

A. HANAUER.

GEAR-PLANNER.

No. 183,298.

Patented Oct. 17, 1876.

Fig: 1.

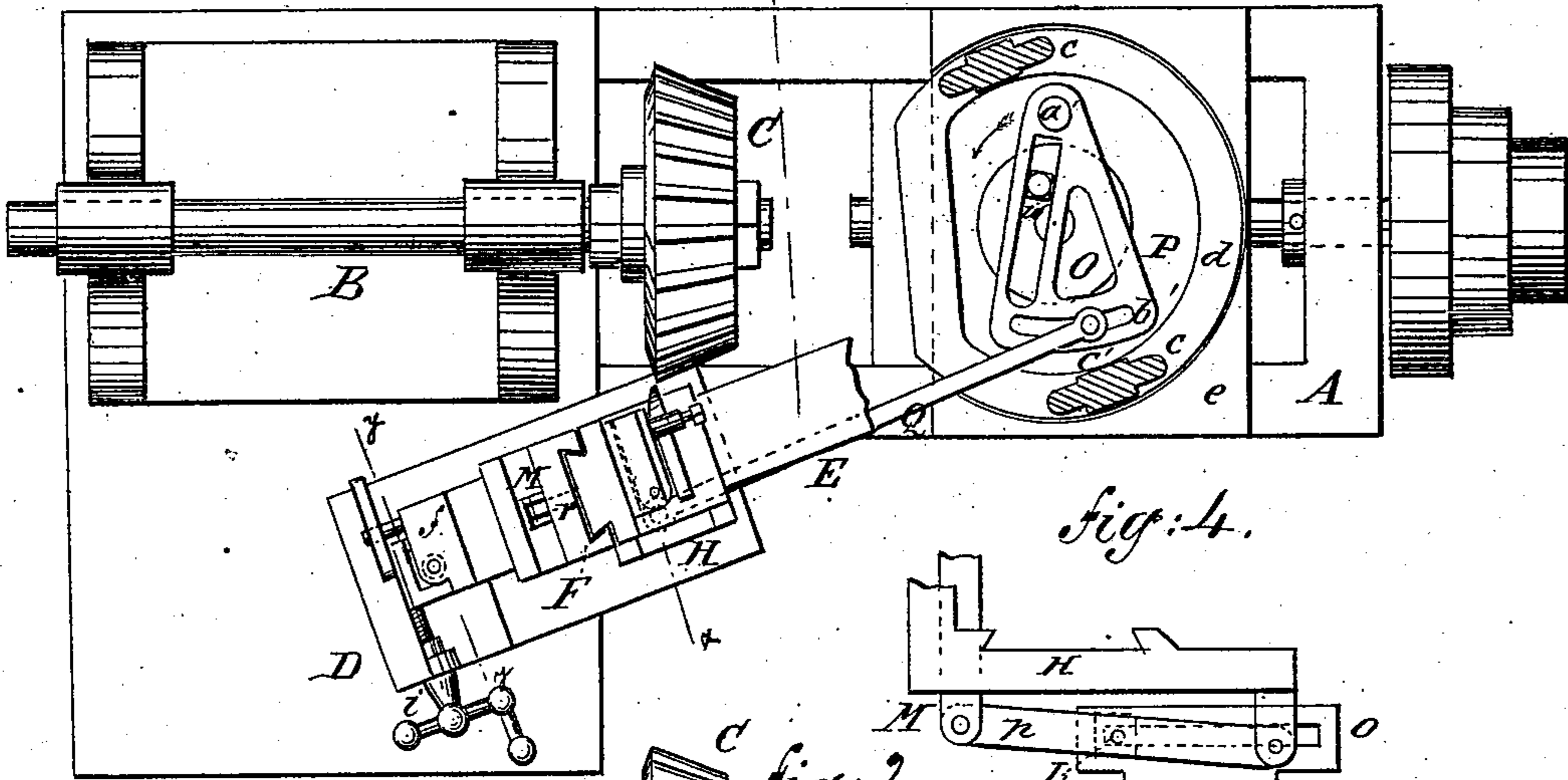


Fig: 4.

