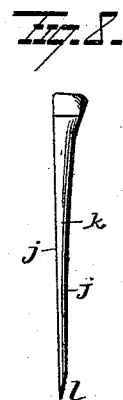
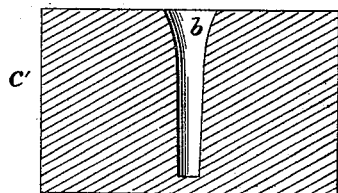
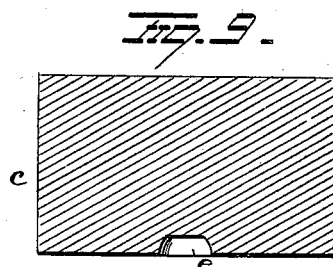
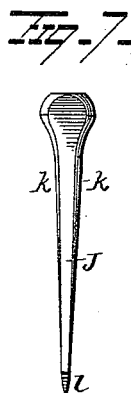
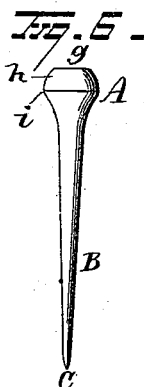
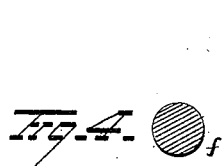
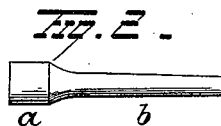


(No Model.)

W. W. MINER.
METHOD OF MAKING HORSESHOE NAILS.

No. 490,393.

Patented Jan. 24, 1893.



Witnesses
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UNITED STATES PATENT OFFICE.

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. 490,393, dated January 24, 1893.

Application filed May 26, 1892. Serial No. 434,489. (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
5 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
10 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 provide horse-shoe nails which will be preferably homogeneous in structure, not liable to split or
15 sliver; sufficiently stiff and hard to be driven without buckling; sufficiently soft and ductile to be easily clinched and having smooth and rounded corners and a highly finished
20 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 claims.

25 In the accompanying drawings, Figure 1 represents a blank. Fig. 2 shows the blank after it has been partly reduced. Fig. 3 illustrates the blank of Fig. 2 after a head has been formed thereon. Figs. 4 and 5 illustrate cross sections of different forms of heads.
30 Fig. 6 shows the blank of Fig. 3 with its shank reduced to a tapering form. Figs. 7 and 8 show the completed nail, and Fig. 9 shows the heading dies.

35 In manufacturing horse-shoe nails by my improved process I first take round wire—preferably Siemens & Martin steel. The wire may be cut into blanks like the one represented in Fig. 1. These blanks are then reduced to the form represented in Fig. 2 which
40 operation may be performed in any desired manner, although I prefer to do this by means of what is known as a wire pointing machine, and for this purpose may use the well known
45 Hopson & Brooks or the Dayton wire pointing machines, 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
50 of the surface of the shank or body

throughout its length, whereby the density of the shank is rendered practically uniform and has imparted thereto a perfectly smooth and highly polished surface. Or the operation of reducing the blank may be performed
55 on the well known Simonds rolling machine. The blank after having been reduced to the form represented in Fig. 2 consists of the enlarged end *a* and reduced shank or body *b*, which is of tapering form through its length.
60 This blank is then placed within a pair of holding dies *c c'*, with the enlarged end *a* extending into the countersunk portion *d*. By means of a die *e*, the enlarged end *a* is then upset and formed into a rounded head
65 *f*, which may be circular in cross section as illustrated in Fig. 4 or it may be oval in cross section as illustrated in Fig. 5. In either case, the sides of the head are rounded while the upper end *g* is flat. The headed
70 blank is then subjected to another operation whereby its shank or body is elongated and a tapering form is imparted to it from the head to its point, the shank being rendered
75 circular in cross section throughout its entire length. This operation is preferably performed on a wire pointing machine of the character heretofore referred to. The blank resulting from this operation is represented
80 in Fig. 6, in which *A* represents the head having rounded sides *h* and flattened top *g* while *B* represents the tapering body or shank and *C* the point. The head as will be observed is gradually enlarged from its flattened
85 upper end to the point *i* of its greatest diameter from which point it is gradually contracted in diameter until it merges into the body or shank *B*.

The blanks after having been formed as shown in Fig. 6 are then annealed and the
90 following process is preferably employed. The blanks are placed in a muffle from which air is expelled by the introduction of illuminating gas under pressure. After the air has been expelled and the muffle is filled with
95 gas, the muffle 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
100

have become sufficiently cool they are removed from the muffle.

The annealing process renders the blanks quite ductile, but the final process which consists in flattening the blank, operates to impart to the finished nail such a degree of stiffness and hardness that it can be driven without buckling while on the other hand it will be sufficiently soft and ductile to adapt
10 is 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 to them the brightly polished surface produced
15 by the heading and reducing process, and by gradually cooling the blanks, I prevent the color from flowing.

If desired, the blanks may be annealed immediately after the first operation of reduction, or they may be annealed subsequently to their being flattened and a blue color may be given the finished nail by the annealing process. However I prefer to anneal the blanks just prior to the final pressing operation by which they are flattened, because by
20 so doing, I am enabled to impart to the finished nail by the final operation of pressing and flattening the requisite degree of hardness and stiffness to the shank and point which
25 will insure the nails being driven without bending or buckling.

The blanks of the form represented in Fig. 6 after they have been annealed, are then subjected to a pressing process by which they are
35 flattened 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 me November 26, 1889 or any other suitable machinery may be used for this purpose. The
40 flattening of the blank serves to transform it into a completed nail having flattened sides *j, j*, rounded side edges *k, k*, and beveled point *l*. While the blank by the final process is transformed into the desired shape of the completed or finished nail, its entire surface is rendered perfectly smooth and has imparted thereto a highly finished appearance.
45 By taking large size wire, it enables me to

produce the head by a single operation in a heading machine while by the employment of small wire two operations in a heading machine are required in order to upset a sufficient length of the wire to produce stock enough to form the head. 55

While I have described my process as consisting in reducing the body or shank of the blank; then forming a head on one end of the blank and then reducing its body or shank to a tapering form and after annealing the blank, flattening it by pressing, I would have it understood that I do not restrict myself to this exact method as I may reduce the body or shank of the blank at the first operation to the desired length and size so that no further reduction will be necessary, and then produce the head on the blank thus reduced, and afterward anneal and flatten. 60

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. 65

Having fully described my invention what I claim as new and desire to secure by Letters-Patent, is:— 75

The method of making horse-shoe nails which consists in cutting wire into blanks of suitable lengths; reducing a portion of the blank by swaging to circular form in cross-section and of less diameter than that of the original blank; upsetting a rounded head on the enlarged and unreduced end of the blank; then reducing the shank or body of the blank to a tapering form circular in cross-section throughout its length and flattening the head and shank of the blank thereby producing a horse-shoe nail having flattened sides and rounded edges throughout its length. 80
85
90

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.