

J. M. HANSEN.
FORGED STEEL CAR WHEEL.
APPLICATION FILED MAR. 5, 1909.

942,381.

Patented Dec. 7, 1909.

FIG. 1

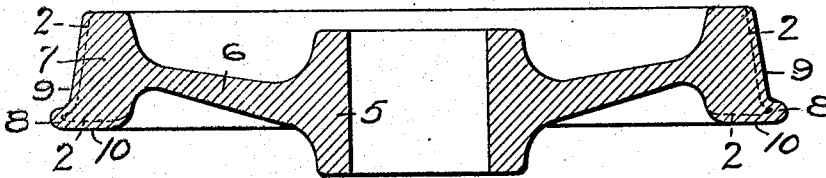


FIG. 2

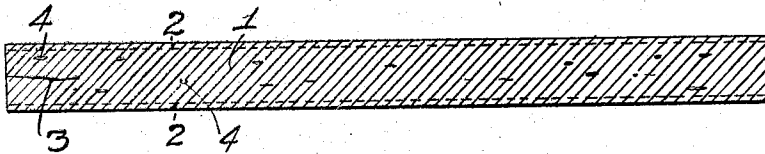


FIG. 3

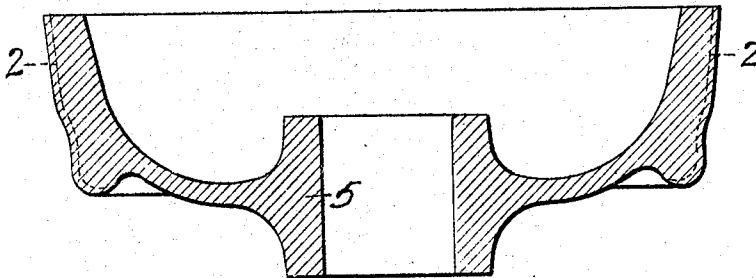
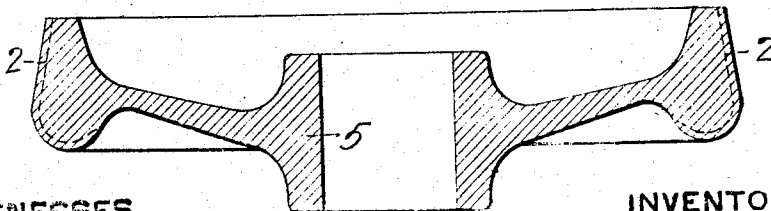


FIG. 4



WITNESSES.

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FORGED STEEL CAR-WHEEL.

942,381.

Specification of Letters Patent.

Patented Dec. 7, 1909.

Application filed March 5, 1909. Serial No. 481,458.

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 Forged Steel Car-Wheels; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to forged steel car wheels, its object being to provide an integral steel car wheel having a strongly condensed wearing face on both its tread and flange, and one which is free from the imperfections present within the body of the steel slab from which the wheel is formed.

It is a well known fact that in the casting of steel ingots certain imperfections exist in the body of the ingot the most serious of which is what is termed piping, where the metal in the top of the ingot contracts and settles down, blow holes and other imperfections also occurring in the body of the ingot on account of inclosed gases and for other like reasons. In the rolling out of the metal ingot it is not always possible to weld together the metal where these imperfections occur and they frequently exist in the slabs and plates rolled from the ingot in the form of seams which are liable to form imperfections in the wearing face of the tread of forged steel car wheels, and if present in the flanges thereof so weaken the same as to cause the easy fracture thereof. It is also a well known fact that in the rolling out of these ingots to bring them into slab form the surface metal of the same is condensed and compacted more than the interior metal of the slab and provides a surface of special hardness and fine wearing quality and which is practically free from the above imperfections which may exist in the body of the slab. Experience in the manufacture of these car wheels has shown that they are of much greater strength when made integral, that is, when the hub, web and tread are forged by die forging or roll forging from a single piece of steel, and it has also shown that to properly support the tread portion of the wheel the web portion should connect therewith between the side edges of the tread, that is, about mid-way of the body of the tread, such disposition of the metal transmitting the load from the hub directly through the web to the entire body of the

tread and thence to the rail on which it runs. By my invention I provide such a steel car wheel with a strong tread and flange having faces of high wearing quality and free from the imperfections within the body of the slab from which it is formed, and also improved in other particulars, such as in the lay of the fiber in the tread which adds to the wearing quality of the wheel.

