J. K. GRIFFITH.

METHOD OF CASTING CAR WHEELS.

APPLICATION FILED AUG. 6, 1912.

1,066,604.

Patented July 8, 1913.

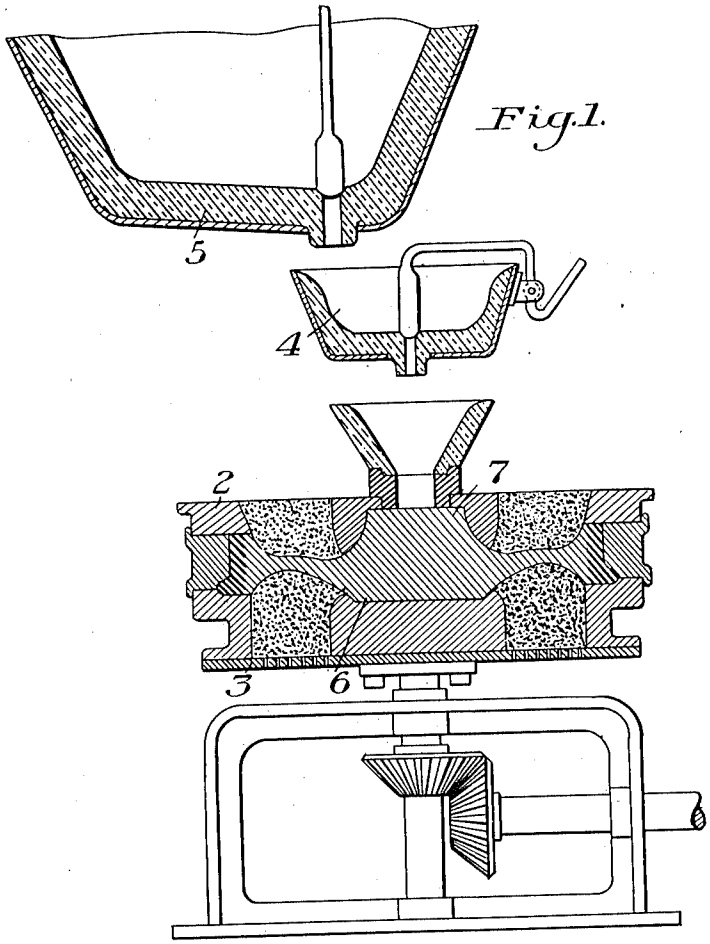
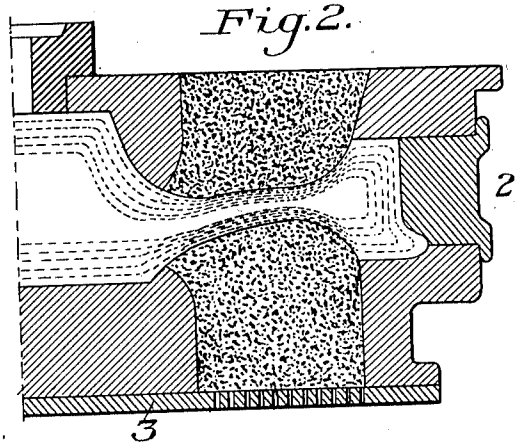


Fig. 1.

Fig. 2.



WITNESSES

R. A. Balderson

H. M. Corwin

INVENTOR

J. K. Griffith,

by Bakewell, Byrnes & Parmelee,

Attys.

UNITED STATES PATENT OFFICE.

JACOB K. GRIFFITH, OF PITTSTON, PENNSYLVANIA.

METHOD OF CASTING CAR-WHEELS.

1,066,604. Specification of Letters Patent. Patented July 8, 1913.

Application filed August 6, 1912. Serial No. 713,576.

To all whom it may concern:

Be it known that I, JACOB K. GRIFFITH, a resident of Pittston, Luzerne county, Pennsylvania, have invented a new and useful Improvement in the Method of Casting Car-Wheels, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical section illustrating apparatus which may be employed in carrying out my improved method; and Fig. 2 is a similar view on a larger scale of a portion of the apparatus.

My invention has relation to the manufacture of car wheels, and is more particularly an improvement over the method described and claimed in my Patent No. 790,202 of May 16th, 1905.

The object of the present invention is to provide a simple and efficient method whereby not only all the advantages of the method of the said patent are retained, but which enables the manufacture of a composite car wheel in which the tread or tire portion of the wheel may be of a different character of metal from the body of the wheel.

In accordance with my present invention, the tread or tire portion of the wheel may be composed of either a high-carbon steel, or an alloyed steel, such as chrome steel, manganese steel, vanadium steel, tungsten steel, etc., while the center portion is of ordinary low carbon steel.

