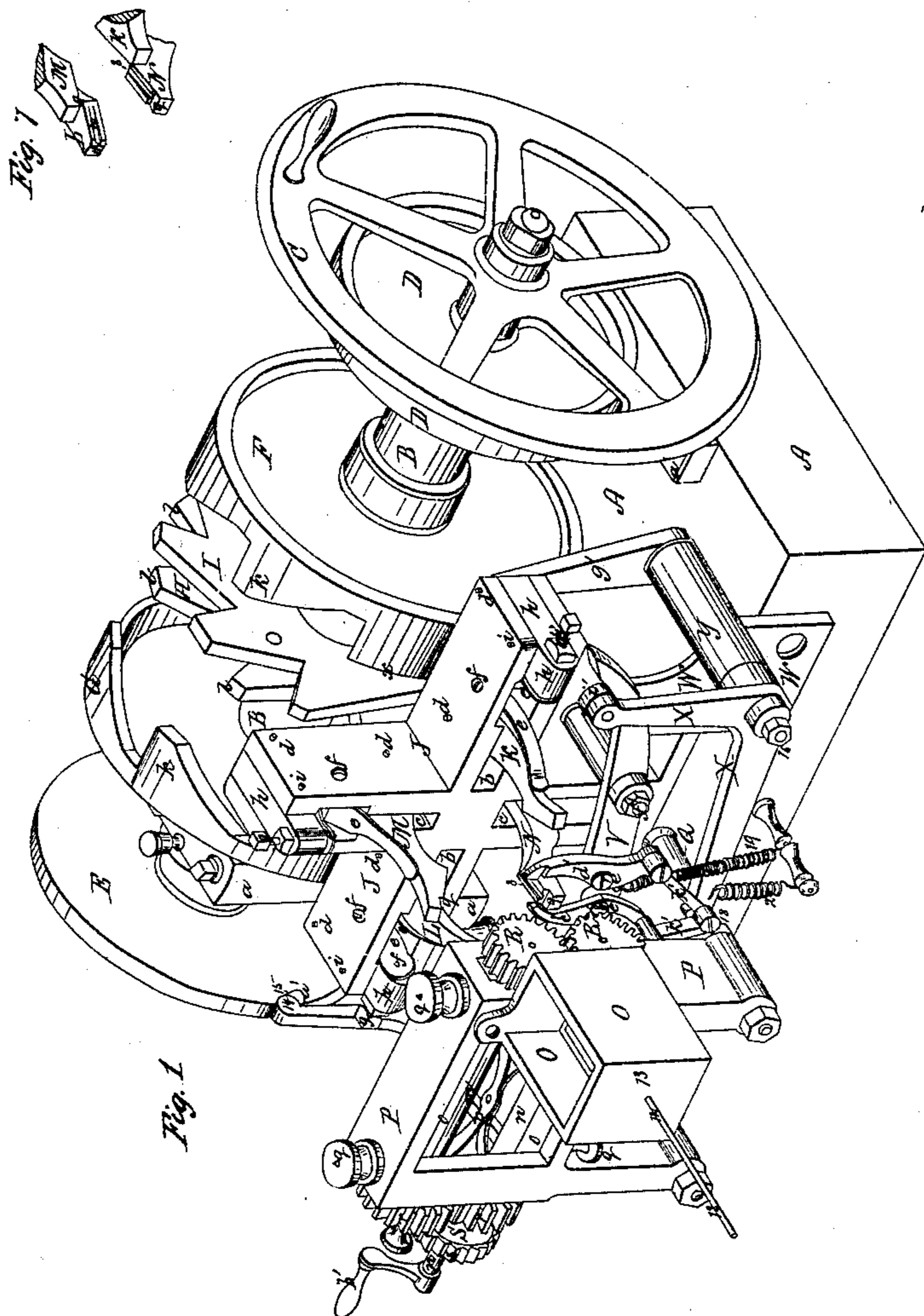


S. S. PUTNAM & L. H. DWELLEY.  
MACHINE FOR MAKING HORSESHOE NAILS.

No. 62,685.

Patented Mar. 5, 1867.



