Jan. 12, 1937. H. F. JOHNSON ET AL 2,067,269

METHOD OF MAKING TRACTOR SHOES AND SIMILAR ARTICLES

Filed June 1, 1931

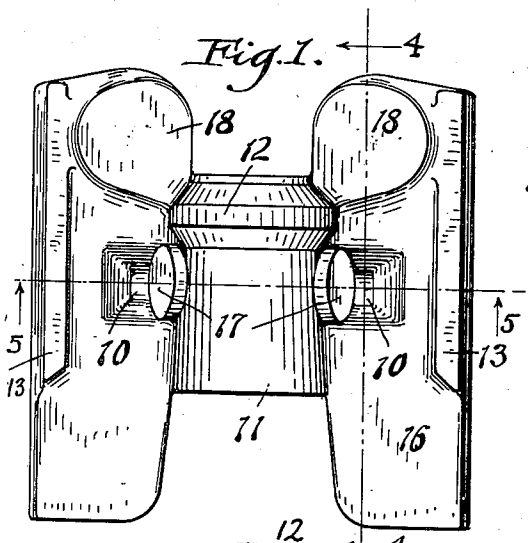


Fig. 1.

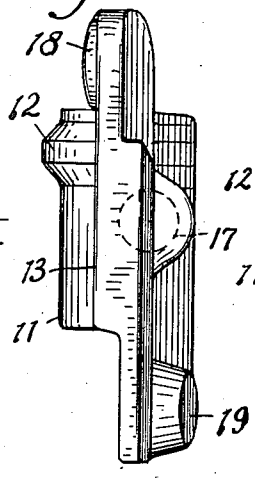


Fig. 3.

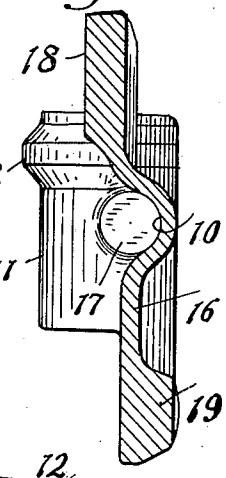


Fig. 4.

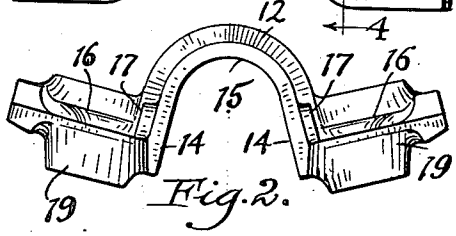


Fig. 2.

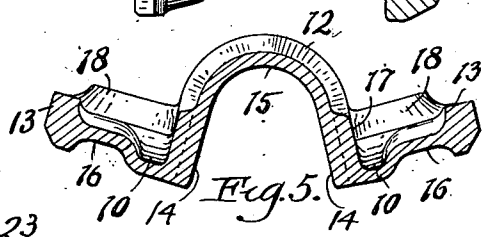


Fig. 5.

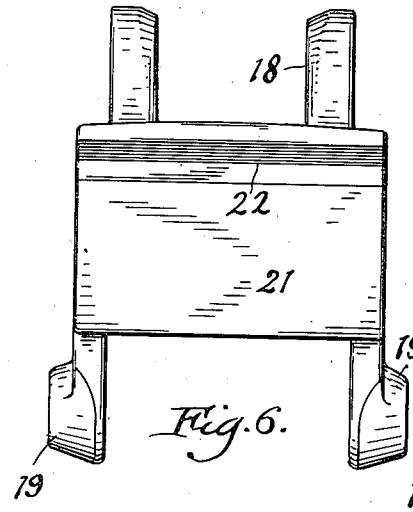


Fig. 6.

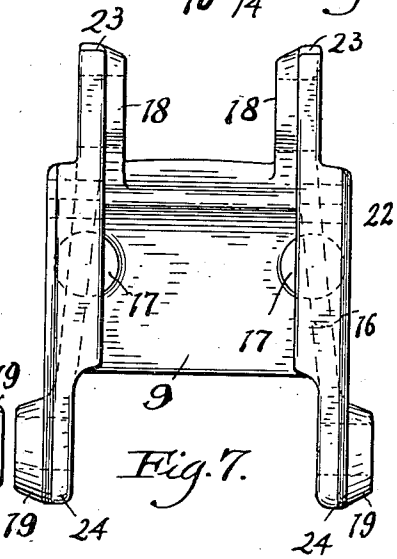


Fig. 7.

