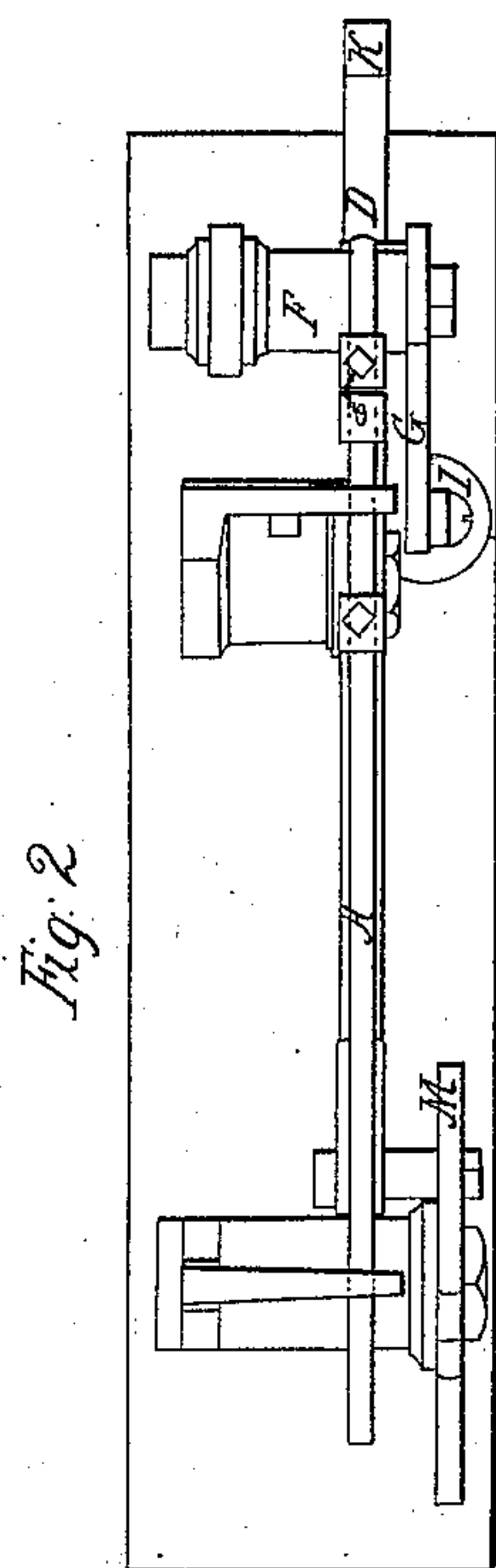
