

(No Model.)

2 Sheets—Sheet 1.

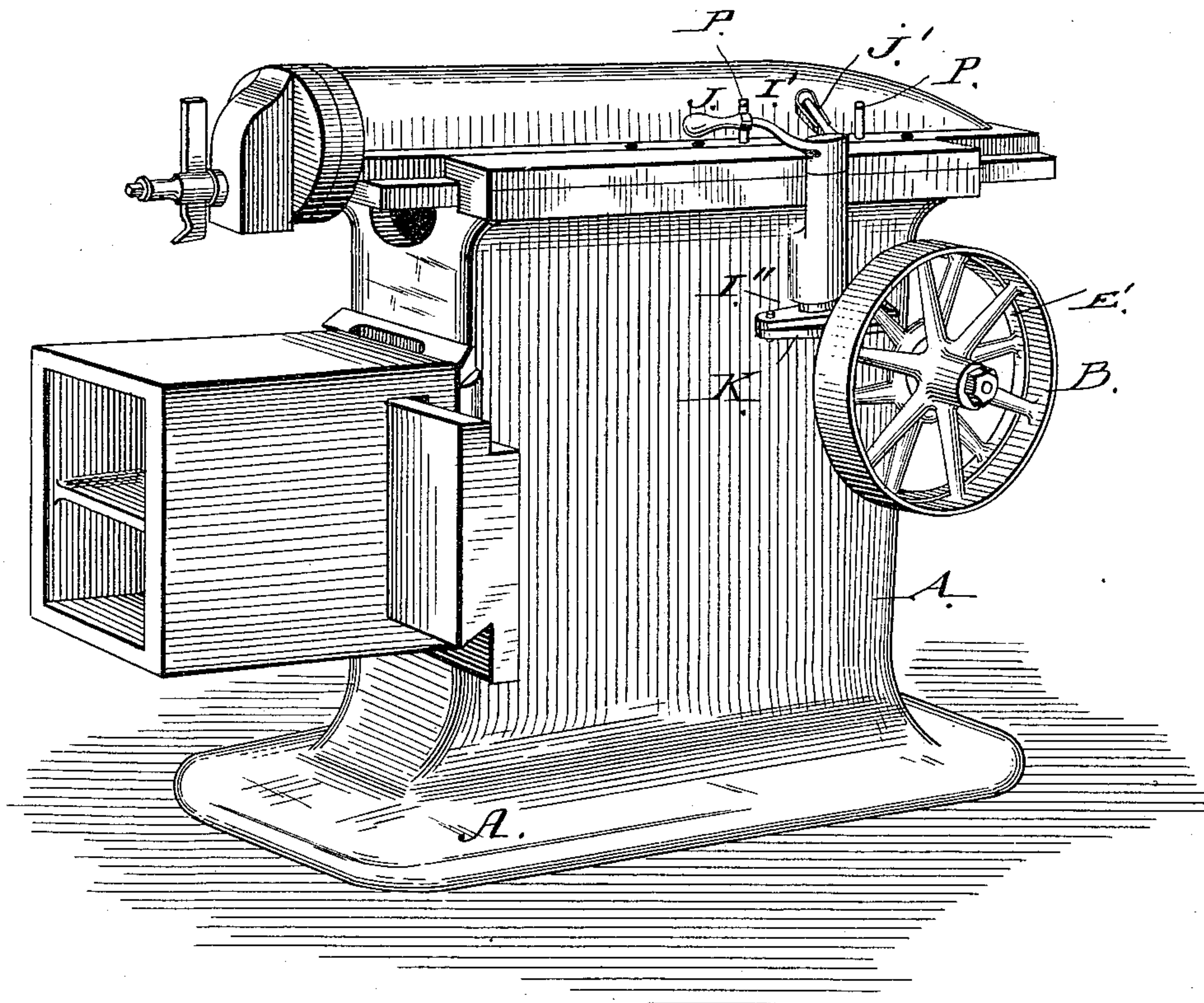
S. W. PUTNAM.

METAL PLANING MACHINE.

