

2 Sheets--Sheet 1.

J. RUSSELL.
Cut Nail-Machines.

No. 144,229.

Patented Nov. 4, 1873.

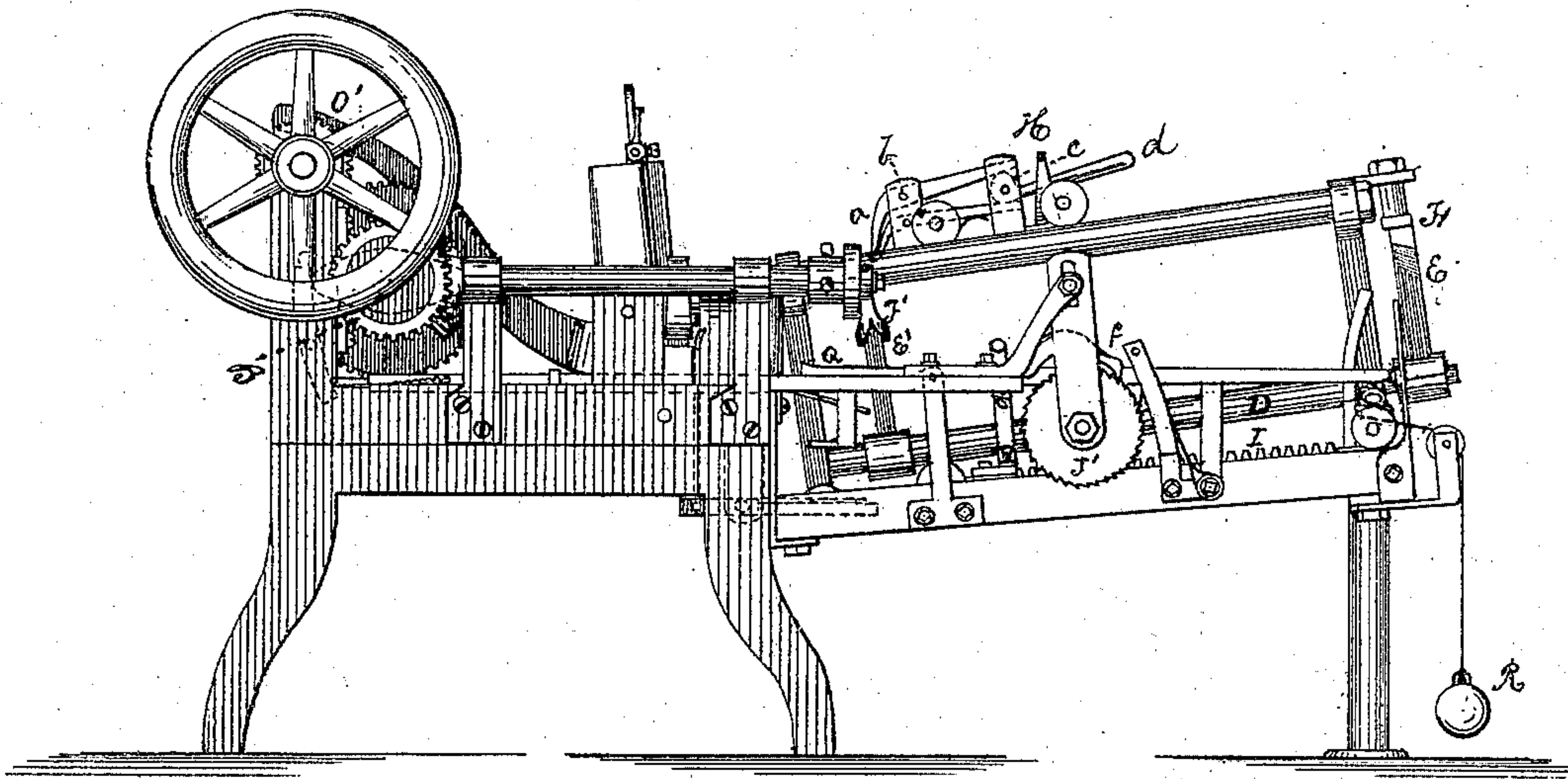


FIG. 1.