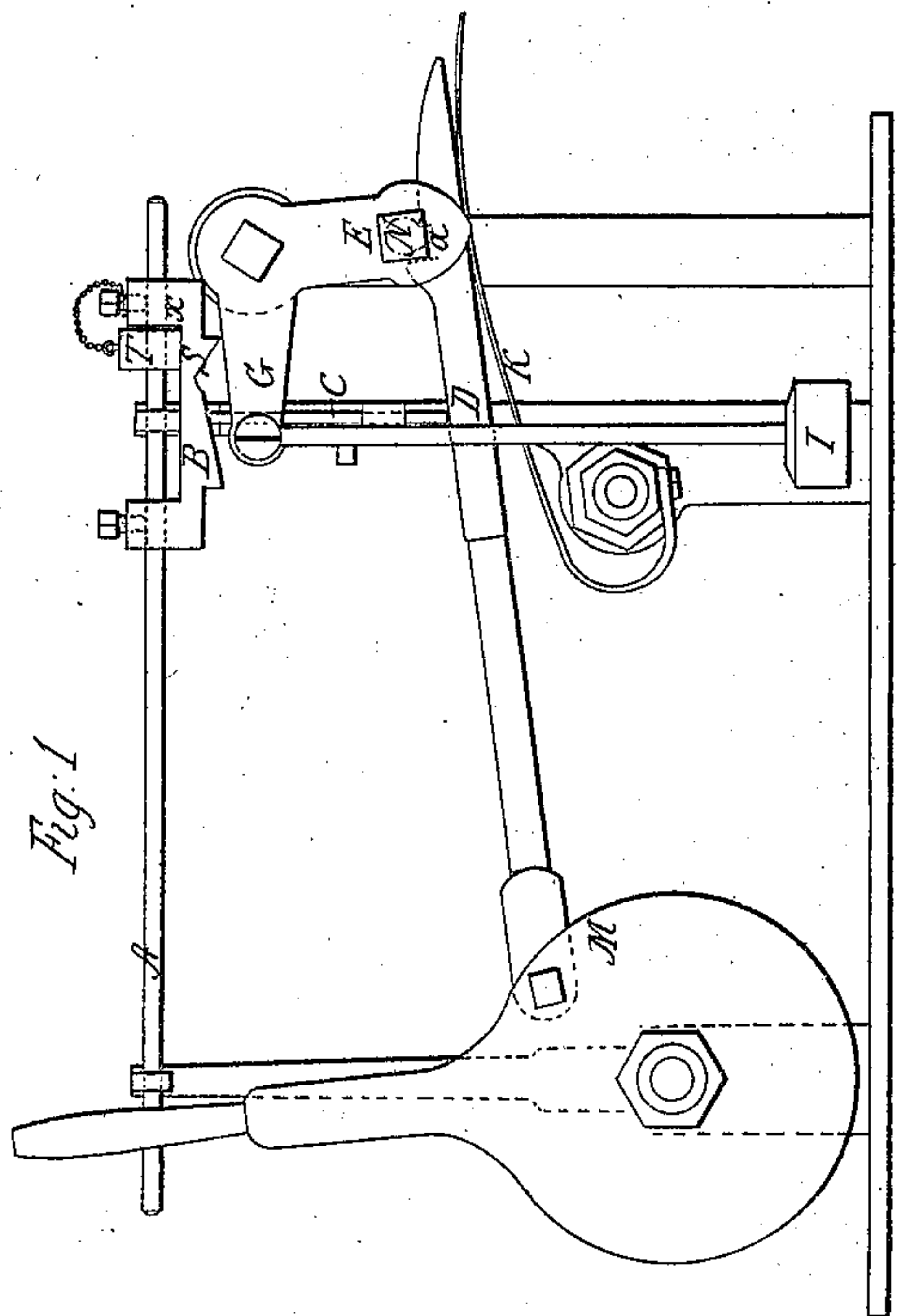