It consists, generally stated, in an integral steel forged car wheel formed from a rolled slab or blank having a hub, a web, and a tread united to the web about mid-way of the tread body, and having the wearing faces of the tread and flange formed of the condensed face metal of the rolled blank.

It also consists in certain other improvements hereinafter set forth.

In the accompanying drawings Figure 1 is a sectional view of the wheel embodying the invention, the peculiarities of the wheel embodying the invention being illustrated in connection with such sectional view; Figs. 2, 3 and 4 illustrate the preferred method of making the wheel, Fig. 2 showing the slab from which it is formed; Fig. 3 being a view of the blank produced in the first forging step or operation; and Fig. 4 is a view showing the second step in the preferred method of forging the wheel, the final step being illustrated in Fig. 1.

The wheel forming the subject of the invention may, of course, be produced by any suitable forging operation, whether by roll forging or by die forging. It has not been considered necessary to illustrate the mechanism employed to produce the wheel, the blanks as illustrated showing one practicable way to obtain the result from a rolled slab. The wheel is shown as formed from an integral slab of rolled steel, such a slab being illustrated in Fig. 2 at 1, the face metal of the slab being indicated at 2 by dotted lines close to the edge of the slab while the seam formed by the piping which may be present in the blank are shown at 3 and those formed by blow holes and other imperfections at 4. It will be understood that in the rolling of the ingot such imperfections are drawn out, the faces of the steel being brought into close contact but not always perfectly welded together.

The wheel embodying the invention has the hub 5, the web 6 and the tread 7, which

is united to the web about mid-way of the tread body so that the tread body directly supports the web and through it the hub, and the load is transmitted through the hub and web directly into the body of the tread. The wheel has the flange 8; and the wearing or tread face 9 and the interior wearing face 10 of the flange are formed of the condensed face metal of the ingot which metal is, as above stated, condensed and compacted more than the body of the ingot in the rolling operation, and therefore of firmer grain and harder, and, therefore, forms wearing faces upon the wheel tread and flange of much greater hardness than where such wearing faces are produced from the interior of the slab, giving greater life to the wheel; while, as such surface metal is practically free from the imperfections above stated, the wearing faces of the tread and flange are practically free from such imperfections, and are not liable to cracking and spawling from such causes. The metal forming the wheel flange is also developed from the outer metal of the rolled slab, and is therefore free from such imperfections which may be present in the interior of the steel body, and of greater strength for this reason. While the wheel having such peculiarities may of course be formed in any desired way, it can best be produced by turning the slab up into practical bowl form, as shown in Fig. 3, and then forcing the metal downward and outward, as illustrated in Fig. 4, so as to bring the surface metal of the original slab to form the flange and the wearing faces of the tread and flange. By such forging the tread of the wheel is also compressed in such way as to produce a fiber which in general course stands on edge to the tread of the wheel, and by throwing the fiber on such lay the hardness and wearing qualities of the wheel are also increased so that even after the wearing off of the face metal forming the wearing faces of the wheel, or after the re-forging of the wheel when it is worn, such metal standing on edge will provide a harder wear-

ing surface and in that way extend the life of the wheel.

Inspection of the wheel by those skilled in the art shows clearly the presence of the compacted face metal on the tread and flange, while the lay of the fiber of the tread portion of the wheel is also evident upon proper inspection of a section thereof. The wheel is also distinguishable by suitable physical tests. As the entire wheel is formed from a single slab, it is also free from any of the imperfections which occur from imperfect welding of different parts together, and from the imperfections arising in connection with what is known as a built-up wheel, that is, one made of different parts mechanically connected.

What I claim is:

1. An integral steel forged car wheel formed from a rolled slab and having a hub, a web and a tread united to the web about mid-way of the tread, and having the wearing faces of the tread and flange formed of the condensed face metal of the rolled slab.

2. An integral steel forged car wheel formed from a rolled slab and having a hub, a web, and a tread united to the web about mid-way of the tread, and having the fiber of the rim set on edge toward the wearing face of the tread, and the wearing faces of the tread and flange formed of the condensed face metal of the rolled slab.

3. An integral steel forged car wheel formed from a rolled slab and having a hub, a web, and tread united to the web about mid-way of the tread, and having the flange formed of the outer metal of the rolled slab, and the wearing faces of the tread and flange formed of the condensed face metal of the rolled slab.

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

JOHN M. HANSEN.

Witnesses:

WM. A. STEINMEYER,
JOHN F. WILL.