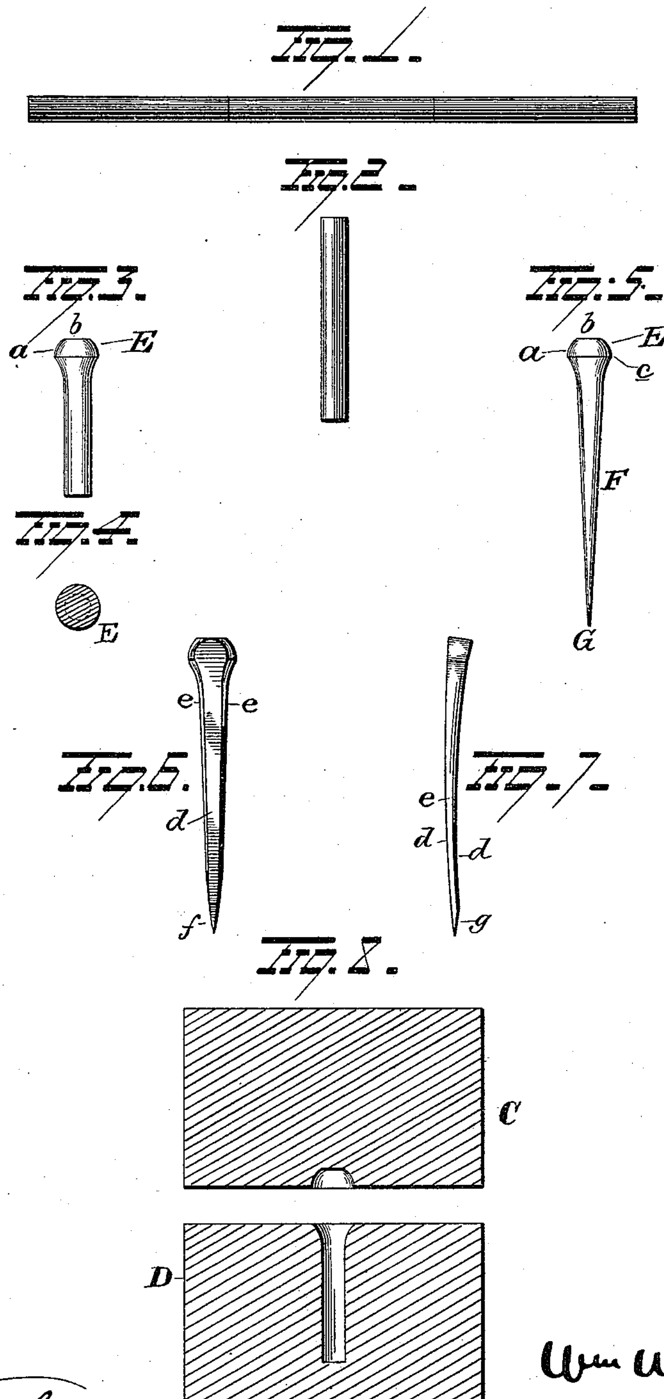
(No Model.)

W. W. MINER.

PROCESS OF MAKING HORSESHOE NAILS.

No. 490,392. Patented Jan. 24, 1893.



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PROCESS OF MAKING HORSESHOE-NAILS.

SPECIFICATION forming part of Letters Patent No. 490,392, dated January 24, 1893.

Application filed May 20, 1892. Serial No. 433,772. (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 Processes of Making 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 a horse-shoe nail perfectly homogeneous in its structure; not liable to split or sliver; sufficiently stiff and hard to adapt it to be driven without buckling and ductile enough to be easily clinched; and having smooth and rounded edges and a highly finished surface.

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

In the accompanying drawings, Figure 1 represents a length of wire from which the nail blanks are severed. Fig. 2 is a severed blank. Fig. 3 is a view in side elevation of the blank shown in Fig. 2 after a rounded head has been formed thereon by swaging or upsetting. Fig. 4 is a cross-section taken through the rounded head of Fig. 3. Fig. 5 is a view in side elevation of the blank after its body or shank portion has been reduced and a tapered form imparted thereto. Fig. 6 is a view in side elevation and Fig. 7 an edge view of the finished nail. Fig. 8 is a view in vertical section of the heading dies.

In manufacturing nails by my improved process, I first take round wire—preferably of Siemens & Martin steel and by any suitable machinery cut the same into suitable short lengths and thereby produce blanks like those represented in Fig. 2, the dotted lines in Fig. 1 showing the length of the blanks as cut from the wire. The blank A as thus formed, is then placed in suitable dies, which may be of the form represented by C D in Fig. 8. The heading die C acting upon that portion of the blank which projects from the die, D, serves to swage or upset a head E, on one end of the blank as represented in Figs. 3 and 4. As represented in the drawings, the head is cylindrical in cross-section and has rounded sides *a* and flattened top *b*. The pressure exerted in forming the head, by which it is made of greater diameter than that of the body of the blank is sufficient to render it exceedingly tough and homogeneous in structure. The headed blank of Figs. 3 and 4 is then subjected to the action of a suitable machine which operates to elongate the body or shank and impart a tapering form to it from the head to its point, and render it circular in cross-section throughout its length.

The operation of reducing the body or shank to a tapering form having a circular cross-section throughout its length may be performed by any suitable machinery though I prefer to perform this step in the operation by what is known as a wire pointing machine and for this purpose, may use the well-known Hopson and Brooks or the Goodyear wire pointing machine, which are adapted to deliver against the periphery of the body of the blank a multiplicity of blows substantially equal in number and force upon every portion of the surface of the shank throughout its length, whereby the density of the shank is rendered practically uniform and has imparted thereto a perfectly smooth and highly polished surface. The blank thus produced is illustrated in Fig. 5, in which E represents the head, having rounded edges *a* and flattened top *b*, while F represents the tapered body or shank and G the point. The head, as will be observed, is gradually enlarged from its flattened upper end to the point *c* of its greatest diameter from which it is gradually contracted in diameter until it merges into or joins with the body of the shank.

The blanks after having been formed as illustrated in Fig. 5 are then annealed and the following process is preferably employed. The blanks are placed in a muffle from which the air is expelled by the introduction of illuminating gas under pressure. After the air has been expelled and the muffle is filled with gas, the latter is placed in a suitable furnace and heated to a temperature sufficient to impart a cherry red heat to the blanks. The muffle is then removed from the furnace and allowed to cool gradually, and when the blanks

have become sufficiently cool, they are removed from the muffle. By being subjected to this annealing process, the blanks are rendered quite ductile, but by the final process, by which they are flattened, the finished nail will be sufficiently hardened and stiffened to insure its being driven without buckling while it will be sufficiently soft and ductile to enable it to be easily clinched.

By annealing the blanks in an air-tight muffle, I prevent the oxidation of the outer surface of the blank and hence preserve the brightly polished surface produced by the heading and reducing process, and gradually cooling them, I prevent the color from flowing.

The blanks of the form represented in Fig. 5 and after having been annealed, are then subjected to a pressing process by which they are flattened 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 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 side edges *e e* and beveled point *f*. While the blank by the final pressing process is transformed into the desired shape of the completed nail, its entire surface is rendered perfectly smooth and has imparted thereto a highly finished appearance.

The various steps of my improved process may be performed by any suitable machinery which may comprise separate machines, or, a single machine may be adapted to automatically perform the different steps in the order set forth.

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 substantially as set forth which consists in upsetting a rounded head on one end of a blank, reducing the body or shank of the blank to a tapering form circular in cross-section, annealing the blank and then flattening the head and shank of the blank and thereby stiffening it and 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,
H. B. ARMES.