In the practice of my invention, I place a mold, such as shown at 2 in the accompanying drawings, and which is preferably a mold of the general construction shown and described in my said patent, upon a revolving table 3, and cause it to revolve at a sufficiently high rate of speed to cause the metal first poured into the mold to be driven by centrifugal force to form the rim or the tread portion of the wheel. This metal may be poured into the mold from a small auxiliary ladle 4 suitably placed above the mold, or suspended from a large ladle 5, as may be desired. This auxiliary ladle is supplied with a sufficient quantity of hard or alloyed steel to form the rim of the wheel, or to form so much of the wheel as it may be desired to make hard. After this metal has been allowed to run into the mold, which is being revolved at a high rate of speed, soft metal from the large ladle is allowed to pass into the same auxiliary ladle, and from thence into the mold until the latter is filled. The rotating action causes the alloyed or high-carbon steel to be at once thrown to the periphery of the wheel, where it rapidly solidifies, the soldification taking place at the rate of approximately three-eighths of an inch to the minute. In this manner the rim or tread portion not only retains its identity, but any shrinkage cavities that would naturally come to the center of the tread are eliminated.

The steel from which the rim is made can be melted either in crucibles, or in a small furnace provided for that purpose, or by any other approved method.

In order to cause the metal to pass more readily from the center of the mold, or hub portion, to the rim of the wheel when it is first poured, I preferably make the downwardly extending portion 6 of the hub as short as possible, while the top portion 7 is extended to a considerable extent.

As before stated, I preferably use a mold of the general character shown and described in my said Patent No. 790,202, having a metallic rim portion of relatively large cross-section so as to afford a considerable body of metal, sufficient to produce relatively rapid cooling, the hub portion also being of metal, while the web-forming portions are of sand. This construction is of importance, since if a sand mold were employed throughout, and the metal intended to form the rim of the wheel was of less specific gravity than the metal used to form the center of the wheel, the fact that the two different metals would be retained in fluid condition for a short time would cause the less dense metal to gravitate toward the center of the mold and mix with the denser metal, or vice versa.

By my improved method, it is possible to make a wheel, the rim of which may be either of less or of greater density than the center. This is because the first metal poured into the mold comes at once into contact with the heavy cooling portion of the rim of the mold and becomes solidified, thus causing it to retain its characteristics or identity and render it impossible for it to mingle with any metal subsequently poured into the mold. Another advantage in using a heavy body of metal in the rim of the mold is that I am enabled to produce wheels which are so nearly circular that it is not necessary to machine or grind them on the

tread in order to make them perfectly round. This is due to the fact that the inside of the rim or check of the mold is carefully machined, and the rim being heavy does not spring out of shape. Wheels cast in sand molds must always be rounded or trued up in some way, and many chilled iron wheels which are cast in light expanding chills must also be rounded up. My improved method overcomes this necessity. This is of especial advantage in the manufacture of wheels in which the rim is of very hard metal such as chrome steel, which is very difficult to grind.

In the method described in my said Patent 790,202, by causing a more rapid chilling of the metal at the rim than in the web portion of the casting, I was able to take advantage of the fluid compression resulting from the contraction of the rim and exerted inwardly in the plane of the web. By my present invention, I not only retain this advantage, but utilize the centrifugal force of rotation to exert an outward compressive action upon the metal in the web. My present invention, therefore, enables me to form a wheel in which the rim portion of higher wear-resisting character, by its more rapid cooling maintains its identity during the casting operation, forming a more or less distinct annulus; while at the same time I insure the proper filling out of the web portions of the casting and the densifying of the metal therein, both by the compressive forces exerted by the cooling rim, and also by the densifying centrifugal action.

My invention also can be employed in the manufacture of wheels having a cast iron center and a steel tire, the latter being perfectly united to the body of the wheel during the casting operation. In this manner I can make a wheel with a steel tire of a composition, such as chrome or manganese steel, which is so hard that it could not be rolled into tire form. The present invention also retains the important shrinkage features which are fully disclosed and claimed in my said prior patent.

What I claim is:—

The herein described method of casting composite car wheels, which consists in first pouring a molten steel of a high wear-resisting composition centrally into a rapidly rotating mold to form the rim and tread portions of the wheel, and immediately thereafter pouring into the mold molten metal of a different composition to form the hub and web portions of the wheel, and causing the first named metal to cool with comparative rapidity to form a substantially distinct annulus of the wear-resisting metal, and cooling the web portion of the metal with much less rapidity, whereby it is subject for a longer period to the densifying action of the rotary movement, and also to the compressive action of the contraction of the said rim portion; substantially as described.

In testimony whereof, I have hereunto set my hand.

JACOB K. GRIFFITH.

Witnesses:

JEMIMA CUTLER,

EARLEY M. JOHNSON.