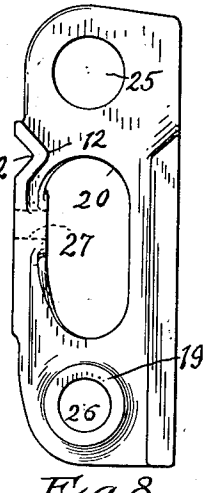


Fig. 8.

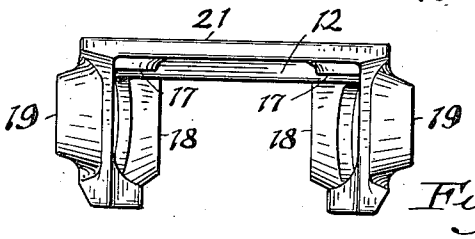


Fig. 9.

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METHOD OF MAKING TRACTOR SHOES AND SIMILAR ARTICLES

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Application June 1, 1931, Serial No. 541,154

3 Claims. (Cl. 29—148.3)

This invention relates to a method of making tractor shoes and similar articles, that is articles of channel shape approximately which, on account of their form, cannot be forged by ordinary methods.

Heretofore it has been the practice to make track shoes for track laying tractors of steel castings, but on account of air holes and other imperfections which are extremely difficult to avoid, such cast shoes are subject to breakage and the delays in the operation of the tractors resulting from such breakage are expensive and annoying. Applicants, conceiving the idea that these shoes might be forged in spite of their shape, after considerable experimentation have evolved a method for forging them, thereby eliminating the difficulties previously experienced with cast shoes.

One of the objects of the invention therefore is the provision of a method of forming tractor shoes and the like by a forging process.

Subsidiary objects are, the formation of square corners without weakening cracks, the accurate and easy centering of the forged blank in operations following the primary operation, the formation of indentations for this purpose in portions of the blank which are later to be removed as cut-outs, and the formation of these indentations in connection with the forging of bosses on the central portion of the blank whereby the surfaces of such bosses are kept smooth and require no machining.

Other objects and features of novelty will appear as we proceed with the description of those embodiments of the invention which, for the purposes of the present application, we have illustrated in the accompanying drawing, in which

Figure 1 is a top plan view of a trimmed blank representing one stage or step in the method.

Fig. 2 is an end view of the same.

Fig. 3 is a side elevation of this blank.

Fig. 4 is a longitudinal sectional view taken substantially on the line 4—4 of Fig. 1.

Fig. 5 is a transverse section taken substantially on the line 5—5 of Fig 1.

Figs. 6 and 7 are top and bottom plan views respectively of the final blank.

Fig. 8 is a side elevation of the finished shoe, that is after the bearing holes have been formed therein, and

Fig. 9 is an end elevation of the same.

In carrying out the method of this application, we start with a block or other mass of heated metal of proper size, and place it between dies in a forging machine, these dies forming a rough blank not illustrated in the accompanying drawing. However in this first forging operation we form in the side members of the blank adjacent the central portion a pair of indentations 10, of which we make use in the succeeding steps of the method for the purpose of centering the blank in the dies. That is to say each pair of dies is provided with complementary projections and sockets to accommodate these indentations.

Ordinarily we perform the blanking in two separate steps, although obviously the invention is not to be limited in that respect. After the blanking operation is completed, whether it be in one or two steps, the blank is placed in a trimming die, by means of which the waste metal all around the blank is cut off. Fig. 1 illustrates the condition of the blank after this trimming operation is performed. It then comprises a central crowned portion 11 having a rib 12 formed therein, and a pair of wings or side members 13 which include the indentations 10. The central portion 11 has substantially flat areas 14 along its edges which merge with an intermediate part 15 that is preferably curved, as indicated in Figs. 2 and 5, but may be composed of a series of flatted elements if desired; for example it may be made as a part of a hexagon or an octagon.

The flat parts 14 of the crowned central portion of the blank are inclined outwardly to an extent, as shown in Figs. 2 and 5, and the side members 13 of the blank extend outwardly from the parts 14 of the central portion at an angle of 90° substantially, this being the desired angle between the central and side members of the finished article, so that when the forged blank is completed the joint between the side members 13 and flat parts 14 of the central member is not disturbed thereafter, that is during the bending operation, and no tendency to crack along the line of this joint develops.

It will be noted that the main web 16 of each side member 13, except at the depression 10, sets back from the outer edge of the flat part 14 of the central crowned member. A boss 17 is formed on the convex side of the crowned member approximately in line with each web 16. By depressing the web opposite the boss 17 we are enabled to provide a flat surface for the boss 17 without any machining operation. If, on the contrary, the web 16 had been permitted to traverse the boss 17, that portion of the web being removed later, a fin would have been left across the face of the boss. Hence the depressions 10 accomplish two important results, first they afford a means for quickly and easily centering the blanks

in the operations following the first forging operation, and secondly they make possible the formation of smooth faces entirely across the bosses 17.

