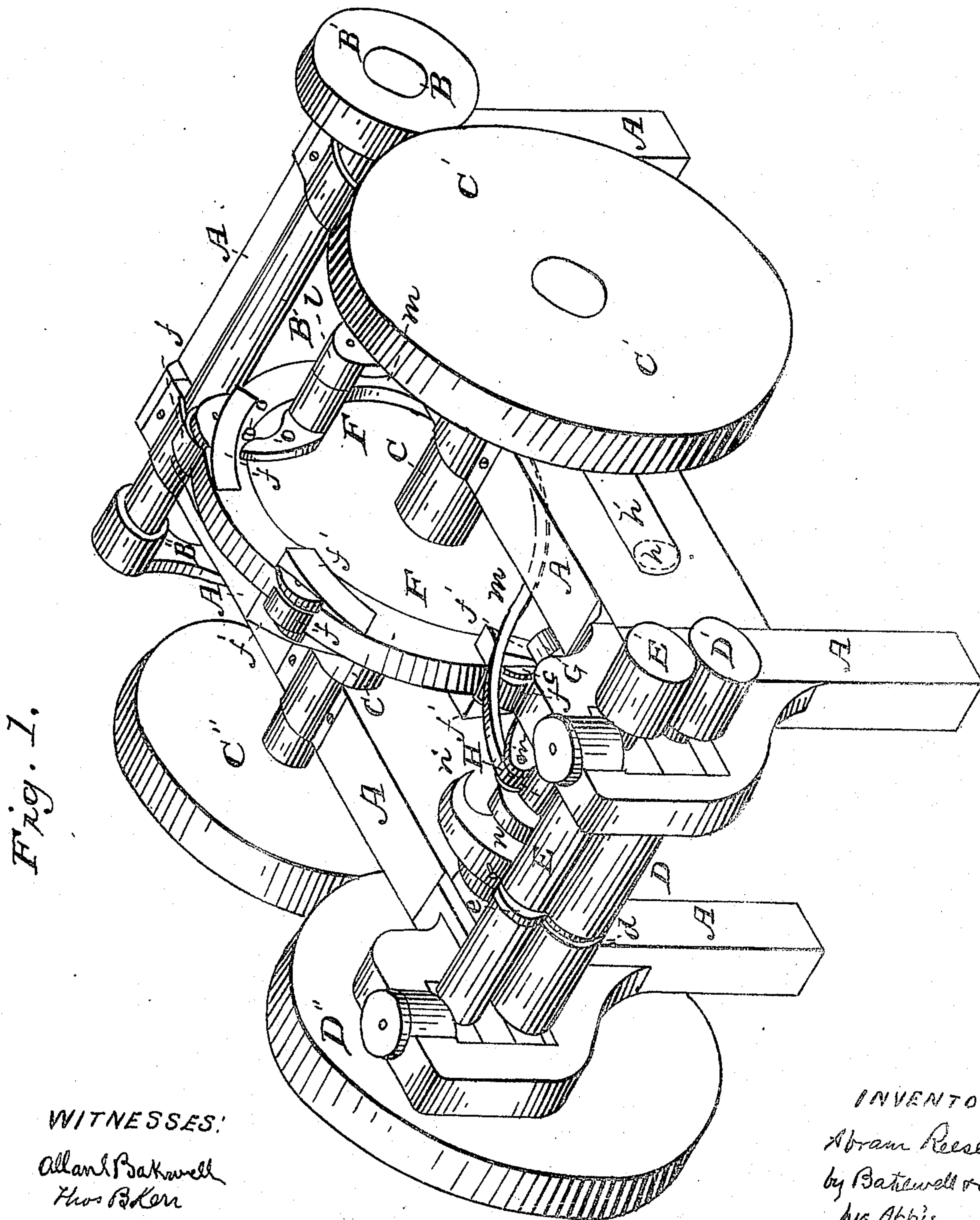


A. REESE.

Horseshoe-Nail Machine.

