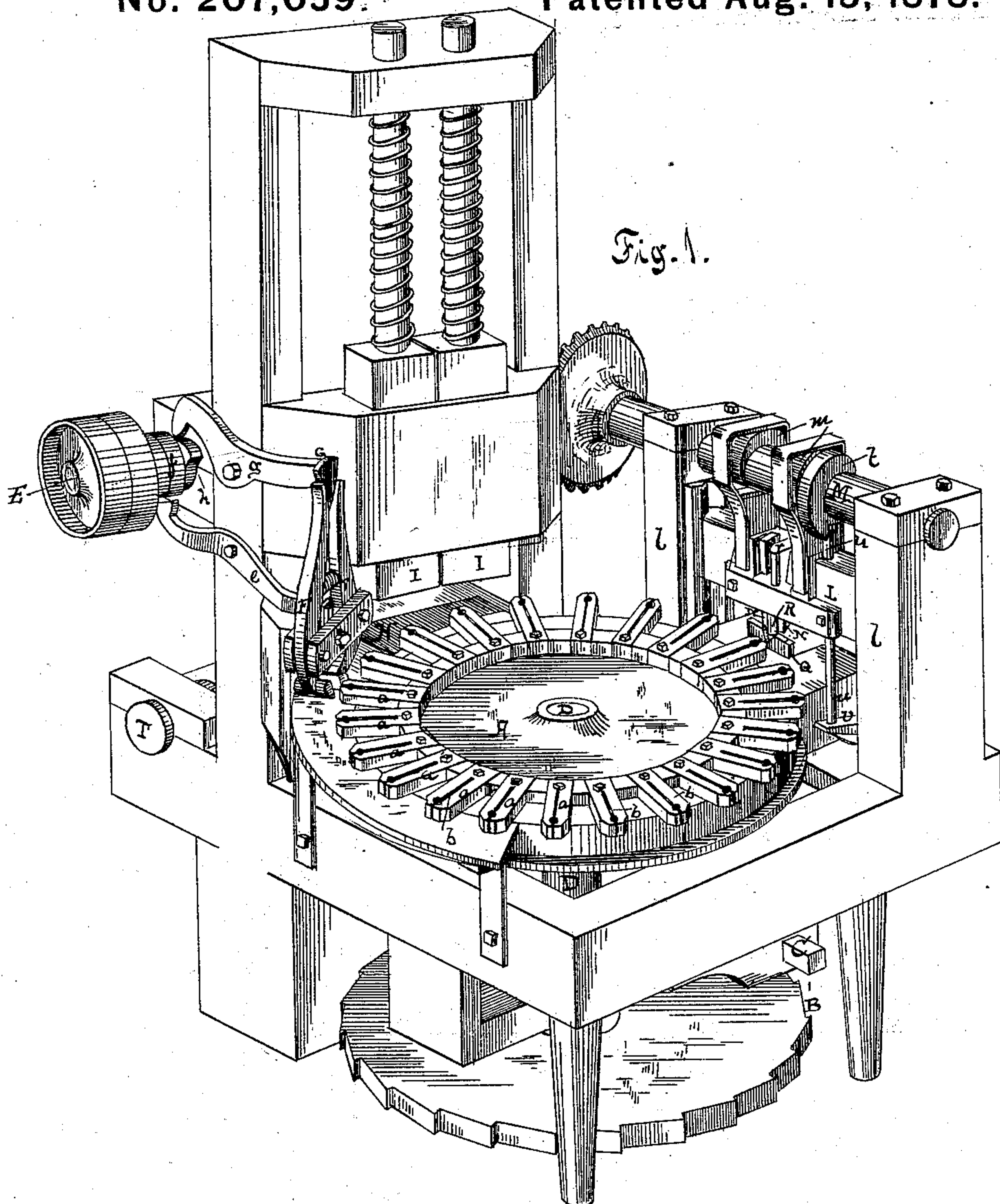


J. MILLS.
Horse-Nail Machine.

No. 207,059.

