

(No Model.)

2 Sheets—Sheet 1.

H. T. RUSSELL.

DIE FOR MAKING OX SHOES.

No. 307,145.

Patented Oct. 28, 1884.

Fig 1.

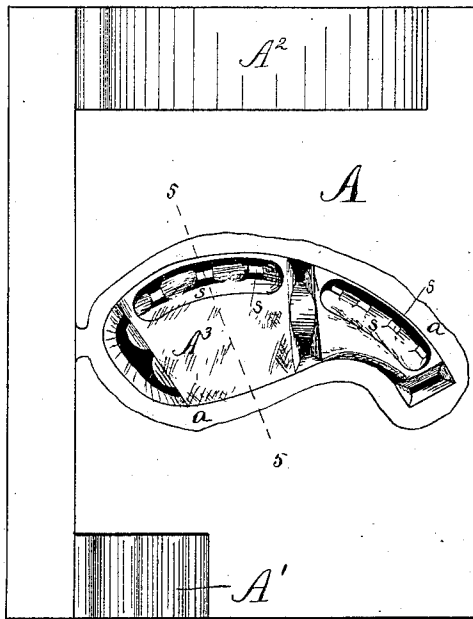


Fig 2.

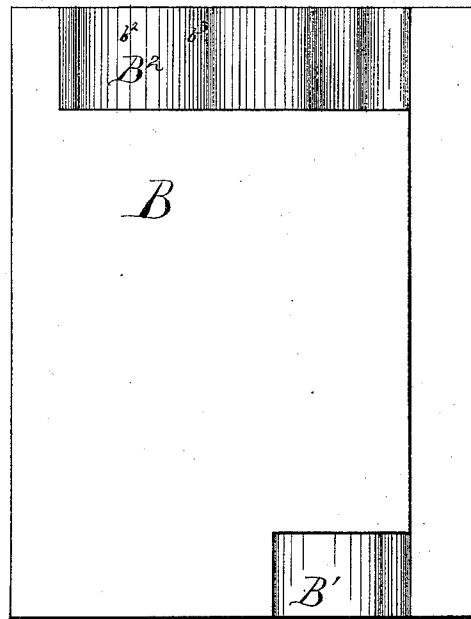


Fig 3.

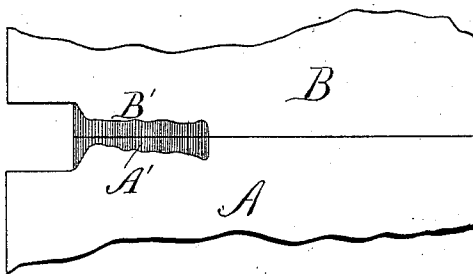


Fig 4.

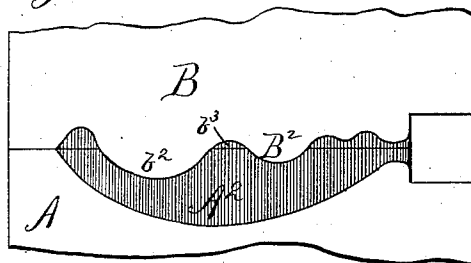


Fig 5.

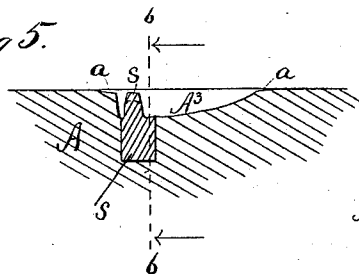
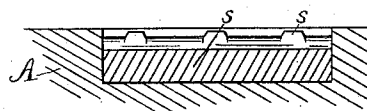


Fig 6.



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(No Model.)

2 Sheets—Sheet 2.

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Fig 7.