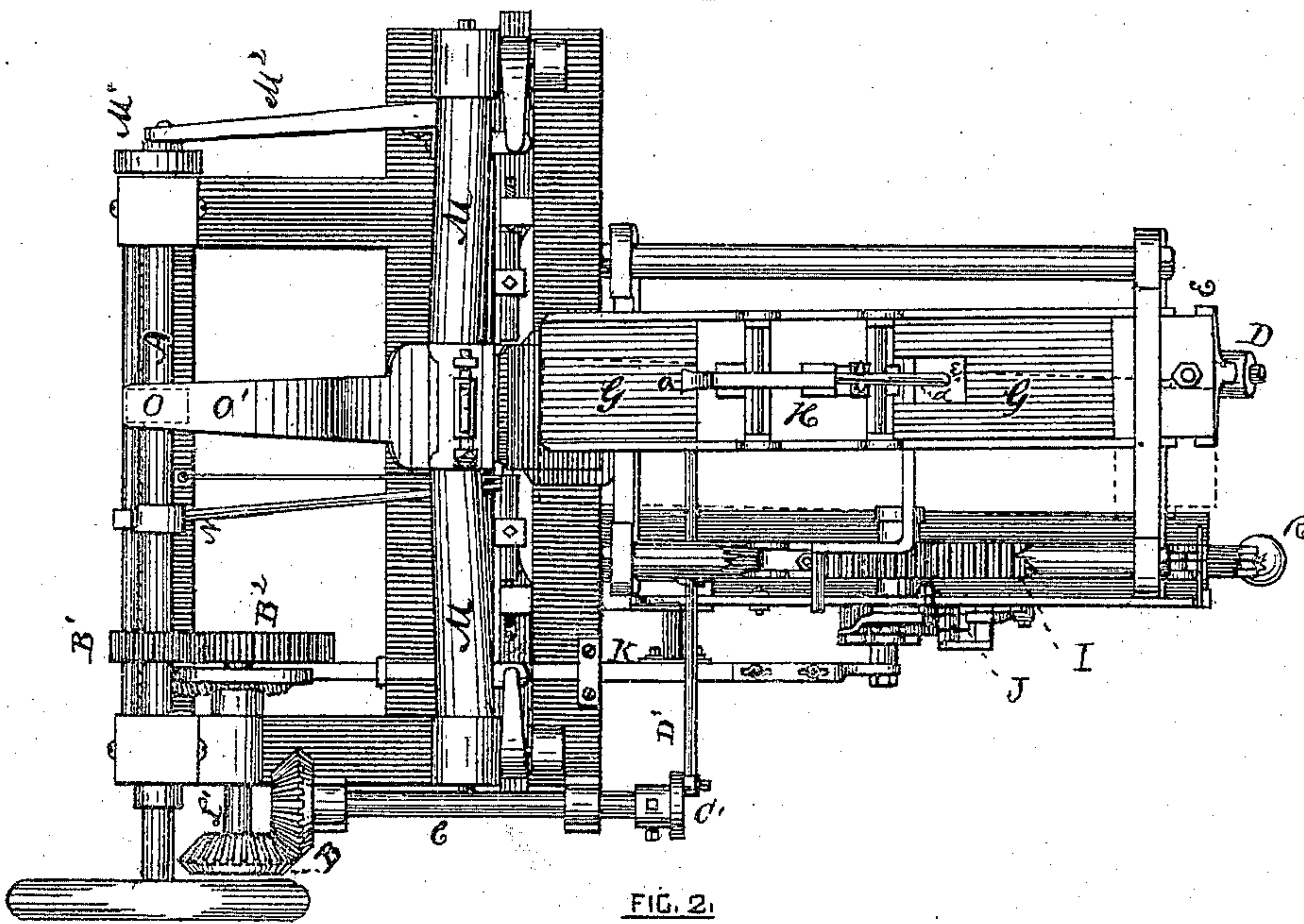


FIG. 2.

