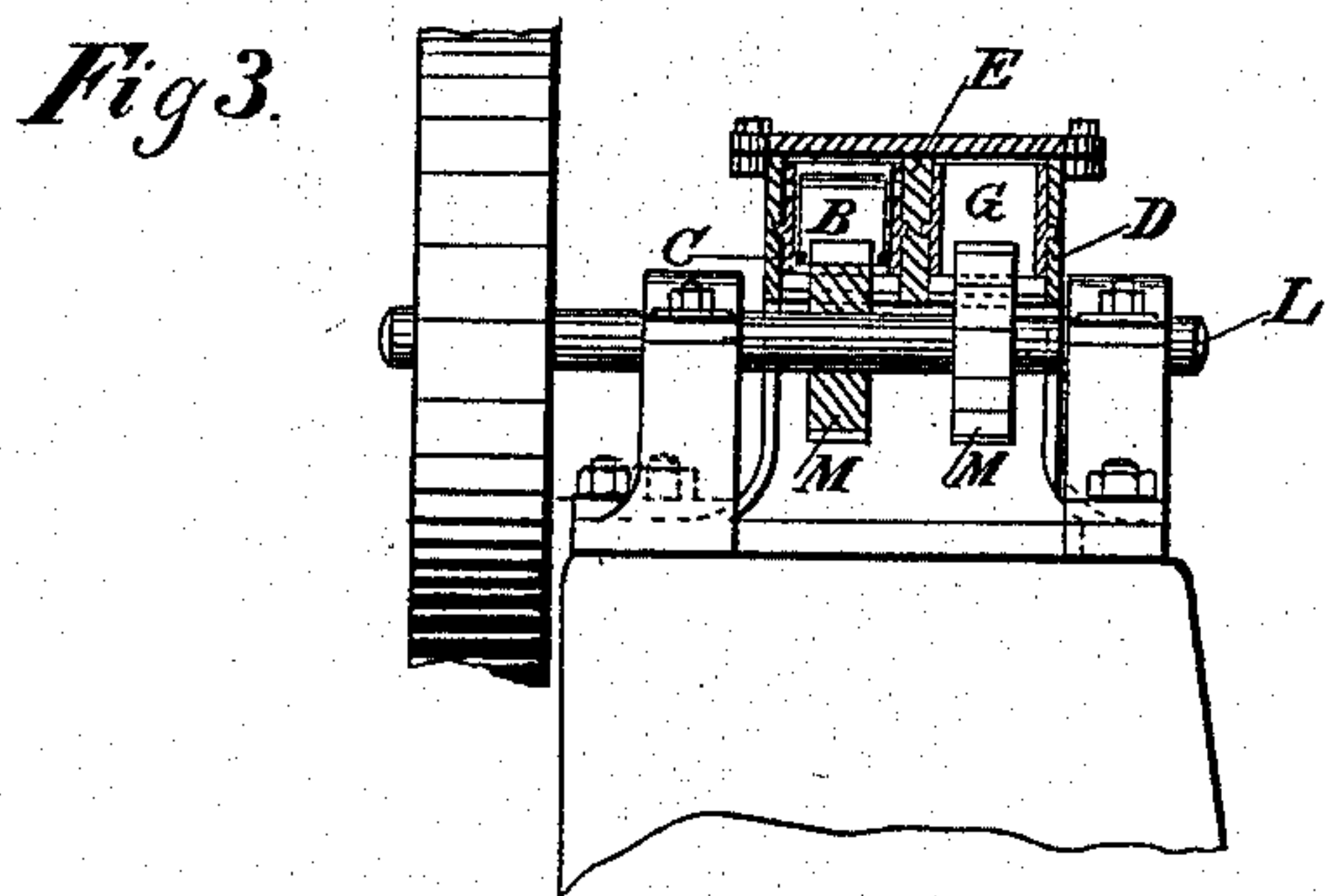
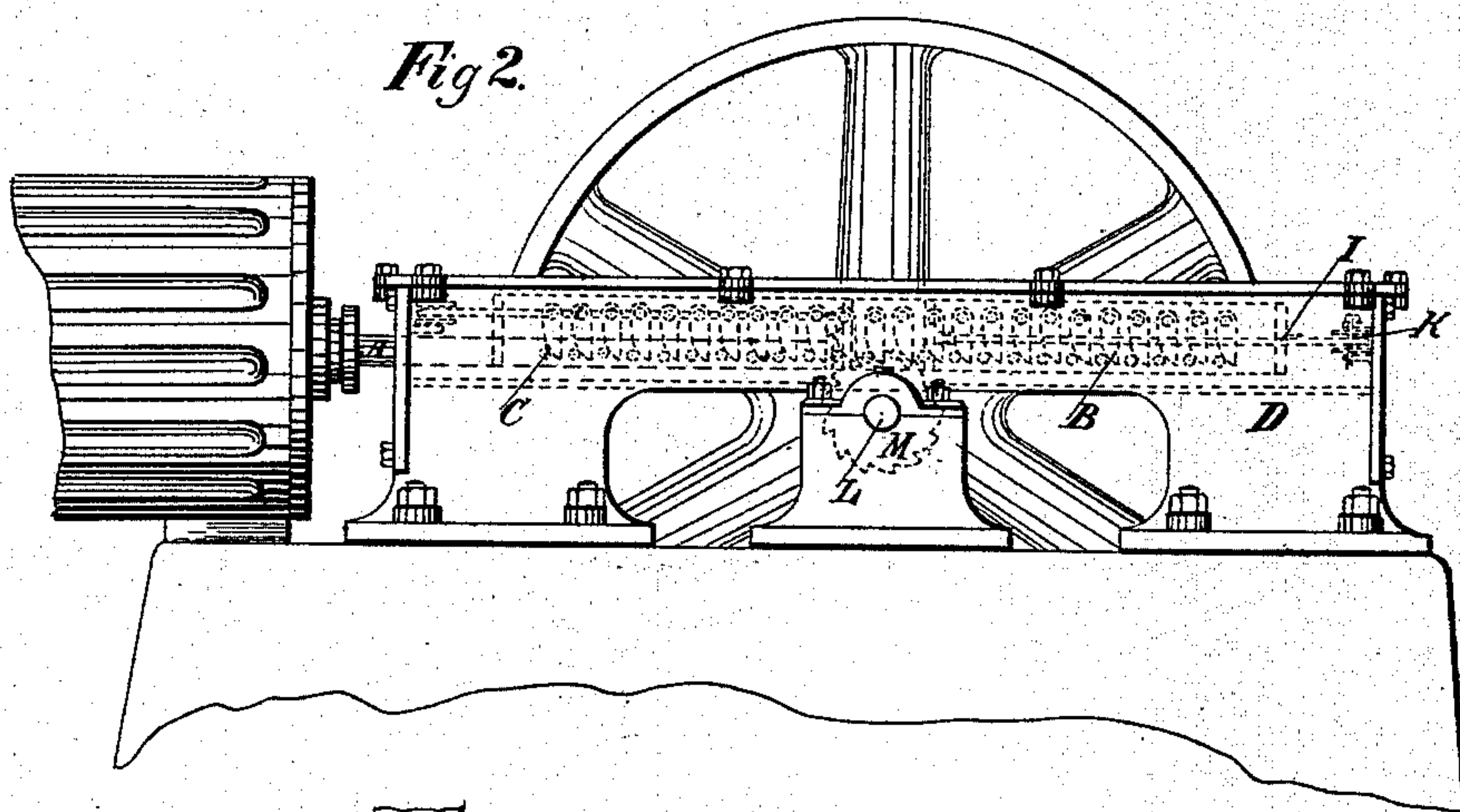
