A. L. PUTNAM.

METHOD OF FORMING METALLIC WHEELS.

APPLICATION FILED AUG. 26, 1915. RENEWED JUNE 18, 1917.

1,253,419.

Patented Jan. 15, 1918.

2 SHEETS—SHEET 1.

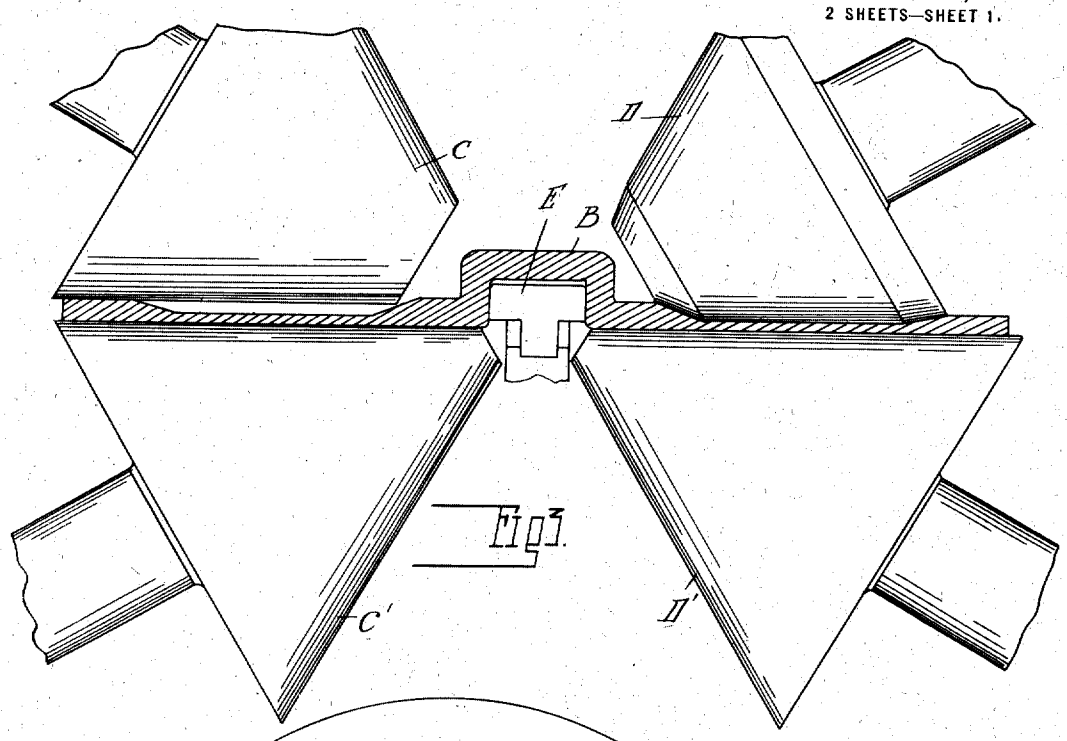


Fig. 3.

