Sheet 1 – 2 Sheets.

J. L. Wiggin,

Making Cut Nails,

No. 55,755. Patented June 19, 1866

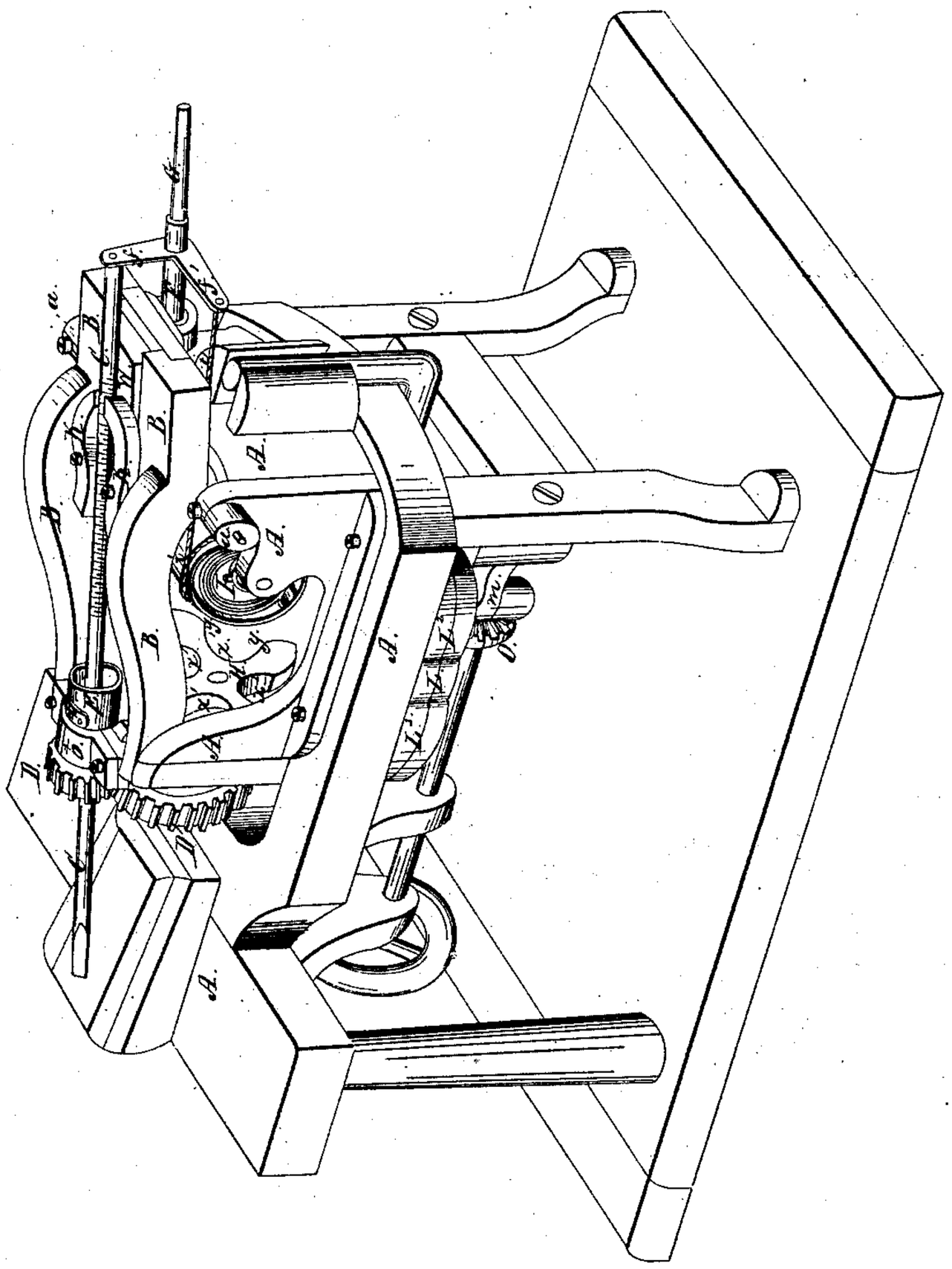

Fig: 1.