No. 336,065.

Patented Feb. 9, 1886.

Fig. 1.



Witnesses

T. W. Fowler
H. B. Applewhite

Inventor

Salmon W. Putnam

By his Attorneys.

A. N. Evans & Co.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

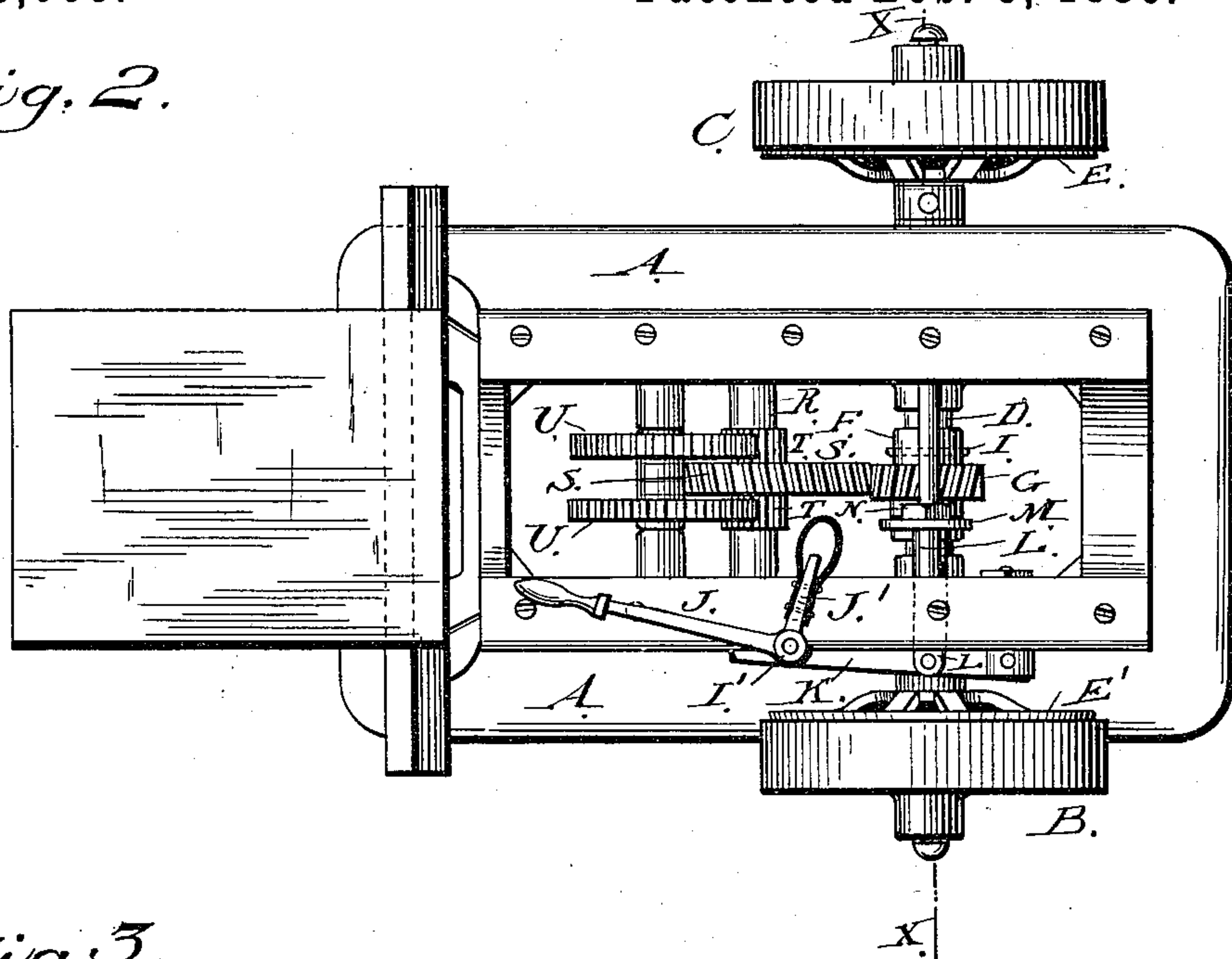


Fig. 3.