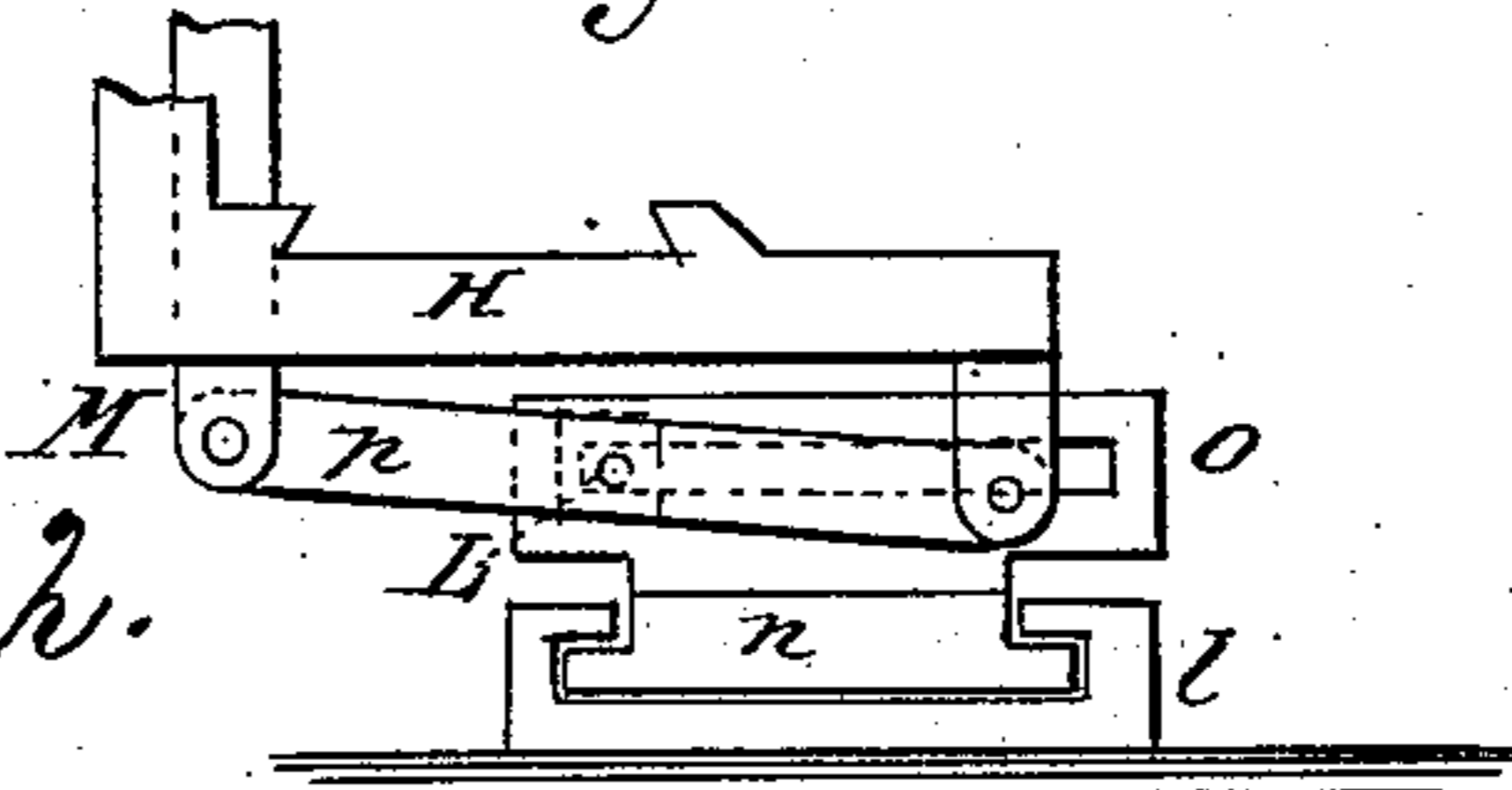


Fig: 2.