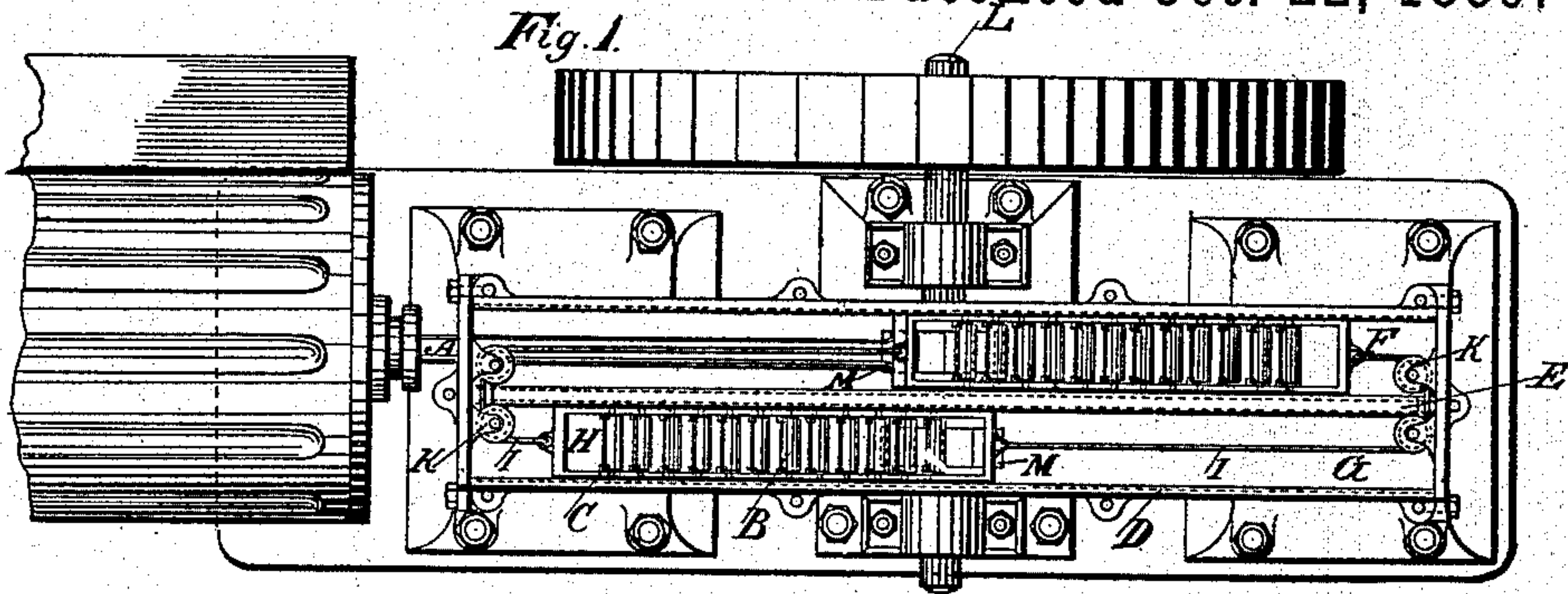


