No. 618,786. Patented Jan. 31, 1899.

H. H. CUMMINGS.

METHOD OF MAKING SPIKES.

(Application filed Apr. 15, 1898.)

(No Model.)

Fig. 1.

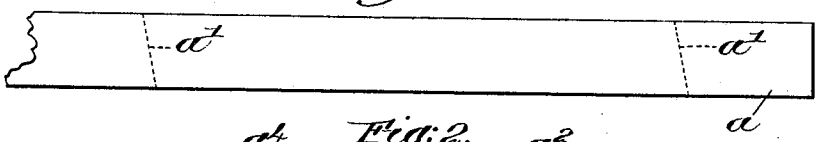


Fig. 2.

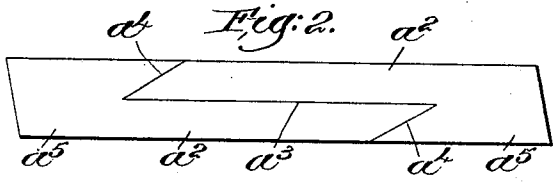


Fig. 3.

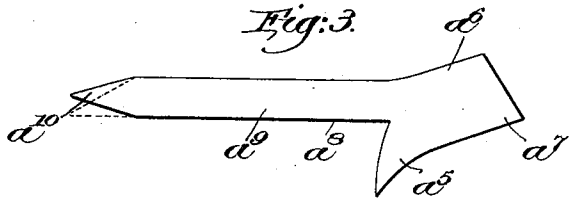


Fig. 4.

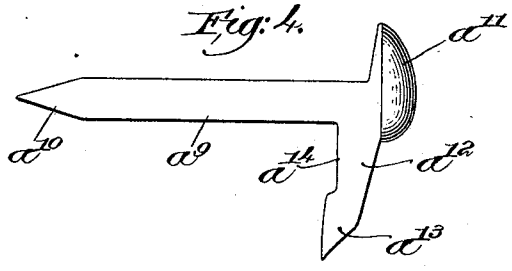


Fig. 5.

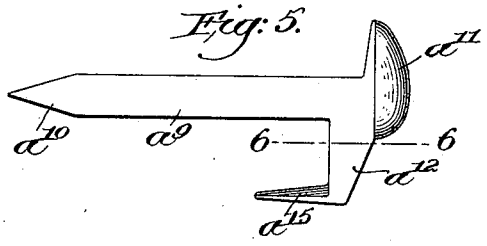
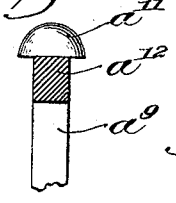


Fig. 6.



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UNITED STATES PATENT OFFICE.

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METHOD OF MAKING SPIKES.

SPECIFICATION forming part of Letters Patent No. 618,786, dated January 31, 1899.

Application filed April 15, 1898. Serial No. 677,643. (No specimens.)

To all whom it may concern:

Be it known that I, HENRY H. CUMMINGS, of Malden, county of Middlesex, State of Massachusetts, have invented an Improvement in Methods of Making Spikes, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention is an improvement in the method of manufacturing spikes, particularly railroad-spikes, and has for its object the production of a spike of unusual tenacity and toughness of material and strength in general.

Various kinds of spikes have been produced in various forms; but it is the general experience that spikes have usually had their grain or fiber offset and more or less fractured and crystallized in the process of manufacture, it being frequently the case also that spikes as heretofore made have jagged edges, where the swaging has actually ruptured the iron or steel to an extent visible to the eye.

It is evident that the faults mentioned are serious ones, not only requiring that a spike shall be unduly large and heavy for the requisite strength, but also occasioning an unevenness of strength in different spikes, inasmuch as one spike will have more fractures or places of weakness than another. Accordingly I have invented the hereinafter-described process or method of manufacture whereby all these faults are effectually obviated. Furthermore, a spike of the special form of my improved spike if made according to the usual method would be expensive, whereas by my improved method the spike is not only stronger, but is inexpensive.

The details of my invention will be more fully comprehended in the course of the following description, reference being had to the accompanying drawings, illustrative of the successive steps thereof.

In the drawings, Figure 1 is a broken detail, in side elevation, of a bar of steel or iron to be manufactured into spikes. Fig. 2 is a portion thereof cut from the bar and also indicating the lines of cut necessary to make two spike-blanks. Figs. 3, 4, and 5 are side elevations illustrating the successive forms assumed by one of these blanks in the process of manufacture. Fig. 6 is a cross-section on the line 6 6, Fig. 5, looking upward.