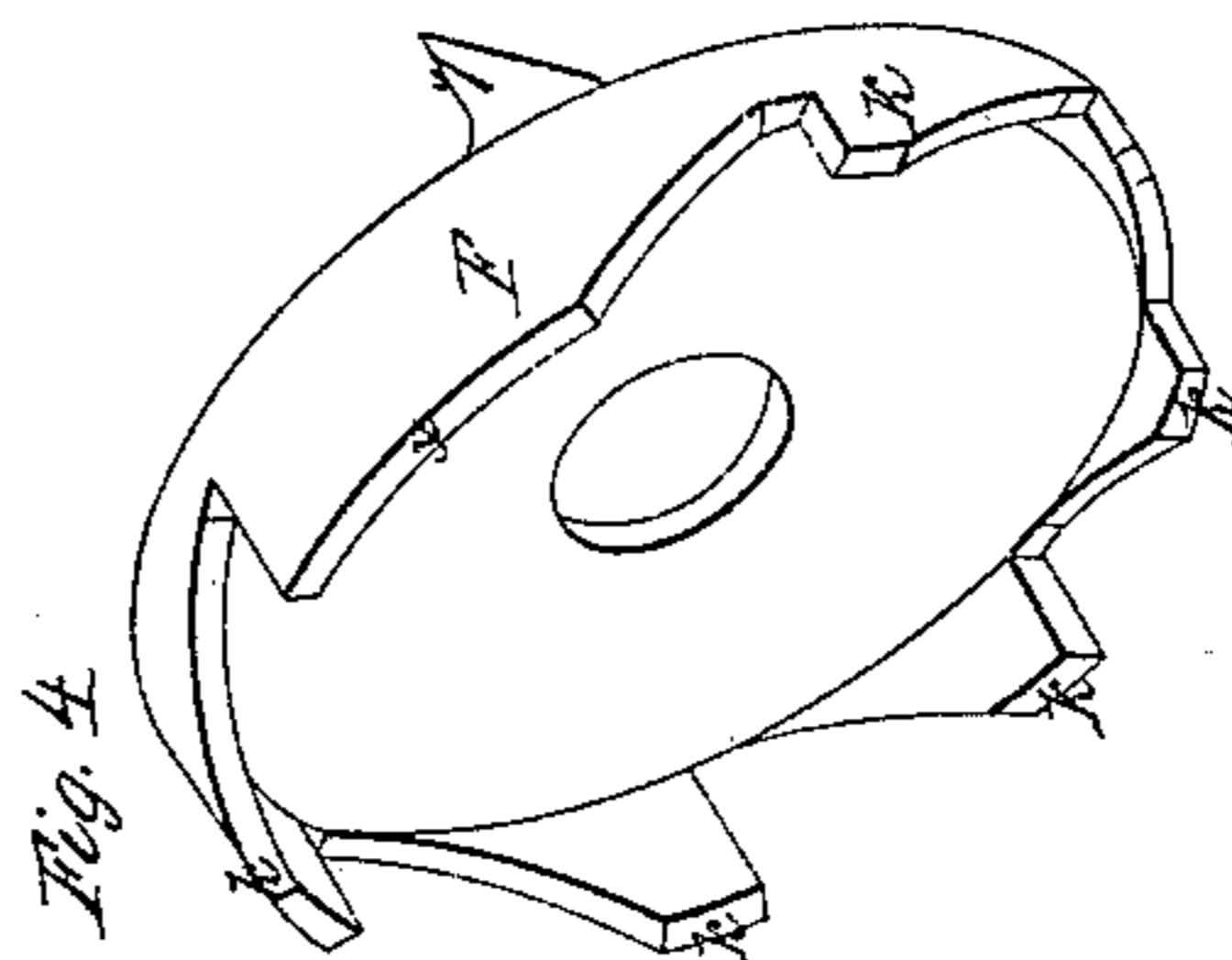
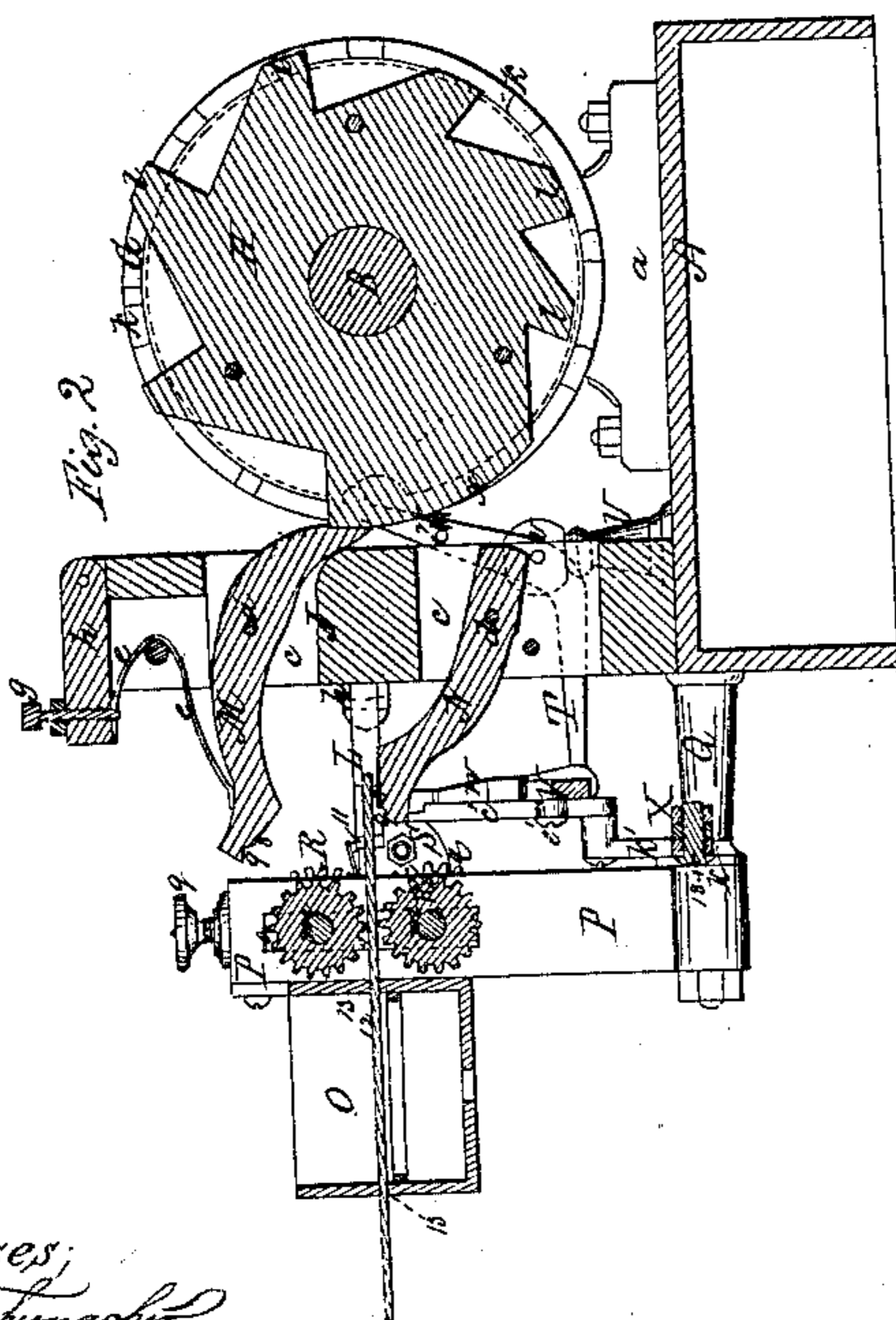