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Wm. Coombs

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J. L. Wiggin by
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his atty

Sheet 2 - 2 Sheets.

J. L. Wiggin,

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Fig: 2.

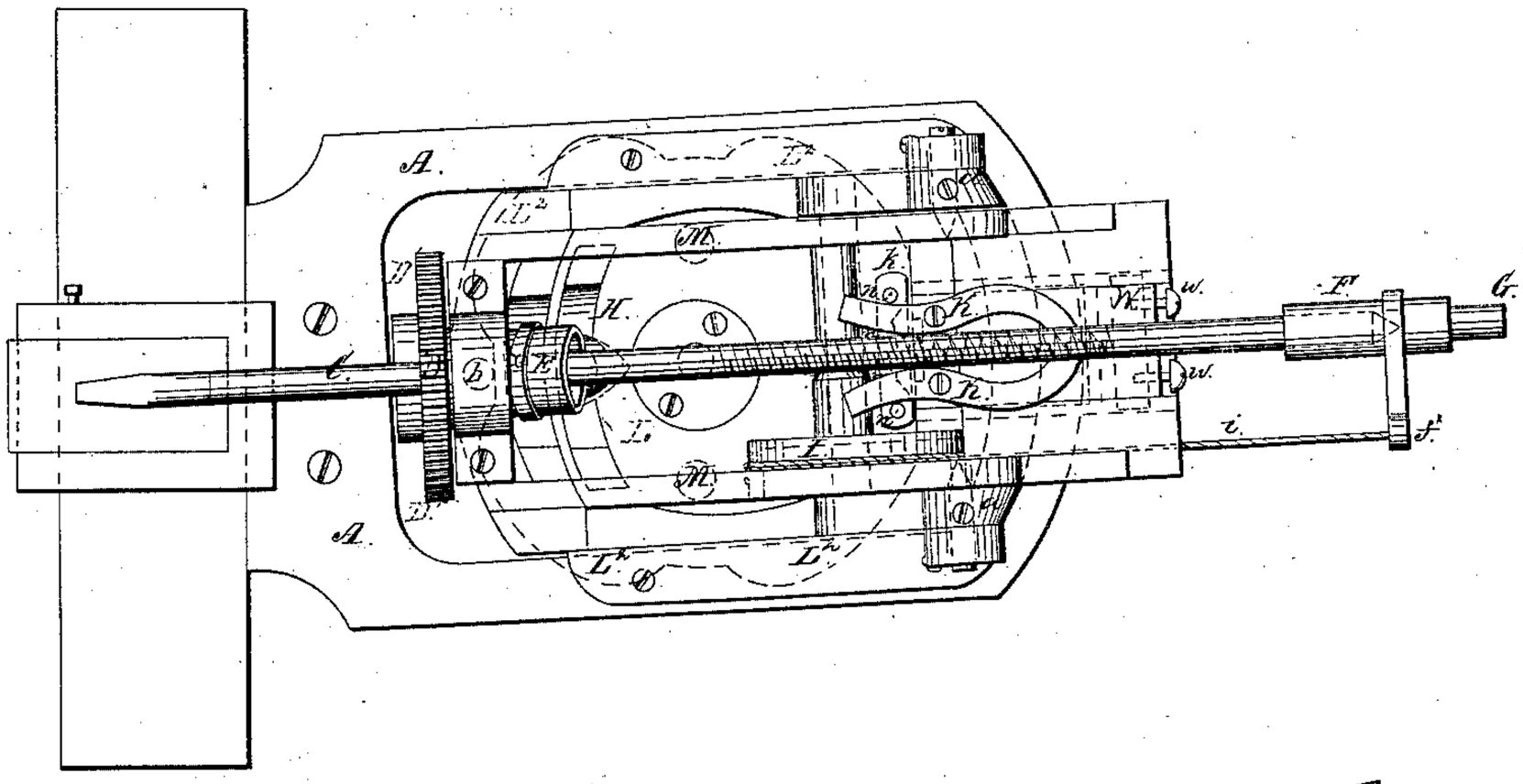
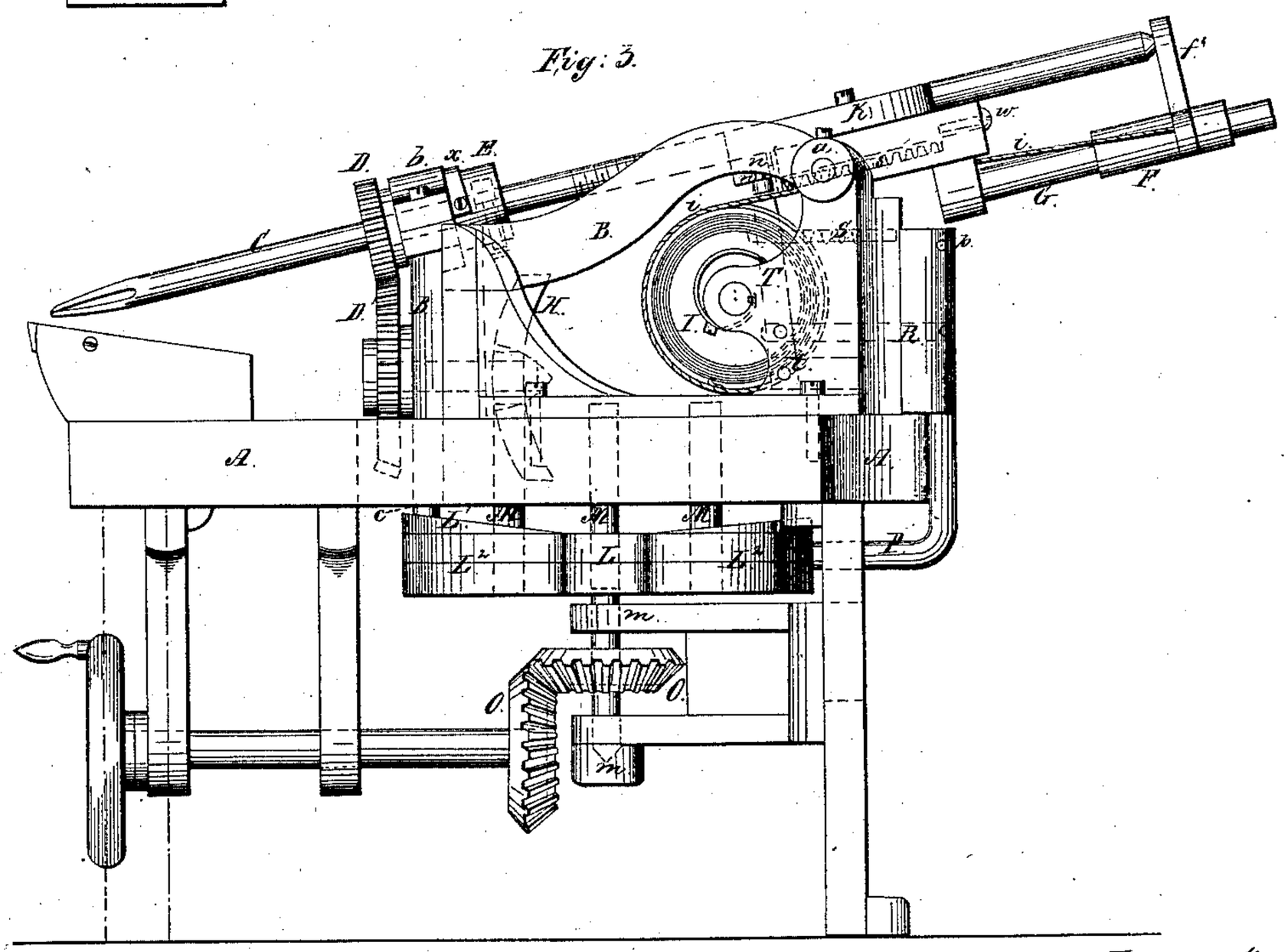


Fig: 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

JAMES L. WIGGIN, OF SOUTH NEW MARKET, NEW HAMPSHIRE, ASSIGNOR TO JOHN W. HOARD, OF BRISTOL, RHODE ISLAND, AND GEO. B. WIGGIN, OF SOUTH NEW MARKET, NEW HAMPSHIRE.