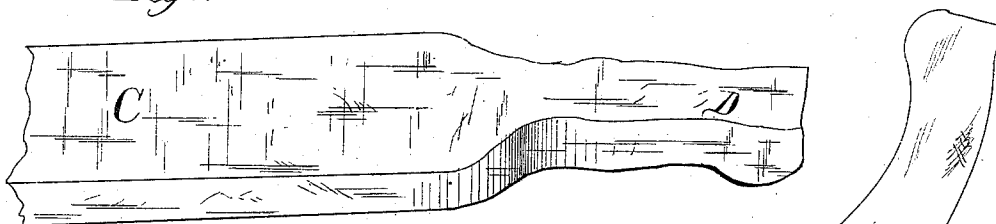


Fig 8.

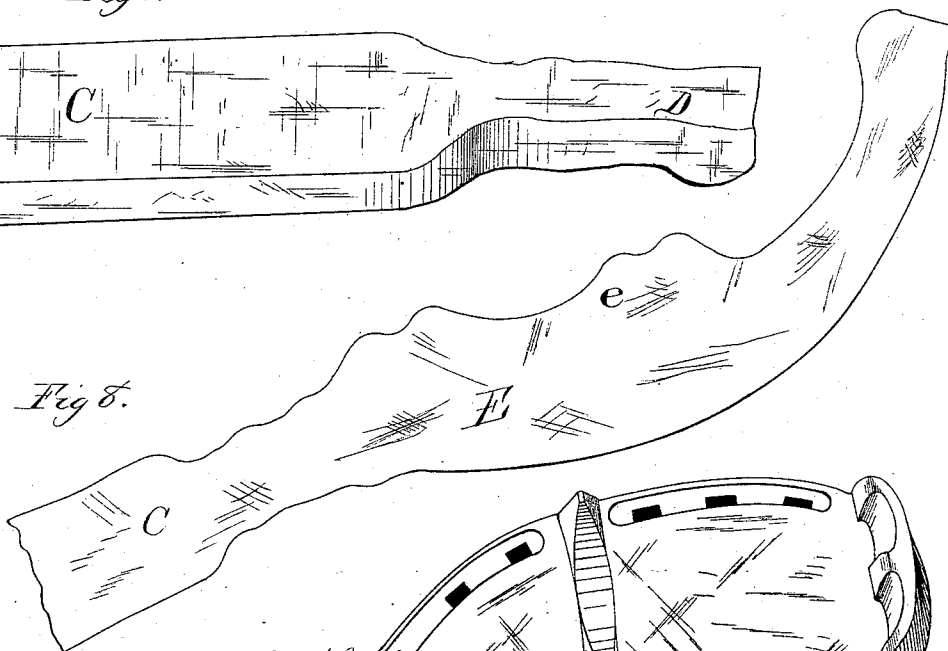


Fig 10.

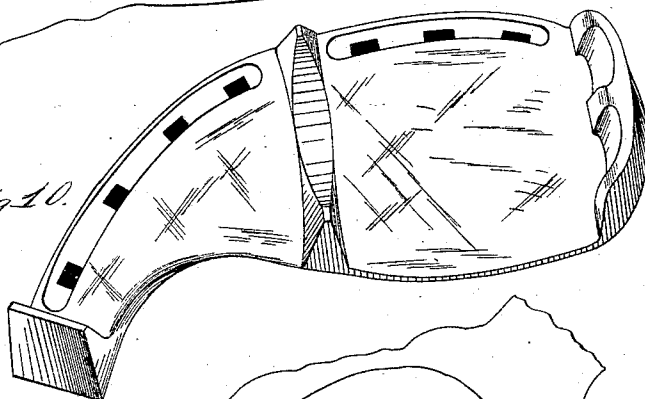
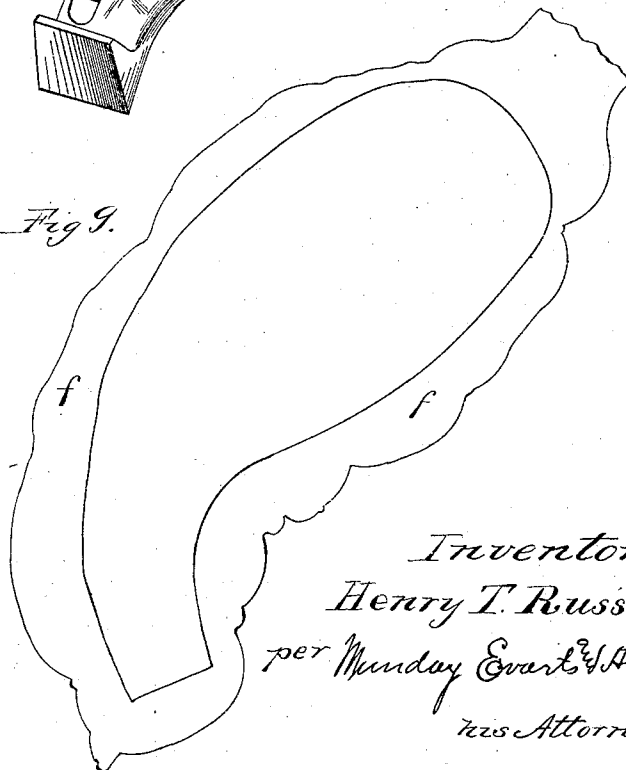