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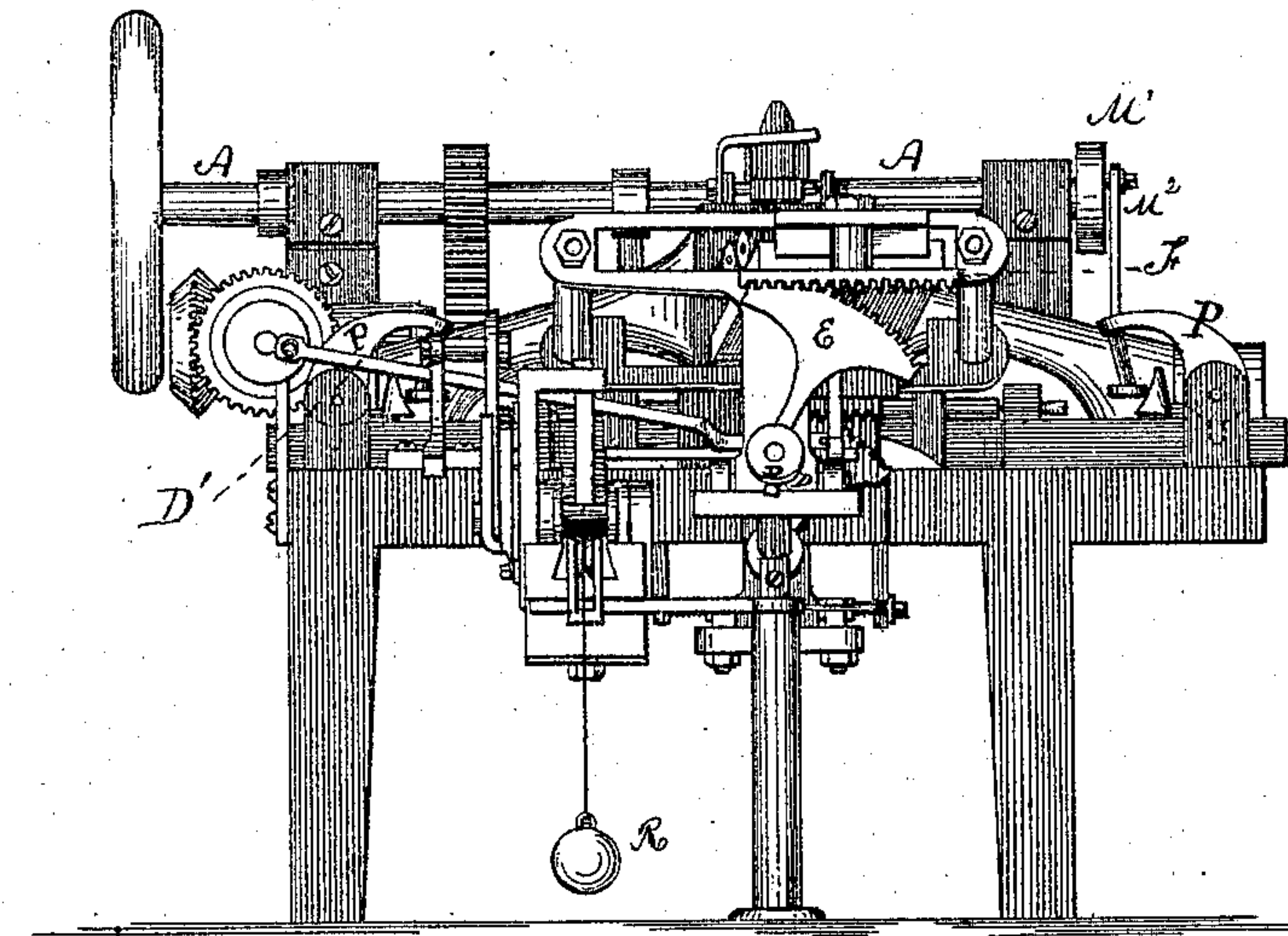


FIG. 3.