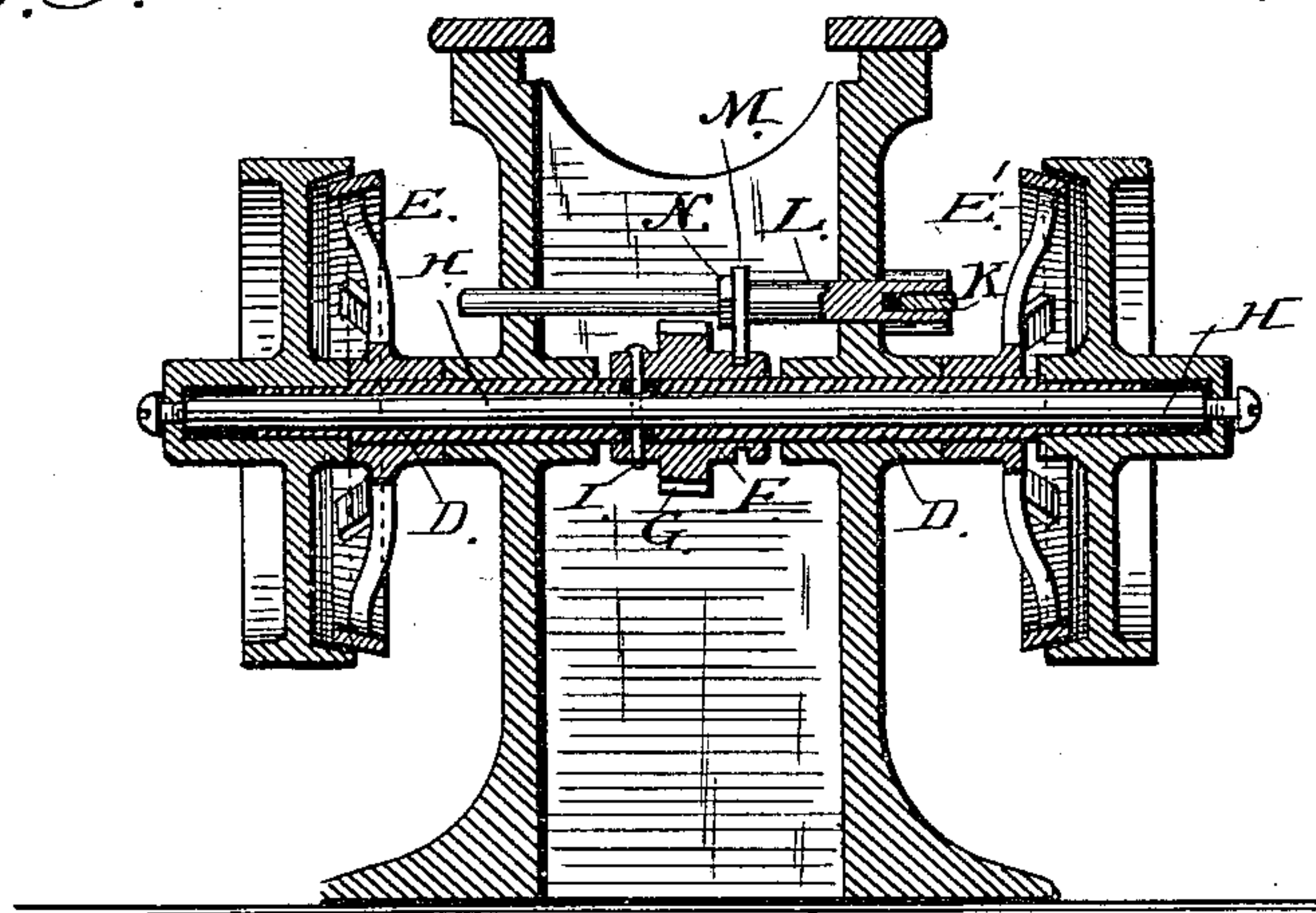
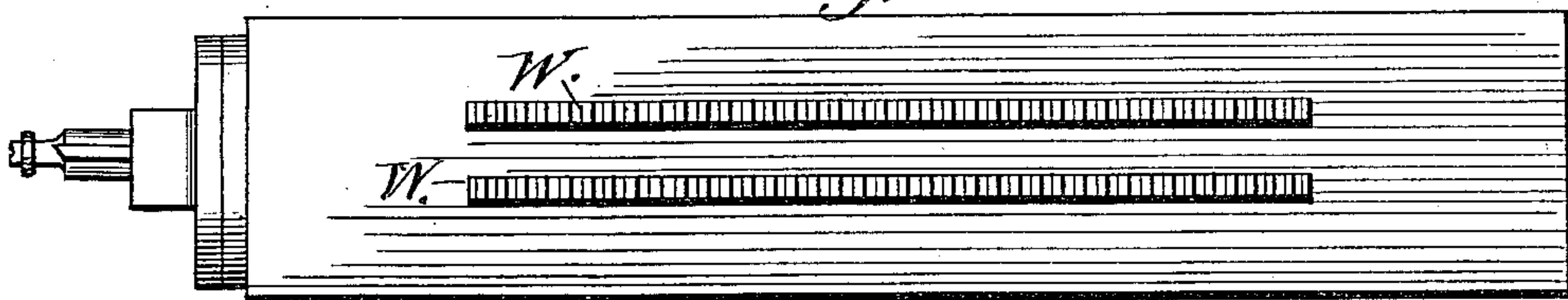


