(No Model.)

W. W. MINER.

METHOD OF MAKING HORSESHOE NAILS.

No. 490,396. Patented Jan. 24, 1893.

Fig. 1.

Fig. 2.

Fig. 3.

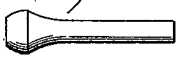


Fig. 4.

Fig. 5.

Fig. 6.

Fig. 8.

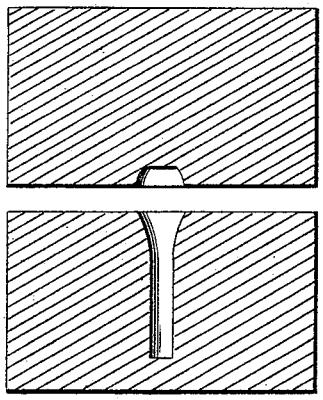
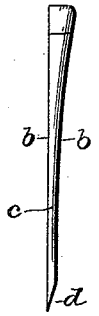


Fig. 7.



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

METHOD OF MAKING HORSESHOE-NAILS.

SPECIFICATION forming part of Letters Patent No. 490,396, dated January 24, 1893.

Application filed May 26, 1892. Serial No. 434,495. (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 piece of wire from which the nail blanks are severed. Fig. 2 is a length of wire for a blank. Fig. 3 shows the blank having a head formed by upsetting on one end thereof. Fig. 4 shows the blank after its shank has been reduced by swaging to a tapering form circular in cross-section. Fig. 5 shows the blank after a conical point has been formed on the end of the shank by grinding. Figs. 6 and 7 are side and edge views of the completed nail, and Fig. 8 is a vertical section of the heading dies.

In manufacturing horse-shoe nails by my improved process I take round wire—preferably of Siemens and Martin steel and cut it into suitable lengths—indicated by dotted lines in Fig. 1 and thereby produce blanks like the one shown in Fig. 2. I then subject these blanks to the action of heading dies which may be of the form illustrated in Fig. 8 and produce by upsetting one end of the blank, the headed blank shown in Fig. 3. The shank of the blank of Fig. 3 is then reduced by swaging to a tapered form circular in cross-section as illustrated in Fig. 4. This operation may be performed on any suitable wire pointing machinery and for this purpose I may use the well known Hopson and Brooks or the Dayton wire pointing machines, or in fact may use any other suitably constructed machine of this type. While the shank is reduced to a tapered form circular in cross-section throughout its length, it is not necessary that the wire pointing machine shall swage the end of the shank to a perfectly round and sharp point, but it will suffice if the main portion of the shank be reduced to the proper size and form, leaving the point to be formed by a subsequent operation, which is as follows:—The blanks of Fig. 4 are subjected to the action of a grinding machine by which the ends of the shanks are ground to a conical point as shown in Fig. 5, in which *a* indicates the ground point. This operation may be performed on a machine in which the blanks of Fig. 4 are placed in the threads of a screw feed and are fed so that while the blanks are rotating their points are brought into contact with the upper or lower side of an emery wheel or other suitable grinding surface and thereby quickly ground to a conical point. The blanks are preferably annealed either immediately before or after the operation of grinding, though I prefer to anneal them before grinding because by so doing, the metal is softened and the operation of grinding is more easily and quickly performed. In annealing the blanks I may place them 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 to the blanks a cherry red heat when the muffle is removed and the blanks allowed to cool gradually and when 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 produced by the heading and swaging processes; 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. 6 and 7 this step in the process may be performed by machinery of the character set forth in Letters Patent No. 415,818, granted to me November 26, 1889 or any other suitable machinery or dies 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 *b*, *b*, rounded side edges *c*, *c*, beveled point *d*, while 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 buckling while on the other hand it is sufficiently soft and ductile to be easily clinched.

By grinding the points, I facilitate the operation of swaging because I thereby render it unnecessary to carry on the operation of swaging until the shank has been reduced to a point, it being simply necessary to reduce the main portion of the blank to the proper tapered form and complete the point by grinding as hereinbefore described, and by this operation I insure perfectly smooth and uniform conically shaped points to the shanks, so that after being flattened the nails will have a perfectly formed pointed beveled end.

I do not limit myself to the precise steps hereinbefore recited for producing horse-shoe nails, as they may be varied without departing from my invention. For instance the head on the blank may be formed by upsetting either before or after the blank has been subjected to a swaging operation, or the head may be formed by the action of swaging dies.

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 upsetting a head on the end of a wire blank, reducing the body of the blank by swaging to a tapering form circular in cross-section throughout its length; grinding the end of the shank to a conical point and flattening the shank and beveling the ground point by pressure and thereby producing a horse shoe nail having flattened sides rounded edges and a smooth finished beveled point.

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

WILLIAM W. MINER.

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