No. 652,469. Patented June 26, 1900.

W. D. YOUNG.

HORSESHOE.

(Application filed Apr. 26, 1898.)

(No Model.)

Fig. 1.

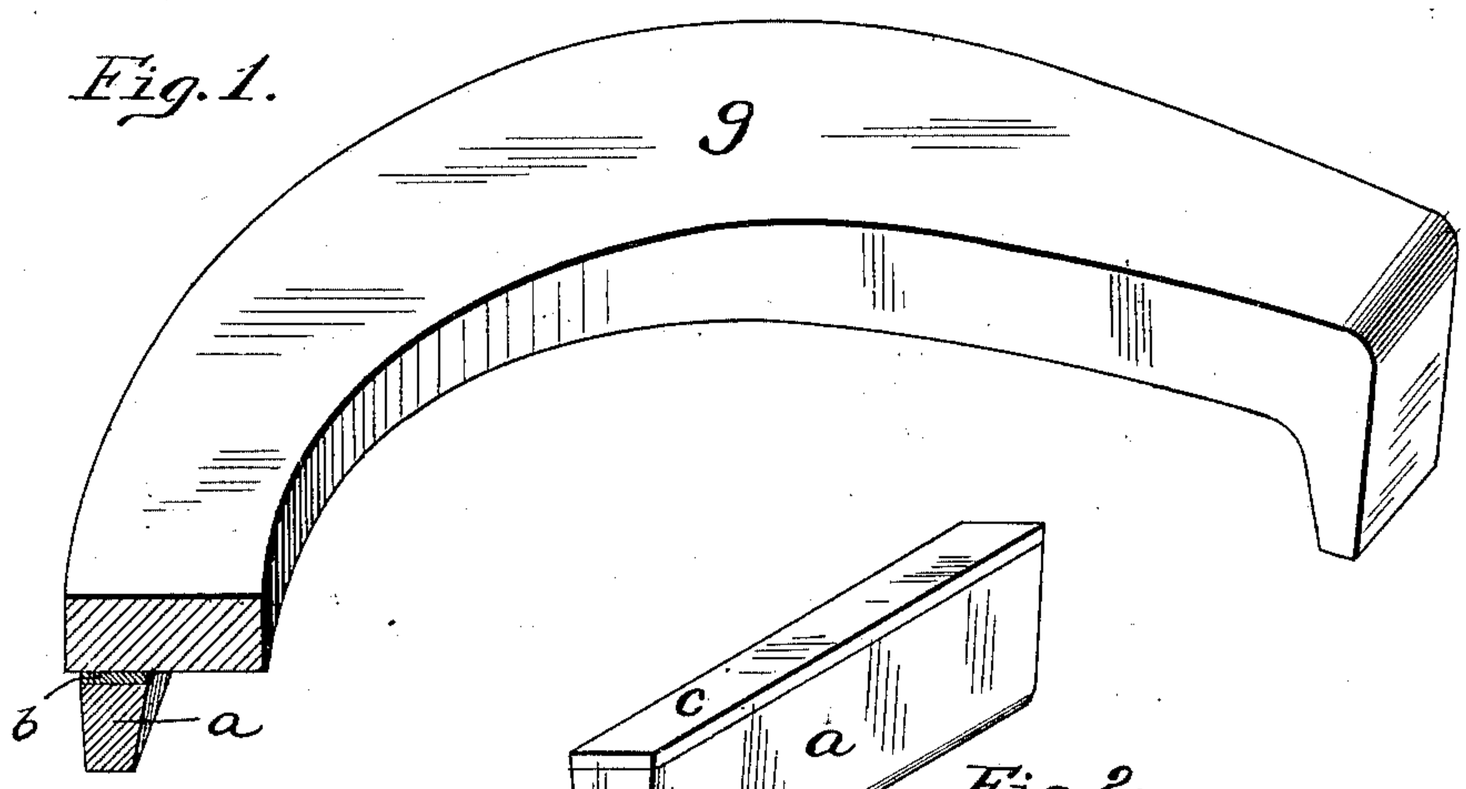


Fig. 2.

