G. L. HALL.

Machine for Making Horseshoe-Nails.

No. 218,733. Patented Aug. 19, 1879.

Fig. 1.

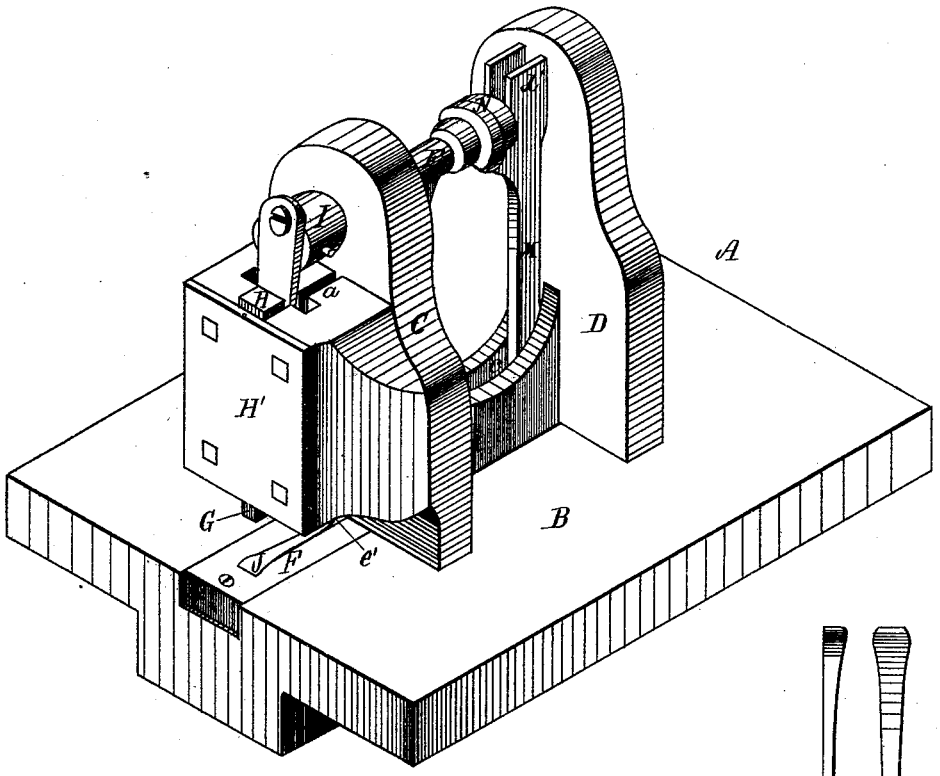

Fig. 2.

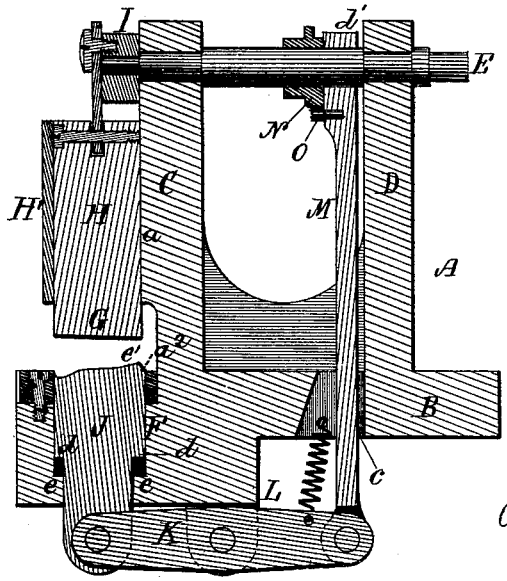

Fig. 3.

Witnesses.
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GEORGE L. HALL, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR MAKING HORSESHOE-NAILS.

Specification forming part of Letters Patent No. **218,733**, dated August 19, 1879; application filed March 28, 1879.

To all whom it may concern:

Be it known that I, GEORGE L. HALL, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in the Manufacture of Nails, of which the following is a specification.

My present invention relates to the manufacture of pointed nails by punching them at one operation from a previously-rolled bar or plate of metal, the opposite edges of which are thickened to provide the heads of the nails, my invention being especially applicable to the manufacture of horseshoe-nails on an extensive scale.

I am aware that it is not new to produce a pointed nail by punching it directly from a previously-rolled bar or plate of metal; but in all cases in which a pointed nail has been thus made prior to my invention the last stage in the finish of the nail (with the exception of rattling) has been to pass it through a trimming-die, the friction of the sides of which, as the nail is crowded through it, has the effect of rounding, twisting, and otherwise injuring the point of such nail, which constitutes a very serious objection, for the reason that when driven its course is uncertain and irregular. In fact a true and flat point is universally recognized to be the most important feature in a horseshoe-nail.