Patented Aug. 13, 1878.



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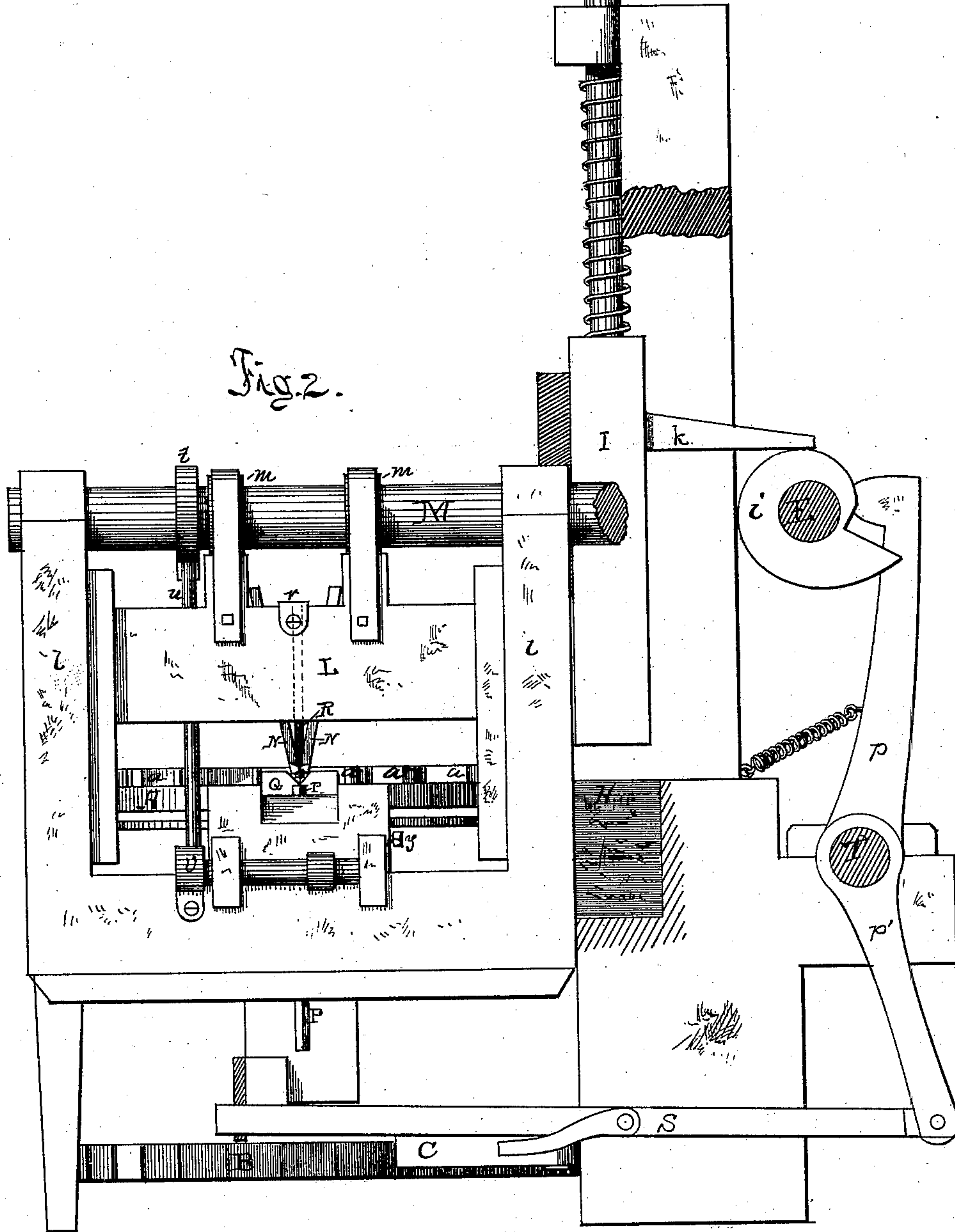
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James Mills