(No Model.)

P. M. MACDONALD.
RACK AND PINION MECHANISM.

No. 413,285.

Patented Oct. 22, 1889.



WITNESSES:

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UNITED STATES PATENT OFFICE.

PETER M. MACDONALD, OF KERRVILLE, TEXAS.

RACK-AND-PINION MECHANISM.

SPECIFICATION forming part of Letters Patent No. 413,285, dated October 22, 1889.

Application filed June 8, 1889. Serial No. 313,626. (No model.)

To all whom it may concern:

Be it known that I, Lieutenant-Colonel PETER M. MACDONALD, a subject of the Queen of Great Britain, residing at Kerrville, in the county of Kerr and State of Texas, have invented a new and useful Improvement in Rack-and-Pinion Mechanism, of which the following is a specification.

My invention relates to improvements on rack-and-pinion mechanism to dispense with the connecting-rod on steam-engines, whereby a more equal, constant motive power at any point of the piston-stroke, and no dead or weak points of the same, will be obtained. I attain these objects by the construction illustrated in the accompanying drawings, in which—

Figure 1 is a top view of a part of a horizontal engine with my improvement attached as it appears after the removal of the lid. Fig. 2 is a front view of the same, and Fig. 3 is a vertical section at the main shaft L of Fig. 1.

Similar letters refer to similar parts throughout the several views.

In the yoke on the end of the piston-rod A, hanging freely on their own axles are a number of separate teeth B, and on the inside of this yoke is, in front of each tooth and near to the lower end of the same, a boss C, to prevent the teeth from being forced back. This yoke slides to and fro in a compartment F of a box D, which is separated, through a partition E, in two parallel compartments F and G, and fixed on the bed of the engine. In the compartment G is another yoke H, with an equal number of teeth, constructed as the former one, and connected with the same on both ends by means of a wire rope I or chain

running over rollers K. Below the center of the box D rests on bearings the main shaft L, on which is fixed, exactly under each row of teeth, a ratchet-wheel M. The end of this shaft may carry the fly-wheel and pulley. When the piston-rod A makes the stroke, the teeth of its yoke will engage the ratchet-wheel and turn the same. At the same time the teeth of the yoke H will be raised and slip back over the other ratchet-wheel; but when the piston-rod goes back the teeth of the yoke H will engage their ratchet-wheel and continue the rotation of the shaft L, whereby the teeth of the yoke of the piston-rod will be raised and slip back over the ratchet-wheel, and so on. Thereby the two teeth-rows, with their ratchet-wheels, will work alternately and produce equal, constant motive power.

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

The combination of a reciprocating rod, a yoke carrying a series of teeth and adapted to slide in a guideway, another yoke carrying a similar series of teeth and movable in a contiguous guideway, flexible connections between said yokes, whereby the movement of one reversely moves the other, and toothed wheels fixed upon a shaft and adapted to engage alternately the teeth in said yokes, substantially as described.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

PETER M. MACDONALD.

Witnesses:

WM. SCHUEHLE,
E. A. LUZENBERG.