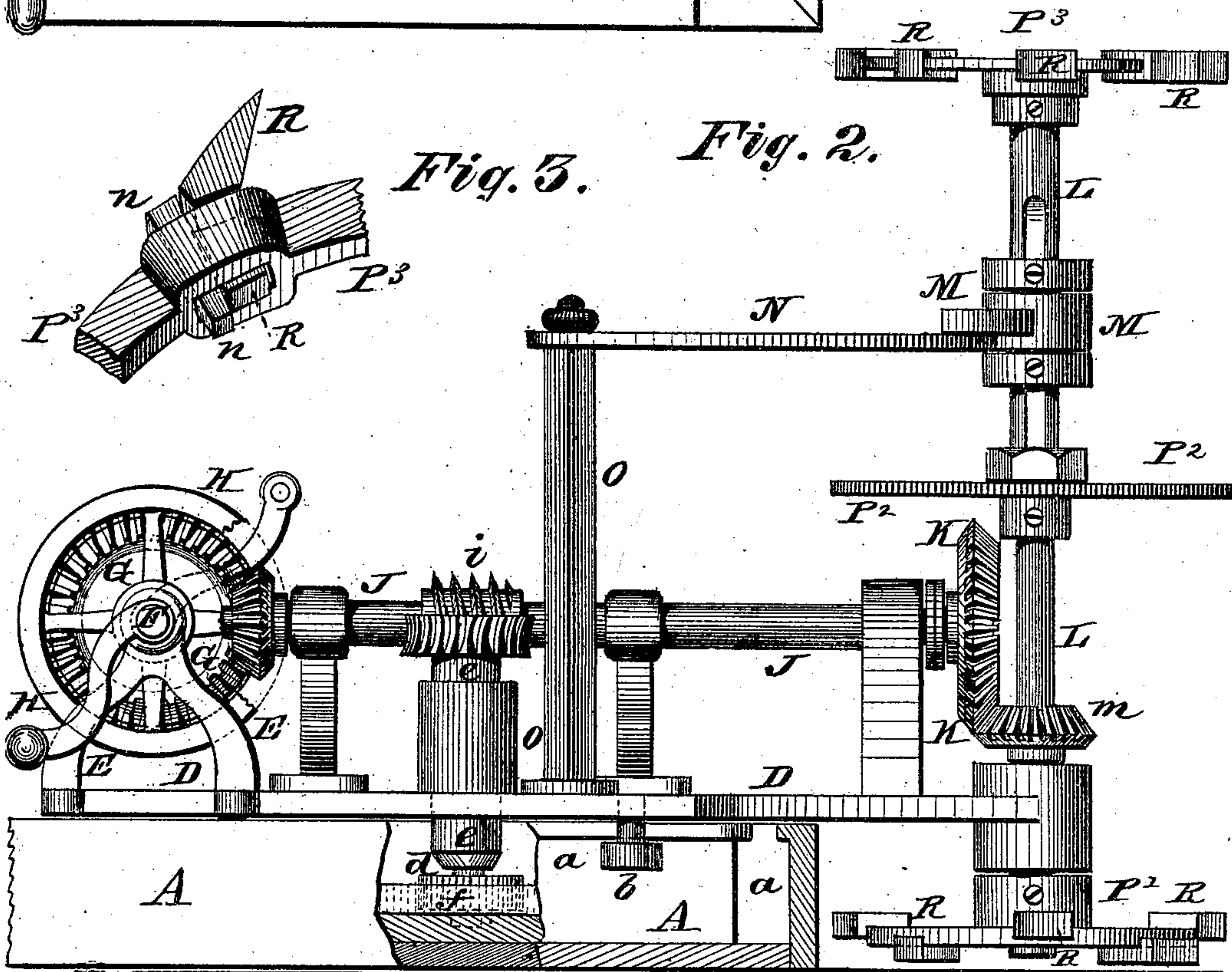
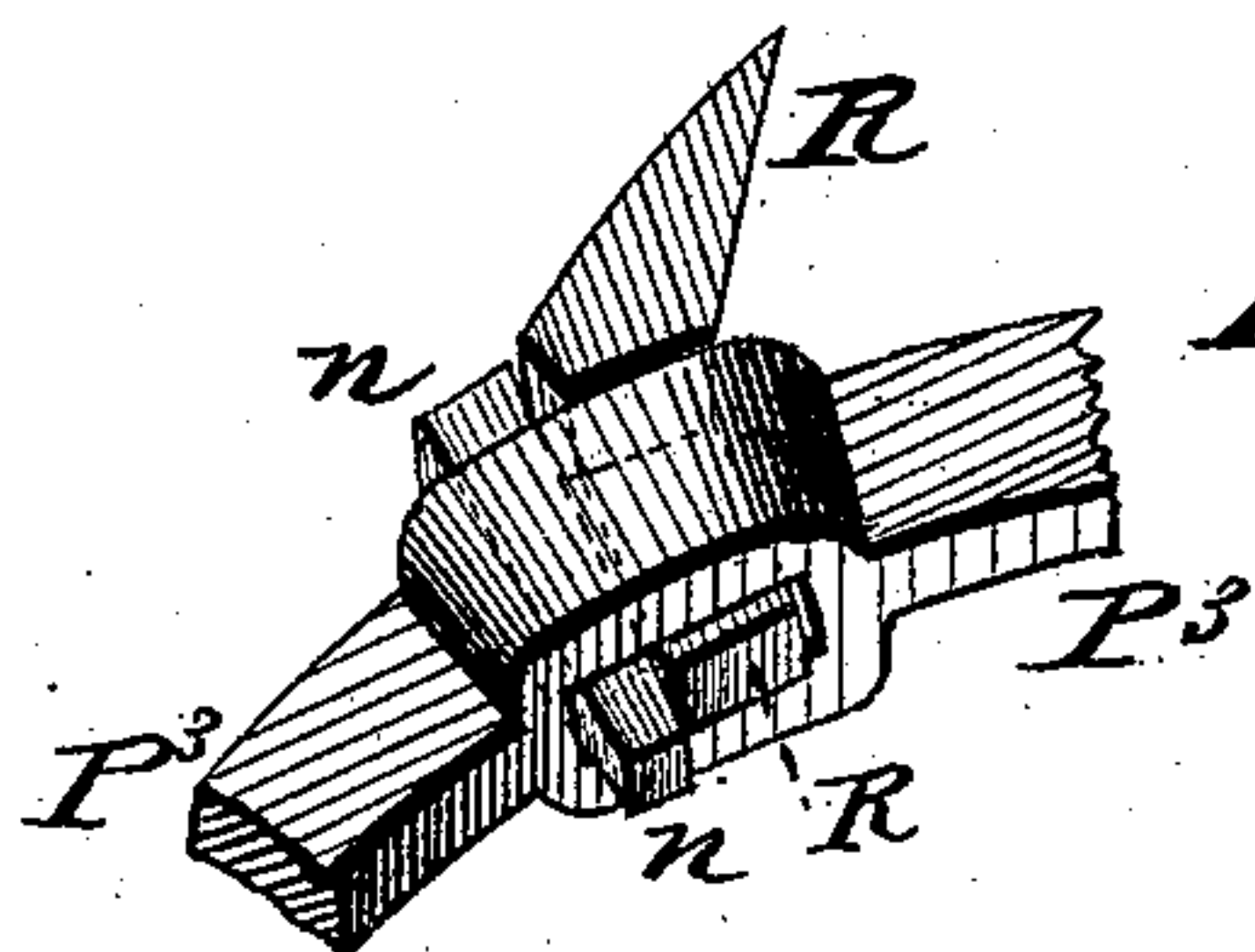
