March 5, 1929. E. A. NELSON 1,704,369

METHOD OF FORMING WHEEL HUB SHELLS

Filed Dec. 21, 1927

Fig. 1

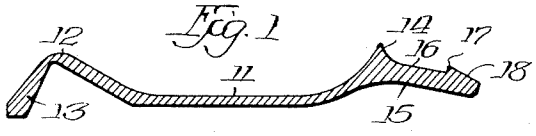


Fig. 2

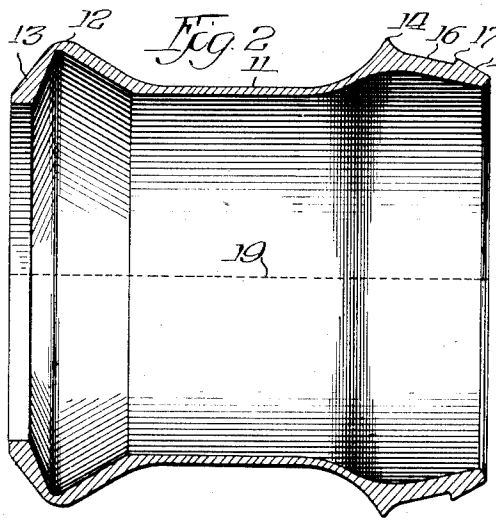


Fig. 3

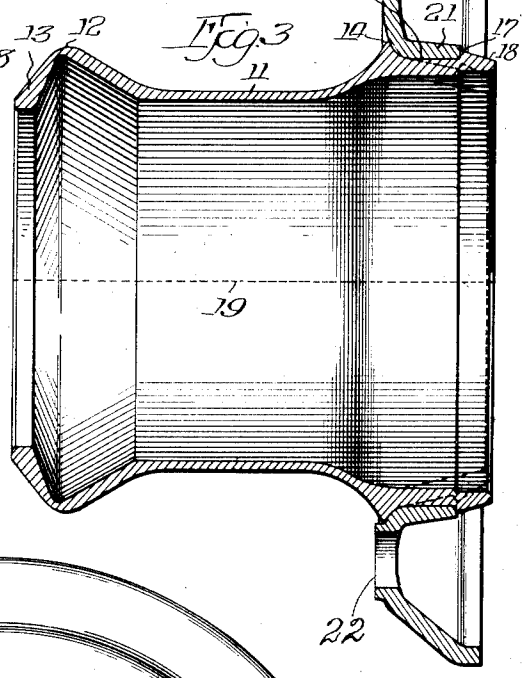
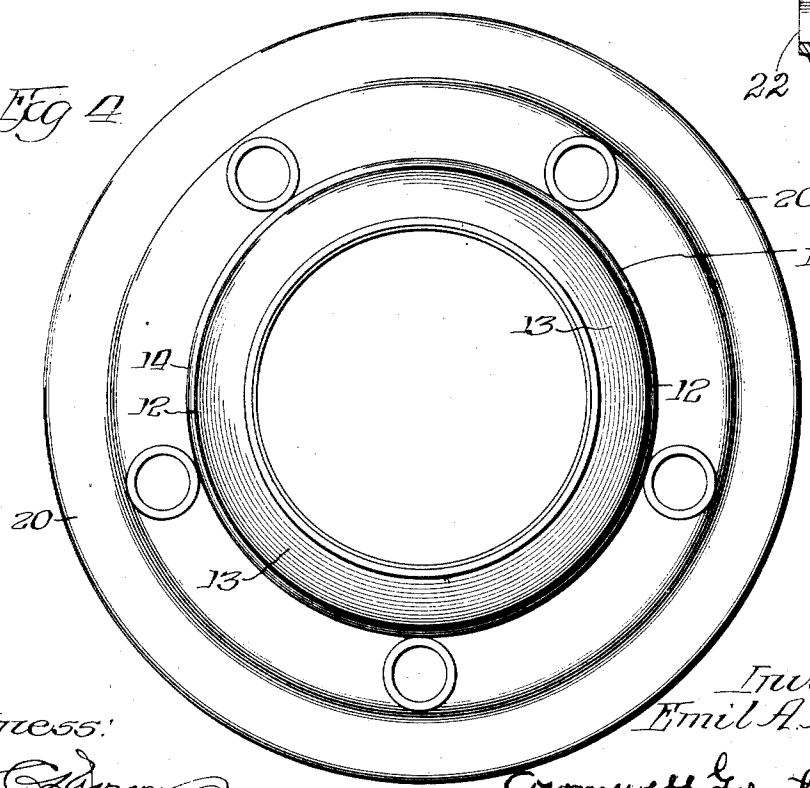