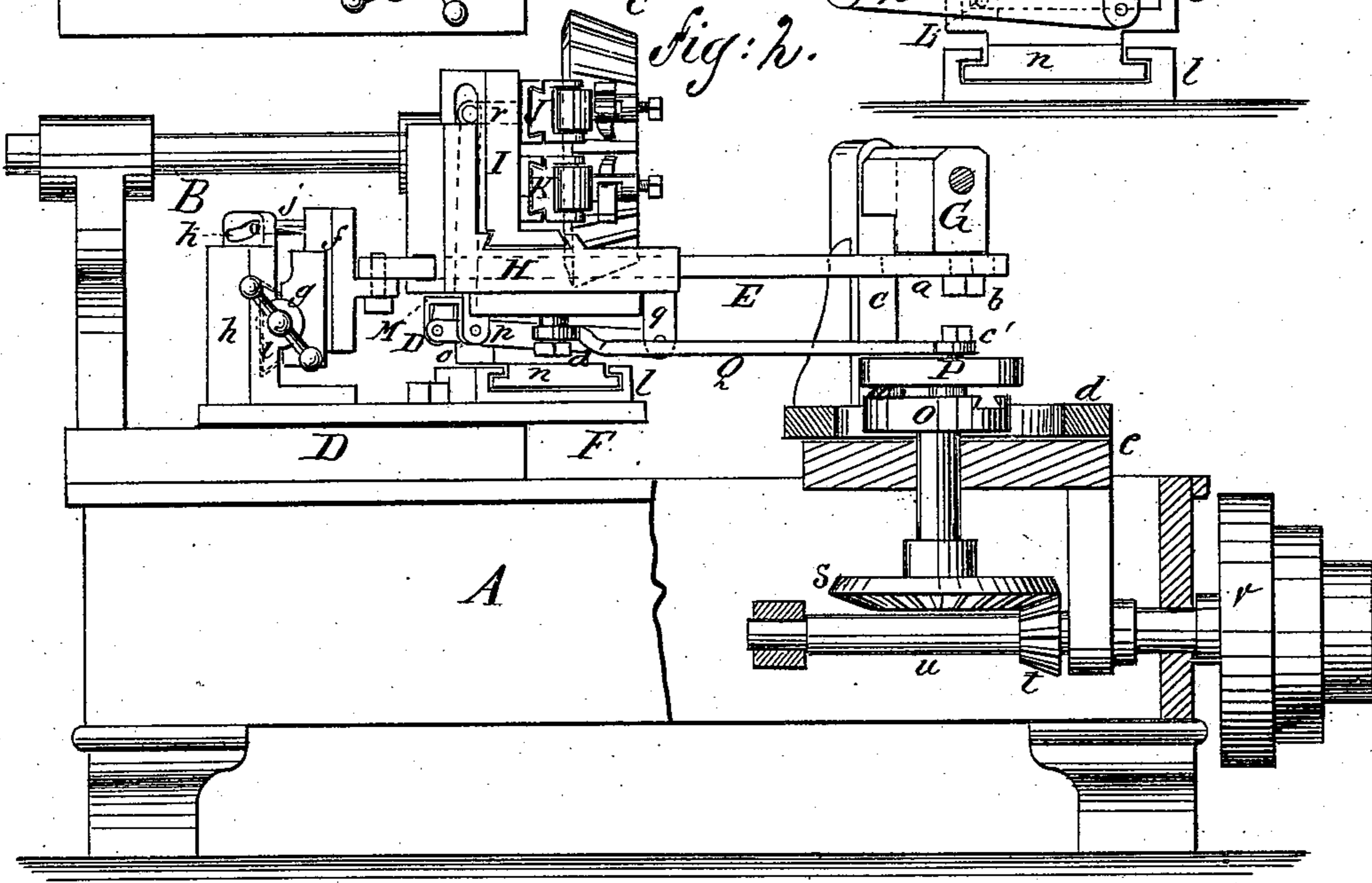


Fig: 5.