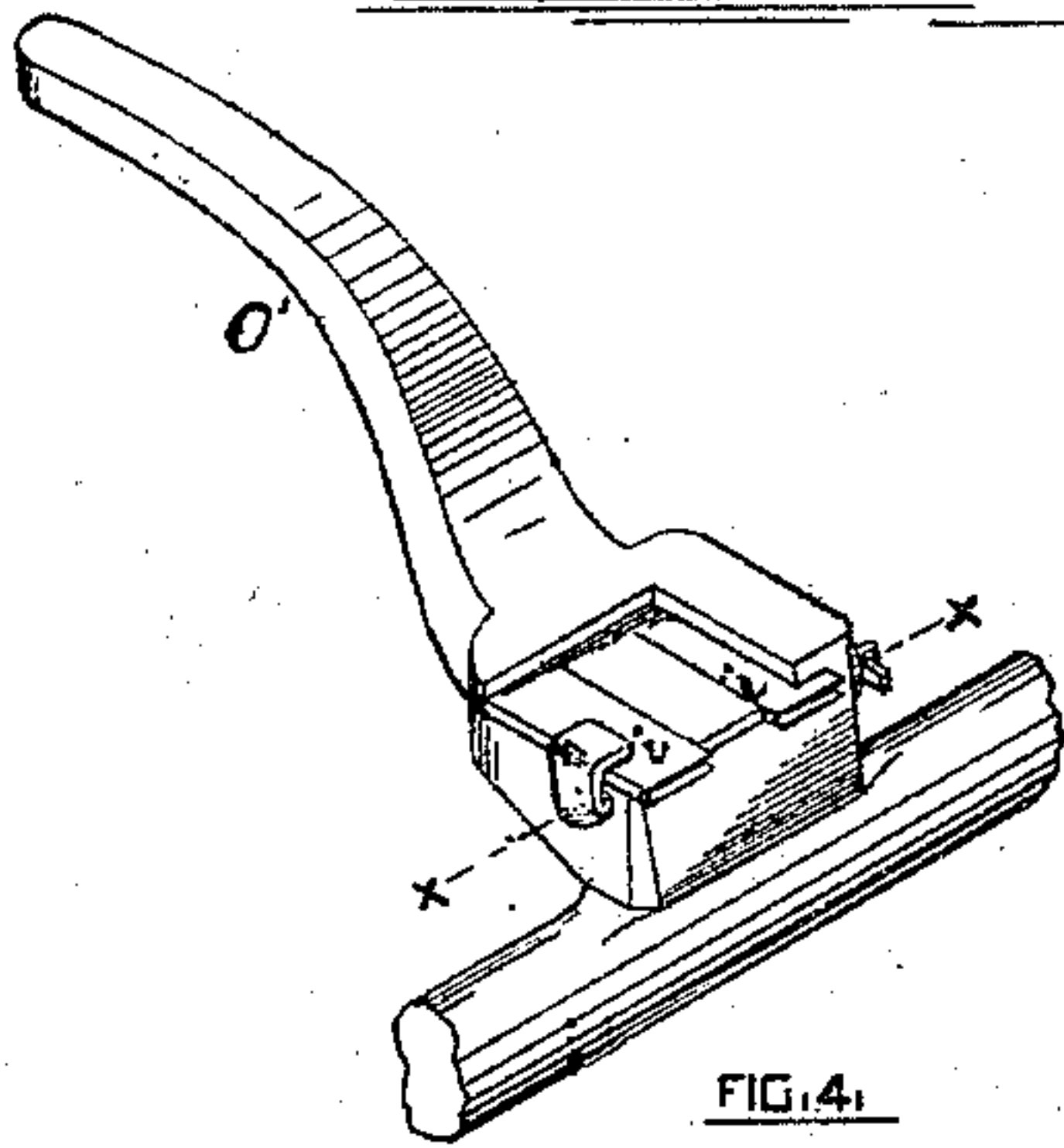


FIG. 4.



FIG. 5.

