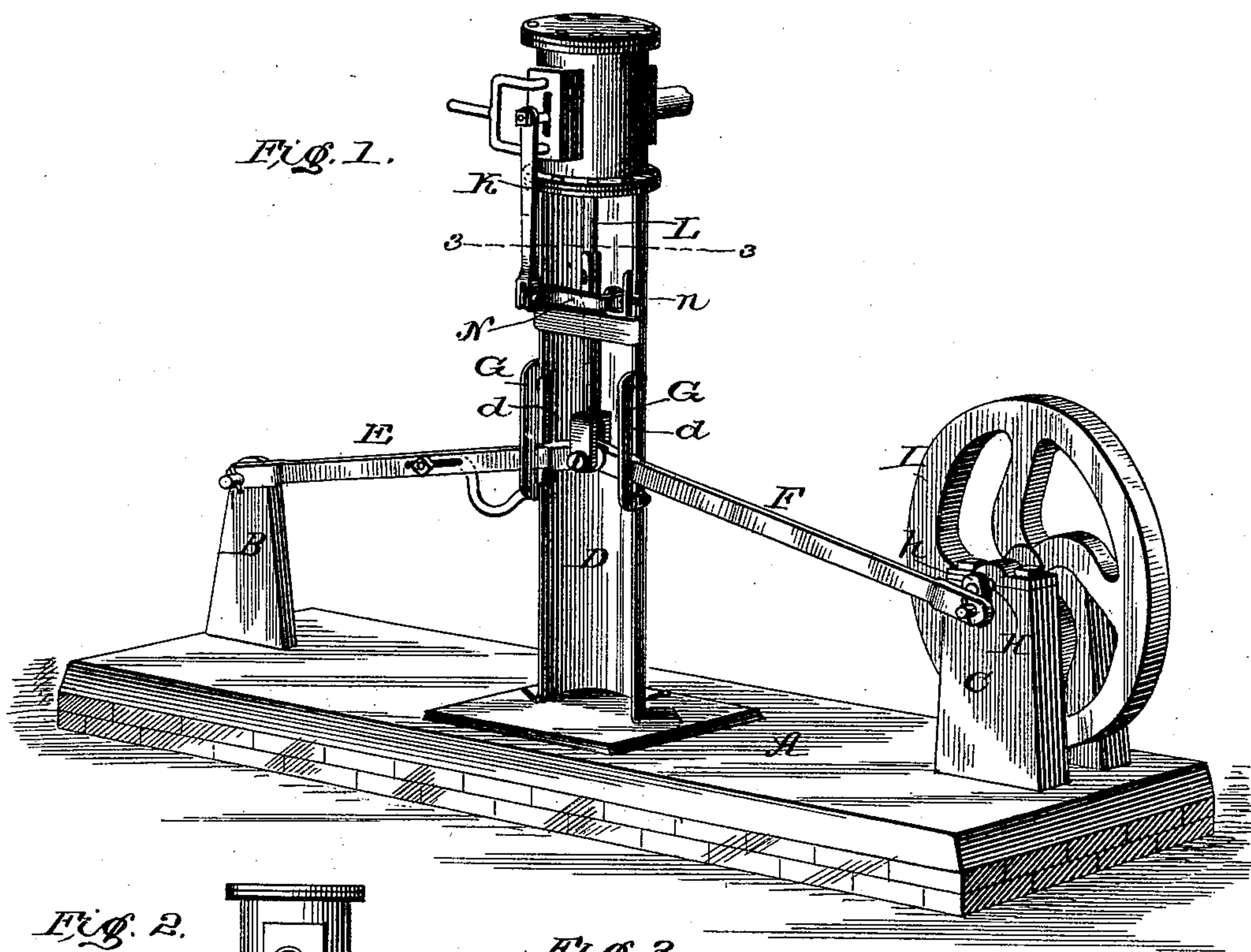


(No Model.)

E. H. ALLRED.  
STEAM ENGINE.

No. 500,462.

Patented June 27, 1893.



WITNESSES:  
*Fred G. Dietrich*  
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# UNITED STATES PATENT OFFICE.

ELIJAH H. ALLRED, OF RANDLEMAN, ASSIGNOR OF ONE-TENTH TO WILLIAM C. HAMMER, OF ASHBOROUGH, NORTH CAROLINA.

## STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 500,462, dated June 27, 1893.

Application filed January 19, 1893. Serial No. 458,946. (No model.)

*To all whom it may concern:*

Be it known that I, ELIJAH H. ALLRED, of Randleman, in the county of Randolph and State of North Carolina, have invented a new and useful Improvement in Steam-Engines, of which the following is a specification.

My invention is an improvement in steam engines and has for an object certain improvements and consists in the special construction and combinations of parts as will be hereinafter described and pointed out in the claims.

In the drawings—Figure 1 is a perspective view of the improved engine. Fig. 2 is a partial side elevation thereof and Fig. 3 is a cross section on about line 3—3 of Fig. 1 looking down.

In the construction shown the bed plate A has mounted upon it near its ends the stands B and C and between its ends the upright D. This upright is in the nature of a hollow column open at one side and having its edges recessed or cut out at *d* to receive the jointed ends of the toggle arms E and F, such ends being retained in said recesses *d* by retaining plates G bolted to the upright and forming guides for the toggle to brace and steady the movements of the latter. At their outer ends the arms E and F are connected respectively with the stand B and the crank *h* of the shaft H. The shaft H journals in the stand C, has a fly wheel I and may be provided with suitable means for transmitting the power. The steam cylinder is supported upon the upright D and is provided with a steam valve and an exhaust valve not shown such valves being connected respectively with rods J and K by which they are operated in the manner presently described. The piston rod L connects with the jointed ends of the toggle arms so that as it reciprocates it will operate the toggle arms to revolve the crank and main shaft as will readily appear from Fig. 1 of the drawings. The rod J is connected with one end of a rocking lever M which is pivoted between its ends at *m* to the upright D and has

its other arm connected pivotally with toggle arm E so that the lever M is rocked as the toggle is operated. To the rod J is pivoted one end of a lever N which is pivoted between its ends at *n* and connects at its other end with the rod K. By this construction the operation of the toggle arms serves to properly actuate both the steam and exhaust valves.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an engine substantially as described the combination of the base plate, the upright D having recesses *d*, the main shaft, the toggle arms jointed together at their ends, and fitting at such ends in the recess *d*, the steam cylinder supported on the upright D and having its piston rod connected with the toggle arms and the retaining plates secured to the upright D over the recesses *d* all substantially as set forth.

2. In an engine substantially as described the combination with the cylinder and the steam and exhaust valve rods J and K of the lever N, pivoted between its ends and connected at one end with the rod K and devices by which to operate the rod J all substantially as and for the purposes set forth.

3. The improvement in engines herein described and shown consisting of the base plate, the upright D thereon the cylinder mounted on said upright, and having steam and exhaust valve rods J and K, the lever N pivoted to the upright D and connected at its opposite ends with the rods J and K, the toggle arms, the piston rod connected with said arms at their joint and the lever M pivoted to the upright and connected at one end to one of the toggle arms and at its other end with the rod J all substantially as and for the purposes set forth.

ELIJAH H. ALLRED.

Witnesses:

ADESON L. DAVIS,  
JOHN W. BUTTAIN.