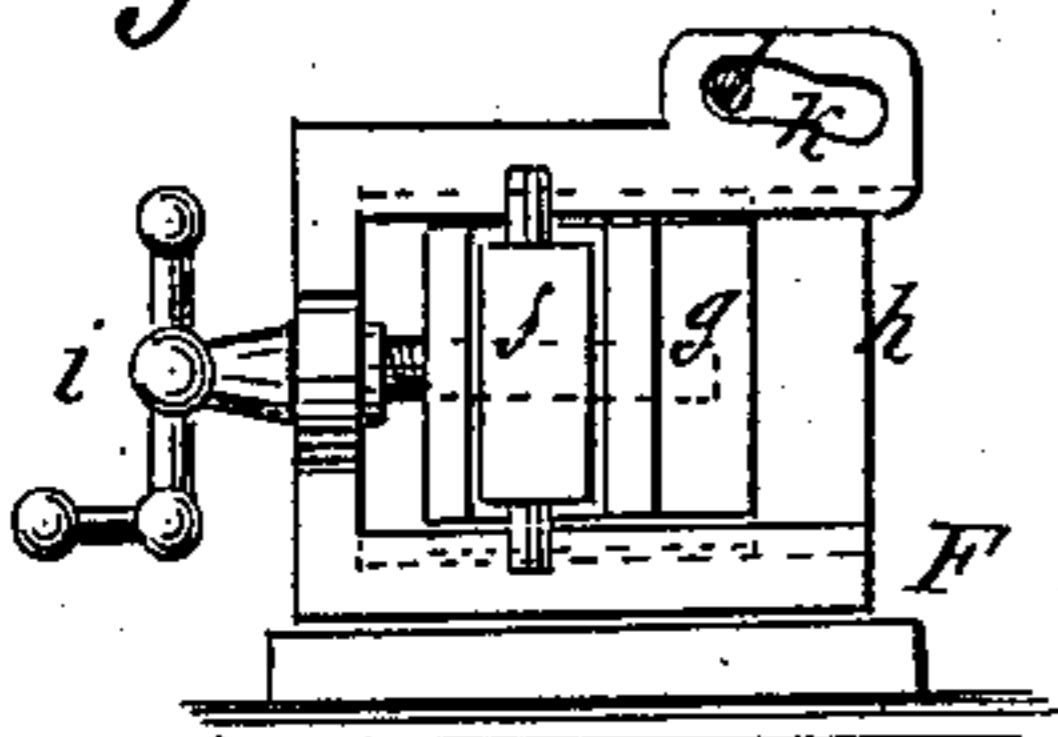
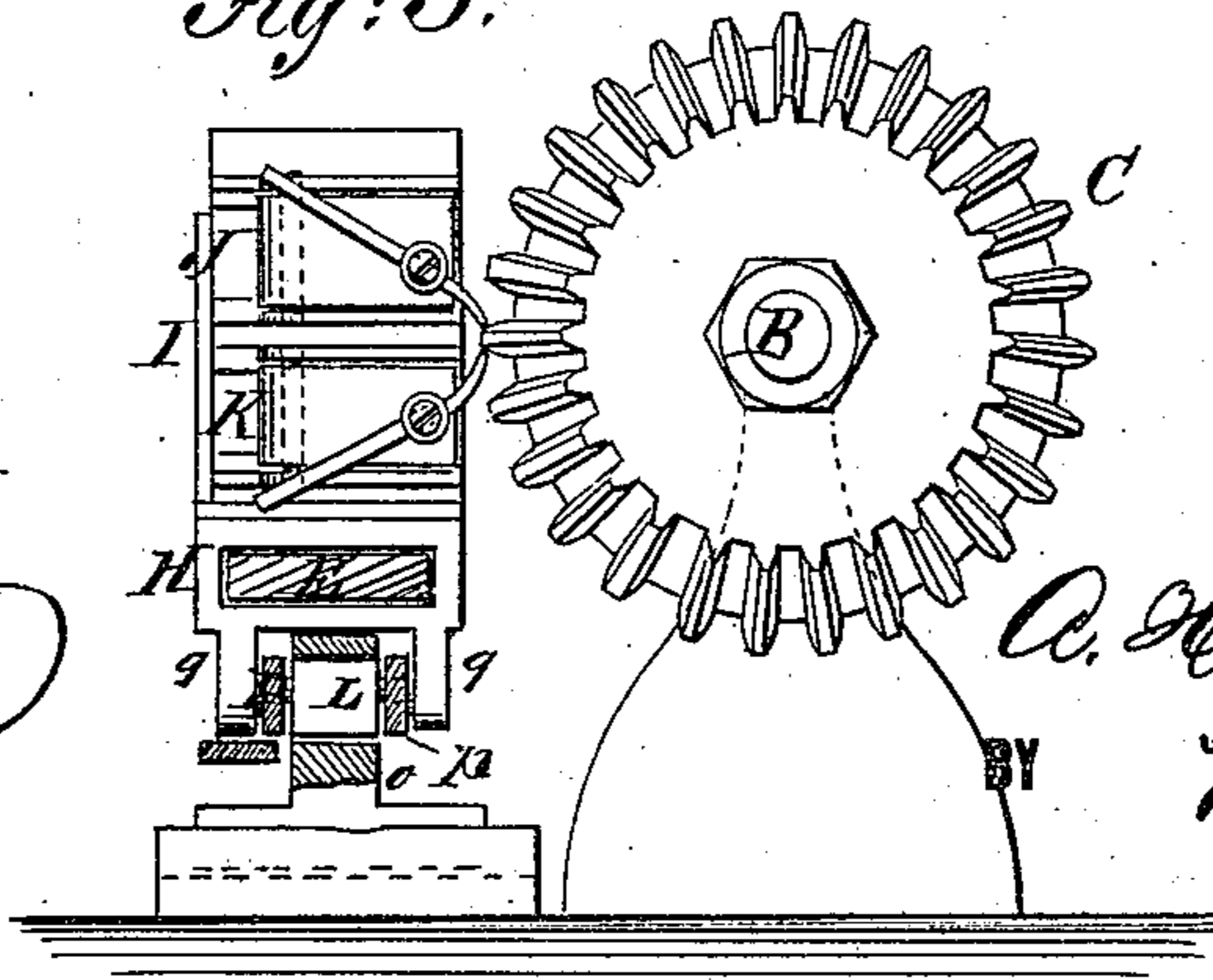


