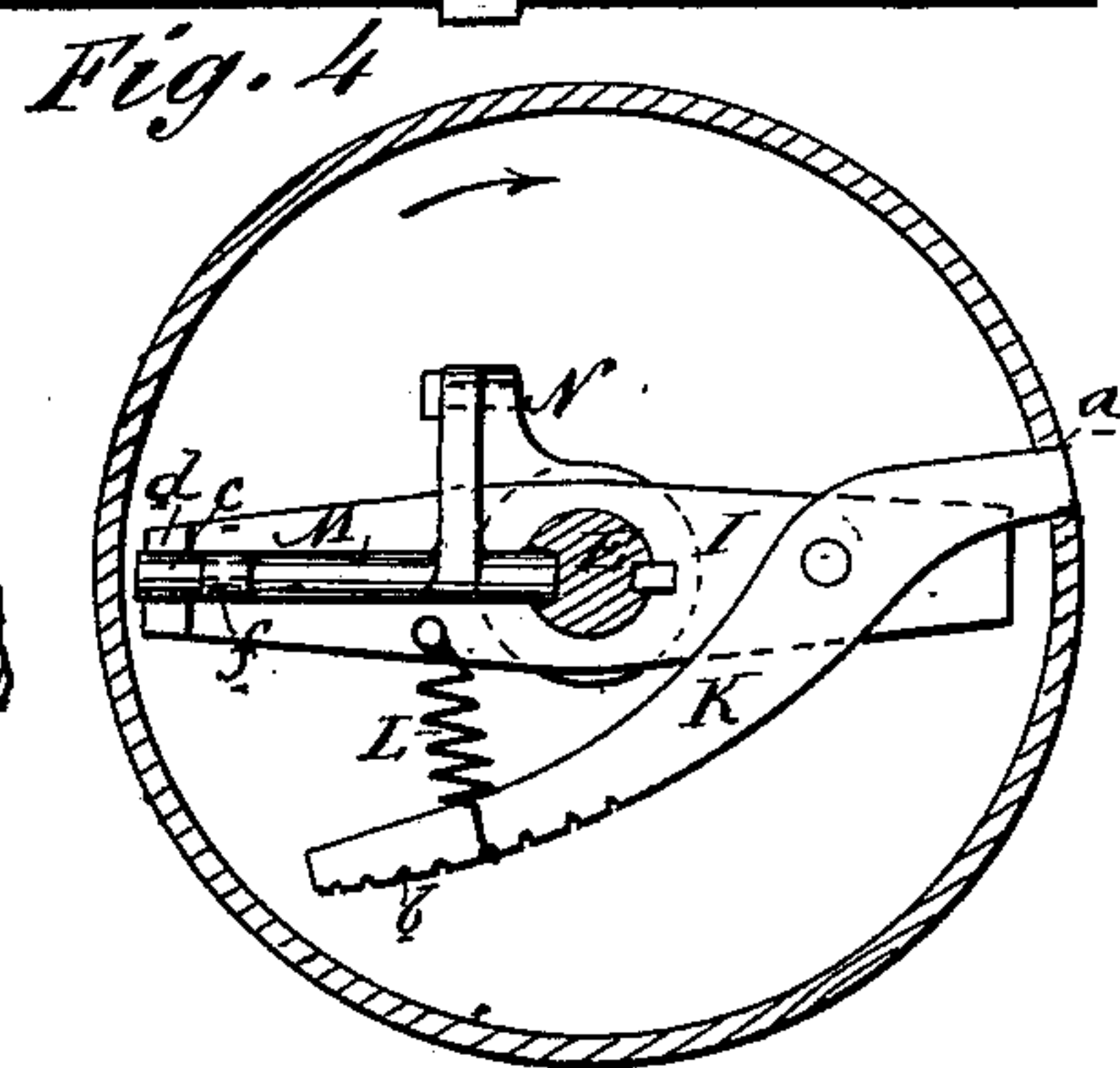