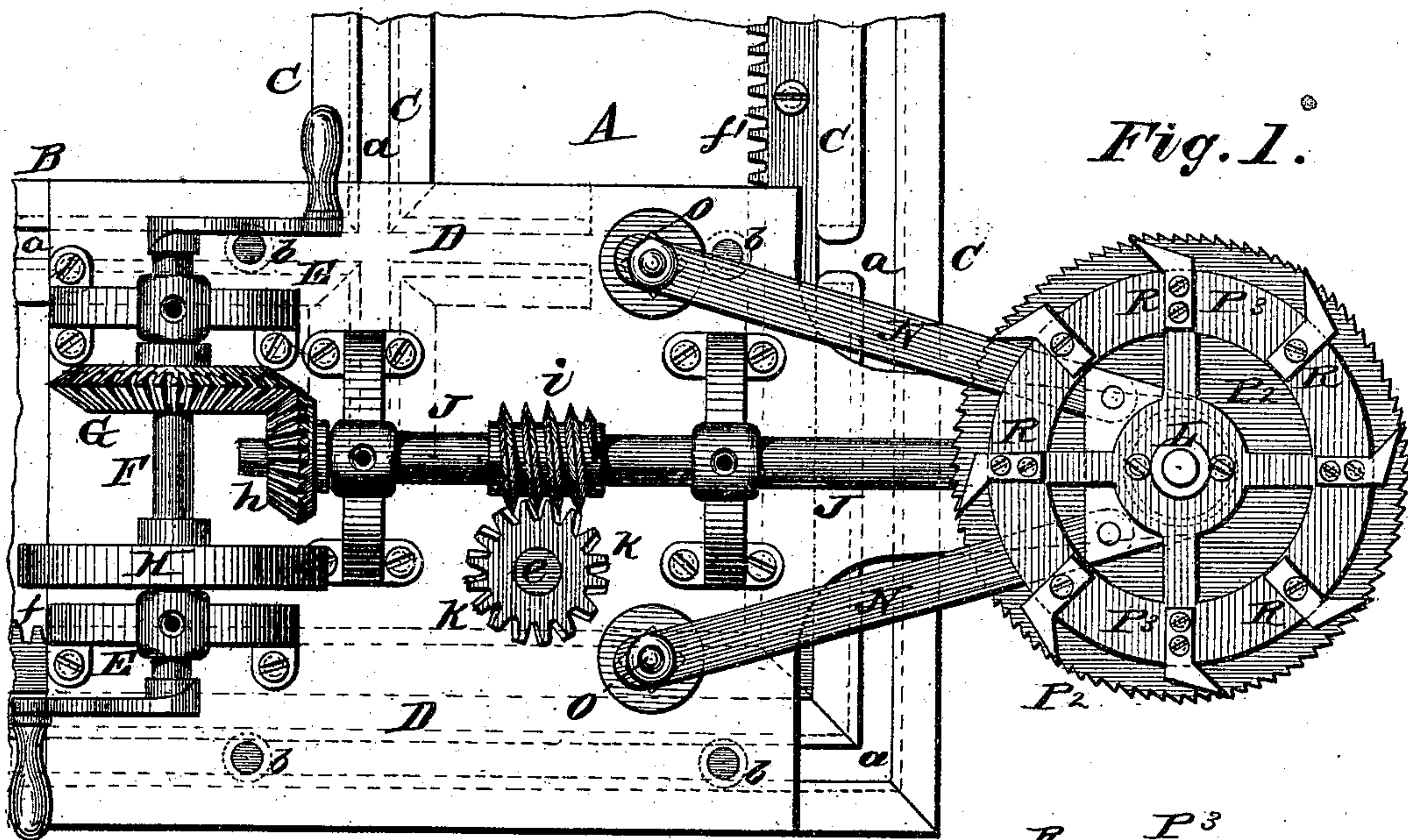


