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J. M. HANSEN.

METHOD OF TEMPERING AND ANNEALING CAR WHEELS.

APPLICATION FILED NOV. 15, 1906.

FIG. 1

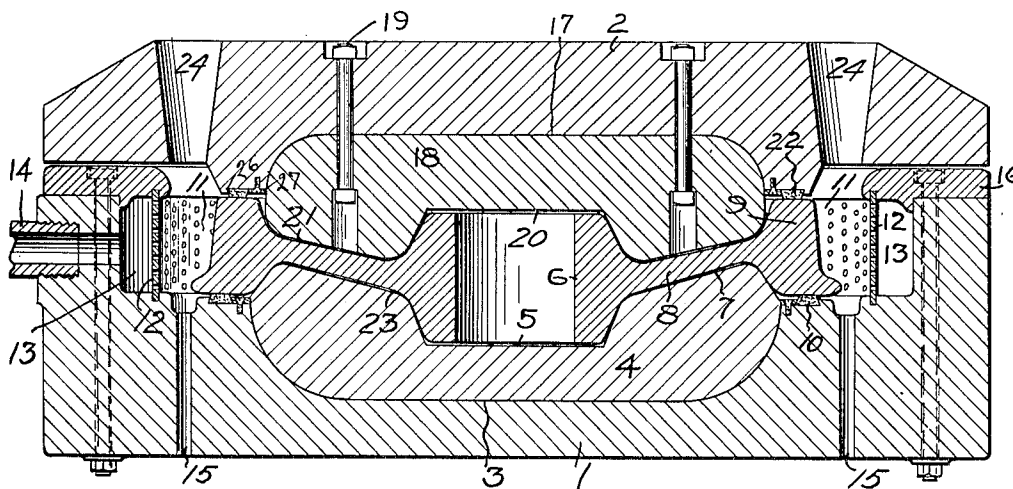


FIG. 2

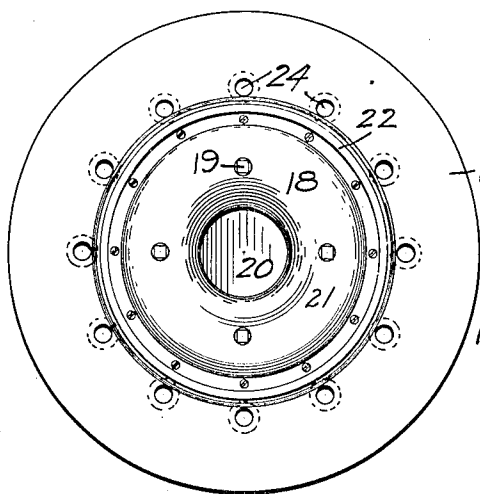
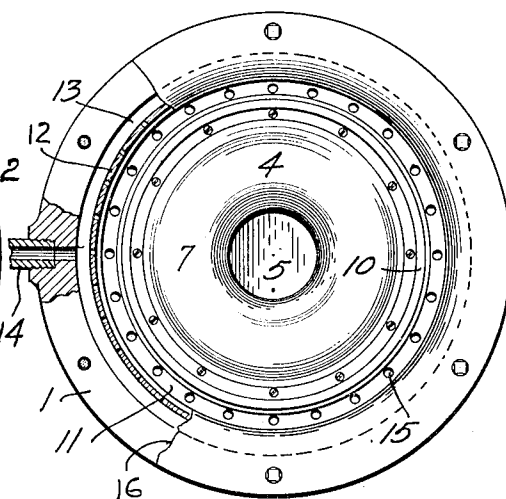


FIG. 3



WITNESSES.

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METHOD OF TEMPERING AND ANNEALING CAR-WHEELS.

No. 871,932.

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To all whom it may concern:

Be it known that I, JOHN M. HANSEN, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Method of Tempering and Annealing Car-Wheels; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to the manufacture of car wheels, and especially to the tempering, or hardening, or retaining the hardness, of the tread face thereof and the annealing of the body, including the web and hub. These car wheels are made from steel by forging operations or combined forging and rolling operations, or are made from cast iron in suitable molds. It is desirable in such wheels that the body, including the hub and web portions as well as the inner portion of the tread, shall be as soft and tough and free from strains as practicable, while the outer or wearing face of the wheel be rendered as hard as possible so as to resist the wearing or abrading action on the wheel and so extend its life.

The present invention has these objects in view and is especially adapted for the treating of forged or forged and rolled steel car wheels, though applicable also to cast wheels.

In the practice of the method the heated wheel after the completion of the forging, or forging and rolling, and the setting operations, is inclosed within a suitable case, the body of the heated wheel being held within a practically air tight heat retaining chamber, and a suitable hardening fluid, such as water, is then projected against the tread portion of the wheel, the passage of the water into the heat retaining chamber being prevented by suitable packing, such as asbestos, contacting with the upper and lower faces of the wheel tread. In this way the heat is held within the body portion, and it is cooled so gradually as to properly anneal it by its own heat, while the outer face or tread portion of the wheel is tempered or hardened by the cooling medium, so as to largely increase its wearing qualities.

In the accompanying drawings Figure 1 is a vertical central section of the cooling case illustrating the wheel in position; Fig. 2 is a bottom view of the upper section thereof; and Fig. 3 is a top view partly broken away of the lower section of the cooling case.