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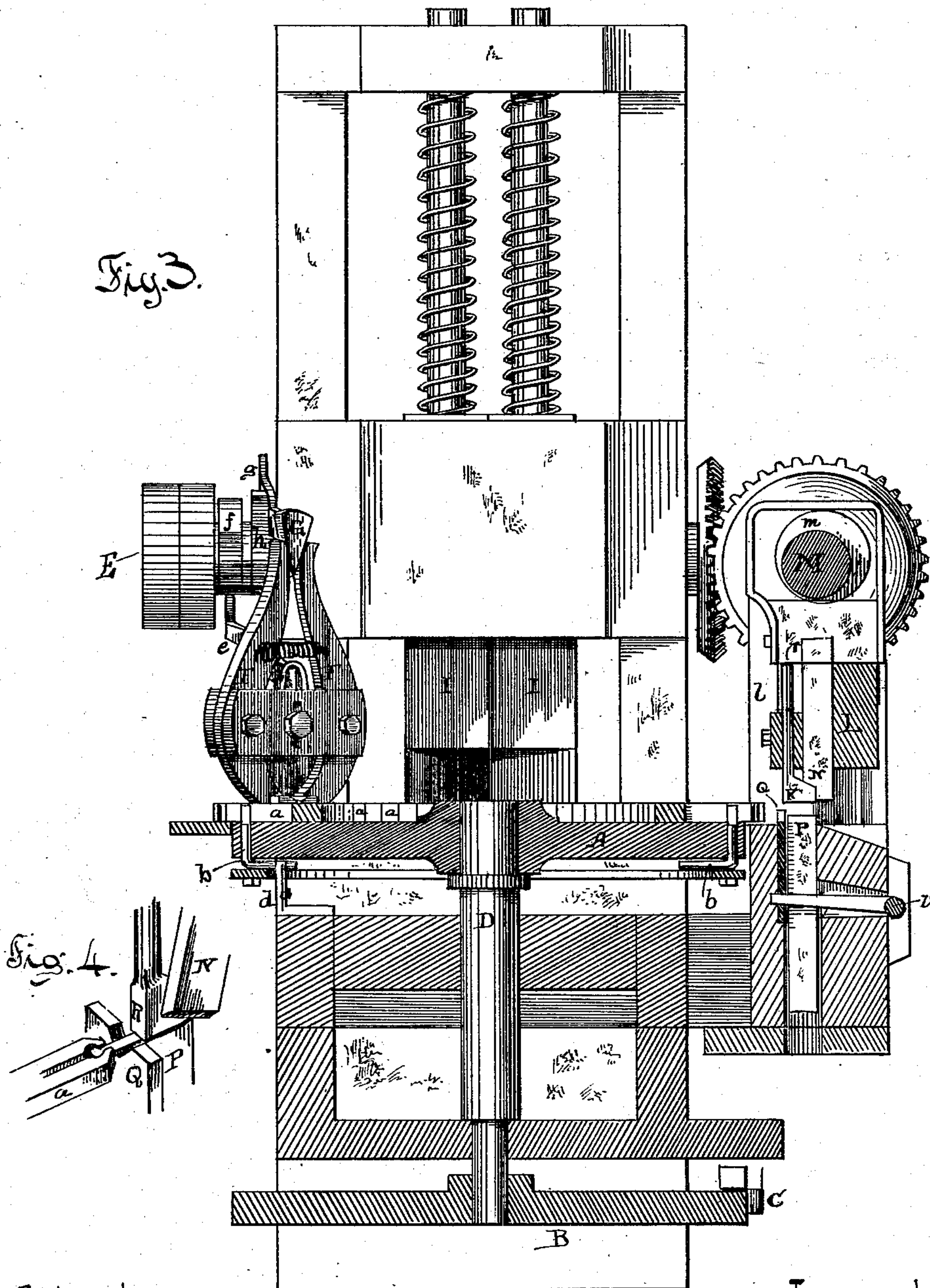
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UNITED STATES PATENT OFFICE.

