

(No Model.)

C. E. ALBRO.

MACHINE FOR CUTTING TEETH OF METALLIC GEAR WHEELS.

No. 281,819.

Patented July 24, 1883.

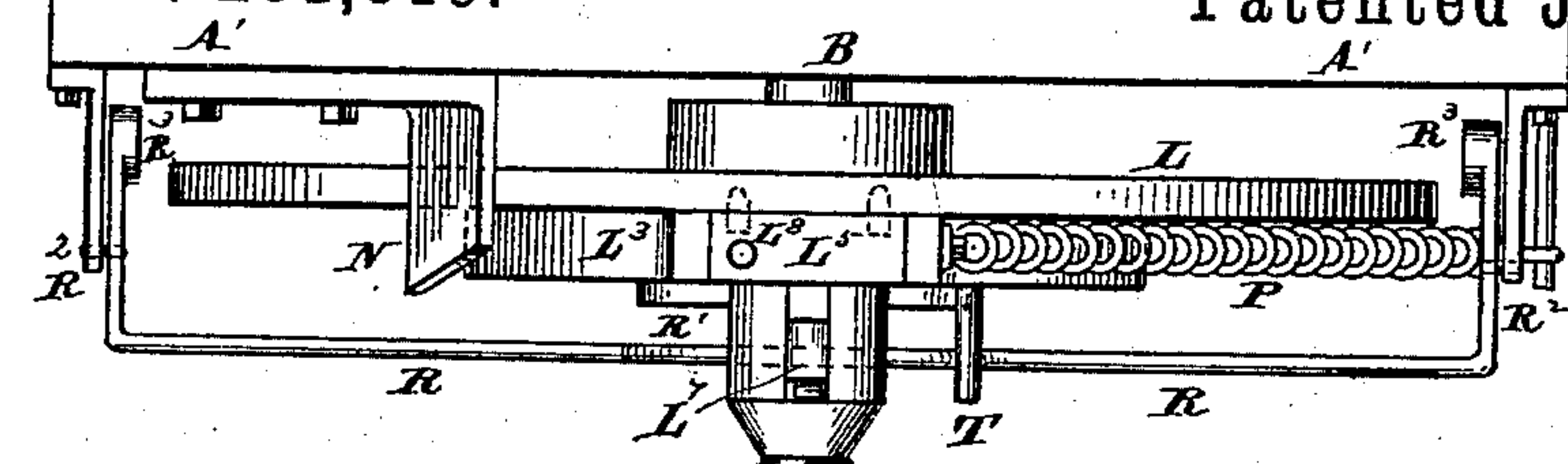


Fig. 3

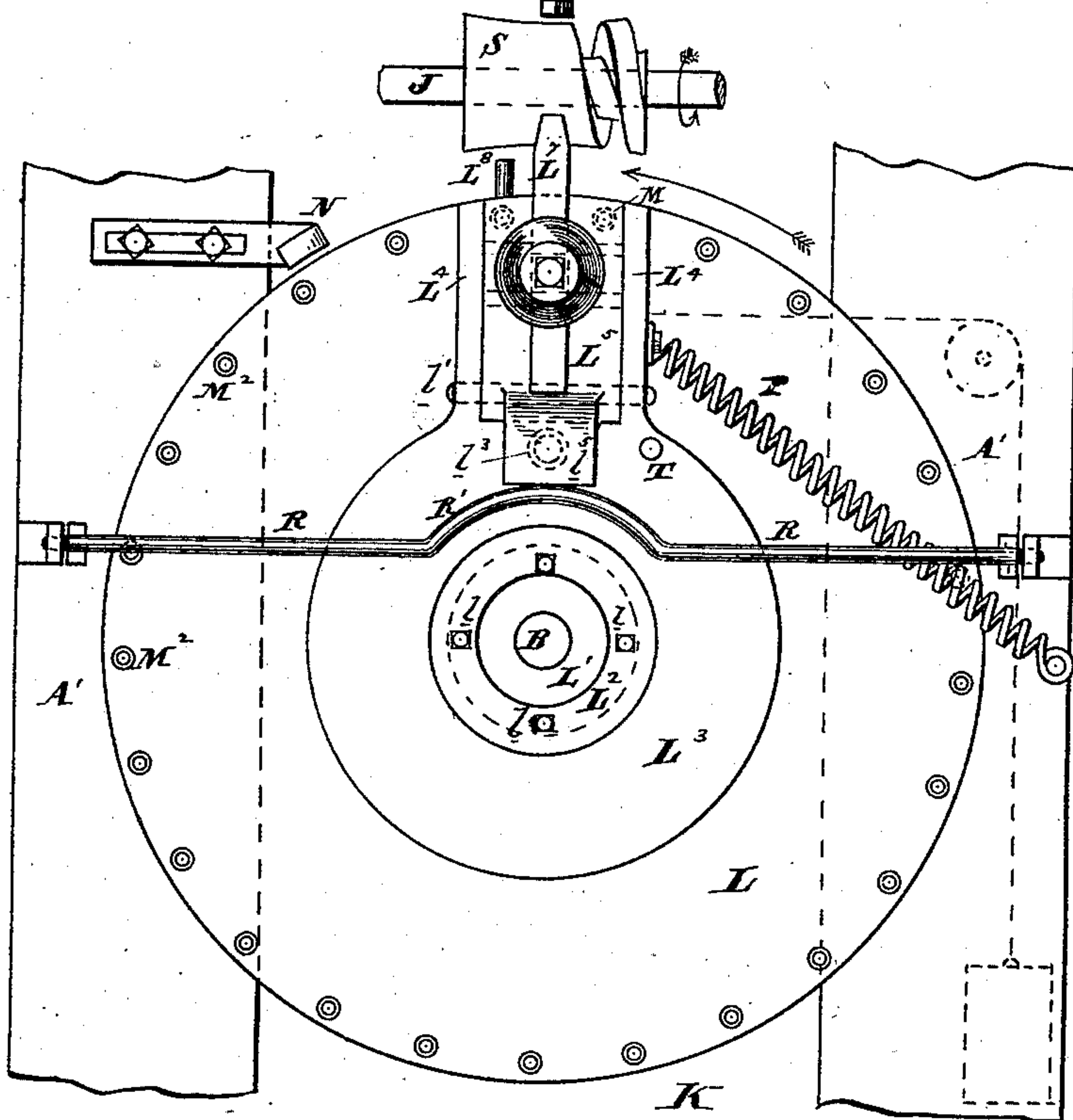


Fig. 1

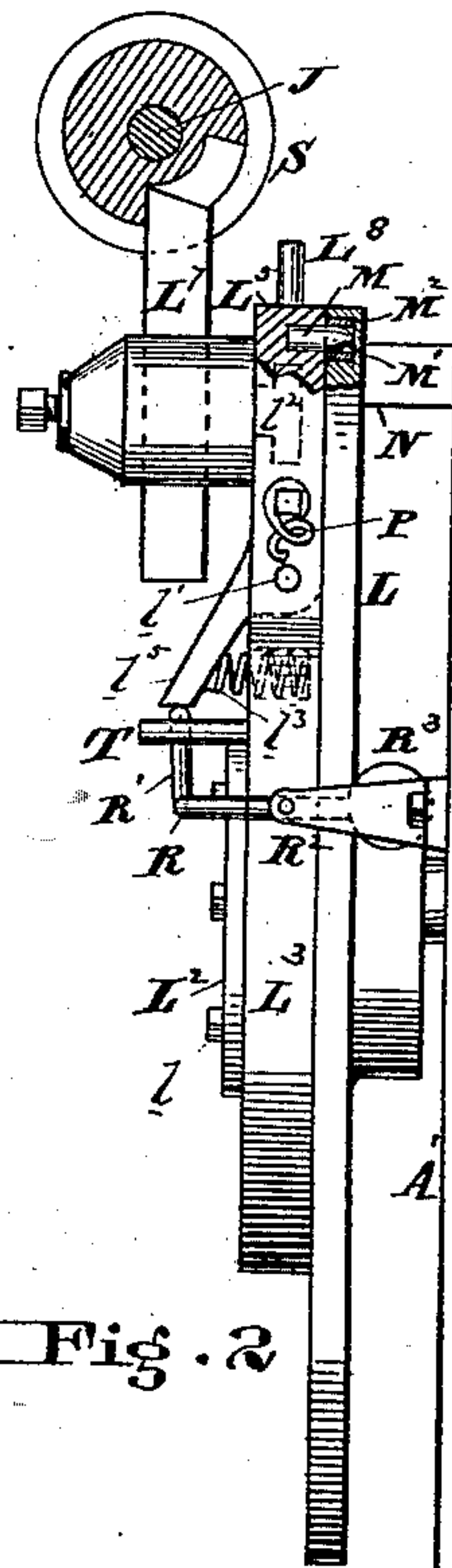


Fig. 2

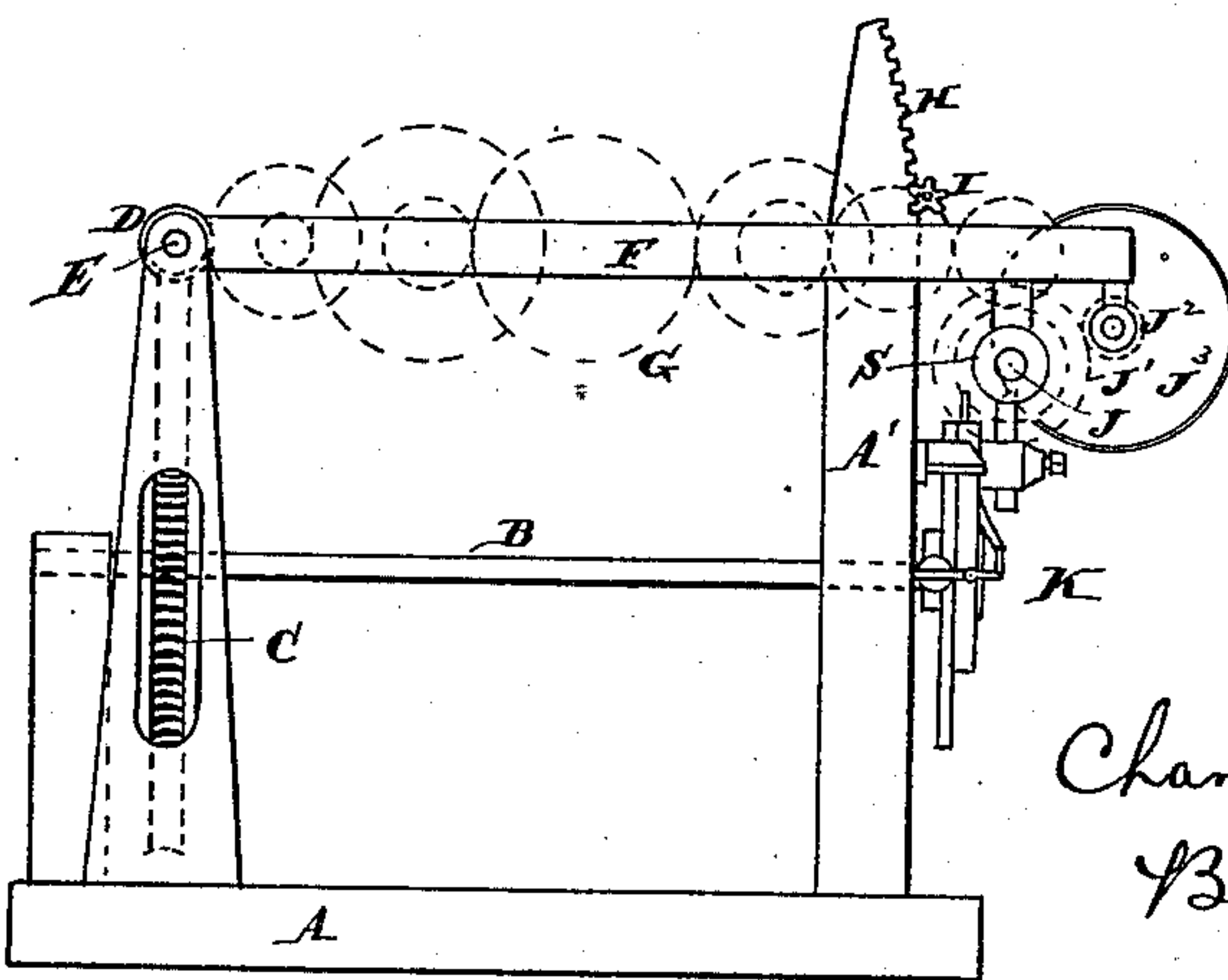


Fig. 4

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L. J. Mason  
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Inventor  
Charles E. Albro  
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*Wm. A. Smith*



# UNITED STATES PATENT OFFICE.

CHARLES E. ALBRO, OF PHILADELPHIA, PENNSYLVANIA.

## MACHINE FOR CUTTING TEETH OF METALLIC GEAR-WHEELS.

SPECIFICATION forming part of Letters Patent No. 281,819, dated July 24, 1883.

Application filed October 6, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES E. ALBRO, of the city and county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Gear-Cutters, of which the following is a specification.