J. GOWLAND.  
Machine for Cutting and Mining Coal.  
No. 227,354. Patented May 11, 1880.



Witnesses:

P. Dietrich.  
Jno. A. Stockman.

Inventor  
John Gowland.  
Per C. H. Watson & Co Attorneys.



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Fig. 4.

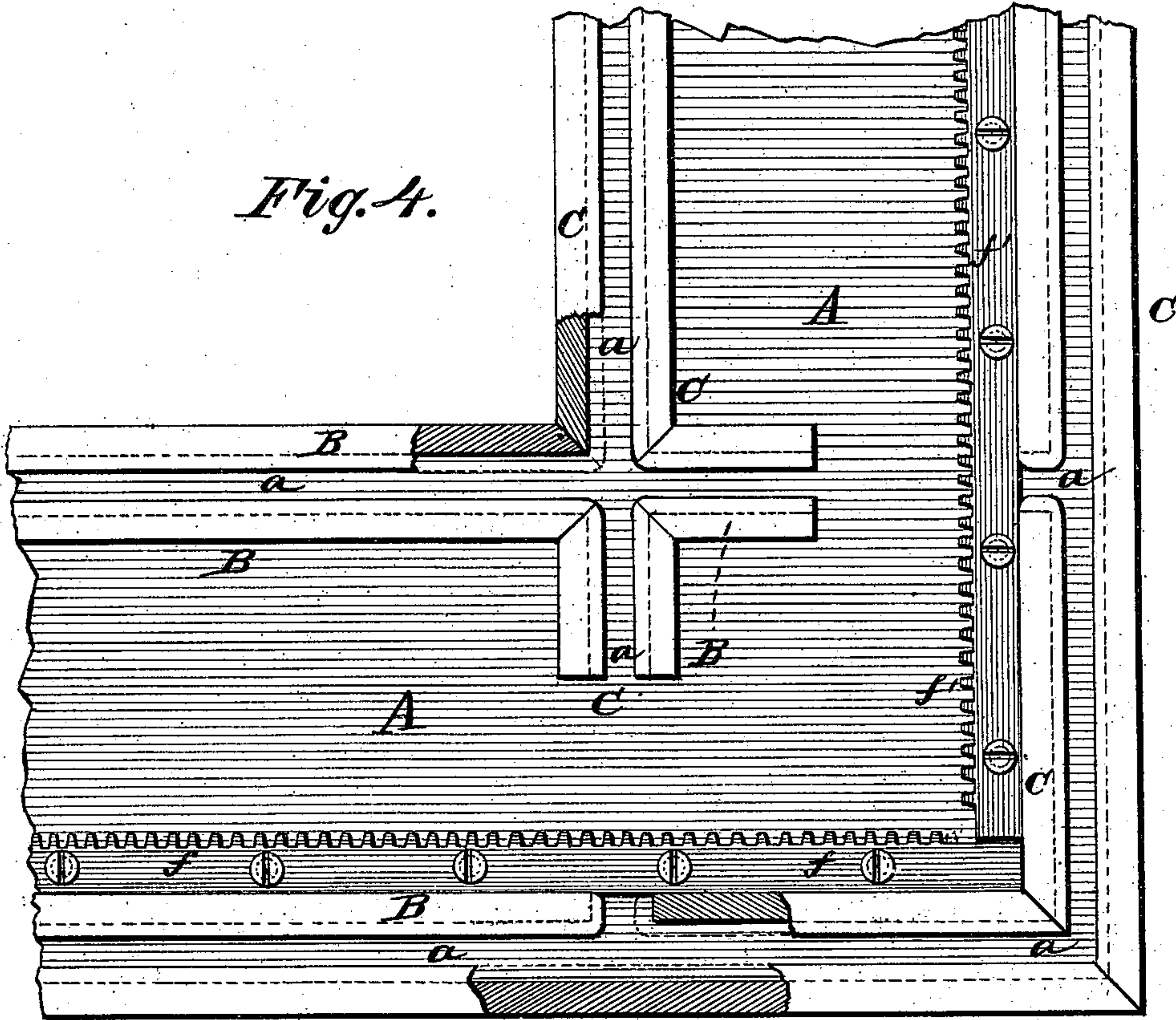
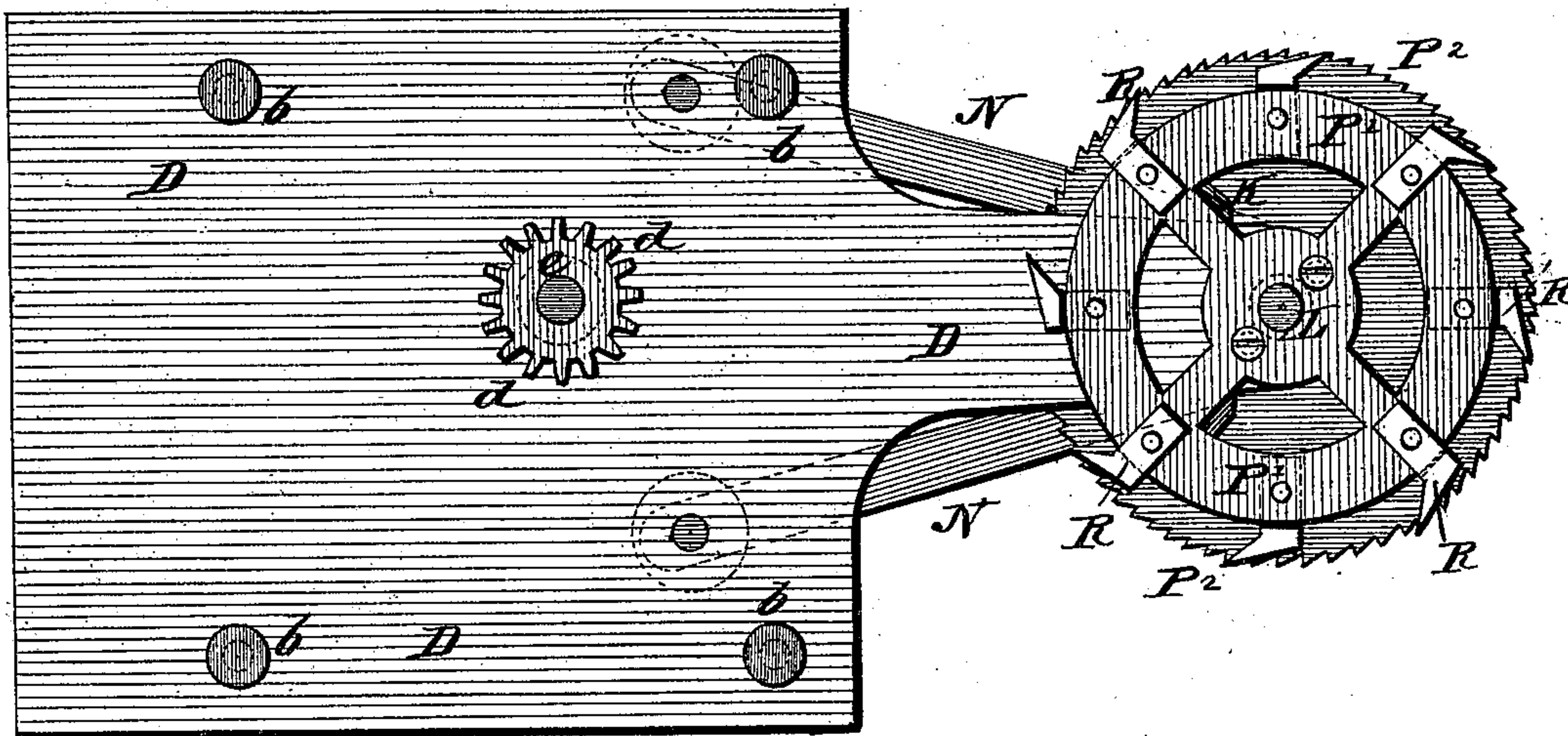