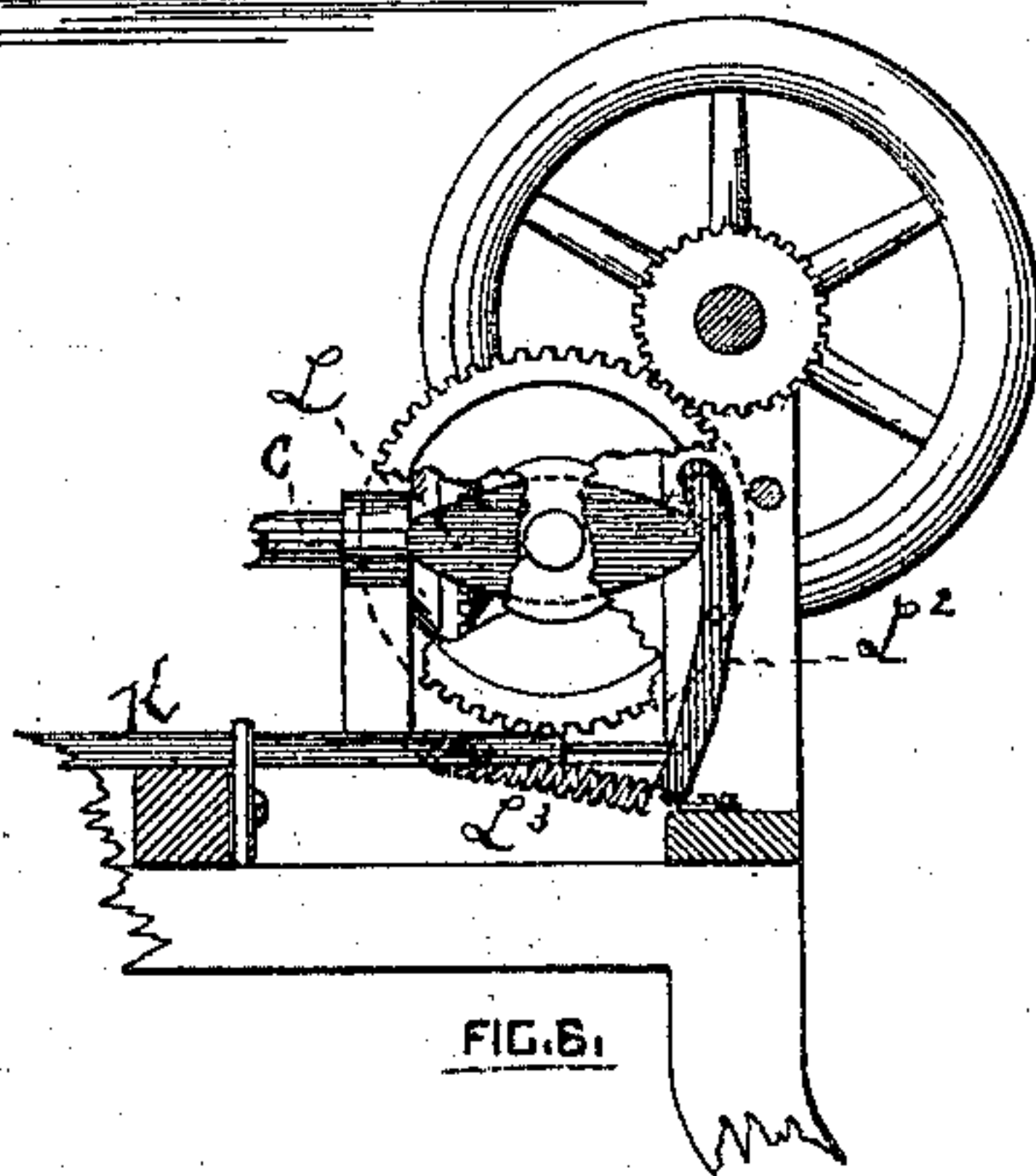


FIG. 6.