IMPROVEMENT IN NAIL-PLATE FEEDERS.

Specification forming part of Letters Patent No. **55,755**, dated June 19, 1866.

To all whom it may concern:

Be it known that I, JAMES L. WIGGIN, of South New Market, in the county of Rockingham and State of New Hampshire, have invented certain new and useful Improvements in Machinery for Feeding Nail-Plate; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 represents an isometrical perspective view of a machine constructed in accordance with my invention. Fig. 2 is a plan view, and Fig. 3 an elevation, of the same, the dotted lines in the two latter figures showing in profile the parts concealed.

My invention relates to mechanism for feeding nail-plate to an ordinary or suitable single-cutting nail-machine, in which the plate after each cut must be turned over before being cut again; and it has for its object the construction of a feeder which shall be automatic in its operation, both feeding the nail-plate forward and rotating or turning the plate, stopping at every half-turn to allow the cutter to strike off the nail-blank. To accomplish this latter result—*i. e.*, turning the nail-plate—it is necessary that there should be some means provided for simultaneously drawing back and lifting the feeding-bar which holds the nail-plate, so as to clear the cutter and raise the plate, in order that it may not, in turning, strike against the under block which forms one of the cutting-edges of the nail-cutting machine.

I am aware that many methods have been devised for effecting the above-mentioned results; but these methods are all more or less objectionable, in that the mechanism employed is complicated and at the same time cannot be relied on at all times to perform its functions properly and accurately.

In the present invention my intention has been to avoid these defects, simplifying as far as possible the arrangement and combination of parts required to impart proper motion to the feeder, and at the same time making the apparatus accurate in its operation.

In order to effect this arrangement I have constructed a nail-plate feeder which consists substantially of a feed rod or bar provided with the usual nippers or tongs for holding the nail-plate, and supported in a movable frame of suitable construction, which frame is swung in the stationary frame of the machine. The feed-bar and movable frame are actuated by means of a wheel working horizontally, which, on its periphery and upper face, is provided with cams of suitable size and dimensions, the upper face being, moreover, provided with pins or studs of any suitable number, as hereinafter explained, which are placed within the cams on the said face and at equal distances from each other on the circumference of a circle concentric with the circumference of the wheel. These pins, in connection with a cog-wheel peculiarly constructed, as will be hereinafter explained, cause the feed-bar to revolve, stopping an interval of time at every half-turn to allow the cutter time to cut off the nail-blank from the plate. The cams on the upper surface of the wheel, passing under a pin on the under side of the movable feed-frame, raise the frame and the feed-bar which it supports, so that the plate may be turned. The cams on the periphery, acting upon a lever which is connected with the feed-bar, cause the latter to be drawn back after each stroke of the cutter, and the feed-bar, as soon as the lever ceases to act upon it, is again fed forward to the cutter of the nail-machine by the pressure of a volute spring secured in a drum and arranged as hereinafter described.

The machine in which these various motions are imparted to the feed-bar is so arranged and constructed that the operation of lifting, drawing back, feeding forward, and stopping may be performed at the rate of two hundred and eighty times per minute, (more or less,) at the pleasure of the operator.

To enable those skilled in the art to make and use my invention, I will now proceed to a more detailed description of the parts of which it is composed and the method of its operation, referring at the same time to the accompanying drawings and letters of reference marked thereon.

The stationary frame A is supported on standards attached to a plate which may be part of the common bed-plate of the feeder and of the

nail-cutting machine, and it is so constructed as to afford suitable bearings for the movable or vibratory frame B, the drum containing the volute spring I, and toothed wheels D D′ and H.