No. 86,450.

Patented Feb. 2, 1869.



WITNESSES:

Allan Bakwell
Thos Baker

INVENTOR:

Abram Reese.
by Batewell & Christy,
his Attys.

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Fig. 3.

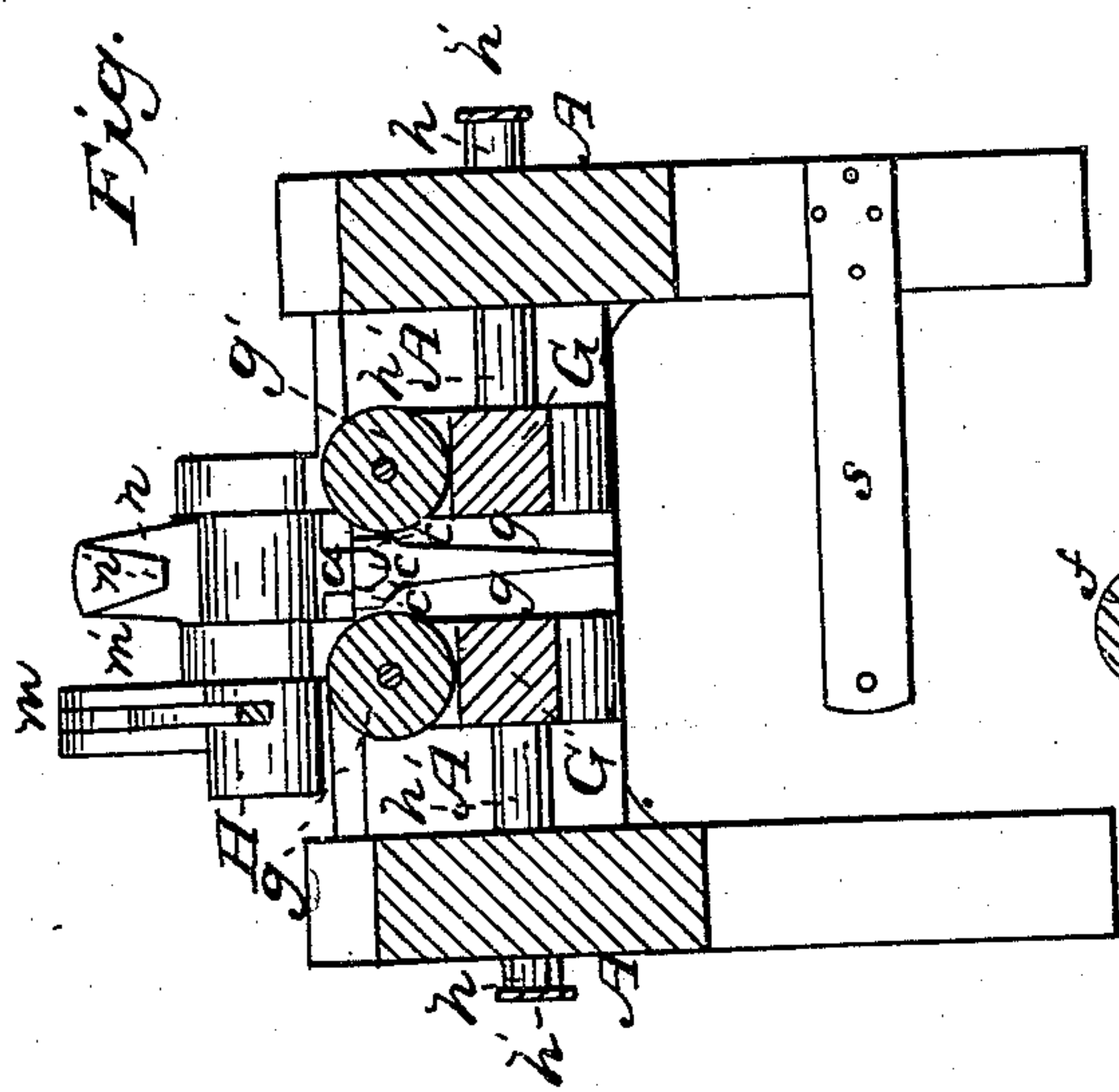
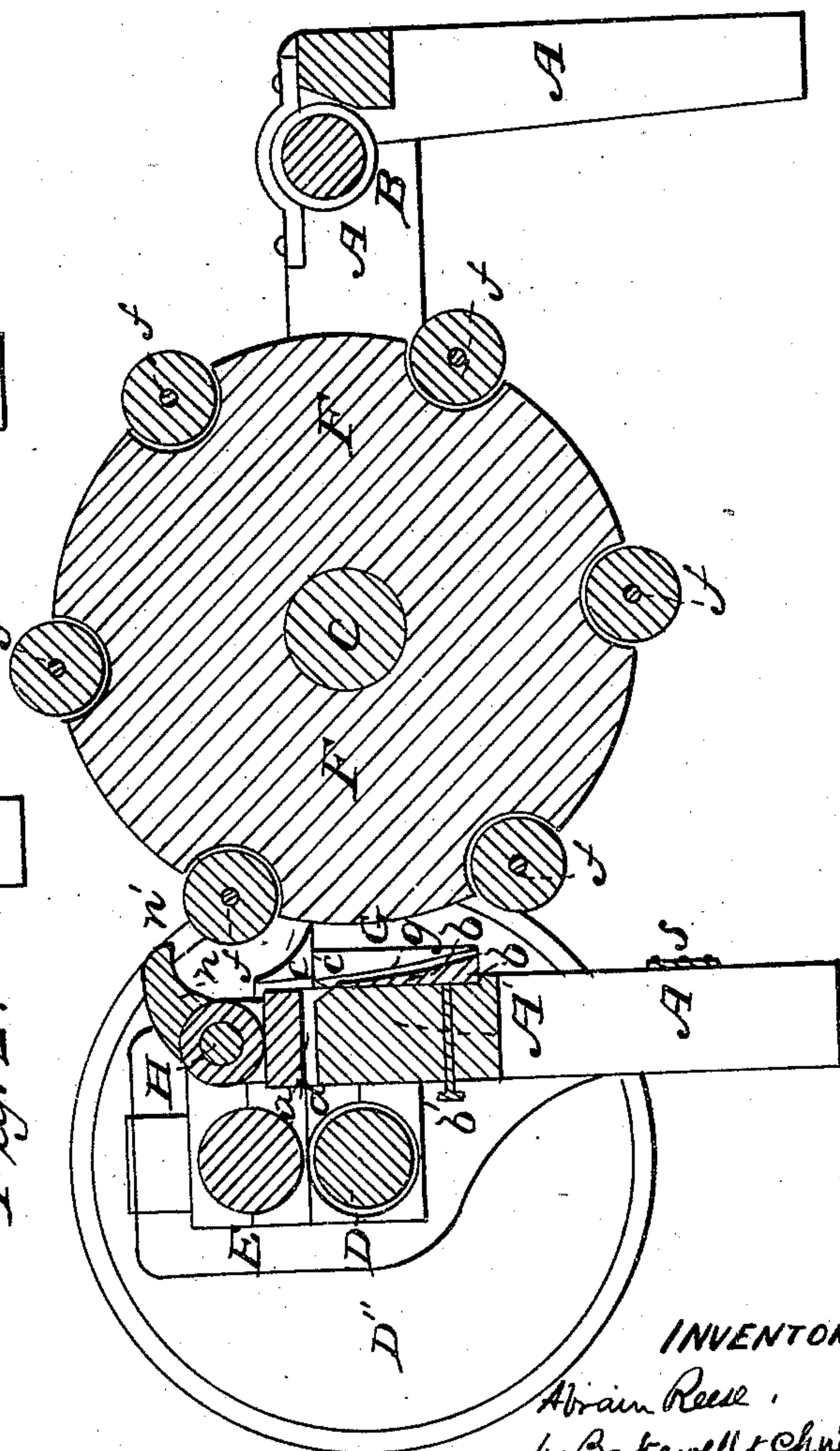


Fig. 2.