In carrying out my method or process of manufacture I take a usual rectangular bar a of the metal which it is desired to convert into spikes and preferably shear it on the diagonal lines a', thereby producing a rhomboidal block of the contour shown in Fig. 2. This piece of metal is then heated in a furnace and brought under shearing-dies, which cut the block into two blanks a^2 on the lines a^3 a^4. I then while the metal is still red-hot lift the projecting hook-like spur a^5, thereby deflecting the head portion, as indicated at a^6, and bringing its apex a^7 into substantial alinement with the adjacent or back edge a^8 of the body a^9 of the spike; also, the point is deflected or centered from the position shown in dotted lines to the position shown in full lines at a^{10}, Fig. 3. All this is accomplished while the metal is in its heated condition, so that thereby there is no possibility of fracturing the grain, but instead thereof the metal is somewhat compressed and toughened by the process. The partly-formed blank is then passed to a swaging tool or die, and while yet hot it is swaged by a downward pressure into the shape shown in Fig. 4, the result being that a broad, heavy, solid, and compact driving-head a^{11} is formed in the position shown, the projecting brace portion a^{12} is thickened and strengthened, and a slightly-depending end a^{13} is formed thereon. This formation is due to the fact that the metal is swaged while hot and that the blank was originally cut on the diagonal line a', or at least was deflected into the inclined position substantially as shown in Fig. 3, thereby providing a maximum amount of metal adjacent the back edge of the blank and a minimum amount of metal overhanging the opposite or forward edge thereof. The flow of the metal under the swaging action (it being understood that an opposite swaging or resistance is provided at the under side a^{14} of the brace a^{12}) takes place readily and tends to arrange the grain of the head in parallelism to the direction thereof, at the same time compressing and toughening

the head and absolutely preventing any possible rupture of the grain or crystallization thereof. The head having been formed as stated and as shown in Fig. 4, it is next subjected to proper pressure to form the portion a^{13} of the brace into a relatively thin tapering prong, as indicated at a^{15}, Fig. 5, this figure showing the spike in its completed form.

The result of my method is that instead of there being any ragged or furred edges, particularly at the head, such as are commonly found in ordinary spikes, the head is entirely smooth and uniform at its edges and is exceedingly dense and tough.

Besides the features of advantage and superiority last alluded to the head of the spike is brought to the required shape without any point of weakness therein, whereas if this spike had been formed in the usual manner it would have been practically impossible to have formed the spike without the practical destruction or serious weakening thereof, and, moreover, the cost of manufacture in the old way would be practically prohibitive. Indeed this matter of lessening the expense of manufacture is one principal object of my method.

By observing Fig. 2 it will be evident that the lines of cut are such that there is no waste of material. The depending spur portion a^5 of the head and the beveled edge or side of the point of the adjacent blank are formed by one cut, and this spur is in a position that requires the least deflection in order to bring it into the desired form of the brace, as shown in Fig. 5.

If the blank were originally cut in the form shown in Fig. 4 or in the form shown in Fig. 5, there would not only be necessarily a considerable waste of the material of the original stock, but also the grain of the brace a^{12} would run transversely thereof instead of longitudinally, as it does according to my method.

By my method the cost of manufacturing is reduced to a minimum and it is possible to put out these superior spikes commercially in competition with the old style of cheap spikes.

While I have herein explained my invention in its details, I do not intend to limit myself otherwise than as hereinafter expressed in the claims.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The herein-described method of forming a spike with a head having a laterally-extended brace, which consists in forming the spike-blank first with a spur approximately parallel with the length of the spike, and afterward and while in a heated condition turning the said spur away from the said body, and forming the brace by the flow of the metal from the head under swaging while still hot, substantially as described.

2. The herein-described method of forming a spike with a head having a laterally-extended brace, which consists in forming the body with a head portion having a spur approximately parallel with the said body, throwing the spur away from the body, and swaging the head portion to form the head, and the spur to form the brace, some or all of said steps being performed while the metal is in a heated condition.

3. The herein-described method of manufacturing the head of a spike, said method consisting in shearing the metal obliquely to the body of the blank, and providing a hook-like overhanging portion or spur adjacent the higher side of the head, heating the blank and deflecting the head relatively to the body, so that the said higher portion of the former will be in approximate alinement with the body, then swaging the head downward, causing the heated metal to flow away from the body in the direction of said overhanging portion, at the same time opposing a swaging resistance to the under side of the latter, substantially as described.

4. The herein-described method of manufacturing spikes, said method consisting in shearing the metal bar transversely, heating the sheared portion, then cutting the blank therefrom on the lines a^3, a^4, lifting the overhanging portion of the head and deflecting the latter forward into approximate alinement with the body of the spike, and centering the point of the spike, and then, while the metal is still in a heated condition, swaging the head downwardly, causing the heated metal to flow laterally and toward the back of the spike, substantially as described.

5. The herein-described method of manufacturing spikes, said method consisting in shearing the metal bar transversely, heating the sheared portion, then cutting the blank therefrom on the lines a^3, a^4, lifting the overhanging portion of the head and deflecting the latter forward into approximate alinement with the body of the spike, and centering the point of the spike, and then, while the metal is still in a heated condition, swaging the head downwardly, causing the heated metal to flow laterally and toward the back of the spike, and deflecting the extremity of the rear projection of the head, substantially as described.

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

HENRY H. CUMMINGS.

Witnesses:
ALEXANDER C. PROUDFIT,
FREDERICK L. EMERY.