Fig. 5.



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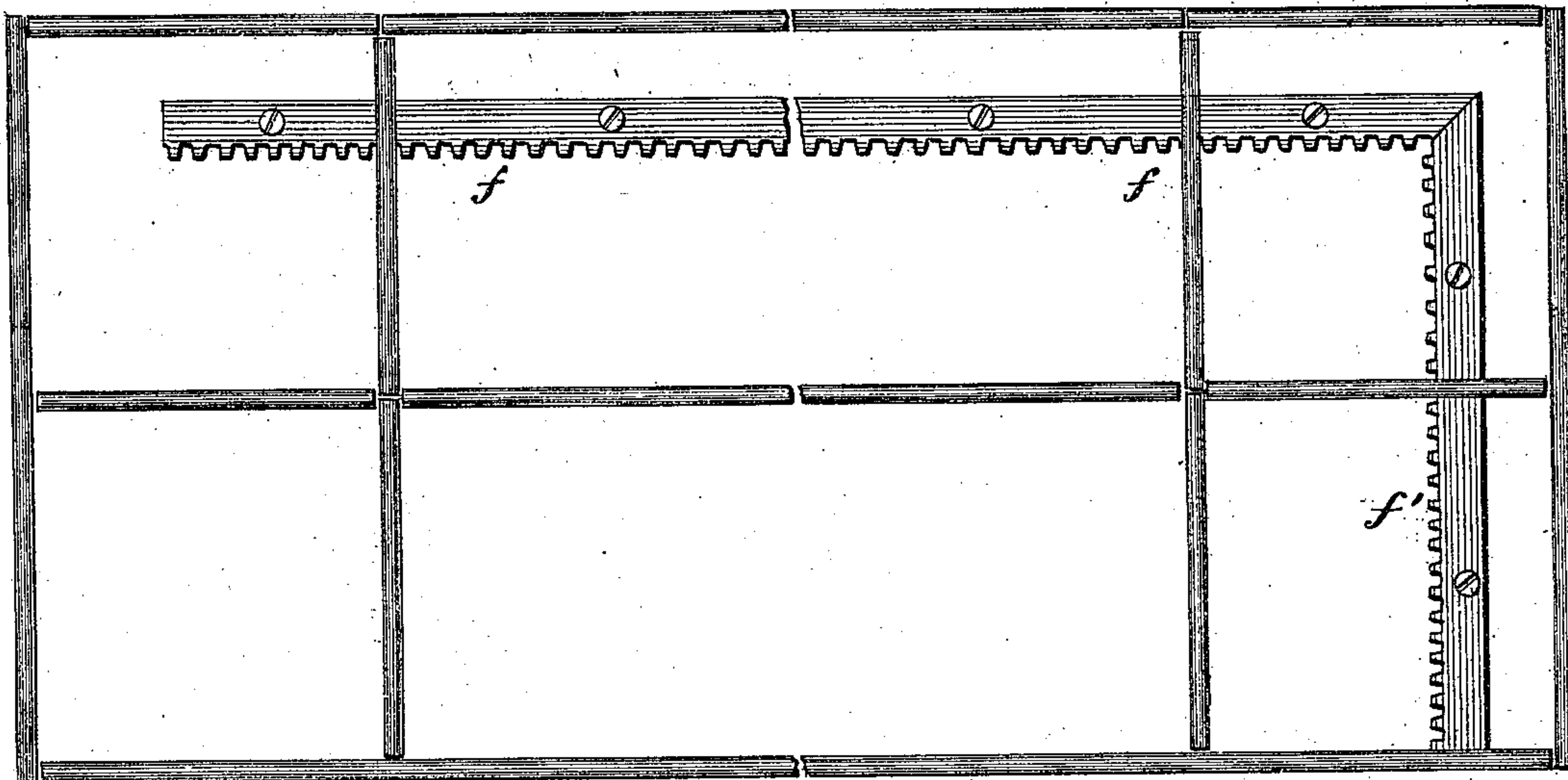
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