

Feb. 27, 1934.

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1,948,544

TOOL FOR FORMING AXLE HOUSINGS

Filed Nov. 24, 1930

2 Sheets-Sheet 1

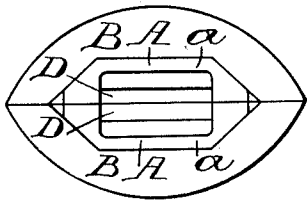


Fig. 1.

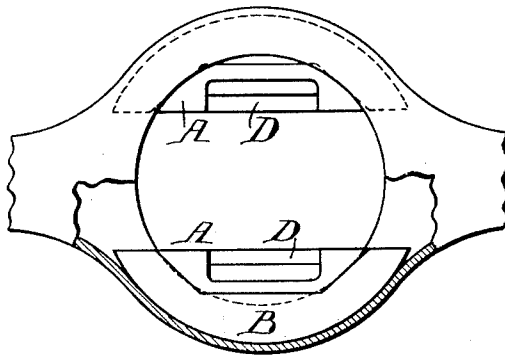


Fig. 4.

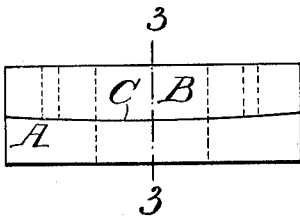


Fig. 2.

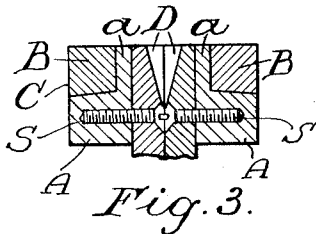


Fig. 3.

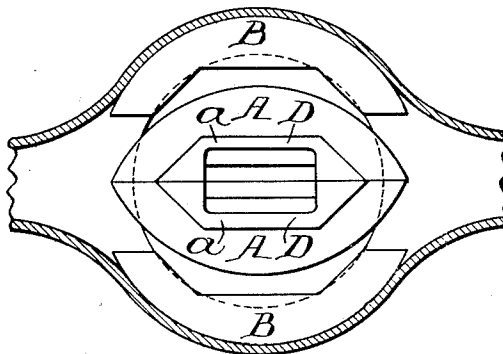


Fig. 5.

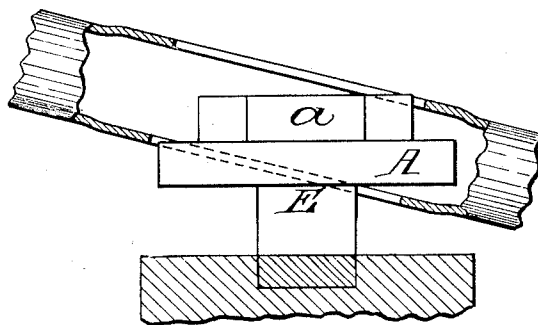


Fig. 6.

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Fig. 7.

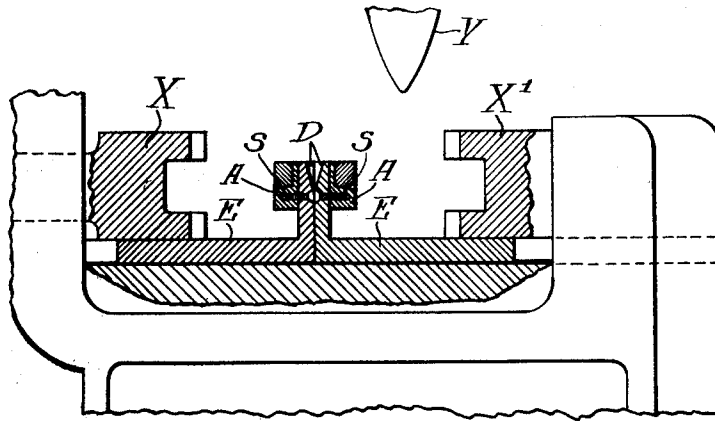
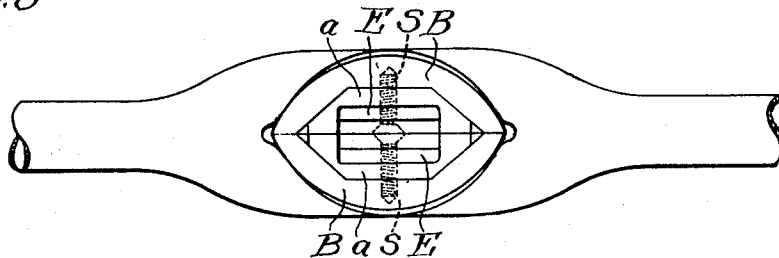