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UNITED STATES PATENT OFFICE.

ABRAM REESE, OF MCCLURE TOWNSHIP, PENNSYLVANIA.

IMPROVEMENT IN MAKING HORSESHOE-NAILS.

Specification forming part of Letters Patent No. 86,450, dated February 2, 1869.

To all whom it may concern:

Be it known that I, ABRAM REESE, of McClure township, (Pittsburgh post-office,) in the county of Allegheny and State of Pennsylvania, have invented a new and useful Machine for Making Horseshoe-Nails; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, in two sheets, making a part of this specification, in which—

Figure 1 is a perspective view of my improved machine. Fig. 2 is a longitudinal vertical section formed by a plane passing along the line of the feed through the machine, and cutting the feed-rolls, fore plate, and main wheel; and Fig. 3 is a vertical section formed by a plane passing transversely across the machine, between the fore plate and main wheel.

Like letters of reference indicate like parts in each.

The nature of my invention consists in the construction and combination of devices by which, first, a nail-rod is fed continuously forward into the proper position to be acted on by the reducing-rolls and side dies, which form the nail, the continuous feed going on while the nail is being formed; second, the nails are drawn, shaped, and pointed by the concurrent though alternate action of dies and rollers, the front and rear faces of the nail, including the head, being formed between an adjustable fore plate and the faces of a series of friction-rollers arranged on the circumference of a wheel, and the edges, down to the point, being formed between the faces of a pair of recessed converging dies, which operate by percussive strokes from opposite directions at the same time; and, third, the nail, when finished, is cut from the nail-rod and drops out of the machine without interrupting or impeding its continuous action.

To enable others skilled in the art to make and use my invention, I will proceed to describe a machine in which it is exhibited and made manifest.

A A' represent the frame-work of my machine, being made of any suitable material, shape, and size, whereby the machinery employed can be conveniently and successfully operated. Mounted on this frame are the axles B C, connected together by friction, pulley, or gear wheels B' C', and receiving motion by a

crank, B', or other suitable device. The gear-wheel C' plays into a similar wheel, D'', which latter is hung on one of the two feed-rolls D E, such feed-rolls being geared together by wheels D' E', so as to receive a continuous and uniform motion. One of these feed-rolls, D, has a groove, *d*, into which plays a collar, *e*, on the other roll, E, the aperture between the two being of such size as to secure a firm bite on a nail-rod fed therein, but without reducing or drawing it. The nail-rod, after passing through between the feed-rolls D E, passes along a groove, *a*, in the end beam A' of the frame A. Immediately under the inner end of this groove *a*, and by a mortise let into the inside of the end beam A', is a fore plate, *b*, against which the end of the nail-rod, introduced along the groove *a*, is to be drawn and shaped to the form of a horseshoe-nail, as presently to be described. Relatively to this fore plate *b*, the main wheel F, hung on the axle C, is so placed that the small friction-rollers *f f*, working in proper bearings in its periphery, shall, as they successively come around, operate clear of the fore plate *b* by the thickness of the nail to be made. To secure this relative operation more perfectly I adjust the fore plate *b* to the desired position by one or more set-screws, *b'*. The upper end of the fore plate *b*, just at the inner end of the groove *a*, has a recess, *c*, of the size and shape of the head of a horseshoe-nail; and from the lower end of the recess *c* to the lower end of the fore plate *b*, the working-face of the fore plate *b* is made slightly concave, with such degree of curvature as may be desired, so as to make, in connection with feed-rollers *f*, nails of any required thickness, either uniform or variable, from head to point. Then, as the nail-rod, fed in by the rolls D E along the groove *a*, projects beyond the face of the fore plate *b*, its end will be caught by the friction-rollers *f* as they come around, will be forced down against the fore plate *b*, and drawn out in length, as well as reduced in thickness; and as the feed-rolls D E operate continuously each successive friction-roller *f* will take a new bite on the end of the rod, turn down, and draw out into the nail a little more iron; but the recess *c* will always be kept full, the rod being bent down into it by each roller *f*. But, to keep the metal from spreading out into