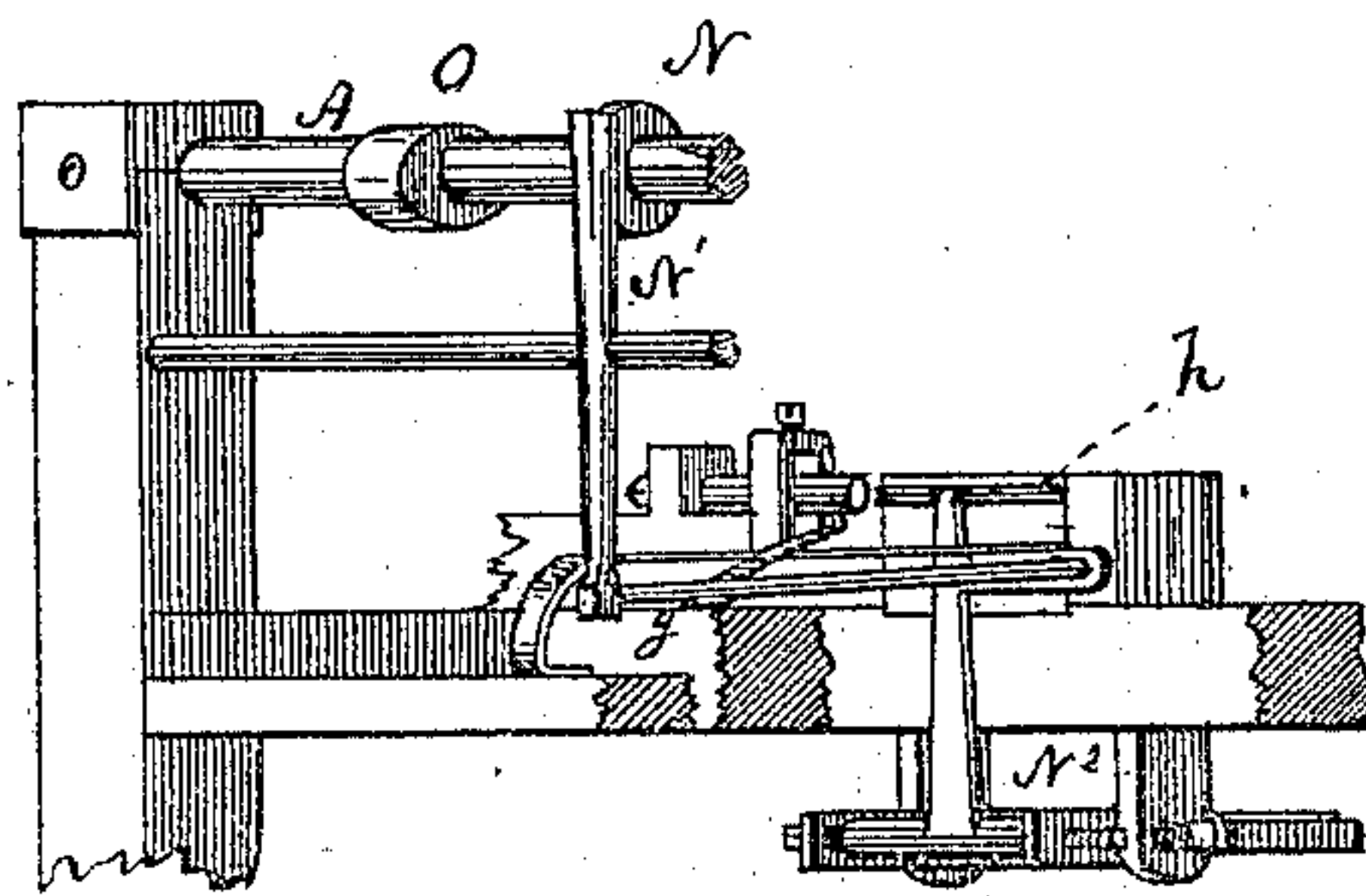


FIG. 7.

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Edmund C. Rice
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INVENTOR,

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UNITED STATES PATENT OFFICE.

JACOB RUSSELL, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, TO HIMSELF AND WILLIAM SPRAGUE.

IMPROVEMENT IN CUT-NAIL MACHINES.