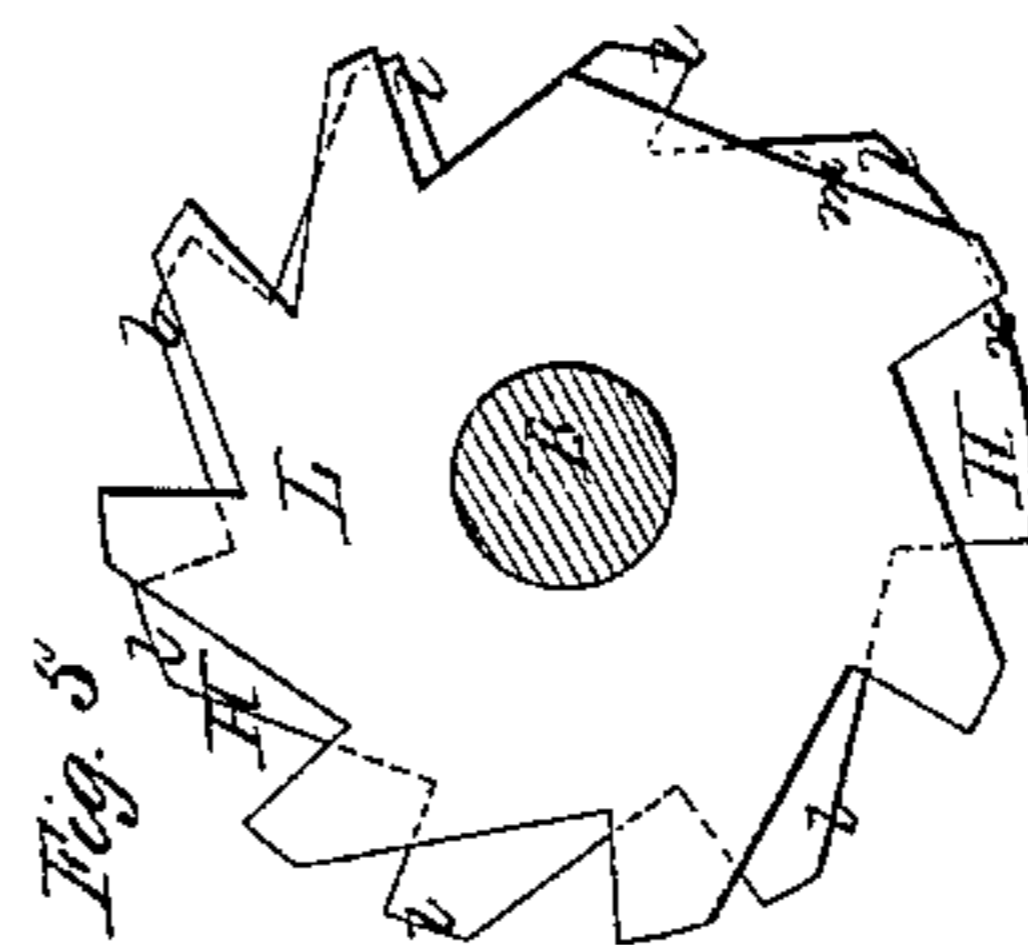
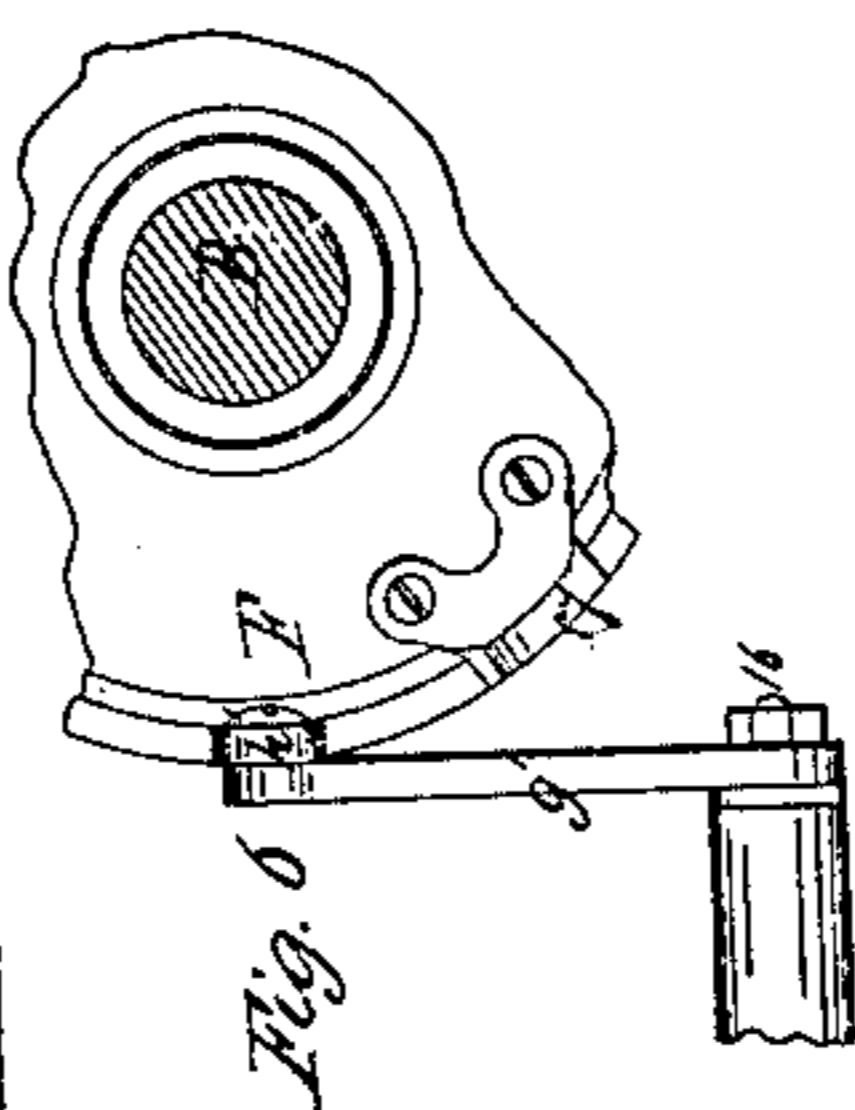
