(No Model.)

G. NIMMO.

Harrow-Tooth.

No. 228,551. Patented June 8, 1880.

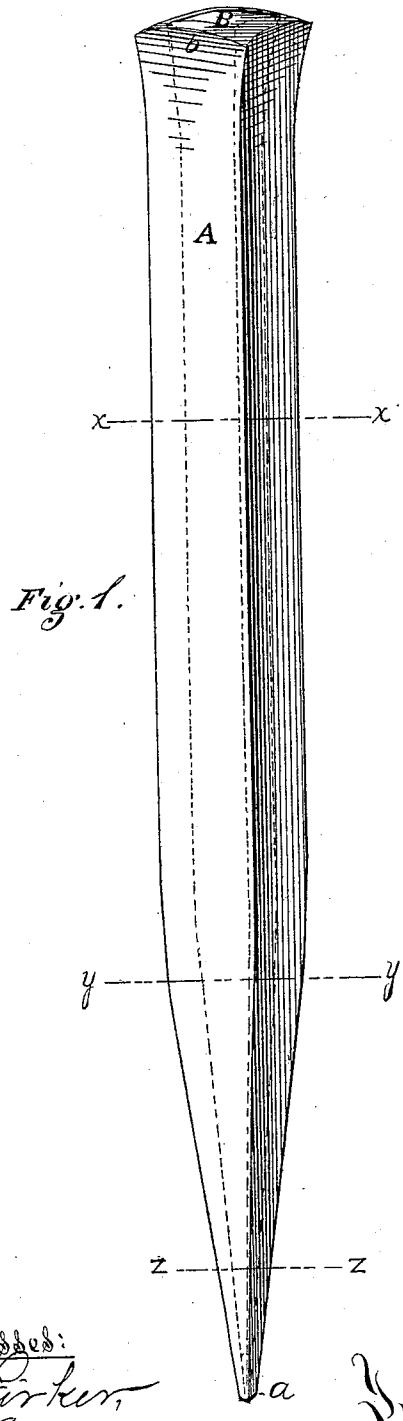

Fig. 1.

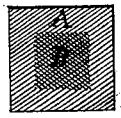

Fig. 2.

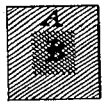

Fig. 3.

Fig. 4.

Witnesses:
C. L. Parker,
R. A. Whittlesey.

Inventor: George Nimmo,
By Attorney George H. Christy.

UNITED STATES PATENT OFFICE.

GEORGE NIMMO, OF ALLEGHENY, PENNSYLVANIA, ASSIGNOR TO HIMSELF AND HUGH McDONALD, OF SAME PLACE.

HARROW-TOOTH.

SPECIFICATION forming part of Letters Patent No. 228,551, dated June 8, 1880.

Application filed March 13, 1880. (No model.)

To all whom it may concern:

Be it known that I, GEORGE NIMMO, of Allegheny city, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Harrow-Teeth; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figure 1 is a perspective view of a harrow-tooth illustrative of my invention; and Figs. 2, 3, and 4 are transverse sectional views of the same, taken in the planes of the lines *x x*, *y y*, and *z z*, respectively.

My present invention relates to harrow-teeth; and it consists in making the same with an exterior plating of steel, of suitable grade for agricultural purposes, and a core or interior of iron, the two grades of metal being fused or welded into one body, and the iron core having a shape or form corresponding to the exterior of the tooth and extending through the entire length of the tooth from head to point.

My improved harrow-tooth may be made as follows: A billet or bar of iron, and by preference of fibrous iron, is provided, its length and size being limited with respect to the amount of steel added thereto and the extent of reduction desired in working. To the sides of such billet or bar I mold or cast (preferably cast) a body of steel in any of the known ways for securing a complete or welded union between the two grades of metal. This may be done by arranging the iron billet in the center of an ordinary steel ingot-mold of proper size for holding the requisite amount of steel in addition to the iron, and then pouring molten steel into the mold, filling the same around the iron core. The compound ingot thus made will have a fused or welded union between the two grades of metal, and upon being properly reheated such ingot may be drawn down by hammer or rolls, or both, the two grades of metal being drawn out equally until reduced to a size equal to the desired size of the body of the tooth. The bar thus made is then cut into blanks of proper length, and such blanks, being properly heated, are given an upset head, *b*, and a four-sided pyramidal point, *a*, by forging upon an anvil, or with suitably-shaped dies, or by means of suitably-shaped reducing and pointing rolls, as may be preferred, whereby the iron center B is given a pyramid form similar to that of the exterior of the tooth, and is drawn out with the steel exterior A, so as to extend through the entire length of the tooth from head to point.

All-steel harrow-teeth have been used heretofore, also teeth having an iron body and a steel point, giving, however, but a single grade of metal in cross-section of the tooth; but such teeth are all open to the objection that the steel part of the tooth when reduced to the proper size is very liable to break off if allowed to strike a solid obstruction, owing to the brittle or frangible nature of steel.

My invention is intended to overcome this difficulty or objection, and at the same time secure all the advantages peculiar to steel teeth, such as preventing the adhesion thereto of loam or soil, and also in the matter of wear, by making the inner core, B, of the tooth of tough iron, which is not liable to break, and extending the same through the entire length of the tooth, so as to be operative at any and all parts which may be subject to fracture. The point of the tooth is, of course, most liable to break, and by drawing down the iron core as I have described, so as to conform to the exterior of the tooth and extend to the extreme point, as represented by dotted lines, Fig. 1, and by cross-hatching in Figs. 2, 3, and 4, I secure the useful effects of the iron core at the place where it is most needed, and at the same time I secure an exterior plating of steel, which will prevent adhesion of soil and secure the advantages of steel in keeping the point sharp and in good working condition.

When, after long use, the point of my improved tooth has become dull or blunt by gradual wearing away, it may be reheated and again pointed or drawn down, as when first made, the iron point being drawn out with the steel coating or covering.

I do not wish to limit my invention to any particular thickness of steel upon the iron core; but I consider the relative sizes or

quantities illustrated in the drawings to be about that best adapted for soil having comparatively few rocks, stones, or like obstructions therein, the amount of steel shown being in ordinary use sufficient to give durability by resisting wear and preventing adhesion of soil, while the iron core will give the strength necessary to prevent breakage; and for all practical purposes I can secure these advantages to their full extent by the described combination of metals in the tooth, and still make the tooth comparatively small in cross-section, and consequently much lighter and cheaper than heretofore.

I am aware that agricultural irons having a steel center and an iron or comparatively soft surface have been used, the object being to secure a self-sharpening tool; but I do not claim such structure, as it does not embody my invention; neither is it adapted to secure the special advantages secured by my invention.

I claim herein as my invention—

A harrow-tooth having exterior sides of steel and an interior core of iron, such metals having a fused or welded union into one solid body, said iron core corresponding in form to the exterior of the tooth and extending through the length of the tooth from head to point, substantially as and for the purposes set forth.

In testimony whereof I have hereunto set my hand.

GEORGE NIMMO.

Witnesses:

R. H. WHITTLESEY,

C. L. PARKER.