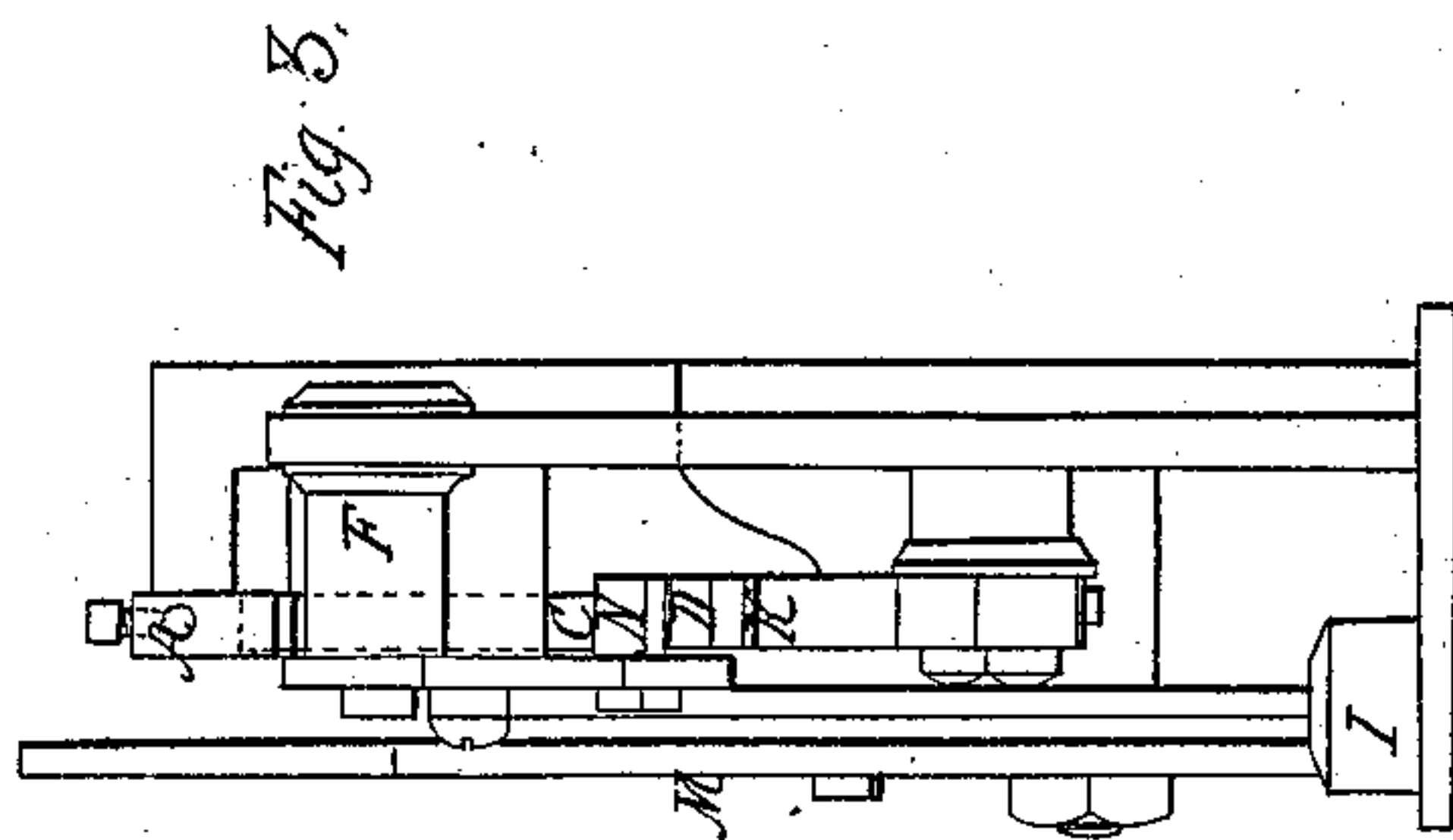