Fig 9.



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UNITED STATES PATENT OFFICE.

HENRY T. RUSSELL, OF CHICAGO, ILLINOIS.

DIE FOR MAKING OX-SHOES.

SPECIFICATION forming part of Letters Patent No. 307,145, dated October 28, 1884.

Application filed December 17, 1883. (No model.)

To all whom it may concern:

Be it known that I, HENRY T. RUSSELL, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in the Art of Manufacturing Ox-Shoes, of which the following is a specification.

An ox-shoe is peculiarly formed. It is wide at the heel and narrow at the toe. The toe portion is curved laterally toward the opposite half of the hoof. The wide portions of the shoe are thick upon the outer side, and taper to a thin edge at the inner side. The outer edge is convex, the inner concave. The most approved form of the shoe is provided with a wide calk around the heel, a narrow one at the toe, and one or more intermediate ones at the center. The difficulty in the forging by machinery of shoes of this character is in obtaining of a sufficient amount of stock in the extra thick portions of the shoe—as, for instance, in the various calks. This difficulty will be readily understood by those conversant with the art, and the only way heretofore known by which such a shoe could be machine-forged was by subjecting a large amount of metal to be operated upon in addition to the amount required by the shoe alone. This, however, is very undesirable, as it consumes stock at a rate ruinous to the profit of the business, leaving a thick fin surrounding the shoe at the end of the forging. By reason of this difficulty in forging, manufacturers have resorted to casting the shoes of malleable iron, which, however, produces an inferior shoe. To reduce the surplus metal to such a point as will render the manufacture of the shoes by machine-forging profitable and practicable is the object of the present invention, and I accomplish it by first producing from the stock a blank so shaped as to present a large amount of metal in those parts from which the calks and other thick portions of the shoe are to be formed, and a less amount in other parts from which the light portions of the shoe are made, and then subjecting such blank to the action of finishing-dies.

The invention further consists in the several steps or operations involved in the formation of the shoe from bar metal, as hereinafter set forth.

In the accompanying drawings, which form a part of this specification, and in which similar letters of reference indicate like parts throughout the several figures, Figures 1 and 2 are respectively face views of the upper and lower die-plates. Figs. 3 and 4 are elevations of opposite sides of the die-plates as they appear when brought together. Fig. 5 is a vertical section of the lower finishing-die upon the line 5 5 of Fig. 1. Fig. 6 is a partial vertical section upon the line 6 6 of Fig. 5, showing the removable nail-hole forming portion of the die, a transverse section of which is given in Fig. 5. Figs. 7, 8, 9, and 10 show the shoe in the various stages of its formation, Fig. 9 showing the upper and Fig. 10 the under side of the shoe.

In said drawings, A represents the lower plate, upon which the under part of the several sets of dies are formed; and B represents the upper or opposing plate, having the upper dies. The latter plate is preferably attached to or a part of a drop-hammer.