a broad sheet under the action of the rollers *f*, I use a pair of side dies, *g g*, the faces of which are of the shape of the opposite edges of the horseshoe-nail. Such dies *g* are recessed at their upper ends, as at *c'*, and below that converge, so that they shall, by their successive percussive strokes, reduce the nail in all parts from head to point to the desired taper. These dies *g* are set in die-blocks *G*, and such die-blocks *G* project back, one on each side of the main wheel *F*, so far that the friction-rollers *g'*, which are set one in each of such die-blocks *G*, shall be engaged by the wedge-shaped blocks or cams *f'*, which are placed on the sides of the rim of the wheel *F*. The die-blocks *G* receive their swaging strokes by supports *h*, which extend back from each through the sides *A* of the frame, and there rest against springs *h'*. Then, with the revolution of the wheel *F*, not only are the rollers *f* brought into use, as already described, but the cams *f'* force the rollers *g'*, die-blocks *G*, and dies *g* back and apart till they are released by the rollers *g'* passing over the square ends or bases of the cams *f'*. The die-blocks *G* and dies *g* are then driven toward each other simultaneously by the action of the springs *h'* on the supports *h*, and by a quick and strong percussive stroke on the opposite edges of the nail which is being made they swage it into shape, giving it from head to point any taper form desired.

The head of the nail is formed by the rollers forcing the metal of the nail-rod down into the recess *c* and by the action of the recessed parts *c'* of the dies *g* coming up on the two sides.

It will be observed that, with the mode of construction shown, the rolling and swaging are carried on simultaneously, though the rollers *f* and dies *g* operate alternately—that is to say, as soon as one roller *f* has completed its work and rolled out the amount of nail-rod fed in the dies *g* immediately follow with swaging blows on the opposite edges.

It will also be observed that just previous to each stroke of the rollers *f* only a very small amount of nail-rod is fed in. This small amount is rolled and swaged. The next roller *f* takes a new bite, not only on what is already rolled and swaged, but also on the very small length of nail-rod fed in since the stroke of the last preceding roller *f*, so that it is not until after several strokes of the rollers *f* that a sufficient amount of nail-rod is fed into the machine to make a single nail, and by that time the metal so fed in is rolled and swaged to the shape required, and the nail is ready to be severed from the rod. As soon as this is done the making of another nail is commenced. In this way the nails are rapidly reduced to shape, the thickness being regulated by the rollers *f* and fore plate *b*, the width of the body by the converging dies *g g*, and the head by the recessed parts *c c' c'*, as described.

The die-blocks *G* move back and forth on suitably-shaped slides *i*.

The size of the gear-wheels *C'' D''* is such,

and such is the proximity of the successive rollers *f* and cams *f'* to each other, that as soon as sufficient metal has been fed in past the fore plate *b* to furnish material for a single nail it will have received the rolling and swaging requisite to reduce it to the nail shape. Nothing then remains but to cut it off from its parent bar or rod without interruption to the movement of the machine.

To accomplish this result, I place an axle, *H*, across from one side of the frame *A* to the other just in the rear of the upper feed-roller, *E*, and between it and the main wheel *F*. On this I adjust an oscillating hook-shaped knife, *n*, the cutting-edge *n'* being at the extremity of the hook, and so adjust it that on making a downward stroke its edge *n'* will strike the nail-rod just at the upper part of the recess *c*, or, in other words, will cut off the nail and nail-head from the nail-rod which is being fed in. The nail will then drop out, and the knife *n* immediately make its return stroke, so as to be out of the way of the operation of the other devices in making another nail. Thus the feeding, rolling, and swaging go on uninterruptedly.