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

SALMON W. PUTNAM, OF FITCHBURG, MASSACHUSETTS.

METAL-PLANING MACHINE.

SPECIFICATION forming part of Letters Patent No. 336,065, dated February 9, 1886.

Application filed December 24, 1885. Serial No. 186,607. (No model.)

To all whom it may concern:

Be it known that I, SALMON W. PUTNAM, a citizen of the United States, residing in Fitchburg, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Metal-Planing Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a perspective view of a metal-planing machine with my improvements attached. Fig. 2 is a top view of the same with the ram removed. Fig. 3 is a transverse vertical section through the line *xx* of Fig. 2. Fig. 4 shows the rack-bars on the under side of the ram.

My invention relates to machines for planing metals; and it consists of the several combinations of devices hereinafter described and claimed.

To enable those skilled in the art to make and use my invention, I will proceed to describe the manner in which I have carried it out.

In the drawings, A represents the casing of my machine. B is the driving-pulley, and C is the pulley for reversing the motion of the ram. The driving-pulley is driven by a cross-belt, and the reversing-pulley by a straight belt, operated from a counter-shaft by steam or any suitable power. A hollow shaft, D, runs transversely through the machine and carries near each end friction-clutches E E', rigidly attached thereto, for a purpose hereinafter explained. The shaft D carries on its center a loose sleeve, F, to which is rigidly attached a spiral pinion, G, the angle of the spiral being about twelve degrees from a horizontal line through the shaft. I do not confine myself to any particular angle; but I have ascertained by practical experience that this angle secures the desired effect. The sleeve F is rigidly secured to an inner shaft, H, by means of a pin, I, working in a slot made through the hollow shaft D, so as to allow the sleeve and its spiral pinion a slight lateral movement on the hollow shaft. The inner shaft, H, extends entirely through the hollow shaft, and has secured on its ends the driving and reversing pulleys, as shown in Fig. 3, the length

of the inner shaft being sufficiently extended to allow the pulleys B and C to be removed from the friction-clutches E E', or for either clutch to be brought into action, as may be desired. It is evident that if both pulleys be removed from contact with the clutches, the ram will cease its movements. It is equally evident that if the driving-wheel be forced sufficiently far from its clutch to bring the opposite pulley in contact with its clutch the reversing-pulley will act on the ram and cause it to move back; and if the reversing-pulley be thrown sufficiently far from its clutch by the movement of the inner shaft, H, the driving-pulley will be brought in contact with its clutch, and the ram will again be moved forward. I have ascertained by actual experience that the best results are produced by giving the exterior faces of the clutches an angle of about six degrees from the horizontal line of the shaft.