For the practice of the invention I prefer

to employ a cooling case such as that illustrated in the accompanying drawing, this case being formed of two sections 1, 2, preferably made of cast metal. The lower section 1 has the central cavity 3 to receive the lining 4 of suitable refractory or heat retaining material, such as fire brick, this fire brick lining being preferably made to conform to the shape of the hub and web of the wheel, and as illustrated having the central depression 5 to receive the hub portion 6 and the inclined face 7 to fit to the web portion 8 and the inner face of the tread 9 of the wheel.

Beyond the cavity 3 is secured a suitable packing 10, such as asbestos, which contacts with the lower face of the wheel tread 9, forming a water-tight joint therewith to prevent the passage of the hardening or tempering fluid within the annealing or heat-retaining chamber inclosing the hub and web, this heat retaining chamber is practically air tight so as to retain the heat around the hub and web of the wheel and permit the slow cooling and consequent annealing thereof.

The lower case 1 has formed in it the tread receiving or spraying chamber 11, the outer wall of which is formed of the annular perforated plate 12, through which the water or other hardening or cooling medium is projected against the tread face of the wheel. Back of this annular perforated plate is the annular water chamber 13 with which any suitable supply 14 communicates. Leading down from the spraying or tread receiving chamber 11 are a series of suitable discharge openings 15. As shown in the drawing the lower edge of the annular perforated plate 12 is seated in the body of the lower case 1 and its upper edge is seated in an annular plate 16 bolted to and forming the top portion of the lower case.

The upper case 2 fits onto the lower case 1, as shown, and it has the central cavity 17 in which is seated the fire brick or like lining 18, shown as held within the cavity by suitable bolts 19, this upper fire brick lining having the central cavity 20 to receive the upper portion of the hub 6 and the inclined face 21 fitting to the web portion 8 of the wheel and to the back face of the tread portion 9 thereof. This upper case is also provided with a like asbestos or other heat retaining and water-proof packing 22, which contacts with the upper face of the wheel tread and with the packing 10 prevents passage of the

water into any portion of the heat retaining chamber 23 formed as shown by the fire brick or like linings 4 and 18 above described. The packings 10 and 22 are shown as formed of rings fitting within the dovetailed seats 26 formed in the bodies of the casings and held in place by metal rings 27 secured to the casings by suitable screws. The upper case 2 is preferably carried out over the lower case 1, as shown, and is provided with a series of steam outlets 24 communicating with the upper portion of the spraying chamber 11 above referred to.

The above apparatus illustrates the preferable form of apparatus for practicing my invention, and I will now describe the said method in connection therewith, it being of course understood that the invention may be practiced with any apparatus suitable therefor. The car wheel, after the completion of the forging or forging and rolling operation, while still at a suitable heat is placed within the case formed of the two sections 1 and 2, as above described. The body, including the hub and web and inner portion of the tread, are thus inclosed within the heat retaining chamber 23 while the outer portion of the tread 10 extends within the spraying chamber 11, and the passage of water into the heat retaining chamber 23 is prevented by the packing 10 and 22. The weight of the upper case 2 holds it in place. Water, oil or other suitable tempering or hardening material is then forced through the pipe 14 and travels around through the annular chamber 13 and is sprayed or projected against the outer face of the tread, acting to chill and temper or harden the same. The spraying is continued as long as desired, either during all or only a portion of the time of the cooling of the wheel body, the water draining through the outlets 15, and any steam formed by contact with the heated wheel tread escaping through the steam ports 24. Meanwhile the heat is held within the body of the wheel, both the hub and the web and the inner portion of the tread, by its inclosure within the heat retaining chamber 23, so causing the gradual annealing of the same, and while exposing the outer face of the tread to the cooling or hardening action, it is prevented from entering to too great a depth into the wheel tread.

It is preferred that the faces of the heat retaining linings in the chamber 23 fit closely

to the wheel body so as to support and prevent warping or distortion of the wheel body during cooling, the fire brick lining of the lower case giving such support to the hub and preferably to the web of the wheel body. The wheel can be held within the case until it is entirely cooled, the water spray being continued either during all this time or a portion thereof, as found best. In this way I am enabled to properly anneal or cool the wheel body and remove any strain therefrom and also to increase the hardness of the wearing face and so to largely increase the wearing qualities of the wheel.

The invention may also be employed in connection with wheels which have been worn, such as by re-dressing the face of the worn wheel, and then heating the same and placing it within the case and subjecting it to the same slow cooling action of the body and tempering or hardening the face, and the life of the wheel be thus largely extended. The invention can also be employed to advantage with cast iron wheels to harden, or retain the hardness of the chilled or other surface of the wheel during annealing.

What I claim is:

1. The method of annealing the body and hardening the tread of car wheels, consisting in inclosing the body of the wheel when in a heated state within a practically air tight heat retaining chamber and projecting against the tread face a suitable hardening medium.
2. The method of annealing the body and hardening the tread of car wheels, consisting in inclosing the body of the wheel when in a heated state within a practically air tight heat retaining chamber, sealing the wheel at the tread and projecting upon the tread face a suitable hardening medium.
3. The method of annealing the body and hardening the tread of car wheels, consisting in giving a resting support to both hub and tread, and inclosing the hub when in a heated state within a heat retaining chamber, sealing the tread portion from said heat retaining chamber, and projecting against the tread face a suitable hardening medium.

In testimony whereof, I the said JOHN M. HANSEN have hereunto set my hand.

JOHN M. HANSEN.

Witnesses:

ROBERT C. TOTTEN,
J. R. KELLER.