Specification forming part of Letters Patent No. **144,229**, dated November 4, 1873; application filed February 17, 1873.

To all whom it may concern:

Be it known that I, JACOB RUSSELL, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Machines for Cutting Nails; and I do hereby declare that the following specification, taken in connection with the drawings making a part of the same, is a full, clear, and exact description thereof.

Figure 1 is a side elevation. Fig. 2 is a top view. Fig. 3 is a rear view. Fig. 4 is a view in perspective of a gripping-lever. Fig. 5 is a view in section of the same on the line *xx* of Fig. 4. Fig. 6 is a side view of a portion of the feeding mechanism. Fig. 7 is a view in perspective, showing the nipper and its attachments.

The characteristic feature of my machine, aside from various details in construction and arrangement, resides in the means by which the nail-plate can be held and fed to the cutting-shears, so as to reduce within the lowest possible limits the waste which, in all nail-cutting machines, comes from the "butt" which is left after the machine has cut all the nails from the nail-plate which its organization will permit.

A is the principal shaft, to which the power is applied. The revolution of this shaft gives motion to the bevel-gear B, through the gear-wheels B¹ B², Fig. 2. The counter-shaft C has at one end a bevel-gear, engaging with the bevel-gear B, and at the other end a crank, C'. This crank gives a rocking motion to the shaft D by means of the connecting-link or shackle-bar D'. This last-named rocking shaft D, so deriving its motion from the principal shaft A, is provided with two toothed sectors, E E', mounted thereon near the extremities of the shaft, respectively, and such toothed sectors engage with racks F F'. Such racks are swivel-jointed to a bed-guide, G. This guide, in combination with the nippers which hold the plate and feed it to the cutting-shears, constitutes an important and distinctive feature in the machine, as will be presently understood. Instead of turning the nail-plate over, so as to cut the nails successively, first with one side of the nail-plate uppermost and then the other, as is usual, I present the plate

angularly to the cutting-shears, the same face of the plate being always up, and shear the plate into blanks by a succession of transverse cuts, whose lines diagonally cross the longitudinal axis of the plate, and, such blanks at their widest ends being headed successively by two sets of headers acting alternately, the whole plate is worked into nails, with the exception of so much of it as is held by the nippers hereinafter described. That portion so held by the nippers is called the butt; and to make this portion as small as possible the plate is laid on the guide G, which is simply a bed or frame of cast-iron set inclined toward the cutting-shears and having raised sides, against which the side edges of the nail-plate abut, and the rear end of the plate is taken hold of by a pair of nippers, *a*, Fig. 1, which, because the bed-guide G supports the plate, need take no greater hold upon the end than to the extent of one-eighth of an inch, or within the average width of a nail. In all machines which hold and support the plate by the gripe of the nippers it is necessary that the nippers should take a hold to the extent of from two to four inches, and this large butt becomes, in cutting up a ton of nail-plate, a serious item of loss. The nippers above referred to may be arranged in any convenient way, and should be mounted on a carriage, H, which is fitted to slide or travel on the bed-guide G. In this instance the nipper-jaws are pivoted in a standard, *b*, and are made with curved beaks, which are forced together by means of a cam, *c*, operated by a lever, *d*; and in order to enable the curved beaks to take hold of the end of the plate while it is resting upon the surface of the guide-bed, a portion of such bed is cut away or slotted, as seen at *e*, Fig. 2.

The guide-bed G is made to move laterally and vibrate angularly by means of the sectors E E' and the racks F F', before referred to, and the relative lengths of the radiuses of the sectors must be such as to give the necessary angular movement of the bed with respect to its longitudinal axis, so that the cutting-shears can clip blanks from the end of the nail-plate as it is fed to them, and have them come alternately heads and points.