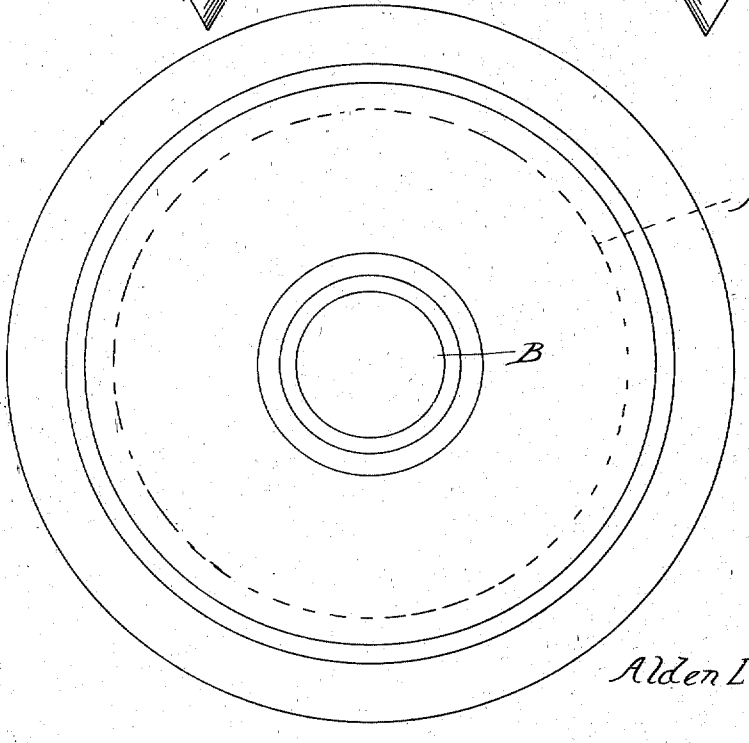


Fig. 1.

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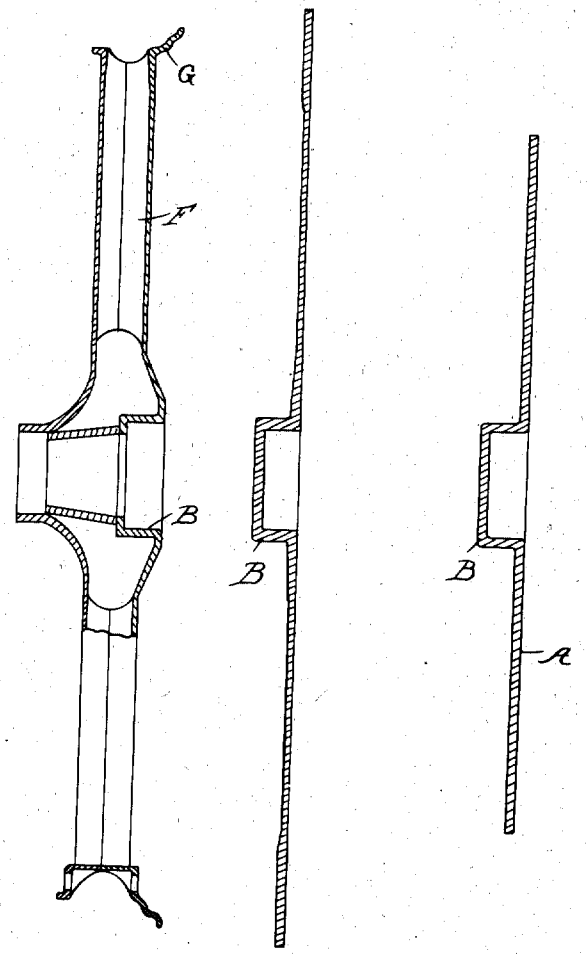


Fig. 3. Fig. 4. Fig. 2.

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UNITED STATES PATENT OFFICE.

ALDEN L. PUTNAM, OF DETROIT, MICHIGAN, ASSIGNOR TO DETROIT PRESSED STEEL COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

METHOD OF FORMING METALLIC WHEELS.

1,253,419. Specification of Letters Patent. Patented Jan. 15, 1918.

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To all whom it may concern:

Be it known that I, ALDEN L. PUTNAM, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Methods of Forming Metallic Wheels, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to the manufacture of metallic wheels, and it is the primary object of the invention to obtain a process of forming the complete wheel from a sheet metal blank, with the metal properly distributed for maximum strength in the structure.

In the present state of the art separate spoke sections and hub sections have been formed from sheet metal, but wheels in which both hub and spokes are formed from an integral blank are not practical. This is for the reason that the stresses which are exerted upon the hub are so great that a heavy gage of metal is required. On the other hand the spokes are under lighter stress and to avoid unnecessary weight in the wheel should be formed of light gage metal. Again the rim of the wheel requires a gage of metal which is intermediate that of the spokes and that of the hub. Thus integral constructions of wheels which are formed up from sheet metal blanks of uniform gage are not successful.

With my improved process of manufacture wheels having integral hub, spoke and rim sections may be successfully formed from sheet metal blanks, by first forming said blanks so as to vary the thickness thereof in different portions.

