(No Model.)

W. W. MINER.

METHOD OF MANUFACTURING HORSESHOE NAILS.

No. 490,394. Patented Jan. 24, 1893.

Fig. 1.

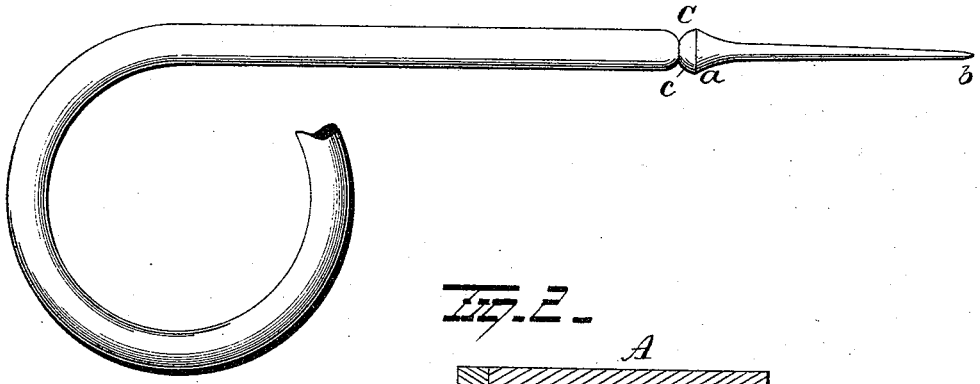


Fig. 2.

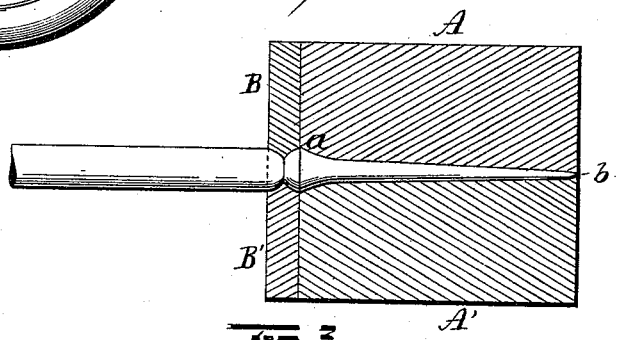


Fig. 3.

Fig. 4.

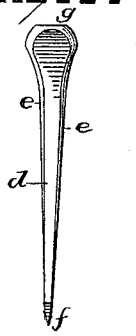
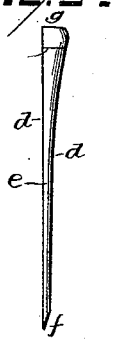


Fig. 5.



Witnesses
C. E. Nottingham
A. N. Bright

Inventor
William W. Miner
by H. A. Seymour
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM W. MINER, OF NEW HAVEN, ASSIGNOR TO THE NEW PROCESS NAIL COMPANY, OF TORRINGTON, CONNECTICUT.

METHOD OF MANUFACTURING HORSESHOE NAILS.

SPECIFICATION forming part of Letters Patent No. 490,394, dated January 24, 1893.

Application filed May 26, 1892. Serial No. 434,490. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. MINER, of New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Methods of Manufacturing Horseshoe-Nails; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improved method of manufacturing horse-shoe nails.

The object of the invention is to produce horse-shoe nails perfectly homogeneous in structure; not liable to split or sliver; sufficiently stiff and hard to be driven without buckling, and soft and ductile enough to be easily clinched, and with smooth and rounded corners and a highly finished surface.

With these ends in view my invention consists in the method of manufacturing horse-shoe nails as will be hereinafter described and pointed out in the claim.

In the accompanying drawings Figure 1 represents a coil of wire the end of which has been reduced by suitable machinery to form the shank and head of a horse-shoe nail. Fig. 2 is a detached view representing a view in section of the swaging dies for reducing the shank and head. Fig. 3 is a view of the blank. Figs. 4 and 5 are side and edge views of the completed nail.