The shoes are preferably formed from bar iron or steel C, rectangular in cross-section, a portion of which, about half the length required for a shoe, is first placed edgewise between the dies A' B' and subjected to compression therein. This results in a narrowing and thickening of the part exposed, and is illustrated at D, in Fig. 7. The next operation is designed to impart in great measure the rounded outer edge formation, and to bend the toe edgewise around to the required position. At the same time I accumulate an extra amount of the metal at the center for the center calks. This second operation consists in subjecting the part D and enough more of the bar to complete the blank in the edgewise position to the action of the dies A² B², the conformation whereof is clearly given in Figs. 1, 2, and 4, one of them, A², having the rounded concave conformation agreeing with the outer edge of the shoe, and the other an irregular face, the chief feature whereof is the convex projection b², by which the toe is bent laterally to the body of the shoe. A cavity at b² allows the accumulation of metal at the center near the location of the intermediate calks. The result of this operation is the formation of a blank, E, (illustrated in Fig. 8,) e

representing the increase of metal at the center. These two operations are initial to the finishing operation now to be described, and are intended to produce a blank from which the completed shoe can be forged to the best advantage and with the least waste of stock; and of course I do not prescribe said preliminary operations as the only ones by which such a blank can be formed. They are specially adapted to the forming of the blanks from rectangular bar metal; but if square metal is used the dies would only require obvious changes, and it may be that both operations can be combined, or the metal be rolled into the proper form. At the next operation not only is the outline of the shoe filled out, but the wearing-face thereof is also completed ready for the shoer, with the necessary calks, nail-grooves, &c. This is done by placing the blank flatwise over the deep side of the die A³, (which has the shape of the under surface of the finished shoe,) and subjecting it to blows from the flat opposing surface of the hammer-face B. Under the impact of these blows the metal spreads out horizontally in all directions and enters every recess of the die, forming the complete shoe, and a substantially uniform fin, *f*, around its edge.

As the die A³ is intended to admit all the stock required by the shoe, the fin represents the surplus metal operated upon, and to allow room for this surplus the face A is cut away around the die A³ to a slight extent, as shown at *a*. By the preliminary operations, the bulk of the stock having been brought to the points where it is required to completely form the calks and the thick parts of the shoe by the finishing-die, it is easily spread out to the horizontal dimensions and caused to fill every part of said die with only a thin film of surplus metal. After being taken from the die A³, the fin is removed by any suitable means, preferably by a punch having the outline of the shoe, and which will punch it from out the surrounding fin.

I find it possible to perform all these operations successively and quickly with one heating of the stock, though I prefer to reheat just before the finishing operation in the die

A³, as it is important that the stock possess a fair degree of ductility to ease the operation and avoid injury to the die. Other means for prolonging the usefulness of said die may also be adopted, such as subjecting the blank to compression in a die having the outlines of the shoe, and approximating its configuration in other respects just before it is placed in the die A³. This, however, is a matter which may be left to the judgment of the manufacturer, as subjecting the blank after it is brought to the shape of Fig. 8 to a number of blows in die A³ will obviously bring about the same result, so far as the shoe is concerned, as would be obtained by first subjecting the blank to a portion of the compression in an unfinished die of the kind mentioned.

It will be noticed that the projections on the parts *s* of said die A³ extend almost to the level of the top of the die-plate, leaving in the shoe only a thin and easily-punched web at the points where the nails are to be driven. These parts *s* are subjected to severe wear by the action of the metal, chiefly due to the forcing of it over said points toward the thin side of the shoe, and are often broken. This part of the die needs replacing more often, therefore, than the other parts; and hence I make it separate from the remainder, recessing the die to receive and support it, as illustrated in Figs. 5 and 6, so it may be readily removed and a duplicate be inserted in its place whenever required. If not made thus separate, the entire die would need replacing whenever this single part was worn out or broken.

I claim—

1. The die A³, recessed to receive and support the removable portion *s*, in combination with the latter, substantially as and for the purpose specified.

2. The combination of dies A' B' with dies A² B², the same being constructed substantially as shown, and adapted to produce the blank E.

3. The combination of dies A' B' A² B² and A³ B, substantially as specified.

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Witnesses:

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