Fig. 8



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UNITED STATES PATENT OFFICE

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TOOL FOR FORMING AXLE HOUSINGS

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4 Claims. (Cl. 153--48)

This invention relates more especially to rear axle cases for motor vehicles in which a "banjo" or annulus with side flanges is pressed up from a slotted metal tube; but relates also to other articles having a similar formation.

In the formation of articles of the above kind, two opposite longitudinal slots have been formed in a metal tube and the slots spread somewhat with suitable tools. The article is then placed over a pair of internal forming or spreading tools shaped to correspond with the internal contour of the finished banjo; and these tools are then pressed or drawn apart bringing the banjo to approximate shape and flanging the edges. After this operation, if the tools are made of a length which approximates to the internal diameter of the banjo, great difficulty is experienced in removing the article from the tools, owing to the formation of the flanges thereof, as the internal diameter of each flange will usually then be less than the length of the tools, and furthermore the contour of the flange is usually irregular until machined. Heretofore, in order to avoid this difficulty, the tools have had to be shortened somewhat, and this of course impairs the shape of the banjo.

The object of this invention is to provide a form of tools which will allow of their being longer than has heretofore been possible.

According to one feature of this invention each tool is formed in two parts, the division being at about the mid-plane of the tool. The one part may consist of a base portion of the full contour of the tool as seen in plan and extending to about half the height thereof and also of a mid portion extending the full height of the tool. The other or upper part partially surrounds the mid portion of the lower part and makes up the complete tool. It is preferred that the dividing surface between the two parts of a tool be slanted downwardly and outwardly. In using the tools, when the spreading operation is complete, the main part of each tool is withdrawn towards the axis of the article and this leaves the loose parts behind to a more or less degree and this reduces the height of the tools at the margins. Owing to this the article can be moved endwise in relation to the tools, the flange of the banjo passing at one end under the tools to some extent. The other end can then be tilted up to clear it from the tools and the article then moved back endwise when it comes away entirely free. The part of each tool which comprises the main portion thereof has been spoken of as the lower part and the other as the upper part. This is

usually the case because of the loose pieces; but it will be obvious that the tools can be used the other way up if desired.

The loose pieces need not come completely away from the other portions of the tools but only slide back somewhat in relation thereto.

A convenient embodiment of the invention is described with reference to the drawings herewith, of which:—

Figure 1 is a plan view of the forming or spreading tools as they appear prior to the forming operation.

Figure 2 is a front elevation of the tools shown in Figure 1.

Figure 3 is a section taken on the line 3, 3, of Figure 2.

Figure 4 is a part sectional plan view showing the position of the tools in the banjo after the forming operation.

Figure 5 is a view of the tools as they appear in the banjo after the main or middle portions have been drawn in leaving the lateral portions behind.

Figure 6 is a view, partly in section, to show how the banjo can be removed from the tools.

Fig. 7 is an elevational view, partly in section, of the tool in place on the bed of a machine, the view being taken at right angles to the views shown in Figs. 1, 2, 4, 5, 6, and 8; and

Fig. 8 is a plan view showing the tool positioned in a blank preparatory to forming the same before expansion of the tool, the view being disposed in a position at right angles to the plane of the view shown in Fig. 7.