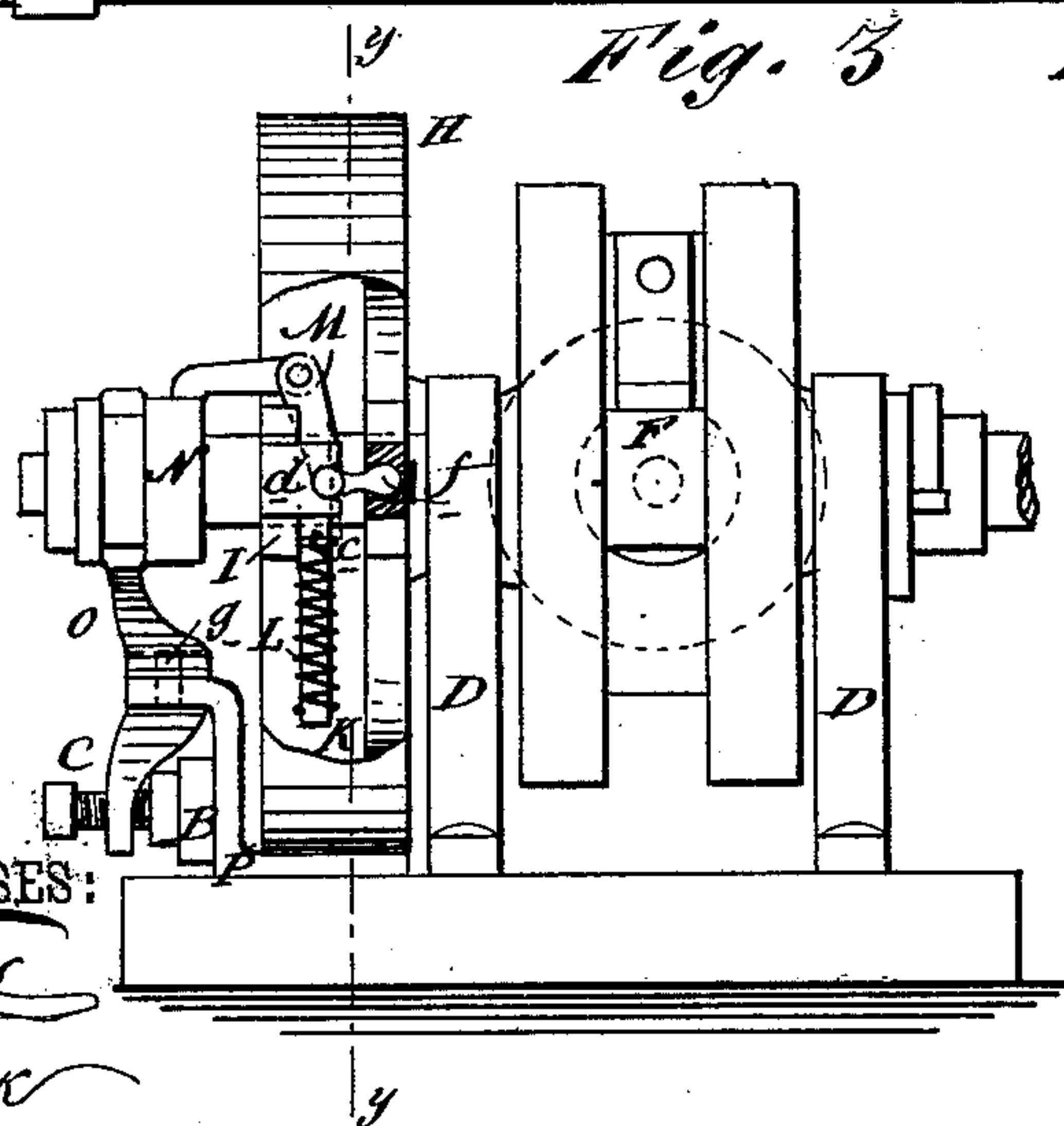
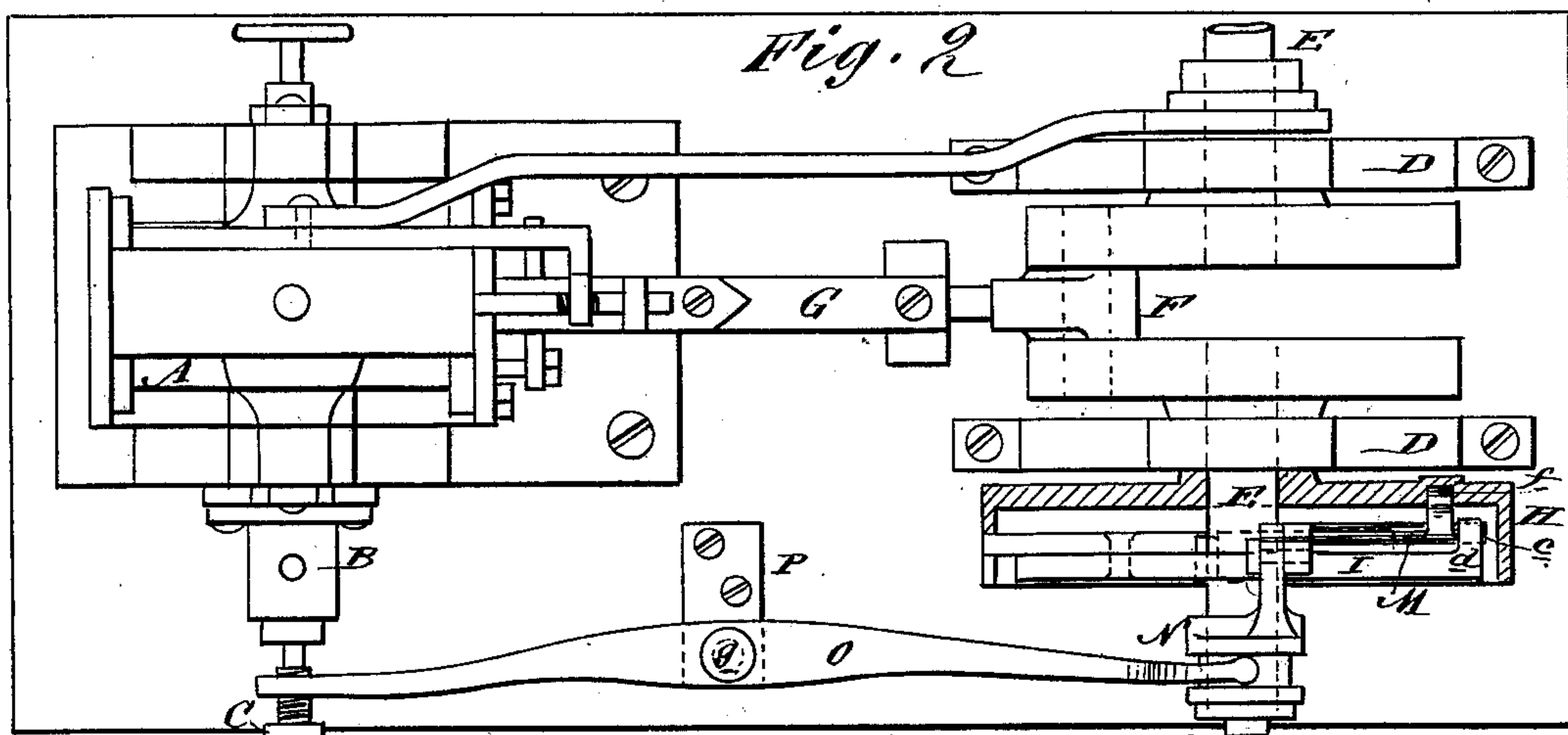