Fig. 4



Witness:

Inventor
Emil A. Nelson

By Cromwell Green & Warden
Attys

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UNITED STATES PATENT OFFICE.

EMIL A. NELSON, OF DETROIT, MICHIGAN, ASSIGNOR TO MOTOR WHEEL CORPORATION, OF LANSING, MICHIGAN, A CORPORATION OF MICHIGAN.

METHOD OF FORMING WHEEL-HUB SHELLS.

Application filed December 21, 1927. Serial No. 241,474.

My invention relates to the manufacture of hub shells for wire wheels, and analogous articles of small diameter and of modified cylindrical shape. The invention is characterized generally by rolling the metal into mill sections, cutting into appropriate lengths, bending into cylindrical shape and butt-welding the ends, as distinguished from drawing and spinning in successive operations from cylindrical tube sections.

Heretofore hub shells have ordinarily been made by drawing, spinning and upsetting at great expense of time, labor and material, while the resultant product has not been entirely satisfactory on account of local weaknesses due to imperfect distribution of the metal and local inequalities of capacity for resistance to the stresses to which the hub shell is subjected in use.

In order that the invention may be readily understood, I have in the accompanying drawing and in the following description predicated thereon set forth a preferred form of the invention and its practice. Obviously the contour of the mill section dimensions and relation of the parts will vary according to the particular hub shell design; wherefore the drawing and description are to be taken as illustrative of the invention rather than as limiting the same beyond the scope set forth in the appended claims.

In the drawings—

Fig. 1 is a cross section through a mill section of a selected contour;

Fig. 2 is a longitudinal section through the hub shell body as formed by bending and butt-welding the ends of the mill section;

Fig. 3 is a longitudinal section through the completed hub shell; and

Fig. 4 is a front elevation of Fig. 3.

The mill section is formed by the rolling of metal longitudinally thereof to present upon its opposite faces, substantially complementary ridges and valleys to correspond to the outer face of the finished hub shell. Slight deviations from a complementary relationship are permissible and in some cases desirable to thicken the metal at certain points where greater strength is required.

Such a mill section is illustrated in Fig. 1, the medial portion at 11 being flat while at one side the ridge 12 is formed with a turned portion 13 of preferably slightly greater thickness. Along the other side a ridge 14 is provided opposite the valley 15 from whence a flat area 16 extends at an inclination to a well defined ridge 17, the metal being from thence beveled at 18 to the edge.

The mill section having been cut into appropriate lengths is bent into cylindrical form as indicated in Fig. 2, the various ridges and valleys and flats preserving their original contour but being shaped into annuli by the bending operation, whereupon the two ends of the rolled mill section are joined as by butt-welding along the dotted line 19.

It will be understood that by the rolling of the section, the fibres of the metal are caused to extend longitudinally thereof and, as the section is bent into cylindrical form, the said fibres will extend circumferentially of the resultant cylindrical shell, thereby imparting to the shell greater resistance to stresses applied radially thereof in use than would be in the case of shells formed from drawn tubes or from bodies formed into a shell by drawing. In such case the fibres would extend longitudinally of the shell in a direction parallel to its axis rather than circumferentially thereof.

