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2,291,393

METHOD OF FORMING WHEEL RIMS

Filed Nov. 20, 1939

2 Sheets-Sheet 1

FIG.1.

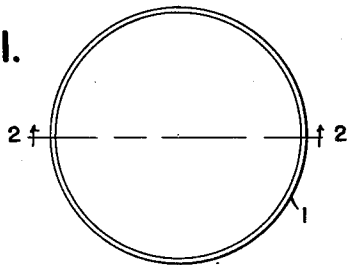


FIG.2.

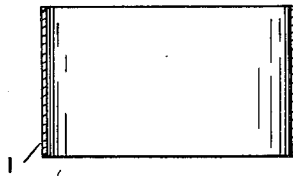


FIG.3.

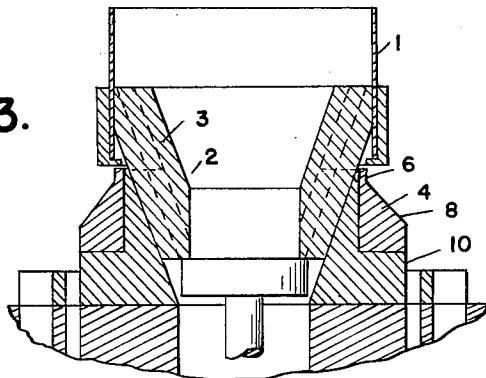
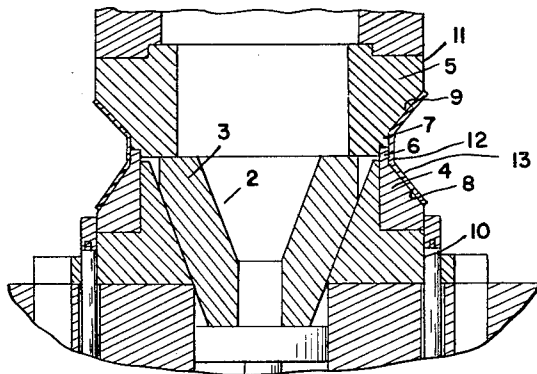


FIG.4.



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FIG. 7.

32, 33, 34, 35, 36, 37

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METHOD OF FORMING WHEEL RIMS

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2 Claims. (Cl. 29—159.1)

The invention relates to the manufacture of wheel rims of that type having a well intermediate its edges and refers more particularly to the method of forming wheel rims of the drop-center type having a central well intermediate the tire bead seats.

The invention has for an object to provide an improved method of forming wheel rims to produce wheel rims having the desired radial and cross sectional dimensions.

The invention has for other objects to provide a method of forming wheel rims by a series of die-pressing steps; and to provide for externally restraining the rim blank during certain of the die-pressing steps to more effectively secure the desired forms of rim blanks.

These and other objects of the invention will become apparent from the following description, taken in connection with the accompanying drawings, in which

Figure 1 is an end view of a rim blank which is to be fashioned into the final rim;

Figure 2 is a cross section on the line 2—2 of Figure 1;

Figures 3, 4, 5 and 6 are axial sections illustrating various steps in the method;

Figure 7 is a section illustrating the various forms taken by the rim blank during its manufacture.

As shown in Figures 1 and 2, 1 is a cylindrical rim blank hoop formed by bending a rectangular strip of metal into circular form and uniting the opposite ends thereof by welding. The hoop may not be truly cylindrical and, therefore, before the hoop is subjected to the first die-pressing operation it is trued to shape the same to cylindrical form by means of the truing device 2 which comprises the segments 3 internally engageable with the hoop intermediate its edges and adapted to expand while being moved into the hoop. The trued hoop has a diameter equal to that of the base of the well of the rim. Figure 3 illustrates the hoop and the expansible truing device.

After the hoop has been trued, it is then subjected to the first die-pressing step during which the opposite edge portions are expanded and progressively reduced in thickness. As illustrated in Figure 4, 4 and 5 are annular dies having at their adjacent ends the cylindrical portions 6 and 7, respectively, having an external diameter equal to the internal diameter of the base of the well. These dies also have the flared portions 8 and 9, respectively, leading from the cylindrical portions 6 and 7 and the enlarged cylindrical portions 10 and 11, respectively, extending from the flared

portions 8 and 9. The dies are relatively moved toward each other into engagement with the inner surfaces of the portions of the rim blank on opposite sides of the central portion for forming the base of the well and in their final position form the rim blank with the cylindrical central portion 12, which forms the base of the well, and the straight-line flared portions 13 leading from the portion 12.