JAMES MILLS, OF KEESEVILLE, NEW YORK.

IMPROVEMENT IN HORSE-NAIL MACHINES.

Specification forming part of Letters Patent No. **207,059**, dated August 13, 1878; application filed May 14, 1878.

To all whom it may concern:

Be it known that I, JAMES MILLS, of Keeseville, Essex county, New York, have invented a new and useful Improvement in Horse-Nail Machines, of which the following is a specification:

This invention relates to improvements on a horse-nail machine for which Letters Patent were granted to me December 15, 1874, No. 157,858; and it consists, first, in devices for straightening the nail edgewise before it is hammered; second, in detached hammers, whereby each nail receives blows of uniform force, whether said nail be thick or thin; third, in devices for centering the nail upon the clearing-die.

In my machine heretofore patented, as above stated, there was no device to straighten the soft nail before it was subjected to the hammer. The hammer was arranged with a double anvil, so that each nail received two blows; but the hammers were attached and operated together, so that two nails were stricken at the same moment, and if one of said nails chanced to be slightly thicker than the other, it is manifest the strength of the blow was sustained by the thicker nail, and the thinner one was not sufficiently compacted. After having been hammered the successive movements of the holder carried the nail to shearing-dies, wherein the sides were successively sheared. Upon these points my present improvement rests.

That others may fully understand my improvements I will particularly describe them, having reference to the accompanying drawings, wherein—

Figure 1 is a perspective view of my machine. Fig. 2 is sectional side elevation. Fig. 3 is a vertical sectional elevation of the same on a line through the shearing-dies. Fig. 4 is a perspective showing the operation of the shearing punches and dies.

The receiving table or carrier is a circular table, A, having a series of forceps or nippers, *a*, arranged radially on its upper surface and projecting beyond its periphery. These nippers are adapted to receive the nail and hold it by the head, their points extending around so as to embrace the head. The table A is mounted upon a central shaft or axis, D, and

is rotated intermittently by a ratchet, B, and reciprocating pawl C, which, for convenience, are located at the lower end of the axis or shaft D. Each nipper *a* is rigidly fastened to the table A. I prefer to make them, as shown, of a single piece of metal split and closing by the elastic action of its sides. A small shaft, *b*, is inserted at a suitable bearing in the table A immediately under the nippers *a*, and its upper end is flattened so as to enter the slit between the sides of the same. The lower end of the shaft *b* is turned at right angles so as to form a crank-lever, whereby it may be partly rotated to cause the jaws of the nippers to open. This part rotation is effected by the engagement of said crank with a stationary abutment or post, *d*, secured to the frame beneath the table in such a part of the table's rotation as may be desired. When the nippers are so opened the nail may be withdrawn and a new one inserted. If desired, there may be two of said posts *d*, so that the discharge and reception of fresh nails will not take place at the same place.

An attendant feeds the machine by putting a nail in position as often as the nippers open for its reception.

The motive power is applied to a shaft, E, having cams upon it adapted to produce the various movements necessary.

After being gripped by the nipper *a* the nail is carried to the straightener, which consists of a pair of pinchers or forceps, F, which are mounted at the end of a pivoted arm, *e*, whereby they may be raised up to permit the nail to move into position beneath, and then descend to seize and straighten it. The arm *e* therefore projects to a point beneath the shaft E, and is actuated by a cam, *f*, upon said shaft. A spring can be applied to force the descent of the straightening-forceps, if desired. When the straighteners F have descended and inclosed the nail between them, a wedge, G, mounted upon the end of a lever, *g*, and actuated by a cam, *h*, is thereby pushed down between the upper ends of the forcep-levers, and the jaws are thereby caused to close upon the nail with force sufficient to straighten it. When so straightened the straightening-forceps open and are raised up clear of the nail by the action of the cams *f* *h*, and the rotation of the

table A carries the nail forward toward the anvil H.