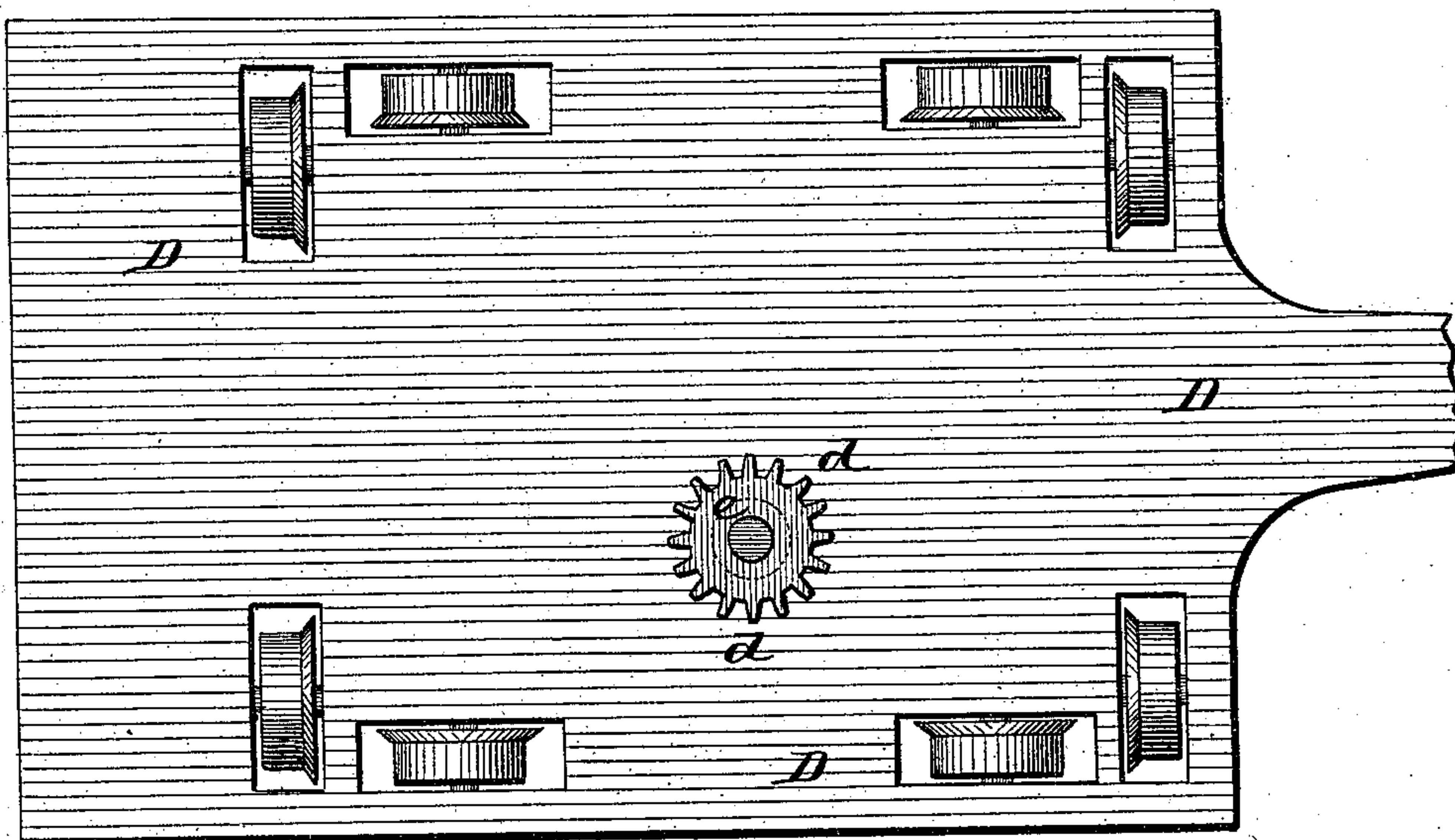
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*Fig. 6.*