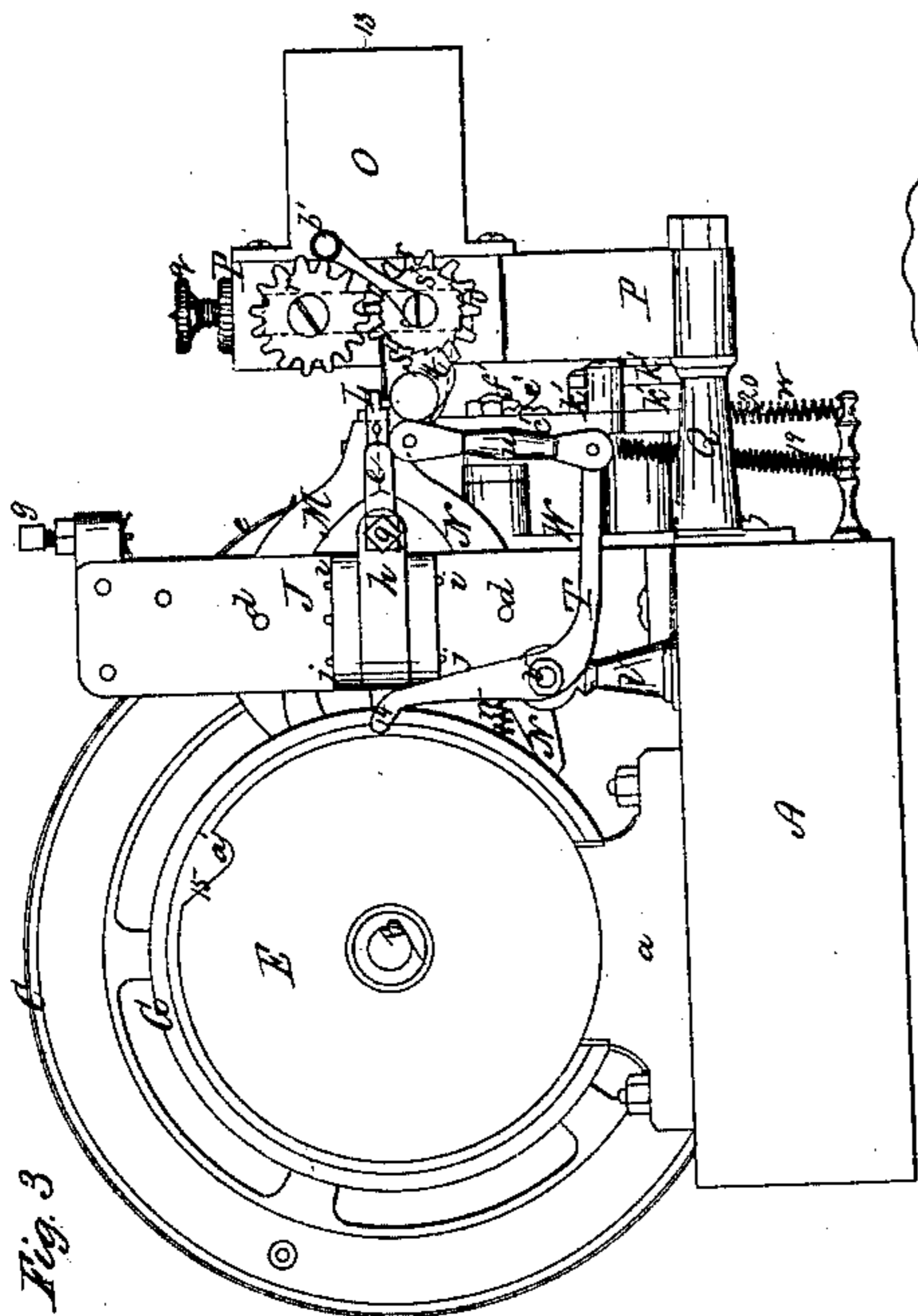
Witnesses,  
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# United States Patent Office.

