(No Model.)

W. W. MINER.

METHOD OF MANUFACTURING HORSESHOE NAILS.

No. 491,368. Patented Feb. 7, 1893.

Fig. 1.

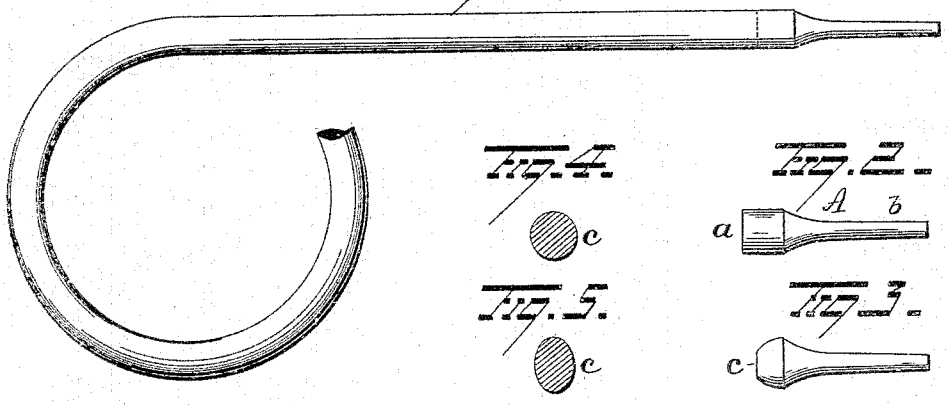


Fig. 4.

Fig. 2.

Fig. 5.

Fig. 3.

Fig. 6.

Fig. 7.

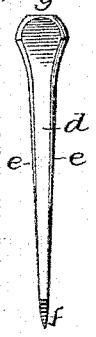
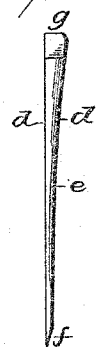


Fig. 8.



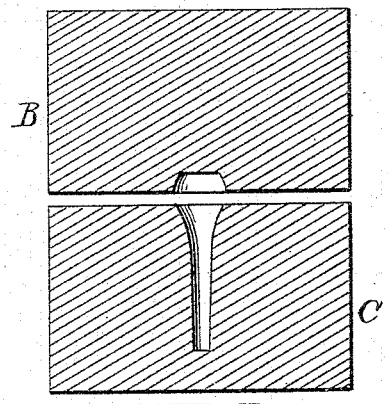


Fig. 9.

Witnesses
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UNITED STATES PATENT OFFICE.

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METHOD OF MANUFACTURING HORSESHOE-NAILS.

SPECIFICATION forming part of Letters Patent No. 491,368, dated February 7, 1893.

Application filed May 26, 1892. Serial No. 434,493. (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 or partly form the shank or body of a horse-shoe nail. Fig. 2 represents the blank severed from the coil. Fig. 3 represents the blank after a head has been formed thereon by upsetting. Figs. 4 and 5 are cross sections of two forms of heads produced by the heading dies. Fig. 6 represents the blank after the shank or body has been reduced to a tapering form circular in cross section from the head to the point. Figs. 7 and 8 are plan and edge views of the completed nail, and Fig. 9 are views in section of the heading dies.

In manufacturing horse-shoe nails by my improved process I take a coil of round wire, preferably Siemens & Martin 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, and so construct the dies that the wire will be reduced to any desired form and diameter. The end of the coil of wire is fed into the wire pointing machinery, and is reduced to the form shown in Fig. 1, when by a suitable cutter, the blank is automatically severed from the coil, thereby producing the blank represented in Fig. 2 in which A represents the blank having an enlarged end *a* and a reduced shank or body portion *b*. This blank is then placed in suitable heading dies B, C, and the enlarged end is upset by endwise compression which results in forming a head *c* on the end of the blank. The head *c* may be made circular in cross section as illustrated in Fig. 4, or oval as shown in Fig. 5, or it may be made in any other desired shape in cross section. The blank is then again subjected to the action of a wire-pointing machine and its shank or body is reduced to a tapering form circular in cross section from its head to its point as illustrated in Fig. 6.

The operation of heading and reducing the blank to the form illustrated in Fig. 6 will serve to harden it and render it too stiff to be readily clinched and hence I prefer at this stage of the operation to soften the metal of the blank by the process of annealing which may be done in the following manner. 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 being subjected to an annealing process substantially as above set forth 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 which is produced by the heading and reducing process, and by gradually cooling them 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. 7 and 8. This step in the process may be performed by machinery of the character set forth in Letters-Patent No. 415,818, granted to be November 26, 1889, or any other suitable machinery 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 beveled operates to impart to the annealed blank the requisite degree of hardness and stiffness to the shank and point to insure the nails being driven without bending or buckling while on the other hand it is sufficiently soft and ductile to be easily clinched.

By a double reduction of the shank or body, I am enabled to use wire of such size that a larger head may be produced than would be practicable to form if small wire were employed because it would be impracticable to swage a length of such small wire as would result in the production of the large head obtained by this process.

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, severing a blank from the coil thereby producing a blank with a reduced shank and an enlarged end, upsetting a rounded head on the enlarged end of the blank, reducing the body or shank to a tapering form circular in cross-section and 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.