The movable or vibratory frame B has its bearings in the stationary frame at *a*. It is so suspended that when not lifted by means of the cams L′, Fig. 3, acting on the stud or pin *c*, fixed in the front end of the said frame, it will incline forward by its own weight, and will rest on the front piece of the stationary frame. To the top of this vibrating or movable frame I secure the nipper or feed bar C in the manner about to be described.

The toothed wheels D and D′ have their bearings in the front end of the movable frame. The upper wheel, D, has a hollow journal which revolves in the box *b*, and, extending through said box, forms also the journal of the funnel-shaped socket E. This journal, itself supported in the box *b*, thus forms a sleeve in and through which the feed-bar C is inserted, and is by this means held in position on top of the frame B. In order to cause the feed-bar to revolve with the cog H, I make use of a socket, E, provided with a spline held in place by a spring, *x*, attached to the periphery of the socket, by which the spline is dropped into a longitudinal groove or slot in the nipper-bar C. When the wheel D revolves the bar moves with it, being caught and held firmly by the spline. At the same time, on account of its longitudinal slot, the bar is capable of a forward or backward motion independently of the wheel and socket, and is thus, even when revolving, fed forward to or withdrawn from the cutter. The feed-bar, under the arrangement just described, can be easily adjusted to or removed from the machine.

On account of the funnel shape of the socket E the bar can be readily inserted in and through the sleeve or hollow journal, and in order to remove it therefrom all that is needed is to withdraw the spline from the slot.

The mechanism by which the feed-bar, arranged and constructed as above shown, is operated can best be described by reference, first, to that which causes the nail-plate to be fed forward, and, secondly, to that part of the apparatus by which the rotation, lifting, drawing back, and stopping of the feed-bar is effected.

The machinery for effecting the forward motion of the feed-bar is arranged as follows: Beneath that part of the feed-bar which extends beyond the rear of the frame is a sleeve, F, mounted on a rod, G, parallel to the feed-bar, and secured to the vibratory or tilting frame. The sleeve F is provided with two arms, *f f′*, at right angles to the bar and to each other. In the upper end of one of the arms, *f*, is a recess or hole, into which the rear end of the feed-bar C (which, for this purpose, tapers to a point) is fitted. To the end of the other arm, *f′*, at right angles to *f*, is secured the wire or cord *i*, connecting the sleeve F with the spring-drum I, secured in suitable bearings in the frame A, as shown in the drawings, by means of which spring the arm *f* presses strongly and continuously against the end of the feed-bar, and in the absence of the superior back-pressure whereby the bar is drawn back, as hereinafter explained, keeps the bar and nail-plate which it holds constantly fed forward against the gage on the nail-cutter machine.

When the bar is to be withdrawn from the machine the arm *f* should be first slipped to one side or the other of the bar, so as to remove from the bar the pressure of the cylinder-spring.

The apparatus for rotating, lifting, &c., the feed-bar is arranged and constructed as follows: The wheel D gears with the larger toothed wheel D′, which latter wheel has its bearings also in the vibratory frame. The shaft on which it revolves extends through both the movable and stationary frame, and forms the axis also of the cog-wheel H, whose peculiar construction will be presently described. Below this cog-wheel is the wheel or disk L, provided with cams L^2 on its periphery and L′ on its upper face. Upon the said upper face, and at equal distances from each other on the circumference of a circle interior to and concentric with the circumference of the cam-wheel, are the pins M M, equal in number in this case to the cogs on the wheel H, although this is not necessary or essential to the proper operation of the machine. The cam-wheel L revolves horizontally, or in a plane parallel to the bed of the machine, and is supported in suitable bearings *m m*, and actuated by the miter or bevel gear O, which transmits motion from the prime mover. It is so placed in relation to the cog-wheel H that when it revolves the pins M will become successively engaged with the cogs.