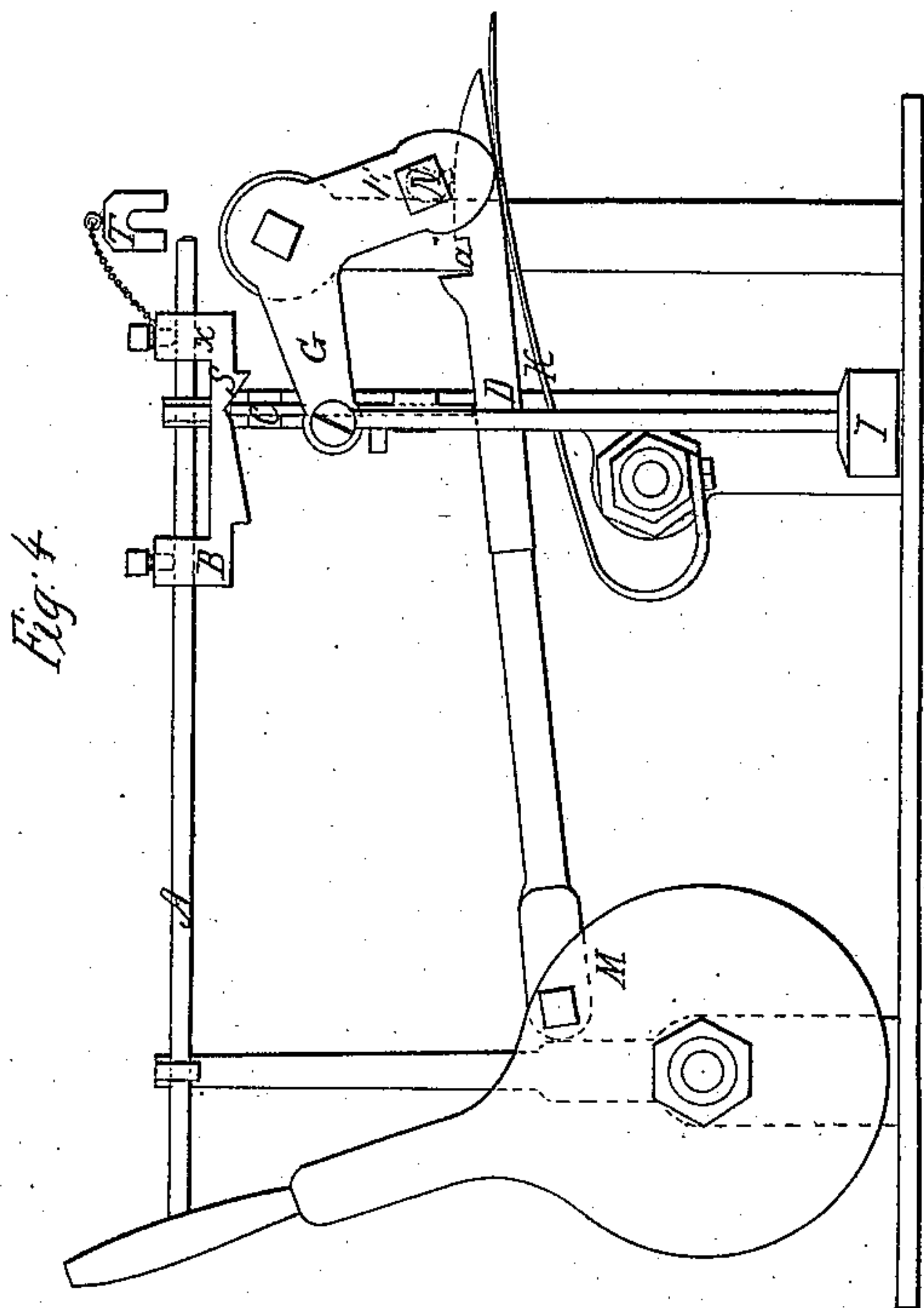