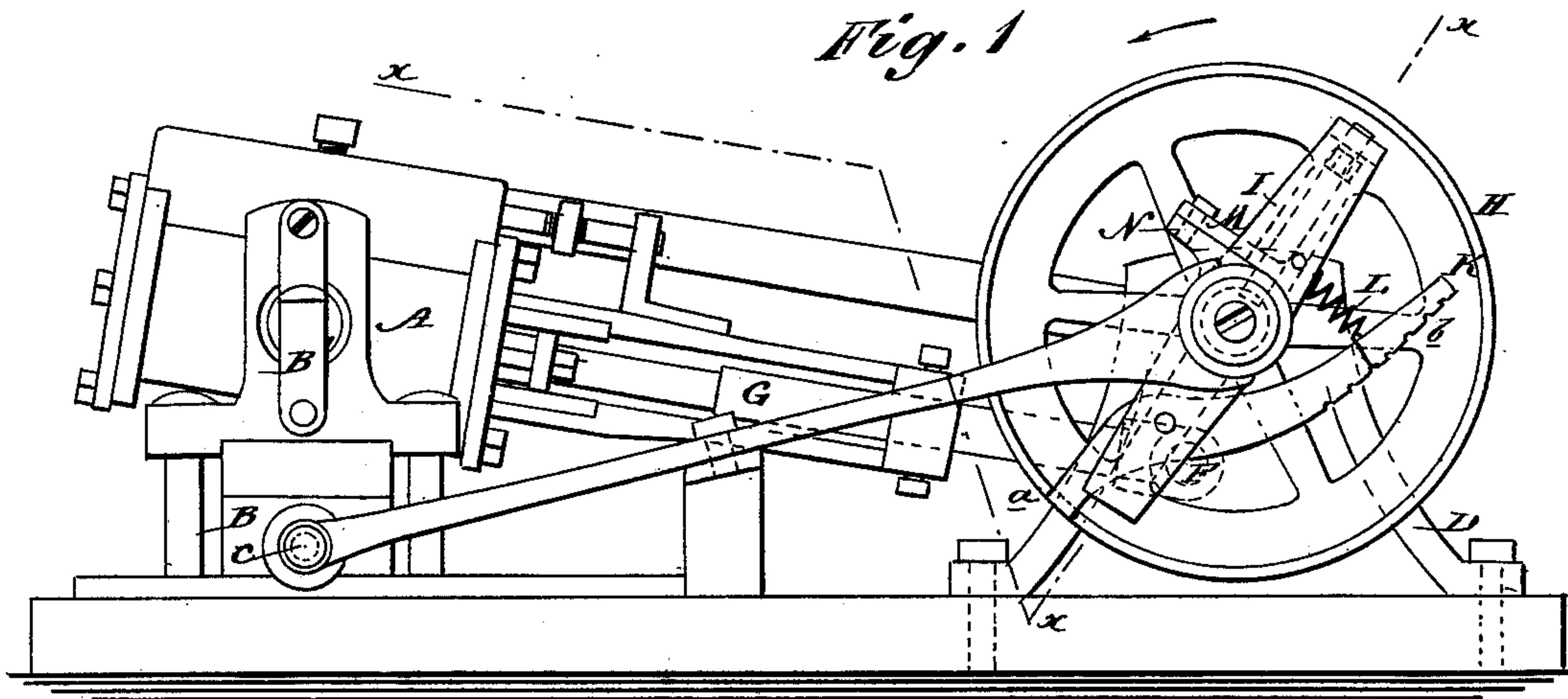