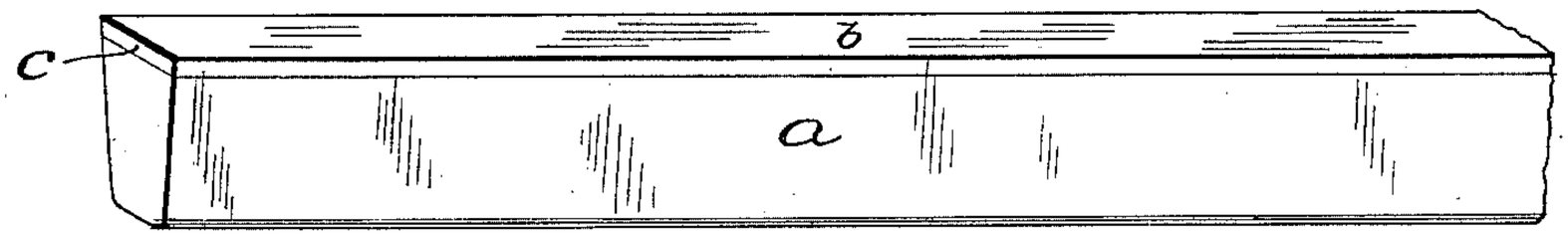
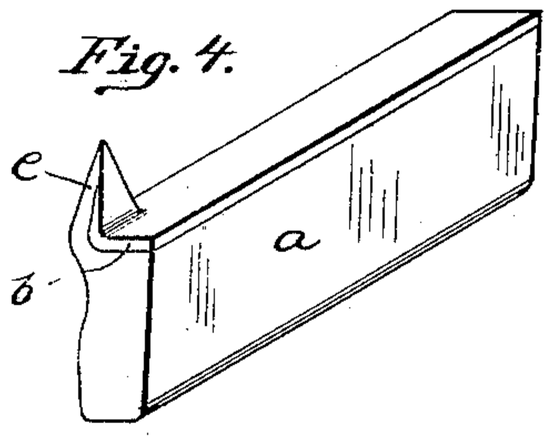


Fig. 3.

Fig. 4.



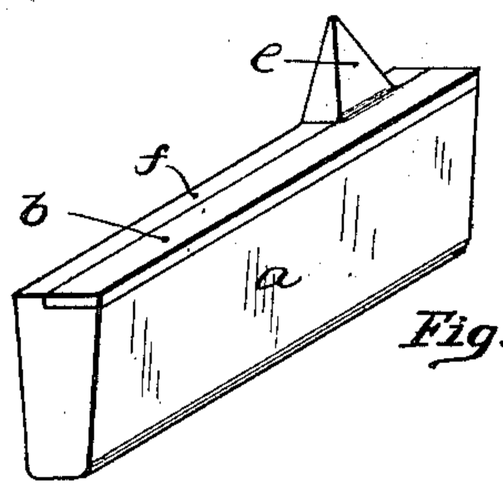


Fig. 5.

Fig. 6.

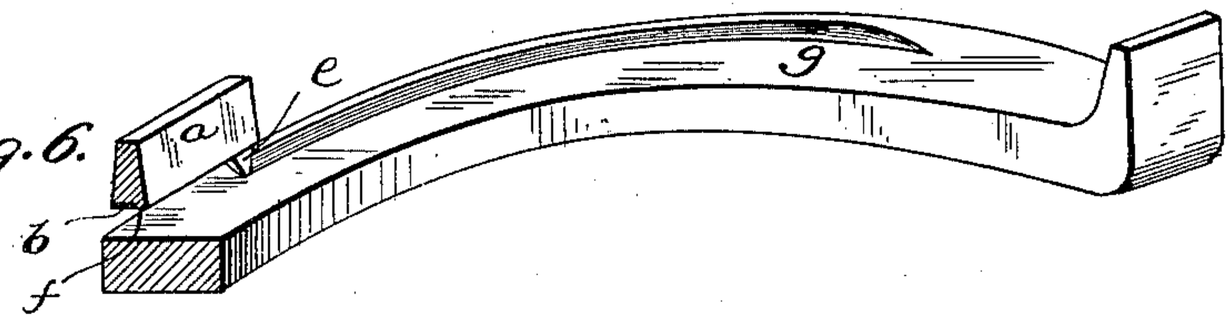
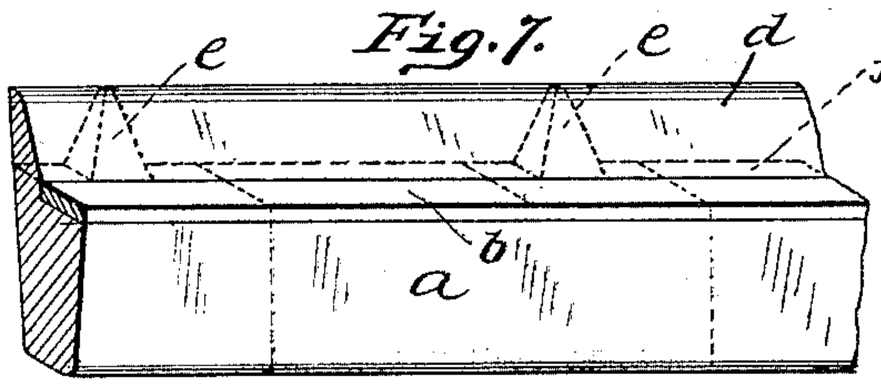


Fig. 7.