SILAS S. PUTNAM AND LUCIUS H. DWELLEY, OF DORCHESTER, MASSACHUSETTS, ASSIGNOR TO S. S. PUTNAM & CO., OF NEW YORK.

*Letters Patent No. 62,685, dated March 5, 1867.*

## IMPROVEMENT IN MACHINES FOR MAKING HORSE-SHOE NAILS.

*The Schedule referred to in these Letters Patent and making part of the same.*

### TO ALL WHOM IT MAY CONCERN:

Be it known that we, SILAS S. PUTNAM and LUCIUS H. DWELLEY, of Dorchester, in the county of Norfolk, and State of Massachusetts, have invented certain new and useful Improvements in Machines for Making Horse-Shoe Nails, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a perspective view of our improved machine.

Figure 2 is a longitudinal vertical section through the centre of the same.

Figure 3 is an elevation of one end of the same.

Figures 4, 5, 6, and 7, details to be referred to.

Our invention relates to that class of nail machines in which the nail is formed by means of spring hammers arranged and operating in pairs, and consists in so regulating the hammers that the force of their blows will be gradually diminished during the formation of the nail, thereby giving it a better finish than where the blows are of equal force throughout the operation; and our invention also consists in pivoting the cutter-arms to an arm or lever, which is operated at the required times to bring the cutters up to sever the finished nail from the rod without moving it from its central position between the hammers. And our invention furthermore consists in certain details which will be more fully described hereafter.

To enable others skilled in the art to understand and use our invention, we will proceed to describe the manner in which we have carried it out.

In the said drawings, A is the bed of the machine, from which rise the standards *a*, in suitable bearings, in which runs the driving-shaft B, which carries at one end, outside the standards *a*, the fly-wheel C and driving-pulley D, and at the opposite end the disk E, while between the standards *a* it carries the cam-wheels F G H I, which operate the hammers. From the bed A rises a frame, J, made in the form of a cross, through the opposite sides of which are cut four slots, two horizontal ones, *b*, and two vertical ones, *c*, in each of which is placed the helve of one of the hammers K L M N, which vibrate on pivots *d* passing through the frame J. These hammers are arranged in pairs, and are operated by the cam-wheels F G H I. The two horizontal hammers K L are thrown together, when released, by flat springs *e*, which bear upon the hammers near their outer ends, and are bent around the screw-pins *f*, their inner ends resting against screws *g*, by turning which the force with which the springs are made to bear upon the hammers, and the consequent force of their blows, may be adjusted with a great degree of nicety. The screws *g* pass through blocks, *h*, which are secured in place by pins, *i j*, and on removing the pins *i*, the blocks *h* can be swung out on the pins *j* as centres, giving free access to the springs *e* and facilitating their insertion and removal. The upper vertical hammer M is thrown by a spring, *e*, in a similar manner, while the lower hammer or former N, is brought up positively by the cam-wheel I, just previous to the blow of the upper hammer M, and when released drops down by its own weight into the position seen in fig. 1, the projections on the cam-wheel I being all at equal distances from the centre around which they revolve, so as to raise the hammer N each time to the same height. The distance of the projections *k*, on the cam-wheels F G, from the faces of the wheels, and that of the projections *l* on the wheel H from the centre around which they revolve, gradually diminish, as seen in figs 4 and 5, so that the hammers K L M are drawn back a less distance for each successive blow, thus gradually diminishing the force of the blows as the operation proceeds, the heaviest blows being struck first so as to reduce the iron quickly, while toward the completion of the nail they are much lighter, by which a more perfect finish of the nail is insured than where the blows are of equal force throughout the operation, and the liability of the breakage of the hammers by the concussion of their faces is also greatly diminished. In the face of each of the hammers M N is formed a groove, 8, of a form corresponding to one side of the shank of a finished nail, the head being formed in a groove, 9, which is made by cutting away the outer edges of the hammers so as to leave a space corresponding to the width of the head of the nail. The horizontal hammers K L are made, the one with a groove, 10, corresponding to the form of one side of the nail and having its outer edge bevelled as at 11, and the other with a perfectly smooth face, so as to give the required form to the sides of the nail on which they operate. It will be seen that the shoulders under the head of the nail are formed by the vertical hammers instead of the horizontal hammers as is usual in