The rim blank is then subjected to a second die-pressing step, as illustrated in Figure 5, during which the diameter of the central portion is maintained and the expanded portions are fashioned. 15 and 16 are annular dies having at their adjacent ends the cylindrical portions 17 and 18 for engaging the central portion 12, the stepped portions 19 and 20 for engaging the flared portions 13 and the enlarged cylindrical portions 21 and 22. While the dies 15 and 16 are being moved toward each other, an external confining device is also brought into engagement with the rim blanks to serve in restraining the same. The confining device comprises restraining segments 23 which are engageable with the outer surfaces of the central portion and the flared portions and which cooperate with the dies 15 and 16. During the second die-pressing step, the diameter of the central portion is maintained and the flared portions are fashioned to approximately or rough form the sides of the well, the tire bead seats and the tire retaining flanges, the flared portions being moved toward each other. It will be noted that the restraining segments cooperate with the dies in forming approximately or roughly the sides of the well, the tire bead seats and the tire retaining flanges.

The rim blank is then subjected to a third die-pressing step which completes the fashioning of the rim. As illustrated in Figure 6, 24 and 25 are annular dies having at their adjacent ends the cylindrical portions 26 and 27, respectively, engageable with the inner surface of the central portion of the rim blank. These dies also have the stepped portions 28 and 29 and the enlarged cylindrical portions 30 and 31 for fashioning the remaining portions of the rim blank into final form. During the movement of these dies toward each other, the rim blank is externally confined by an external confining device which has an annular series of restraining segments engageable with the outer surface of the rim blank throughout its radial extent. During the third die-pressing step, the diameter of the central portion is maintained and the remaining portions are fashioned to completely form the sides of the well, the

tire bead seats and the tire retaining flanges, the restraining segments cooperating with the dies to produce the drop-center rim having the desired dimensions.

In operation and with reference to Figure 7, the rim blank is first formed into a hoop having an average diameter equal to the diameter of the base of the well of the completed rim. The hoop is then trued into cylindrical form, as indicated by the dotted lines 32. The first die-pressing step flares the portions of the rim blank on opposite sides of that portion, or the central portion, for forming the base of the well, as shown by the dash lines 33. The next die-pressing step then fashions the flared portions to approximately the shape occupied in the final rim, these flared portions being given the shape indicated by the full lines 34 and 35 and the dotted lines 36 and 37. The final die-pressing step then refashions the parts indicated by the dotted lines 36 and 37 to bring them to the final desired shapes.

What I claim as my invention is:

1. In a method of forming drop center wheel rims having a well with a base and generally radial side walls, generally axial tire bead seats extending from the side walls, and generally radial tire retaining flanges extending from the bead seats, the three successive steps comprising expanding and flaring by die pressing the end portions of a hoop on opposite sides of and immediately adjacent a portion which later forms the base of the well, shaping by die pressing the expanded and flared end portions to form generally radial portions having parts of final shapes connecting into the well base forming portion, generally axial portions having parts of final shapes, and other generally radial portions, with curved portions intermediate the generally radial parts and the generally axial parts of final shapes, and finally refashioning by die pressing

the intermediate curved portions and the second-mentioned generally radial portions to bring the same to final shapes with the curved portions complementing the generally radial parts and the generally axial parts to completely form the side walls of the well and the tire bead seats, the refashioned second-mentioned generally radial portions completely forming the tire retaining flanges.

2. In a method of forming drop center wheel rims having a well with a base and generally radial side walls, generally axial tire bead seats extending from the side walls, and generally radial tire retaining flanges extending from the bead seats, the three successive steps comprising expanding and flaring by die pressing the end portions of a hoop on opposite sides of and immediately adjacent a portion which later forms the base of the well, shaping by die pressing the expanded and flared end portions to form generally radial portions having parts of final shapes connecting into the well base forming portion, generally axial portions having parts of final shapes, and other generally radial portions, with curved portions intermediate the generally radial parts and the generally axial parts of final shapes, finally refashioning by die pressing the intermediate curved portions and the second-mentioned generally radial portions to bring the same to final shapes with the curved portions complementing the generally radial parts and the generally axial parts to completely form the side walls of the well and the tire bead seats, the refashioned second-mentioned generally radial portions completely forming the tire retaining flanges, and substantially maintaining the diameter of the well base forming portions during each of the three die-pressing steps.

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