In the drawings:

Figure 1 is a plan view of the sheet metal blank showing in dotted and full lines the original and the changed form thereof;

Fig. 2 is a section through the blank showing the preliminary operation of cupping the hub portion;

Fig. 3 is a similar view showing the manner of differentially thinning the blank and expanding the diameter thereof;

Fig. 4 is a view similar to Fig. 2 after the thinning and expanding operation; and

Fig. 5 is a section through a completed wheel.

A is a circular sheet metal metal blank, which is of a gage sufficient for the formation of the hub of the wheel. The original diameter of this blank, as indicated in dotted lines in Fig. 1, is less than the diameter required for the forming of the spokes and rim, but the amount of metal is sufficient to produce the required dimension when the gage is thinned. Fig. 2 shows the first operation, in which the central portion B is cupped to form a portion of the hub, and also to produce a guide for the subsequent operation.

The next operation is that of thinning the blank. This is preferably performed by conical rolls C C′ D D′, which bear upon opposite faces and upon diametrically opposite sides of the blank, while the latter is revolubly guided by a member E engaging the cupped portion B. The action of the rolls C C′ D D′ is to gradually thin the gage of the metal beyond the central hub portion, and after the completion of their operation the blank assumes the form shown in Fig. 4. In this the hub remains of the original gage, and from this point the metal gradually tapers in thickness to the proper gage for forming the spokes. At the outer end of the latter the gage is increased in thickness to produce an annular portion for forming the rim, which is of a gage intermediate that of the spokes and that of the hub.

The blanks formed as above described are then fashioned into metallic wheels, preferably by forming complementary members, which are on the opposite sides of the central plane of the wheel and are electrically welded or otherwise secured to each other. Each member has a properly fashioned hub section B, hollow spoke sections F extending therefrom, with the metal intermediate the spokes cut away, and a rim section G. The metal is so distributed as to secure the maximum strength with the minimum weight, while the tapers between the heavy and light gage portions avoid any line of weakness.

What I claim as my invention is:—

1. The method of forming wheel blanks, comprising the cutting of the blank from sheet metal of a gage equal to the maximum thickness of the wheel, cupping the central portion of said blank to initiate a hub formation, thinning the surrounding portions of said blank and thereby enlarging the di-

ameter thereof, and pressing to fashion to the desired form.

2. The method of forming wheel blanks, comprising the cutting of a blank from sheet metal of a gage equal to the maximum thickness of the wheel, cupping the central portion of said blank to initiate a hub formation, revolving said blank and rolling the portion thereof surrounding said hub to thin the same and increase the diameter, and pressing to the desired form.

3. The method of forming wheel blanks, comprising the cutting of the blank from sheet metal of a gage equal to the maximum thickness of the wheel, cupping the central portion of said blank to initiate a hub portion, revolving and rolling said blank to thin the portion thereof surrounding said hub, thereby enlarging the diameter thereof, the portion intermediate the periphery and the hub being of thinnest gage and the peripheral portion being of a gage intermediate said thinned portion and the gage of the hub, and pressing the blank to form the spokes of the intermediate thinned portion and a rim of the peripheral portion.

4. The method of forming wheel blanks, comprising the cutting of a blank from sheet metal of a gage equal to the thickness of the hub portion of the wheel, cupping the central portion to initiate a hub formation, guiding said blank by said hub and rolling the same to thin and enlarge the diameter of the surrounding portion, the outermost portion being of a gage suitable for the rim of the wheel, and the intermediate portion of a lighter gage suitable for the spokes, and pressing said blank to fashion the spoke and rim sections thereof.

5. The method of forming wheel blanks comprising the cutting of a blank from sheet metal, of a gage equal to the maximum thickness of the wheel revolving said blank and rolling the portion thereof surrounding the hub to thin the same and increase the diameter, and pressing to the desired form.

In testimony whereof I affix my signature in presence of two witnesses.

ALDEN L. PUTNAM.

Witnesses:
WM. J. BELKNAP,
PHYLLIS COBURN.