machines of this class; and by bringing up the lower vertical hammer N positively by means of the cam-wheel I into a position to support the nail just previous to the upper hammer M being released to give its blow, the forming of the nail, with the shoulders under the head exactly opposite to each other, is insured. O is the furnace, in which the nail-rod 12 is heated previous to its being fed into the machine, an aperture, 13, being made at each end for it to pass through. This furnace is attached to a frame, P, (which is secured to supports, Q, projecting from the bed A,) and is placed close to the feeding device so that the nail-rod will be delivered to the hammers before becoming cooled.

We will now proceed to describe the manner in which the nail-rod is fed into the machine. *m n* are two horizontal shafts, which run in long bearings, *o*, the ends of which slide in slots in the frame P, the shafts being kept apart by the double spring *p*, and their distance from each other being regulated by the set-screws *q*. Each of these shafts carries at one end a gear, *r*, by which the motion of the lower one is communicated to the other, and at their opposite ends they carry the toothed feed-wheels or fluted rolls R, by which the nail-rod is seized and carried into the machine. The teeth on the wheels R slightly indent the heated rod and prevent all liability of slip, whereby the certainty of feeding in the same length of rod each time is insured, and it will be seen that the heated rod is cooled less by the contact of the points of the teeth than if smooth rolls were employed, as with the latter a larger surface must necessarily be in contact with the heated iron. The teeth on the wheels R also assist in holding the rod firmly while being operated upon by the hammers. The lower shaft *n* is revolved intermittently so as to produce the feed at the required times by means of a ratchet-wheel, *s*, which is operated by a pawl, *t*, pivoted to an arm, S, which turns loosely on the shaft *n*, between the ratchet-wheel *s*, and gear *r*. To the outer end of the arm S is pivoted a connecting-rod, *u*, the lower end of which is jointed to a bent lever, T, pivoted at *v* to a post, U, rising from the bed A. The upper end 14 of the lever T is bent over and rounded, and is kept in contact with the periphery of the disk E, by the spiral spring *w*, so that as the disk is revolved the end 14 is drawn into the notch *a'* by the spring *w* raising the arm S, through the connections explained, and causing the pawl *t* to fall into the next succeeding tooth of the ratchet-wheel *s*. The inclined portion 15 of the notch *a'* now strikes the end 14 of the lever, raising it out of the notch, and causing the pawl *t* to turn the ratchet-wheel *s*, shafts *m n*, and toothed feed-wheels R a sufficient distance to feed the nail-rod forward the exact amount required for the next nail. A crank, *b'*, is attached to the outer end of the lower shaft *n*, so that the feed-wheels R may be revolved by hand when it is desired to enter or withdraw the nail-rod. Instead of the notch *a'*, a dog or projection on the disk E may be employed to operate the lever T, if preferred.