*Fig. 7.*



Witnesses:

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# UNITED STATES PATENT OFFICE.

JOHN GOWLAND, OF PHILIPSBURG, PENNSYLVANIA, ASSIGNOR TO MATHEW GOWLAND AND JOHN NUTALL, OF SAME PLACE, ONE-THIRD TO EACH.

## MACHINE FOR CUTTING AND MINING COAL.

SPECIFICATION forming part of Letters Patent No. 227,354, dated May 11, 1880.

Application filed August 27, 1879.

*To all whom it may concern:*

Be it known that I, JOHN GOWLAND, of Philipsburg, in the county of Centre and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Cutting and Mining Bituminous Coal; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to  
10 which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The nature of my invention consists in the  
15 construction and arrangement of a machine for cutting or mining bituminous coal by hand or other power, as will be hereinafter more fully set forth.

In the annexed drawings, Figure 1 is a plan  
20 view of my machine. Fig. 2 is a side elevation of the same. Fig. 3 is a detailed view, showing one mode of attaching the cutters. Fig. 4 is a plan view of the bed of the machine. Fig. 5 is a bottom view of the carriage.  
25 Figs. 6 and 7 show modified forms of track-bed and carriage respectively.

A represents the bed of the machine, provided with two sets of rails, B B and C C, at right angles to each other. These rails, upon  
30 which the carriage moves, are arranged as shown in Fig. 4—that is to say, after the carriage has moved upon the rails B B for a distance of, say, twenty inches (more or less) its movement is continued at a right angle on the  
35 rails C C.