The nipper-carriage is fed forward by a pawl-

and-ratchet movement. I, Fig. 1, is a toothed rack, located in a plane parallel with the guided G. With the teeth of this rack a pinion, J, Fig. 2, engages, and to the shaft of the pinion is keyed a ratchet-wheel, J', Fig. 1, and a pawl, f, hinged to a radius-bar in a well-understood way, engages with the teeth of the ratchet. A vibrating movement is given to this radius-bar by means of a reciprocating-rod, K, Fig. 6, and is actuated in one direction by the cam L or the shaft L¹, Fig. 2, acting against the face of the lever L², as clearly shown at Fig. 6. A spring, L³, brings back the rod K, when permitted to do so, by the revolution of the cam L. After the carriage has completed its movement, an arm projecting at right angles from the pawl rides up an inclined plane located on a longitudinal bar, Q, Fig. 1, and raises the pawl clear of the teeth of the ratchets. This bar extends backward and near to where the operator stands, and can be raised on the fulcrum to which it is pivoted, and be sustained by a spring-catch. The operator can then, by hand, or the weight R, if sufficient, pull back the carriage.

The mechanism for cutting the blanks from the end of the nail-plate requires no special description, as it is not unlike that known to manufacturers of nail-cutting machinery. It consists generally of a stationary lower shear and a vibrating upper shear. A yoke-bar, M, Fig. 2, extends transversely across the frame, and is suitably mounted in journal-boxes in standards on the frame. A crank-pin, M¹, in the main shaft, Fig. 2, through a connecting-link, M², gives a vibratory movement to the yoke, and upon this yoke, midway between its ends, is mounted the vibrating shear-blade. Parallel with the shear-blade, and immediately behind it in the stock, is a spring gage-plate, against which the end of the nail-plate is thrust to gage the length of the blank. After a blank has been cut, the gage-plate spring presses it against the face of the stationary shear temporarily; but before the operation of heading is to be performed, the blank should be turned ninety degrees, so as to be gripped upon its two parallel, instead of upon its two tapering, sides. A cam, N, Fig. 7, on the main shaft, at this time, acts upon the lever N¹, and vibrates the lever N² through the connecting-rod g. The upper end of N² has a cross-bar, h, which is lipped, and, pressing against the nail-blank lengthwise and near its lower edge, turns the blank ninety degrees around its own axis. The blank now stands with one of its parallel edges against the end of the stationary shear. At this moment the cam O on the main shaft,

Fig. 7, acts against the tail of the lever O', Fig. 4, which causes the gripping-dies (one for each blank alternately) to gripe the nail-blank hard against the face of the block of the stationary shear. Thus gripped, the heading-dies, which are operated by the vibration of the yoke-bar M, through toggle-links and bell-cranks P, Fig. 3, in a well-understood way, upset the end of the blank into a head, thus finishing the nail. There are two of these headers, which act alternately upon the blanks cut from the plate, heads and points, as hereinbefore explained.

In Figs. 4 and 5 I have shown in detail the gripping-dies i, and a novel mode of attaching them to the die-block, which is actuated by the lever O' and the cam O on the main shaft. The top of the cam-block is recessed and provided with a shoulder at one side, and no shoulder on the opposite side. One of the dies i bears with one edge against the said shoulder, and the other die i projects outward slightly at one edge over the adjacent edge of the die-block, and the two dies are separated by a plate which is interposed between them. A yoke-bolt, with a curved bearing-face or hook at one end, passes laterally through the die-block, beneath the dies, with the hook engaged with the outer edge of the adjacent die i. The end of the yoke-bolt, opposite its hook, is provided with a longitudinal slot, the outer end of which is inclined to receive a flat wedge or key. By driving on the wedge-key the gripping-dies may be tightened or loosened in the die-block, and are readily accessible from the rear of the machine, and can be adjusted as well when the machine is in motion as when it is at rest.

I do not limit myself to the precise construction and arrangement of the several parts as described, but mean to include all mere formal modifications performing the same mode of operation by equivalent means.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The guiding-bed G, with guiding-edges adjacent to its forward end, in combination with the sliding nipper-carriage and the mechanism for laterally moving the bed bodily at each end to and fro, substantially as shown and described.

2. The combination of the vibrating sectors E E', the pivoted racks F F', and the guided G, substantially as described.

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