*H. S. Hopkins,*  
*Steam-Engine Valve-Gear.*

*N<sup>o</sup> 14,545.*

*Patented Mar. 25, 1856.*





# UNITED STATES PATENT OFFICE.

HENRY S. HOPKINS, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO HOPKINS,  
HENDRICK & PECKHAM.

## MEANS FOR REGULATING VARIABLE CUT-OFFS FOR STEAM-ENGINES.

Specification of Letters Patent No. 14,545, dated March 25, 1856.

*To all whom it may concern:*

Be it known that I, HENRY S. HOPKINS, of Providence, in the county of Providence and State of Rhode Island, have invented  
5 an Improvement in Mechanism for Regulating the Operations of a Cut-Off Valve or Mechanism of a Steam-Engine, my invention being an improvement on mechanism for which a patent has been granted George  
10 H. Corliss; and I do hereby declare that the same is fully described and represented in the following specification and the accompanying drawings, of which—

Figure 1, exhibits a front view or elevation of the machinery to which my improvement is applied. Fig. 2, is a plan of the same.

In these drawings, A, denotes a slide rod, which when in use is moved forward and  
20 backward longitudinally by a ball governor. It is fastened to an inclined cam or plane B, which rests against the upper end of a vertical slide bar C, whose foot is supported on a movable catch, D, by which the crank E,  
25 of the shaft F of the cut off valve is moved and liberated. There is attached to an arm G, extending from said crank, a weight, I, by which the cranks is moved in an opposite direction, after it has been liberated  
30 from the catch rod. The said catch rod is pressed up to the vertical slide by means of a spring K arranged under it as seen in Fig. 1, while at one end of it, it is jointed to a vibratory or rocker lever plate, M, and is  
35 arranged with respect to the same as seen in said figure. From the valve crank, a pin, N, extends backward as seen in Fig. 3, which is an end view of the mechanism, and has a shape in transverse section as shown by the  
40 red line in Fig. 1, the same being made to operate in connection with a catch notch, a, of the catch rod before described.

When the engine is going at too great a speed, the ball governor (which is not represented in the drawings, as its application  
45 to and mode of operation of the slide rod is well understood by those who are acquainted with the said mechanism of the said Corliss, and which is described in his Patent Numbered 6162) will draw the inclined plane  
50 toward the right so as to depress the vertical slide and thereby cause the catch bar to be sooner liberated from the catch pin of the valve crank, so that when the engine is moving  
55 too slow, the inclined plane will be

moved in an opposite direction, and the catch rod will be longer in being liberated from its pin. In the action of the vertical slide, either to quicken or prolong the time of liberation of the catch pin it serves as a fulcrum or bearer to the catch lever during  
60 its longitudinal and vertical movements produced by the rocker lever, the action of such parts being well understood.

Having thus referred to that part of the  
65 invention of Corliss, on which my improvement is grafted, I would remark that with the mechanism of Corliss there is much liability to accident from accelerated motion which may result in case the driving belt of  
70 the regulator or ball governor should accidentally slip from its pulley or should there be any defect in the action of the regulator. For should the motion of the regulator cease and its balls fall into their lowest position,  
75 it will readily be seen that the inclined plane will be moved toward the left so as to allow the slide bar to rise suddenly to its greatest height and consequently the speed of the engine would be immediately and  
80 greatly accelerated owing to the increased flow of steam into the cylinder, which would necessarily result. In order to arrest the motion of the engine, or in other words to prevent the catch bar from operating the  
85 valve crank in case of any such improper action of the regulator or ball governor, as above described. I combine with the main inclined plane B, a secondary reversed inclined plane, S, which I arrange with respect  
90 to it as shown in Fig. 1. During the fall of the balls or arms of the governor, this secondary inclined plane will be moved into contact with the vertical slide and force it downward into position, as shown in Fig.  
95 4, which is a front elevation of the mechanism as it appears under such circumstances. In this case, the catch rod will be depressed so far as to be thrown entirely out of action with its crank pin, during the longitudinal  
100 movements of said catch rod: Thus the engine will stop in consequence of the steam being entirely cut off from its cylinder.

In order that the steam may not be entirely cut off, whenever it may be desirable  
105 to stop the engine, under ordinary circumstances, I make use of a movable or shifting stop or block, T, which is formed as seen in Fig. 1, and also in Fig. 4, (which is an end view of said stop). It is made so as to  
110



straddle the rod A, and to extend from the foot of the inclined plane B, to the shoulder piece, *z*. It prevents the reversed inclined plane, S, from being driven over the vertical slide, C. Just previous to stopping the steam engine, the engineer puts the stop, T, in place, and after the engine has been started or set in motion, he should remove the stop so as to allow the reversed inclined plane to be brought into action under circumstances as above specified.

What I claim as my invention or improvement, is—

1. Combining the reversed inclined plane S, with the main inclined plane of the regu-

lator and valve mechanism above described, the same being to operate in manner and for the purpose substantially as hereinbefore specified.

2. I also claim combining the movable stop block, T, or its mechanical equivalent with the two inclined planes B, and, S, the same being for the purpose as set forth.

In testimony whereof, I have hereunto set my signature, this fourth (4th) day of February A. D. 1856.

HENRY S. HOPKINS.

Witnesses:

JEROME B. KIMBALL,  
WM. G. DEARTH.