D represents the carriage or platform carrying the operating mechanism. This carriage is on its under side provided with headed bolts *b b*, which fit in grooves or slots *a a* in the  
40 rails, said grooves or slots being of such form that the heads of the bolts *b* will prevent the carriage from jumping up from the rails.

I prefer, however, to arrange two sets of wheels at right angles to each other under the carriage, and then the tracks or rails  
45 should be made movable, so that only one set of wheels should touch any rails, according to the direction of the movement.

In a suitable bearing on the carriage or platform D is a vertical shaft, *e*, which carries at

its lower end, below the carriage, a pinion, *d*, and this pinion meshes with rack-bars *f* and *f'* along the sides of the two sets of rails, for feeding or moving the machine.

In bearings E E near the rear end of the carriage is placed a shaft, F, to which power  
55 is applied either by hand, by means of cranks, or in any other suitable manner.

The shaft F is provided with a fly-wheel, H, and a bevel-gear wheel, G, which latter meshes  
60 with a bevel-pinion, *h*, on the rear end of a horizontal shaft, J, running in suitable bearings at right angles to the shaft F, as shown. On the shaft J is a worm, *i*, which gears with a worm-wheel, *k*, on the upper end of the shaft  
65 *e*, thus imparting motion to the feed-pinion *d*.

On the forward end of the shaft J is a bevel-gear wheel, K, which meshes with a bevel-pinion, *m*, on a vertical shaft, L, said shaft  
70 having its lower bearing in an arm projecting from the carriage, and an upper bearing at M, which is supported by braces N N from posts O O on the carriage.

Upon the vertical shaft L are secured three circular rim-wheels or cutters, P<sup>1</sup>, P<sup>2</sup>, and P<sup>3</sup>.  
75 Two or three of these wheels may be used, according to the height of the vein to be cut. The lower wheel, P<sup>1</sup>, will cut out two inches or more of coal at the bottom of the vein to allow the coal to drop. The upper wheel, P<sup>3</sup>,  
80 cuts at the top of the vein to free it from the roof instead of blasting it, and the middle wheel, P<sup>2</sup>, cuts between the two. The upper wheel, P<sup>3</sup>, can be raised or lowered to suit the height of the vein by loosening the set-collars  
85 of the shaft and then raising or lowering the same, as required for the upper cutter, and fastening the collars.

In a full-sized machine the frame or track will be made in sections to allow of easy handling. For the cutting-wheels I may use circular saws, as represented at P<sup>2</sup>, or I may use rim-wheels provided with removable cutting-teeth R. These teeth may be fastened by  
90 screws, some lapping on both sides of the rim, or others be placed alternately on opposite sides; or the rim of the wheel may have slots, into which the teeth are inserted and fastened by keys *n*, as shown in Fig. 3.

In practice I make some of the cutters flat  
100

or straight on the face, others round or oval, and still others concave, and they should be arranged to follow each other in the following order—viz., concave, round or oval, and  
5 straight, and so on around the wheel.

With this machine a continuous rotary movement of the shaft F gives a rapid revolving motion to the cutting-wheels, and at the same time feeds the machine the desired distance  
10 forward when it turns a square corner, and then moves along the face of the coal the full width of the room or place to be cut out.

I am aware that a carriage carrying the operating mechanism and moving in two directions, and two or more cutting-wheels arranged  
15 on a vertical shaft, are not new, and I do not therefore claim such, broadly, as my invention; but,

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

1. The combination, with the bed A, rails B C, and carriage D, of the shaft *e*, with pinion *d* and worm-wheel *k*, the rack-bars *f f'*, shaft J, with worm *i* and bevel-pinion *h*, and  
25 the main shaft F, with bevel-gear wheel G, all substantially as and for the purposes herein set forth.

2. The combination, with the carriage D, of the shaft J, receiving its motion from the shaft  
30 F, and operating the feed mechanism, as described, the gear-wheels K *m*, upright shaft L, and horizontal disks P' P<sup>2</sup> P<sup>3</sup>, formed or provided with cutting-teeth, substantially as and  
35 for the purposes set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

JOHN GOWLAND.

Witnesses:

L. H. MUNSON,

THOS. M. CRISSMAN.