The shell illustrated in Fig. 2 having been formed in the manner stated, an annular member 20, formed by pressing in well known manner, is assembled over the portions 16, 17 and 18 and fitted against the shoulder 14, the exterior diameter of the ridge 17 being sufficiently smaller than the interior diameter of the flange 21 of the annulus to permit of the annulus being readily slipped into place, as indicated by dotted lines in Fig. 3. Thereupon that end of the shell within the annulus 20 and its flange 21 is expanded by means of any suitable tool so as to bring the ridge 17 into interlocking relation with the flange 21 and the flat area 16 into bearing contact with said flange, thus locking the flange securely in place about the rear end of the hub shell. The flange 21 may be additionally secured in place by spot or line welding in the area of contact.

The hub shell thus formed presents at 12 an anchorage for the forward series of wire spokes while the annulus 20 serves as an anchorage for the rear series of wire spokes, it being assumed that the particular hub shell here illustrated by way of example is to be employed as an element of a wire wheel.

The annular member 20 serves not only as an anchorage for the rear series of spokes, but also as a medium of attachment to the hub proper by means of bolts seated within the apertures indicated at 22. By virtue of such construction, the rear spokes, which sustain the driving torque, are carried in effect by the wheel hub rather than by the hub shell, thus enabling the shell to be made of lighter stock than would otherwise be required.

It will be observed that according to my invention the formation of the hub shell is simplified over the former practice of drawing and spinning from tube sections; that the distribution of the metal with accuracy as may be required for strength is rendered easy; that the resultant product is more resistant to the radial stresses to which it is subjected in use by reason of the correct distribution of the metal and also because the fibres of the metal lie in a circumferential direction about the shell rather than in a direction parallel to its axis. The processes of manufacture are greately simplified and the efficiency of the product is enhanced.

I claim:

1. The method of forming the bodies of hub shells and the like, which consists in bending a mill section into cylindrical shape and butt-welding the ends to form a cylinder, and interlocking with the rear end thereof an annulus apertured for attachment to the hub.

2. The method of forming the bodies of hub shells and the like, which consists in rolling a mill section to form on its two faces oppositely disposed ridges and valleys extending longitudinally thereof, bending into cylindrical shape and butt-welding to form a cylinder, and permanently securing to the rear end of the cylinder an annulus apertured for attachment to the hub.

3. The method of forming the bodies of hub shells and the like, which consists in rolling a mill section to form on its two faces oppositely disposed ridges and valleys of a desired contour and extending longitudinally thereof, bending into cylindrical shape and butt-welding the ends to form a cylinder with a spoke-attaching annular ridge at its front end and securing about the other end a spoke-attaching annulus.

4. The method of forming the bodies of hub shells and the like, which consists in rolling a mill section to form on its two faces oppositely disposed ridges and valleys of a desired contour and extending longitudinally thereof, bending into cylindrical shape and butt-welding the ends to form a cylinder with a spoke-attaching annular ridge at its front end, and a shoulder and abrupt ridge at its rear end, placing about the rear end against the shoulder a spoke-attaching annulus, and expanding the rear end of the body with the abrupt ridge in interlocked relation to the annulus.

5. The method of forming the bodies of hub shells and the like, which consists in rolling a mill section to form upon one face ridges and valleys extending longitudinally thereof and corresponding to the outer circumferential contour desired for the hub shell body, bending the mill section into a cylinder with an integral spoke-attaching annulus at its forward end, and permanently securing about the rear end a separate hub and spoke-attaching annulus.

6. The method of forming the bodies of hub shells and the like, which consists in bending into a cylindrical form a mill section of desired external contour including a spoke attaching annular ridge at its front end and an annular ridge at its rear end, placing about the rear end against the ridge a spoke attaching annulus and expanding the rear end of the cylinder within the annulus to effect a secure attachment between the two.

In testimony whereof I have hereunto subscribed my name.

EMIL A. NELSON.