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Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM D. YOUNG, OF CHARTIERS, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE AMERICAN STEEL AND WIRE COMPANY, OF NEW JERSEY.

HORSESHOE.

SPECIFICATION forming part of Letters Patent No. 652,469, dated June 26, 1900.

Application filed April 26, 1898. Serial No. 678,860. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM D. YOUNG, a resident of Chartiers, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Toe-Calks; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to horseshoes and the toe-calks to be used therewith. These horseshoes are now generally made by machinery, and the custom has been to make them of iron or of very soft steel, because while the heel-calks of the shoe can be bent down out of the body it is necessary to weld the toe-calk to the shoe, and with any steel it is more difficult to obtain a perfect weld than in welding iron to iron or iron to steel and the higher the carbon of the steel the more unreliable is the weld. It is well known, however, that it is desirable to use a sufficiently-high carbon-steel in the toe-calk to temper or harden, because such toe-calk is subjected to great wear and the wearing qualities of the higher carbon-steel are much superior either to iron or to the extremely-soft steel now employed.

My invention has for its object to provide a toe-calk for the shoe in which it is possible to employ a higher carbon-steel and yet at the same time form a permanent weld between the toe-calk and the steel body of the shoe, and for this purpose I form the toe-calk with a steel body and with a surfacing of wrought-iron on one edge or face thereof to facilitate the welding of such calk to the horseshoe.

My invention also comprises certain other improvements which will be hereinafter more particularly set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a sectional perspective view showing the shoe with the toe-calk secured thereto, the section indicating the different metals and their relative positions. Fig. 2 is a perspective view of the bar from which the toe-calk is made, showing at the end thereof the distribution of the metal. Fig. 3 is a view of the toe-calk bar. Figs. 4 and 5 are views of the calks having prongs. Fig. 6 shows the pronged blank in position for welding, and Fig. 7 is a view of the ribbed toe-calk bar from which pronged toe-calks are formed.

Like letters indicate like parts in each of the figures.

In employing my invention I prefer to form the toe-calk bar and the calks produced therefrom with a body of comparatively-high carbon-steel which has from three to four tenths of one per cent., employing for the purpose a steel which can be tempered, and the only limit as to hardness being as to the brittleness of the steel and the practicability of producing the bar from which the toe-calks are to be formed. While of course the body of the bar may be formed from a lower carbon-steel, still for practical purposes steel of about the carbon indicated is desirable.

On one edge or face of the body *a* of the bar and the toe-calk cut therefrom I form a thin surfacing, as at *b*, of wrought-iron, that surfacing being generally preferably about one-eighth of an inch in thickness and such surfacing being united to the body of the bar or toe-calk by fusion, so as to form a permanent union therewith. This surfacing of wrought-iron can be made to extend either entirely over one edge or face of the bar, as shown in Fig. 2, or only over part of one edge thereof, as shown in Fig. 5. Where the toe-calks are sold in bar form—that is, where the blacksmith buys the bar and cuts the toe-calks therefrom—it is preferred that the surfacing of wrought-iron shall extend entirely over one edge or face of the bar, as at *c*. Where the calks are cut from the bar at the factory ready for use, it is very desirable that such toe-calks shall have a prong on the body thereof which can be driven into the body of the shoe and hold the calk in place on the shoe when it is heated in the forge and before it is welded to the shoe-body. As these shoes are formed of steel, though it be comparatively soft, it is found that even when the shoe is heated before the calk is applied the heated steel will bend over the cold prong on the toe-calk if it is formed of wrought-iron, the wrought-iron prong not being sufficiently stiff to drive into the steel. In order to provide for this difficulty, I form the prong on the toe-calk of steel, so that it will be sufficiently stiff to drive into the heated steel shoe, and I may accomplish this in two ways.