Fig: 3.



WITNESSES:

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# UNITED STATES PATENT OFFICE

ANDREW HANAUER, OF COVINGTON, KENTUCKY.

## IMPROVEMENT IN GEAR-PLANERS.

Specification forming part of Letters Patent No. 183,298, dated October 17, 1876; application filed September 9, 1876.

*To all whom it may concern:*

Be it known that I, ANDREW HANAUER, of Covington, county of Kenton, and State of Kentucky, have invented a new and Improved Gear-Planer, of which the following is a specification:

Figure 1 is a top view, with parts broken away to show the construction more clearly. Fig. 2 is a side elevation, with a part broken away to show the driving mechanism. Fig. 3 is a detail view of the tool-holders and radius-bar in section on line *xx* in Fig. 1. Fig. 4 is a detail view of the lever arrangement for moving the upper tool-holder. Fig. 5 is a detail view of the feeding and guiding mechanism of the radius-bar, taken on line *yy* in Fig. 1.

My invention consists in a machine having a radius-bar upon which slides a tool-rest, provided with two tool-holders capable of moving vertically in opposite directions, one moving with the radius-bar as it is guided by a form or templet, and the other moving in the opposite direction, receiving its motion through a lever and connecting-rod from the tool-rest. It also consists in an arrangement of a crank and slotted lever driven by suitable gearing, and connected with the tool-rest by a connecting-rod. It further consists in the arrangement of the pivot and feeding apparatus for the radius-bar, as hereinafter more fully described.

The object of my invention is to accurately plane both sides of the teeth of cast gear-wheels at one operation, thereby saving the great expense of hand work or of doing it with ordinary planes or shapers.

Similar letters of reference indicate corresponding parts.

A is the bed of the machine, upon which is placed a plate, D, for supporting the head-blocks, upon which are placed the journal-boxes for the mandrel B, which supports the wheel C, the teeth of which are to be planed.