We will now describe the manner in which the finished nail is cut off after being operated upon by the hammers, which in the machine here shown are so arranged and timed with respect to the "cut-off" as to give fourteen blows previous to the nail being detached from the rod. *c' d'* are two cutter-arms, which carry the cutters, and are pivoted at *e'* to a lever, V, which is pivoted at *f'* to a stud projecting from a plate, W, attached to the bed A. X is a bent lever, which is attached to one end of the shaft 16, which is supported in the bearing Y projecting from the plate W, and to the opposite end of the shaft 16 is secured a bell-crank, *g'*, the upper end of which carries a roll, *h'*, which is struck by an inclined projection, 17, (figs. 4 and 6,) on the cam-wheel F as it revolves, rocking the shaft 16 and bent lever X, the upper end of which carries a roll, *i'*, which bears against the curved end of the lever V, and depresses it so as to raise its opposite extremity, and with it the cutter-arms *c' d'*, bringing the cutters into a position ready to sever the finished nail from the rod. To the lower end of each of the cutter-arms *c' d'*, is pivoted a rod, *k'*, and these rods are both pivoted at 18 to the inner end of the bent lever X; and thus, as this lever is rocked, the cutters are brought together to cut off the nail as required, after which, as soon as the projection 17 passes off the roll *h'*, the levers V X are drawn down by the spiral springs 19 and 20, so as to carry the cutter-arms down out of the way of the hammers. By thus pivoting the cutter-arms to a lever, and bringing them up when the nail is to be cut off, instead of making them of a great length and pivoting them to a stationary support, the portions of the cutter-arms above the points where they are pivoted can be made much shorter, causing them to make a more perfect cut, while they can, also, be made much lighter and can be operated quicker, effecting a great saving of wear and tear to the machine which can consequently be run at a higher rate of speed. In some cases, if preferred, each cutter-arm may be pivoted to a separate arm or lever, operated by suitable mechanism without departing from the spirit of my invention.

#### Operation.

The end of the nail-rod being passed into the furnace O, through the aperture 13, and heated as required, is passed through the aperture at the opposite side of the furnace between the feed-wheels R, which are then revolved by turning the crank *b'* so as to carry the rod forward to the hammers, which are in the position represented in fig. 1, and the machine being set in motion, the nail-rod is operated upon a sufficient number of times to form a finished nail, the force of each blow of the hammers being diminished as the operation proceeds. The hammers K L M are now held open, while the nail is being cut off by the portions *x* of the cam-wheels F G H, while the wheel I, being cut away at *m'*, fig. 5, allows the hammer N to drop down by its own weight, as seen in fig. 1. The projection 17 on the cam-wheel F now strikes the roll *h'* on the end of the bell-crank *g'*, forcing it out and rocking the bent lever X, which, through the connections explained, raises the cutter arms *c' d'* and causes the cutters to be brought together to sever the finished nail from the rod without moving it from its normal position. The projection 17 now passes off the roll *g'*, allowing the spiral springs 19 and 20 to draw down the levers V X, and with them the cutter-arms *c' d'*, out of the way of the hammers. At the same time the rounded end 14 of the lever T falls into the notch *a'* in the disk E, causing the pawl *t*, through the connections explained, to fall into the next succeeding tooth of the ratchet-wheel *s*, and as the disk continues to revolve, the end of the lever is forced out of the notch *a'*, causing the pawl *t* to turn the ratchet-wheel *s*, and operate the feed-wheels R so as to carry the nail-rod forward at the proper time the exact distance required for the next nail, when the operation continues as before.

*Claims.*

What we claim as our invention, and desire to secure by Letters Patent, is—

1. We claim the combination of the cams with the spring-hammers, constructed and operating substantially as described and for the purpose set forth.
2. We also claim the rolls R and the feed mechanism constructed substantially as described, in combination with the hammers F G H I, operating substantially as described and for the purpose set forth.
3. We also claim the mechanism substantially as described for cutting off the nail without moving the rod from its normal position.
4. We also claim the mechanism substantially as described for cutting off the nail, in combination with the hammers K L M N, and device for holding them apart and out of the way of the cutters while the nail is being cut off.
5. We also claim the combination of the hammers K L M N, mechanism for cutting off the nail, feed-rolls R, and furnace O, operating substantially as described for the purpose set forth.
6. We also claim the hammer or former N, brought up positively to the nail-rod, in combination with the spring-hammers K L M, substantially as and for the purpose set forth.
7. We also claim the cam-wheels F G H I, in combination with the hammers K L M N, and a device for cutting off the nail, substantially as described.

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