My invention has reference to gear-cutters in general, but more particularly to that class adapted to cut worms for worm-wheels; and it consists in securing to the master-wheel shaft of a gear-cutting machine a cutter combined with mechanism whereby said cutter is made to travel at the speed of a tooth of the worm-wheel adapted to mesh with the worm said cutter is cutting, and means to cause said cutter to return to its original position after passing through the worm-blank without arresting the movement of the master-wheel shaft, and in many details of construction, all of which are fully set forth in the following specification and shown in the accompanying drawings, which form part thereof.

The object of my invention is to provide means to cut worms for worm-wheels, the teeth of which worms converge to a point coinciding with the center of the worm-wheels with which they are adapted to mesh.

My object is, further, to obviate the necessity of the cutter rotating with the master-wheel shaft, and in lieu therefor to cause it to make a portion of a revolution and then automatically return to its original position.

In the drawings, Figure 1 is a front elevation of my improved gear-cutter. Fig. 2 is a side elevation of same. Fig. 3 is a plan view of same, and Fig. 4 is a side elevation of a gear-cutting machine having my improved cutter attached thereto.

A is the frame of the gear-cutting machine. B is the master-wheel shaft, carrying on one end the master-wheel C and on the other my improved gear-cutter K.

D is the master-wheel worm, and E is its shaft.

Pivoted to the shaft E are arms F, carrying on its free end and above the cutter K the worm-blank shaft J, which is driven through spur-wheels J' J<sup>2</sup> by band-wheel J<sup>3</sup>. This shaft J is also connected through a train of gears, G, with the shaft E, whereby a proper relative velocity is given to the master-wheel shaft. H is a rack, into which the pinion I meshes,

said pinion being carried upon the frame or arms F, and is used to regulate the elevation of said frame.

To the end of the master-wheel shaft B, I secure a hub, L', provided with a flange, L.

Encircling the hub L', and resting against the flange L, is an annular ring, L<sup>3</sup>, provided with extensions L<sup>4</sup>, which is kept in position upon said hub by a ring-plate, L<sup>2</sup>, held in place by bolts l.

Pivoted to the ring L<sup>3</sup> at l', and guided by extensions or guides L<sup>4</sup>, is the cutter-block L<sup>5</sup>, to which is adjustably secured by groove l<sup>2</sup> the cutter-holder L<sup>6</sup>, which in turn carries the cutter L<sup>7</sup>.