In manufacturing horse-shoe nails by my improved process I take a coil of rounded wire, preferably of Siemens & Martins steel, and place it on a reel from which it is automatically fed to a suitable wire-pointing machine and for this purpose I may use the well known Hopson & Brooks or the Dayton wire pointing machines, it being understood of course that in the use of either one of these machines or of any other the dies would require such modification in shape and size as would adapt them for use in the manufacture of horse-shoe nails. The end of the coil of wire is fed into the wire pointing machine and is reduced to the form shown in Fig. 1.

I have illustrated in Fig. 2 a vertical section of the dies and the form imparted to the end of the wire.

A A′ represent the swaging dies which being carried within a rapidly rotating head serve to impart a great number of blows to every portion of the surface of the wire and reduce it to a tapering form circular in cross section from the shoulder *a* to the point *b*. The supplemental dies B B′ operate upon that portion of the wire adjacent to the shank, and by their repeated blows serve to impart thereto a head C which is circular in cross-section. The blank after having been thus reduced by swaging to the form shown in Fig. 2, is withdrawn from the dies and severed from the coil—which operation may be effected automatically by any suitable cutter whereby there is produced the blank shown in Fig. 3, in which C represents the head having a flat top *c*. The head is gradually enlarged from its flat top *c* to the point of its greatest diameter which is represented at *d* and from the latter point the head is gradually reduced in diameter and merges into the tapering shank.

The operation of reducing the blank by swaging renders it exceedingly hard and homogeneous in its structure and imparts to every portion of its surface a smooth and highly polished finish. In order to soften the metal sufficiently to enable the nail to be readily clinched I prefer to anneal the blanks at this stage and one suitable method of annealing is as follows. The blanks are placed in a muffle from which air is expelled by the introduction of illuminating gas under pressure. The muffle is then placed in a suitable furnace and heated to a temperature sufficient to impart a cherry red heat to the blanks when it is removed and allowed to cool gradually and when the blanks are sufficiently cool they are removed from the muffle. By their being subjected to an annealing process, the blanks are rendered quite soft and ductile and owing to the exclusion of air from the muffle I prevent the oxidation of the surface of the blanks and preserve to them their brightly polished surface produced in the process of swaging, while by gradually cooling the blanks I prevent the color from flowing. The blanks are then subjected to a pressing process by which they are flattened on their opposite sides as represented in Figs. 4 and 5.

This step in the process may be performed by machinery of the general character set forth in Letters Patent No. 415,818 granted to me November 26, 1889, or any other suitable machinery or devices may be used for this purpose. The flattening of the blank operates to transform it into the shape of a completed nail having flattened sides *d d* rounded edges *e e* beveled point *f* and flat top *g*. The entire surface of the nail is rendered perfectly smooth and has imparted thereto a highly finished appearance.

The final operation of pressing by which the blank is flattened and its point is beveled operates to impart to the annealed blank the requisite degree of hardness and stiffness to the shank and point to insure the nail being driven without bending or buckling while on the other hand the nail is sufficiently soft and ductile to be easily clinched.

It will be observed that by my improved process, I produce the head and shank of the nail by swaging and hence every portion of the nail is substantially equal in hardness and is homogeneous throughout. By swaging the upper end of the head, I not only impart the desired form to the head of the nail, but also point the end of the wire so that when the swaged blank is severed therefrom the end of the wire is in a condition to be again fed to the swaging dies.

I do not restrict myself to the employment of any special form of swaging machines or pressing dies, as it is evident that my improved process may be carried into effect on widely varying forms and constructions of machines.

Having fully described my invention what I claim as new and desire to secure by Letters Patent is:—

The method of making horse-shoe nails which consists in reducing the end of a wire coil or length of wire by swaging and forming a blank consisting of a head circular in cross-section and a tapering shank circular in cross-section throughout its length; severing the blank from the coil or length of wire, annealing the blank and then flattening the head and shank of the blank and thereby producing a nail having flattened sides and rounded edges throughout its length.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WILLIAM W. MINER.

Witnesses:
S. G. NOTTINGHAM,
C. S. DRURY.