To secure such cutting and return strokes of the knife *n*, I connect the axle *H*, by a tripping device, with a pin, *o*, in the side of the wheel *F*. Such tripping device consists of a bent or jointed lever, *m*, at one end, loosely pivoted to an arm, *m'*, on the axle *H*, and at the other end rigidly connected with a tripper, *o'*, the two at that end being pivoted to a support, *l*, which furnishes a fulcrum for the lever-action.

With each revolution of the wheel *F*, or oftener, if so preferred, and as often as a nail is formed, the pin *o* engages the tripper *o'*. This operates the jointed lever *m*, by which the downward cutting throw described is communicated to the cutter *n*. These devices are so attached as that the cutter *n* shall make its downward stroke immediately following one of the rollers *f*, as it gives the last roll to the face of the nail, in order that the nail may be securely held in place while being cut, and also so that the cutter *n* shall immediately make its return stroke, so as not to be in the way of the next following roller *f*.

A spring, *s*, of any suitable construction, attached to the frame *A*, and connected with the jointed lever *m*, secures the return stroke of the cutter *n* as soon as the nail is severed. The cutter *n* should, of course, operate with a quick cutting stroke.

By the use of such a machine I dispense with the large amount of skilled labor ordinarily required in making horseshoe-nails, and, in fact, employ no manual labor except that of a feeder to feed in the nail-rods between the rolls *D E*, the rods being, however, first heated in any suitable or convenient furnace.

The characteristic feature of my feeding device consists in the fact that it operates by continuously feeding in the nail-rod while the nail is being made, and with no interruption even

while the nail is being severed from the rod, and so on, nail after nail, successively and continuously until all the rod, unless it be a few inches at the last end, is worked up into nails.

I am aware that horseshoe-nails have been drawn out by reducing-rolls acting against a former, and that the edges thereof have been swaged to the required shape by side dies, the amount of metal, however, required for a nail being, in machines so made, fed in at a single feed, so that all the metal of each nail is operated on at every stroke of the rolls and dies; but I find it better to feed in the nail-rod continuously, as above described, since then each successive stroke of rolls or dies acts on an additional feed of nail-rod, more perfectly and thoroughly working the metal, and consequently producing a better nail. I do not therefore claim the construction of the devices just named, nor do I claim them in combination with each other.

I am also aware that feeding-rolls such as I have described are frequently operated by an intermittent motion, so as to feed in at each feed or stroke the amount of metal required for a single nail, and such use of such rolls I do not claim.

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

1. In nail-making machines in which are combined swaging-dies, reducing-rolls, fore plate or anvil, and feeding apparatus, as here-

in set forth, an arrangement of mechanism which shall move the nail-rod forward gradually but continuously, so that the rolls and dies shall act alternately and successively on different portions of a nail-blank, substantially in the manner described.

2. The arrangement of the several parts of the machine, taken in connection with the mode of operation of those parts which feed in and forge the nail-rod, by virtue of which arrangement the rod is fed in continuously, and is reduced and forged to the shape required by reducing-rolls and side dies acting consecutively and alternately on different portions of the rod, as said different portions are, by the action of the feed-rolls, continuously projected forward, substantially as described.

3. The hook-shaped knife *n*, arranged on a vibratory shaft in the same vertical plane as the reducing-rolls and fore plate, with mechanism to operate said shaft, and thus cause the knife to descend and sever the blank from the rod while the former is pressed against the fore plate by one of the reducing-rolls, substantially as hereinbefore described.

In testimony whereof I, the said ABRAM REESE, have hereunto set my hand.

ABRAM REESE.

Witnesses:

ELL TORRANCE,
G. H. CHRISTY.