In order to conveniently move or ship the inner shaft and the pulleys in or out, as desired, I have arranged a convenient "shipper," I', provided with the two arms J J', by which to operate a crank-arm, I'', at its lower end, which in turn moves the lever-arm K, attached to the rod L. This rod passes transversely through the machine and slides freely back and forth as operated on by the lever K.

On the rod L is formed a shoulder, against which rests the plate M, secured rigidly in position by the screw-nut N. The lower edge of the plate M is hollowed out, so as to fit snugly into an annular groove cut in the sleeve F, whereby as the rod L is moved from or toward either pulley, the plate M acts simultaneously on the sleeve F, and gives it and the inner shaft, H, a corresponding movement, thus tightening the pulleys or releasing them from the clutches at will. This may be accomplished by either of the arms J J', the arm J being moved by the hand of the operator, and the arm J' by coming in contact with the "shipper-dogs" P on the ram. It is evident that when the ram is moving forward under the action of the driving-wheel, if a shipper-dog comes in contact with the arm J' the arm will be thrown forward and the driving-pulley will be thrown out of gear with its clutch, thus bringing into play the reversing-pulley, and on the backward movement, when the arm

again strikes a dog, the direction of the ram will be instantly reversed, and its movement will be forward. In the meantime the operator, by means of the arm J, can stop the machine or reverse the action of the ram at pleasure.

On the shaft R and meshing with the spiral pinion G is the spiral gear-wheel S, having the angle of the spiral, corresponding with angle of the pinion, and on shaft R are pinions T, meshing with and operating the cog-gearing U, which in turn meshes into the rack-bars on the under side of the ram, thereby giving the forward and backward motion to the ram. On the bottom of the ram I place two rack-bars, W, to be operated by the two trains of gearing, with the cogs in one train overlapping those of the other—that is, when a cog in one train of gears is just leaving the “pitch-line” a cog in the other train is just entering the pitch-line, the pitch-line being the neutral point of contact between the two gears. The object of this double-rack arrangement is to give a smoother motion to the ram than could be obtained by a single rack, particularly after the cogs have been worn.

An important result of my spiral gear is to make the machine automatically adjustable. When resistance from the ram is felt through the train of gears, the pressure of the inclined cogs of the spiral gear and pinion causes the latter to have a lateral movement or thrust, which increases the contact between the pulleys and their clutches. Thus it will be seen that the greater the load or resistance to be overcome by the cutting-tool the tighter the inclined faces of the pulleys and friction-clutches are brought together, thus making my machine to automatically adjust itself to its work; or, in other words, it absorbs power from the driving-pulleys in proportion to the

work being done. It is also evident that this action of my spiral gear will compensate for wear and is self adjusting.

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

1. In a metal-planing machine, the hollow shaft D, friction-clutches E E', and mechanism for operating the same, in combination with the inner shaft, H, and pulleys B and C, substantially as and for the purpose set forth.

2. In a metal-planing machine, the hollow shaft D, provided with the friction-clutches E E', and the inner shaft, H, provided with the pulleys B and C, in combination with the sleeve F, rigidly attached to the rod L, and provided with an annular groove, the plate M, the rod L, and the lever K, all constructed to operate substantially as and for the purpose set forth.

3. The rod L and lever K, in combination with the shipper I', provided with the arms J J' and crank-arm I'', and the shipper-dogs P, substantially as and for the purpose set forth.

4. The shaft provided with the spiral pinion G, and suitable mechanism for operating the same, in combination with the spiral gear S, arranged to give a lateral thrust to the shaft, substantially as herein set forth.

5. The spiral gear S and pinions T, in combination with the cog-gearing U, substantially as herein described.

6. In a metal-planing machine, the two trains of cog-gearing U, in combination with the double rack bars W, with the cogs on one train overlapping those on the other, substantially as and for the purpose herein set forth.

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Witnesses:

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