To provide such prong, I may either form the bar with the wrought-iron surfacing extending entirely over one edge or face and then force upwardly from the steel body at one end of the calk a prong *e*, as shown in Fig. 4, or I may roll the bar with a rib *d* of steel on part of one edge thereof and form the surfacing *b* of wrought-iron extending over the remainder of such edge, as shown in Fig. 7. I then shear off the rib portion *d*, so as to form one or more prongs *e* of steel extending up from the toe-calk. The toe-calk as so produced has therefore the steel prong *e* and part of its edge *f* of steel—that is, where the rib has been cut away to form the prong *e*—while the remainder of its edge has the surfacing of wrought-iron. When such toe-calk is to be secured to the steel shoe-body *g*, the shoe is heated and the toe-calk placed over the shoe in the position in which it is to be welded, and the steel prong *e* of the cold toe-calk is driven down into the heated steel body of the shoe. This brings the toe-calk into position for welding, and the shoe is then inserted in the forge-fire and raised to the welding heat, when the wrought-iron surfacing on the steel body of the toe-calk will form a perfect weld with the steel body of the shoe, and where part of the edge is of steel, as at *f*, such wrought-iron surfacing will also aid in uniting the exposed portion *f* of the edge with the shoe-body through the running or flow of the molten wrought-iron provided in the iron surfacing of the portion of the edge of the toe-calk. In this way a practically-perfect welded union is provided between the toe-calk and the shoe-body and a permanent union formed by means of the wrought-iron surfacing on the toe-calk, which will weld readily to the steel shoe-body, and as it has been united by fusion to the steel toe-calk body it forms a thin layer of wrought-iron interposed between the steel shoe and steel toe-calk and a practically perfect and permanent union between the two.

In case it is not desired to employ the prongs *e* on the toe-calks the surfacing of wrought-iron extends over the entire edge of the blank, as at *c* in Fig. 2, and in such case the toe-calk is heated either while in bar form or after it is cut into short lengths to form individual calks thereof, and the toe-calk and the shoe are brought to a welding heat, the wrought-metal surfacing of the toe calk placed in contact with the shoe-body, and the two welded together, it being found that a practically perfect and permanent union can be formed between the steel toe-calk and the steel shoe-body in this way.

In the manufacture of the bars from which the toe-calks are produced in case the surfacing of wrought-iron is to extend entirely over the edge of the steel body in preparing for the rolling of the bar a thin slab of wrought-iron is secured on the bloom or billet forming the main body portion, and the two are placed in the heating-furnace and raised to such high heat that the wrought-iron and the steel will be united by fusion when first passed through the rolls. This requires such a heat that a very high carbon would be burned and rendered useless, so that too high a carbon-steel cannot be used. In the forming of a toe-calk bar, such as illustrated in Fig. 7, from which the pronged toe-calk is to be made in preparing the pile for rolling a thin wrought-metal slab is secured only on one side of the edge of the bloom or billet, leaving the other side of the edge exposed, and as the blank is rolled to shape the steel rib *d* is raised from the body thereof, while the wrought-iron forms the edge beside such rib, and the ribbed portion can then be cut away to form the prong, as above described.

It is found that in the shoes produced having toe-calks embodying the above features, while a practically perfect and permanent union can be made between the steel toe-calk and the steel shoe-body, the steel in both the toe-calk and the shoe-body can be of higher carbon and therefore of greater wearing qualities than has heretofore been found practicable and that the steel of the toe-calk can be of sufficiently-high carbon to be tempered and hardened and therefore have very high wearing properties.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A toe-calk for horseshoes formed of a composite rolled body having its main portion of steel and having on one edge or face thereof a surfacing of wrought-iron to facilitate welding to the shoe-body, substantially as set forth.

2. A toe-calk for horseshoes formed of a composite rolled body having its main portion of steel and having on one edge or face thereof a surfacing of wrought-iron to facilitate welding to the shoe-body, and having a steel prong for driving into the shoe-body, substantially as set forth.

3. A toe-calk for horseshoes formed of a composite rolled body having its main portion of steel and having on a portion of one edge thereof a surfacing of wrought-iron to facilitate welding to the shoe-body and the remainder of such edge of steel, and having on said edge a steel prong for driving into the shoe-body, substantially as set forth.

4. A horseshoe having a steel body portion provided with an exposed bottom face of steel and a steel toe-calk, and having a thin layer of wrought-iron rolled with one of said bodies and interposed between the two and united to one of them by welding, substantially as set forth.

In testimony whereof I, the said WILLIAM D. YOUNG, have hereunto set my hand.

WILLIAM D. YOUNG.

Witnesses:

JAMES I. KAY,

ROBERT C. TOTTEN.