Each of the side members 13 has a boss 18 on one end thereof facing in one direction, and a boss 19 on the opposite end thereof facing in the other direction, these bosses constituting bearing bosses in the finished article, as will later appear.

When the trimmed blank shown in Figs. 1 to 5 inclusive has been completed, the next step is to form cut-outs in the side members 13, these cut-outs including the depressions 10. This is accomplished in a punching operation, the blank being held between dies during this operation. The condition of the blank following the punching operation is not illustrated herein, but it is substantially the same as the blank shown in Figs. 1 to 5 inclusive, except for the cut-out portions, and these correspond to the cut-outs 20 illustrated in Fig. 8. While we prefer to form these cut-outs in a separate step of the method, it is readily apparent that the trimming and punching operations might in some cases be performed simultaneously. Hence we do not wish to be understood as limiting ourselves in this particular.

Now, with the trimmed and punched blank completed, we are ready to proceed with the bending or folding up of the blank from the condition shown in Figs. 1 to 5 inclusive to the condition illustrated in Figs. 6 and 7. We have not illustrated, nor do we desire to depend herein upon any specific means for accomplishing this bending operation. Preferably the blank is placed in a press over a form which extends up into the space enclosed by the crowned part of the blank, this form being adapted to yield or retreat as the upper jaw of the press descends. The crowned portion 11 of the blank is thereby pressed out flat so as to have a flat exterior surface 21 with a groove 22 therein opposite the rib 12, and an inner surface 9 which is also flat except for the bosses 17 and the rib 12. When the crowned portion is flattened out the side members 13, which are at right angles to the flat parts 14 of the central portion, naturally assume positions perpendicular to the flattened central portion, so that the resulting article is roughly channel shaped, with projections 23 extending longitudinally in one direction and projections 24 extending longitudinally in the opposite direction, the projections of each pair being spaced apart just sufficiently so that the projections 23 of one shoe will fit nicely within the projections 24 of the next adjacent shoe.

While it may be possible, under certain circumstances, to conclude the formation of the blank with the step just described, we prefer to use a final operation termed "setting", which consists in opening up a collapsible die between the side members 13 of the forging and then moving lateral abutments inwardly against the exterior surfaces of these side members, whereby they are brought into exact angular relation with respect to the flat central part of the shoe and made precisely parallel to each other.

In order that the various shoes may be articulated together, the projections 23 with their bosses 18 have aligned openings 25 formed therein, and the projections 24 with their bosses 19 have aligned openings 26 formed therein. When the track is assembled, the openings 25 of one shoe are caused to align with the openings 26 of the next shoe, and a pivot pin or bolt (not shown) is projected through the aligned openings and secured in place.

It will be seen that the convex side of the crowned portion 11 becomes the inner part 9 of the finished shoe, with the bosses 17 thereof facing the cut-outs 20 in the side members 13. The shoes may be used in the form shown in Figs. 8 and 9, but if desired steel or other wear plates (not shown) may be secured upon them over the surfaces 21. In that event holes 27 are drilled in the bosses 17 for the reception of fastenings, by means of which such plates are mounted in position.

In the foregoing description we have necessarily gone somewhat into detail in order to explain fully the particular embodiments of the invention herein illustrated, but we desire it to be understood that such detail disclosures are not to be construed as amounting to limitations, except as they may be included in the appended claims.

Having thus described our invention, we claim:

1. A method of making channel-shaped forgings, which comprises forging a blank with a central crowned portion and a pair of side members extending outwardly therefrom, said side members having indentations therein for centering the blank upon a die used in a succeeding step, trimming the blank, cutting out portions of the sides including said indentations, and bending the crowned portion thereof into flat form.

2. A method of making a channel-shaped forging with cut-outs in its side members, which comprises forging a blank with a central crowned portion and a pair of side members extending outwardly therefrom, said side members having indentations therein for centering the blank upon a die used in a succeeding step, each of said indentations corresponding in position to a portion of one of said cut-outs, trimming the blank and forming said cut-outs, and bending the crowned portion of the blank into flat form.

3. A method of making tractor shoes which comprises forging a blank with a central crowned portion and a pair of side members extending outwardly therefrom, said central crowned portion having a pair of bosses formed thereon substantially in line with the side members and said side members having indentations therein adjacent said bosses, trimming the blank and cutting out portions of the side members including said indentations, and bending the crowned portion of the blank into flat form.

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