My present invention consists in combining with the punch and matrix a movable plunger or former, which at one point in the stage of the manufacture of the nail—that is, after the latter is punched from the plate—becomes a solid bed or abutment, between which and the die the point of the nail is reduced to a true flat point, and at another time, or during or after the retreat of the punch from the matrix, the former becomes a clearer, to remove the completed nail from the matrix, and so that upon the advance of the nail-plate such nail is pushed away from the mouth of the matrix.

The drawings accompanying this specification represent in Figure 1 a perspective elevation, and in Fig. 2 a vertical central and longitudinal section, of a machine which I have adopted in the present instance to carry out my invention. Fig. 3 is a view of the nail made by this machine.

In such drawings, A represents the general structure of the machine, the same consisting of a flat base, B, which constitutes the working-bed of the machine, and two upright standards, C D, in the upper part of which latter is mounted a horizontal shaft, E, to the rear end of which a pulley is to be attached in the usual manner of communicating rotary motion to a shaft.

The matrix or female die of the punch portion of the machine is shown at F as an orifice in the front part of the bed A, and of the form in horizontal section of the nail to be produced, while the counter or whole die or punch which operates with the matrix is shown at G as affixed to or making part of the lower end of a vertically-reciprocating bar, H, playing in guides *a* of a head, H', applied to the front of the standard C before named, such bar being driven by a crank or crank-wheel, I, affixed to the front end of the shaft E, in such manner as to carry the punch downward into the matrix in the act of punching a nail from the nail-plate, and subsequently elevate the punch sufficiently above the bed B to permit the nail to emerge from the matrix and the nail-plate to advance.

J in the accompanying drawings represents a second vertical bar or former, of a size in cross-section approximating that of the punch-bar H before named, such bar J being supported in the vertical passage F of the bed B below, and coincident with the punch, and driven in reciprocal paths of movement therein by a horizontal lever or working-beam, K, arranged below the said bed B, and pivoted at its front end to the lower end of the former-bar, which extends below such bed, the fulcrum of the lever K being supported by hanger L, depending from the under side of the bed, while the rear end of the lever is pivoted to the lower end of a vertical slide bar or beam, M, extending upward through an opening, *c*, in the bed, and straddling, by its upper forked end, *d'*, the shaft E, by which means its movements are guided.

In advance of the bar M, I affix to the shaft E a wiper-cam or eccentric, N, which operates, with a stud or bowl, O, of the bar M, to impart vertical reciprocations to the plunger or follower J.

The former J is formed with shoulders or

abutments *d d*, which, when such former is at its lowest position, find a seat upon corresponding shoulders *e e* of the passage F, in which the former plays, the latter shoulders providing a solid abutment or foundation for the plunger.

The passage F, as before stated, constitutes the matrix of the punching portion of the machine, while the former constitutes a movable or shifting bottom of such matrix.

Two peculiar features will be observed in the construction of the plunger or former and punch.

The upper end of the former is longer in horizontal section or area than the lower end of the punch, to the extent of an enlargement or backing, a^2, formed upon the rear edge of said former, which extends beyond the highest point of the slope or incline, and serves to strengthen this portion of the former against the strains and labor devolving upon it.

The matrix or opening is correspondingly extended in length to receive the former, and this variation in the sizes of the punch and matrix is productive of an important advantage, for the reason that as the matrix is longer than the nail formed by it, no clogging or obstruction occurs at the extreme end of such matrix.

The parts of the machine are so turned that while the punch is descending into the matrix and punching a nail from the nail-plate the former is at its lowest position and stationary; but simultaneously with or immediately after the ascent of the punch the former (now become a clearer) rises and expels from the matrix the nail cut by the preceding descent of such punch, and remains in this elevated position, in which its upper edge is practically flush with the top of the bed B, until the nail-plate advances and carries before it the nail resting upon the top of the clearer.

The adjacent faces of the punch and former are of such contour as to coincide with a cross-section of the nail-plate and the body of the nail cut from the such plate, with the exception of the point of such nail, and it is in this portion of my machine that the vital and novel feature mainly exists.

It will be seen that upon the edge of either the punch G or the plunger J (the plunger in the present instance) I raise a flat sloping incline or swell, *e'*. This incline *e'*, as the dies approach each other, compresses or condenses, and in so doing stiffens and hardens, the point of the nail and reduces it to a thin edge in one direction, while the walls of the matrix preserve the edges of the point, the result being that I produce a flat and true, as well as hard and stiff, point, which renders the nail of great value in driving, as it follows a uniformly true course and is not easily bent.

A view of the nail is shown in Fig. 3 of the accompanying drawings.

The nail after removal from the machine is to be tumbled or rattled to remove the burrs or rough edges, as is now generally practiced.

If deemed desirable, the punch and former may be adopted to compress the entire nail; but in practice the point of the nail or the point and a small portion of the shank would require to be thus acted upon.

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

The combination, with the upper plunger or punch, of the matrix made longer than the punch and the reciprocating former contained in said matrix, and provided with an extension shoulder or backing, substantially as and for the purposes set forth.

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