In these drawings, A A are the main portions of the two tools and B B the portions which are movable laterally, each dividing surface C being sloped downwardly in an outward direction as clearly shown in Figure 3. It will be seen that each portion A has a middle portion *a* extending up to the full height of the tool, that is to say, to the full height of the loose portions B. D D are recesses with which engage the usual taper plunger Y, which presses the tools apart. The tools are mounted on supports E sliding in the bed of the machine and the spreading plunger (not shown) is carried by the moving head of a suitable press in a manner well understood. As will be seen in Figures 6 and 7 the supports E are L-shaped members disposed in a groove in the bed of the machine and extending upward to receive the tool members A which are attached thereto by screws S. These supports E are free to slide longitudinally of the grooves in which they are disposed. Cooperating blocks X and X'

are also mounted on the bed of the machine, block X' being stationary and block X being movable. A hydraulic ram or other suitable means is employed to move the block X.

5 The general construction of the apparatus is similar to that shown in applicant's prior Patent 1,548,756, but differs in the details of the spreading tool.

In carrying out the process of forming the
10 banjo from the slotted tube, the latter is first spread somewhat by a separate tool to allow the tools shown in Figure 1 to be inserted in the manner shown in Figure 8. The movable block X is then moved into engagement with the tube
15 and that tube and the tool members in it are moved into the working position of the machine. In this position the slot D is disposed in alignment with the spreading wedge which is operated to spread the tool members into the position in which they are shown in Figure 4. The
20 tool members A A and B B and the forming blocks X and X' together form the work to shape. The movable block X is then drawn back into the position in which it is shown in Figure 7. After
25 this the portions A A are drawn towards each other to the positions shown in Figure 5 leaving the portions B B out against the inner wall of the banjo as also shown in Figure 5. The banjo can then be removed from the portions A A by moving it endwise to some extent, the inner edge
30 of the flange at one end moving under the tools A until the edge of the flange diametrically opposite clears the opposite ends of the tools A, allowing it to be lifted up until it can pass inwards,
35 over the lower portions of the tools A, to an extent sufficient to allow the first named part of the edge to clear the respective end of the tools A, when the banjo will come away completely. The method of removal is clearly indicated in
40 Figure 6.

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

1. A tool for forming flanged annuli of axle housings and the like comprising a pair of supporting plates butted together and adapted to be
45 moved apart, a supporting portion rising out of said plates at the ends thereof, said posts abutting each other when said plates are butted together, the engaging face of each post being cut away at the free end of the post to form a V-
50 shaped slot for receiving a spreading tool, forming blocks mounted on said posts and spaced from said plates, said blocks being formed as segments of a cylinder and adapted to lie on the circumference thereof when said plates are
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spread by a tool registered with said slot, there being a portion of said blocks separable from the rest and adapted to remain on the circumference of said cylinder when said plates are re-
80 abutted by the withdrawal of said spreading tool.

2. A tool for forming flanged annuli of axle housings comprising, a stationary bed plate, a guide means thereon, supporting means on said
85 guide means and movable therealong, and forming blocks mounted on said supporting means and shaped to form the web and flanges of the annulus of a housing, said blocks having a length greater than the diameter of the flange of a finished annulus and having an arcuate working
90 face of radius equal to the radius of the inside face of the web section of a finished annulus, each of said blocks comprising two sections the lower one of which is rigidly attached to said supporting means and terminates in an upper
95 face which slopes downwardly toward the web forming face of the section, the upper section of said blocks being registered with the lower section and removable therefrom to facilitate removing the blocks from a completed annulus
100 formed thereby.

3. A forming tool for use in forming flanged annuli of axle cases and like articles, comprising a pair of base portions adapted to be forced
105 apart and being longer than the internal diameter of the flanges of the annulus, a support upon which said portions are suitably mounted, a loose portion divided from each of said base portions at about midway of and in a horizontal
110 plane of the tool and being displaceable laterally in relation to said base portions whereby, after said forming operation and, on the inward movement of said base portions, the loose portions are left by said base portions in outward lateral
115 displacement in relation thereto to facilitate the removal of said base portions from the formed annulus.

4. A forming tool for use in forming flanged annuli of axle cases and like articles, comprising a pair of base portions adapted to be forced apart
120 and being longer than the internal diameter of the flanges, said bases each having a portion formed to the full contour of the tool and a set back portion of less lateral dimension, and a loose member registering with each base and partially surrounding said set back portion, said
125 loose members being displaceable laterally with respect to said base portion upon movement of said tool away from a formed annulus to facilitate removal of the tool therefrom.

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