The hammers I consist of two metallic bars, with steel heads, mounted in a vertical frame and guides directly above their several anvils. They are provided with wipers *k*, which are raised up by cams *i* on the shaft E, and are permitted to fall freely upon the nail, the blow being accelerated, if required, by springs.

If necessary, there may be more than two hammers in the gang; but for horse-nails that number is considered sufficient.

The continued rotation of the table A carries the nail to the shearing-dies, where the point is properly shaped. For convenience I mount this die in a cross-head, L, which moves up and down in guides on the posts *l l*, placed on the frame of the machine in a plane tangential to the periphery of the table A. The cross-head L is actuated by cams *m* on a counter-shaft, M, which is carried by bevel-gears from the main shaft E. The cams *m* press the cross-head L downward, and straps which pass therefrom over said cams draw it up again, though any other proper arrangement of devices may be resorted to.

The die which determines the form of the point of the nail consists of the end of a bar of steel, P, worked down to a cross-section shape corresponding to the form of the nail-point. This bar is mounted in a proper socket in the frame below the cross-head L. It may be held in place by any appropriate device. I prefer to employ a competent set-screw, *y*, for that purpose. When the edges become worn, it is only required that the end should be ground off flat, and, if necessary, retempered, the proper shape being always preserved.

The punch consists of two blades of steel, N, set in the cross-head L, and adjustable up or down. The cutting-edge is at the inner edge across the end, and is adjusted to shear against the end edges of the bar P.

In front of the bar P there is a plate, Q, which has a vertical movement in proper guides. In its upper end it has a V-shaped notch. When the nail has arrived in position, this plate Q is caused to rise up by a spring which impels it, and embrace the nail in said notch, whereby it is brought to a proper central position with reference to the shearing-punch, and held so during the action of said punch.

A presser, R, which moves in a bearing in the cross-head L, and is depressed by a spring, *r*, comes down in advance of the shearing-punch, and holds the nail firmly down upon

the die while the punches are in action. A cam, *t*, acting through a rod, *u*, and rock-shaft *v*, depresses said guide-plate Q to permit the nail to come into position.

The reciprocating pawl C is carried by a sliding bar, S, which is caused to reciprocate by a lever or rock-shaft, T, with its arms *p p'*, which are caused to operate by the engagement of a cam on shaft E with the upper end of arm *p*. A spring, *q*, may be employed to retract said arm and the pawl.

Having described my invention, what I claim as new is—

1. An automatic rotating carrier, A, provided with holding-nippers arranged radially around its periphery, combined with the forceps F, suspended on the end of the pivoted arm *e*, and a wedge, G, at the end of the pivoted arm *g*, combined with cams *f* and *h*, whereby said forceps have imparted to them a movement in a vertical plane, to permit the nail to pass under them into and out of position, and an independent motion in a horizontal plane to close upon and squeeze the nail, substantially as set forth.

2. The automatic rotating carrier A and stationary anvil H, combined with independent hammers I I, moving vertically in guides, and separately actuated by cams on the shaft E, for the purpose of delivering to each nail blows of the same force without regard to thickness.

3. The automatic rotary carrier A, provided with radial nippers to hold the heads of the nails, and the punch and die for shearing the points of the nails, combined with a reciprocating plate, Q, provided with a V-shaped guide-notch and having a rectilinear reciprocation from below, a spring to actuate the same independently, and a rock-shaft, *v*, rod *u*, and cam *t* to forcibly depress said guide between times of action.

4. The automatic rotary carrier A, provided with radial nippers to hold the nail-heads, and the punch and die for shearing the points of the nails, combined with a guide-plate, Q, provided with a V-shaped guide-notch and having a rectilinear reciprocation from below, and a reciprocating presser, R, having a rectilinear reciprocation from above, whereby the nail is clamped at two points and held firmly and truly centered over the shearing-die.

JAMES MILLS.

In presence of—

N. C. BOYNTON,
J. B. MACOMBER.

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