Extending below the block L<sup>5</sup>, and forming part thereof, or secured thereto, is a lug, l<sup>3</sup>, which runs upon or against a pivoted bar, R, curved in the middle, as at R', and pivoted on each end, as at A', the lateral extensions R<sup>2</sup> of said bar being weighted, as at R<sup>3</sup>, to tend to throw the parts R R' up at all times. In place of weights R<sup>3</sup>, springs may be used. A spring, l<sup>4</sup>, is placed under the lug to force it out at all times and keep the cutter L<sup>7</sup> in position for cutting. The upper or free end of the block L<sup>5</sup> is provided with steel pins L<sup>8</sup> and M M, the two latter being upon its under face and projecting toward the flange L, whose face is provided, close to the periphery, with holes M<sup>2</sup>, strengthened by steel bushings M'. These holes M<sup>2</sup> extend all around and at given intervals apart, and are adapted to receive the pins M on the block L<sup>5</sup>.

N is a cam adjustably secured to the frame A, and is adapted to raise the block L<sup>5</sup> by pin L<sup>8</sup>, so that its pins M are clear of the holes M<sup>2</sup>, and also to cause the lug l<sup>3</sup> to fall inside the bar R' and there remain until the pin T on ring L<sup>3</sup> depresses said bar, when, by means of spring P, or its equivalent, it is drawn back, as more fully described hereinafter.

The operation is as follows: A worm-blank, S, being secured to shaft J and the machine being put in motion, the said blank slowly revolves, as does also the flange L on the master-wheel shaft B, the two keeping their proper relative velocities. The cutter K is in the position shown in Fig. 1. As the flange L with the ring L<sup>3</sup> and its cutter move in the direction of the arrow, and, after passing the said cutter L<sup>7</sup>, entirely across the worm-blank, the



cam N causes the block  $L^5$ , with cutter  $L^7$ , to be raised, freeing its pins M of the holes in the flange L, thus arresting the movement of the cutter  $L^7$  without interfering with the movement of the flange L. As the cutter is raised the lug  $l^5$  is depressed, compressing spring  $l^3$  and allowing the bar R to rise up sufficiently to keep said lug depressed and the cutter raised. When in this position the spring P or a weight mechanism draws said ring  $L^3$  and its cutter back to its original position, and during said backward movement the pin T strikes the bar R and depresses it sufficiently to allow the lug  $l^5$  to rise and the pins M enter fresh holes  $M^2$  in flange L, said movements being actuated by spring  $l^3$ . Upon renewing the movement once more the bottom of the lug  $l^5$  runs upon the bar R R'. As the worm-blank is cut it is fed down, either by hand or automatically.

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

1. The combination of flange L, provided with holes  $M^2$ , ring  $L^3$ , pivoted block  $L^5$ , provided with extension or lug  $l^5$  and carrying

cutter  $L^7$ , spring  $l^3$ , pins M,  $L^8$ , and T, cam N, spring P, and weighted pivoted bar R R', substantially as and for the purpose specified.

2. The combination of flange L, provided with holes  $M^2$ , ring  $L^3$ , pivoted block  $L^5$ , provided with pins M and carrying cutter  $L^7$ , pin or extension  $L^8$ , cam N, spring P, or its equivalent, and means to hold said block  $L^5$  up or down, according as to whether it is moving in one direction or the other, substantially as and for the purpose specified.

3. The combination of ring  $L^3$ , pivoted block  $L^5$ , carrying cutter  $L^7$ , and provided with extension or lug  $l^5$ , spring  $l^3$  and pivoted bar R, substantially as and for the purpose specified.

4. The combination of master-wheel shaft B, master-wheel C, worm D, shaft E, train-gearing G, shaft J, and cutter, K, substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

CHARLES E. ALBRO.

Witnesses:

R. A. CAVIN,  
JOHN W. SEWARD.