J. H. SMITH.

MANUFACTURE OF STEEL HEADED HORSESHOE NAILS.

No. 104,785. Patented June 28, 1870.

Fig. 1.

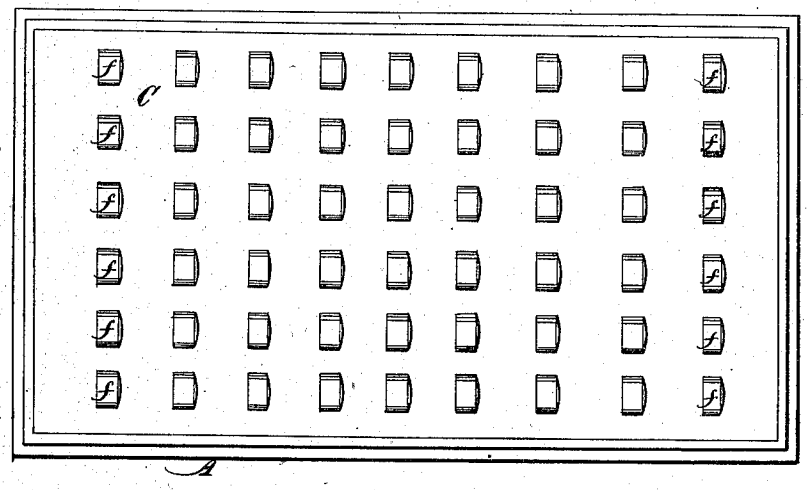
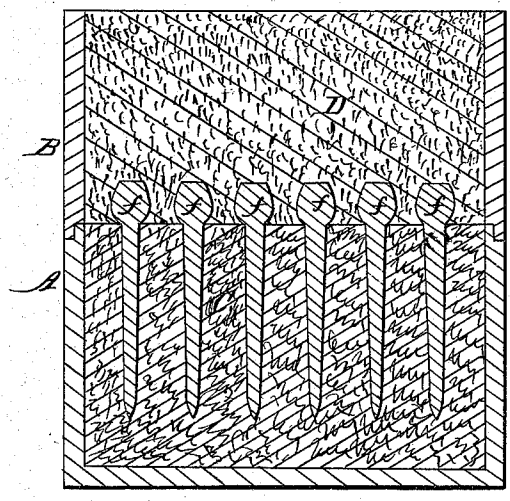



Fig. 2.

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# UNITED STATES PATENT OFFICE.

JOHN HENRY SMITH, OF ALLEGHENY CITY, PENNSYLVANIA.

## IMPROVEMENT IN THE MANUFACTURE OF STEEL-HEADED HORSESHOE-NAILS.

Specification forming part of Letters Patent No. **104,785**, dated June 28, 1870.

*To all whom it may concern:*

Be it known that I, JOHN HENRY SMITH, of the city and county of Allegheny, and State of Pennsylvania, have invented a certain new and useful improvement, namely, a new article of manufacture—viz., wrought-iron horseshoe-nails the heads of which are converted into steel; and I do hereby declare that the following is a full, clear, and exact description thereof.

The nature of my invention consists in making a new article of manufacture—viz., wrought-iron horseshoe-nails the heads of which are converted into steel.

To enable others skilled in the art to make and use my invention, I will proceed to describe more fully the new article of manufacture, and the means for making the same.

I make horseshoe-nails of a good article of wrought-iron, and of any of the known forms, and by any known means. I then convert the heads of the nails into steel by the process of "cementation," or by any other suitable or known means.

I will now give a brief description of a process whereby the heads of the nails may, with ease and facility, be converted into steel.

In the accompanying drawing, Figure 1 is a top view or plan of the lower part of a cementing-chest with the horseshoe-nails embedded in it. Fig. 2 is a transverse section of the cementing-chest with nails embedded in it, and their heads covered with the material for converting them into steel.

The lower part, A, of the cementing-chest is packed with loam or other suitable matter, into which are forced the shanks of the nails, leaving their heads *f* exposed or projecting above the loam C in the part A of the chest. I then place the upper part, B, of the chest on the part A, and fill it with pulverized charcoal, D, packing it closely around the heads of the nails.

The charcoal is pulverized and wet with a solution consisting of water in which nitrate of soda is dissolved. One pound of the nitrate of soda dissolved in ten gallons of water will be sufficient for wetting one ton of the pulverized charcoal, which will be enough to convert into steel the heads of about two tons of nails. The charcoal, after it has been wet with the solution, should be partially dried before covering the heads of the nails with it.

Having the nails embedded in the cementing-chest, as represented in the accompanying drawing, the lid *x* is properly secured on the chest. It is then placed in a heating-furnace, and subjected to a high degree of heat for from ten to fifteen hours. The chest is then removed from the furnace, and it and its contents allowed to gradually cool off, after which the nails are removed, the heads of which will be found to be converted into steel, which may be, if desired, tempered and hardened by the ordinary means used for that purpose.

The advantage of my improvement consists in making the heads of the nails stronger and more durable, and the shanks of the nails more ductile, and of greater tensile strength.

Having thus described my improvement, what I claim as of my invention is—

A new article of manufacture—viz., a wrought-iron horseshoe-nail the head of which is converted into steel, substantially as herein described.

JOHN HENRY SMITH.

Witnesses:

JAMES J. JOHNSTON,

JAS. G. THOMPSON.