The mandrel is provided with the usual index-plate and apparatus for moving the wheel to and retaining it in the required position. E is a radius-bar that is slotted at *a*, and movably attached to the bar G by a tap-bolt, *b*. The bar G is pivoted at its ends to the ears *c*, which are attached to a turn-table, *d*, that

has a bearing in a block, *e*, bolted to the bed A. The outer end of the radius-bar is attached to a vertical slide, *f*, which moves in ways attached to a horizontal slide, *g*, that has ways in a standard, *h*, that is bolted to the plate D. The slide *g* is moved by the screw *i*, and the vertical slide *f* is provided with a stud, *j*, that engages with a templet or guide, *k*, which is fixed to the standard *h*. H is a slide accurately fitting the radius-bar E, and carrying the tool-rest I. J and K are tool-holders, constructed like the ordinary tool-holders of a planing or shaping machine, and are each placed in a slide capable of moving vertically in the rest I. The lower tool-holder K is clamped tightly after being properly adjusted, so that it partakes of every motion of the radius-bar. The upper tool-holder J is capable of sliding vertically. Ways *l*, supported by a plate, F, attached to the plate D, are placed under and at right angles to the radius-bar E. A slide, *n*, is placed in the ways *l*, and is provided with a slotted bar, *o*, placed at right angles to the ways *l*, and parallel with the center line of the tooth to be planed. L is a block accurately fitted to the slot in the bar *o*, to which are pivoted the levers *p p* at their centers, which are also pivoted to ears *q* projecting downward from the slide H. M is connecting-rod that is forked at its lower end, and is jointed to the free ends of the levers *p*. At its upper end it is connected with a post, *r*, which projects from the tool-holder J backward through a slot in the part I. N is a vertical shaft having a journal-box in the block *e* located centrally in relation to the turn-table *d*. To the lower end of this shaft the bevel-wheel *s* is attached, which is driven by a pinion, *t*, on the horizontal shaft *u*, which is also provided with a cone-pulley, *v*. A crank-disk, O, is attached to the upper end of the shaft N, and is slotted to receive an adjustable crank-pin, *w*, which works in a slot in the sectoral arm P, which is pivoted at *a'*, and provided with an arc-shaped slot at *b'* for receiving the adjustable pin *c'*. Q is a connecting-rod that connects the pin *c'* and the pin *d'*, that projects downward from the slide H.

The operation of my machine is as follows:

The wheel to be finished is placed on the mandrel B, and the radius-bar is adjusted to the required bevel. The proper guide or templet *k* is attached to the standard *h*, and the crank-pin and sectoral arm are adjusted to give the proper stroke to the slide H. The tools are adjusted in the tool-holders for working on both sides of a tooth. Power is applied to the pulley *v*, and the tools are fed up to the work by the screw *i*. The stud *j*, that slides in the slot in the templet *k* causes the radius-bar to carry the lower tool in the proper curve.

The movement of the lower tool is duplicated in the upper one by the action of the levers *p*, but in the opposite direction, so that it acts upon the upper side of the tooth in the same manner as does the lower one on the under side of the tooth. As the slide H moves back and forth the fulcrum of the levers *p* moves in the slot in the bar *o*, and as the tools are moved up to the work the bar *o* moves also, being attached to the slide *n*.

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

1. The arrangement, in a gear-planer, of two

tool-holders carried by a single rest, and moving independently and oppositely in forming the curve of the sides of the teeth, being guided by a form, representing one side of the tooth, through an arrangement of levers, for simultaneously planing both sides of a tooth of a gear-wheel, substantially as shown and described.

2. The combination of the slide H, support I, tool-holders J K, levers *p*, and their sliding fulcrum, the slotted bar *o*, slide *n*, connecting-rod M, and stud *r*, substantially as shown and described.

3. The radius-bar E, in combination with the slides *f* and *g*, standard *h*, pin *j*, form *k*, and screw *i*, as herein shown and described.

4. The radius-bar E, in combination with the pivoted bar G, turn-table *d*, and ears *c*, substantially as shown and described.

5. The combination of the slotted crank-disk O, adjustable crank-pin *w*, sectoral arm P, connecting-rod Q, and slide H, substantially as shown and described.

ANDREW HANAUER.

Witnesses:

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