# H. KNUDSON. Dynamometrical Engine Governor.

No. 229,713.

Patented July 6, 1880.



WITNESSES:

*C. Neveu*  
*E. Sedgwick*

INVENTOR:

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BY

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ATTORNEYS.



# UNITED STATES PATENT OFFICE.

HANS KNÜDSON, OF DE FOREST, WISCONSIN, ASSIGNOR TO HIMSELF AND  
HANS S. GRINDE, OF SAME PLACE.

## DYNAMOMETRICAL ENGINE-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 229,713, dated July 6, 1880.

Application filed November 20, 1879.

*To all whom it may concern:*

Be it known that I, HANS KNÜDSON, of De Forest, in the county of Dane and State of Wisconsin, have invented a new and Improved  
5 Dynamometrical Engine-Governor, of which the following is a specification.

Figure 1 is a front elevation of the device applied to an engine. Fig. 2 is a plan of the same on line *x x*, Fig. 1. Fig. 3 is an end ele-  
10 vation with part of the driving-wheel broken away to show the rock-shaft, spring, and other parts. Fig. 4 is a vertical sectional elevation on line *y y*, Fig. 3.

Similar letters of reference indicate corre-  
15 sponding parts.

The object of this invention is to provide a novel device by means of which the work performed by the engine and the strain upon the driving-wheel shall regulate and control the  
20 steam-supply.

The invention consists of a cross-piece keyed on the driving-wheel shaft and reaching nearly across the diameter of said wheel, and near the end of one arm of the cross-piece is fastened  
25 a lever, the short arm of which is connected to the rim or spoke of the driving-wheel, which driving-wheel is loosely set on the shaft, while the long arm is connected by a spiral spring to the cross-piece.