The cog-wheel H is of a concave shape, forming the segment of a sphere whose center should be near or at the intersection with each other of the axes of the cog-wheel H and the cam-wheel L. If this concavity were not given to the wheel, the pins M would slip off the cogs before passing over half the length of the cogs, whereas when constructed as shown in the drawings the cogs and the pins will be in contact throughout the whole length of the former. It is not absolutely necessary that the cog-wheel be of this concave shape, as it may have a plane surface, provided it be of sufficient thickness to engage the pins throughout the whole length of the cogs. By making, however, the wheel of the segmental form above mentioned, less metal is consumed in its construction.

The cogs are of peculiar configuration or form, as seen by reference to the wheel H, Fig. 1. Each cog is nearly as long as its corresponding pin M on the cam-wheel, so that when they are engaged the pin is nearly buried in the cog-wheel. Between each cog is a space or opening, as shown at *x′*, which openings, on account of the gradual swell or increase in size of the cogs toward their outer ends, are contracted, as seen at *y y*. As each pin M

approaches its cog it strikes first against the swell *y* on the cog, at which moment the rotation of the feed-bar commences. The pin moving on strikes against that part of the cog nearest the center of the wheel, and continuing its motion passes over the whole length of the cog, quitting it at the point *y*. This causes the rotation of the feed-bar to cease, and on account of the distance of the cogs from each other an interval of time elapses before the next pin and cog become engaged, during which time the nail-cutter strikes off the blank from the nail-plate. At the same moment when the pin begins to rotate the cog-wheel the mechanism for drawing back the bar from the cutter begins to operate.

As the cam-wheel L revolves the cams L^2 on its periphery actuate the lever P, hinged by its upper end to the stationary frame at *h*, pressing against and forcing it out from the machine.

The lever, by means of the rod R, is connected with the upright bar T, hinged at *t* to the stationary frame A, which latter bar has fastened to its upper end a yoke, *k*, provided with pins or studs *n n'*, for actuating the dogs K by their tail-pieces, which are placed between said studs.

Secured in a dovetail guide or groove in the top of the vibratory frame B is the corresponding slide W, to which are pivoted the jaws or dogs K, which embrace the feed-bar C. On the under side of the slide is placed the spring *s*, one end of which is secured to the front of the dovetail slide and the other is supported against the movable frame, which spring keeps up a continuous pressure on the slide, forcing it forward until held by the nuts or screws *w*, whose heads catch on the rear face of the movable frame.

The moment the feed-bar C begins to rotate the mechanism just described commences to work. The cam L^2 actuates the lever P, forcing it out from the machine. When thus moved the lever draws back the rod R, which connects the bar T with the lever. The rod R, in its turn, draws back the bar T, which carries the yoke K. In moving back the inner studs, *n'*, on the yoke strike against the inner curved faces of the dogs K, forcing the jaws or dogs toward each other, so as to hold firmly between them the feed-bar C, which has its surface roughened in order to afford a better hold for the dogs. The yoke being moved still farther back by the action of the cam L^2 on the lever P, the dogs K are also moved back, carrying with them the feed-bar C.

The sleeve F, which presses against the end of the feed-bar, as heretofore explained, is moved back on its rod G at the same time with the feed-bar, on account of the superior force exerted by the lever P, which overcomes the resistance of the spring I.

The cams L^2 are so constructed that the feed-bar is withdrawn the farthest at the moment when the bar with nail-plate attached has made a quarter-revolution, at which time the nail-plate is perpendicular to the position it occupies when ready to be operated on by the cutter. As the feed-bar approaches the completion of its half-revolution the cam decreases in size, thus lessening the pressure on the lever and loosening the hold of the dogs on the bar by means of the outward studs *n* on the yoke *k*, which, as the yoke is impelled forward again by the spring *s*, act on the outer surfaces of the dogs, forcing them open, and in this manner allowing the cylinder-spring to again force the feed-bar forward against the gage. The cam ceases to act on the lever when the feed-bar has completed the half-revolution, and during the time occupied in passing over the space between the cams L^2, as seen in Fig. 3, the operation of cutting is performed, after which the lever is operated by the next cam in a similar manner to that above explained. Simultaneously with the two operations of rotating and drawing back the feed-bar the feed-bar is also lifted in order to allow the nail-plate to turn. This is effected by means of cams L' on the surface of the cam-plate *h*, which come successively in contact with a stud or pin, *c*, Fig. 3, fixed in the front end of the movable frame. The cams L' are of the same length as the cams L^2, and have the same space between them, during which the pin *c* is not acted on. As soon as the cog-wheel H begins to rotate the cam L' commences to act on the stud *c*, and thus raises the vibratory frame, reaching the highest point at the time when, as above explained, the feed-bar has made a quarter-revolution.