In the drawings, A represents the engine-cylinder; B, the steam-chest; B', the steam-passages from steam-chest to cylinder; C, the governor-rod; D, the pillow-blocks; E, the driving-wheel shaft; F, the eccentric or crank  
30 to which the piston-rod G is attached; H, the driving or belt wheel running loosely on the shaft E.

I is the cross-piece, centrally keyed on the shaft E, and having pivoted to its inner face,  
40 near the end of one arm, the lever K, the short arm of which is fixed in the slot *a* in the rim of the driving-wheel H. The other arm of the said lever K is curved and serrated on its convex edge, as shown at *b*, and is connected by  
45 the spiral spring L to the cross-piece I. The rock-shaft M, that is in contact with the inner face of that arm of the cross-piece I which is opposite the fulcrum of the lever K, is secured, by the projection of its end *c* through the lug  
50 *d* of the cross-piece I, to the said cross-piece,

while its offset or stud *f* holds it at the same end in connection with a spoke of the driving-wheel H. The other end of the said rock-shaft M connects, as shown, with the sliding collar N, that is set on the driving-wheel shaft E, a  
55 simple connecting-pin passing through the lugs of both rocking shaft M and sliding collar N.

The lever O, fulcrumed and supported by pin *g* on standard P, has its forked end embracing the sliding collar N, and its other end  
60 secured to the governor-rod C, and is adjustable thereon by means of the screw-thread on said rod.

When the governor-rod C is in its place and steam is let on the engine will have but barely  
65 enough steam to run at speed even without any work being given to it to do; but as soon as work is given and strain brought on the driving-belt the friction and pull on the driving-wheel H will increase, with the effect of  
70 making the said wheel H offer a resistance to motion, so that it will have a tendency to hold back as the shaft E and cross-piece I turn in the direction of the arrow shown in Fig. 1. The result and measure of this resistance of  
75 the wheel H to the motion of the cross-piece I is the turning inward of the ends of the rocking shaft M, and the consequent inward movement of the collar N and the forked end of the attached lever O, and in consequence the lower  
80 end of the said lever O is thrown outward, and with it the governor-rod C, which opens the steam-ports, and thereby at once admits an increased supply of steam to the engine, the  
85 lower end of the lever O being adjustable on the rod C, so that it may in its extreme motion either entirely cut off the steam or open the ports to their fullest extent.

With an increased strain or pull upon the driving-wheel H there is an increased resist-  
90 ance of the said driving-wheel H to move in concert with the shaft E and cross-piece I, and according to the measure of this resistance is the rocking shaft M so turned as to affect the steam-supply by means of the connecting-col-  
95 lar N, lever O, and governor-rod C.

The greater the tendency of the driving-wheel H to lag in its motion the more will the rocking shaft M be turned inward and the fuller will be the consequent supply of steam. 100



With this steam-governing device applied to an engine increased demand is immediately followed with increased supply of power, and as the demand decreases, as the work slacks at any time, the action of the spring L, which is always opposed to the force which disturbs the relative positions of the wheel H and cross-piece I, tends to restore the said wheel H and cross-piece I to their normal relative positions, and thereby, also, to restore the rocking shaft M and its other connections to their original positions, so that the steam-supply shall be measurably decreased.

The teeth or serrations *b* on the lever K are to facilitate the adjustment of the spring L for effecting the cut-off or supply of steam by the governor-rod C.

With this governor, as steady or a more steady motion can be secured to the engine than by the use of any other governor. With this the engine, or the work it is doing, will control the steam-supply, and not the steam the engine, as is the usual case.

This governor can be set, while the engine is running, by turning the screw governor-rod C, so that when the work is done the steam shall be entirely cut off, and it can be connected directly with the valve in engines especially designed for that purpose, so that the engine can be worked by expansion of the steam.

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

The steam-governing device constructed substantially as described, and consisting of a loose driving-wheel, H, cross-piece I, keyed on the driving shaft, lever K, pivoted to cross-piece I, spiral spring L, rocking shaft M, collar N, sliding on the driving-shaft E, and lever O, connecting collar N with the screw governor-rod C, as herein set forth.

HANS KNÜDSON.

Witnesses:

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