The peculiar construction of the vibratory frame facilitates the lifting of the feed-bar. The front end of the frame extends downward and outside of the front of the stationary frame, which is slotted to guide it in its vibratory movement, and to the bottom of the vibratory frame is fixed the pin or stud *c*. The wheel D, as before said, has its bearings in this portion of the movable frame, and the shaft on which it revolves, inserted through the corresponding side of the stationary frame, forms also the axis of the cog-wheel H. At the point where the shaft pierces the stationary frame a hole or slot is formed in the said frame of sufficient dimensions to allow the shaft to conform to the movements of the vibratory frame to which it is attached.

The side pieces of the frame B, when the frame is not lifted by the cams, rest in recesses formed for that purpose in the front end of the stationary frame and prevent the movable frame from tilting too far forward.

It will be seen that by this peculiar arrangement of cams and pins on the cam-wheel L the operations of rotating, drawing back, and lifting the feed-bar are accomplished simultaneously, while in order to allow the nail-cutter to operate the feed-bar stops for an interval of time after every half-revolution, the other parts of the machine continuing, nevertheless, their motion.

In order to accomplish these results it is not necessary to follow the precise arrangement

of parts shown in the drawings. Instead of employing the number of cams, pins, and cogs by which I have illustrated my invention, any number may be used under such an arrangement and so placed as to retain the same relative position to each other as herein shown and described.

Having thus described my invention and the manner in which the same is or may be carried into effect, what I claim, and desire to secure by Letters Patent, is—

1. Combining, in a movable frame, with a nail-plate feed-bar the wheels and other means of transmission whereby the rotary and vibratory up-and-down and back-and-forth motions are directly imparted to the feed-bar, the whole being constructed and arranged for operation substantially as herein shown and set forth.

2. The sleeve for holding the feed-bar in the movable frame, as described, in combination with gear-wheels, one of which is mounted on said sleeve under the arrangement herein shown and described, whereby an intermittent rotary movement is imparted to the feed-bar.

3. In combination with the sleeve for holding the feed-bar, as described, the spring-spline, in combination with a slot or groove in said bar, substantially as set forth.

4. Pressing the feed-bar against the gage-plate of the cutting apparatus by spring-power mechanism, or the equivalent thereof, when applied through the intermediary of an arm mounted on a sleeve capable of a rotating and sliding movement on a rod parallel to the feed-bar, substantially as herein shown and described, so that the feed-bar may be instantly disengaged at the pleasure of the operator.

5. Effecting the movements of rotation, lifting up, and drawing back of the feed-bar, in the manner herein described, the various devices for this purpose used being actuated by a single disk provided with cams and pins, as herein shown and set forth.

6. In combination with the movable frame which carries the feed-bar and the intermediate support, the disk provided with cams whereby the movable frame is actuated to cause the feed-bar to be lifted between each stroke of the cutting apparatus, as set forth.

7. Pivoting the dogs or jaws for grasping and drawing back the feed-bar, as described, to a slide secured in the top of the vibratory frame, and constructed and arranged as set forth.

8. In combination with the dogs or jaws pivoted to a slide in the top of the movable frame, the vibrating yoke hinged or pivoted to the stationary frame and actuated by the lever, as described, to cause the alternate opening and closing and drawing back of the dogs or jaws, as and for the purposes herein shown and set forth.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

JAMES L. WIGGIN.

Witnesses:

A. WOOD,

G. B. WIGGIN.