F. K. VIAL.

CAR WHEEL MOLD AND METHOD OF MAKING CAR WHEELS.

APPLICATION FILED JAN. 24, 1911.

1,015,362. Patented Jan. 23, 1912.

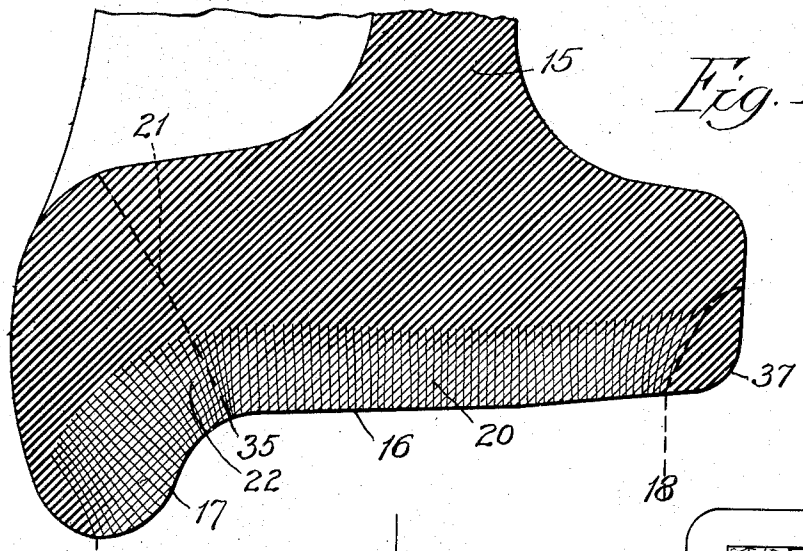


Fig. 1.

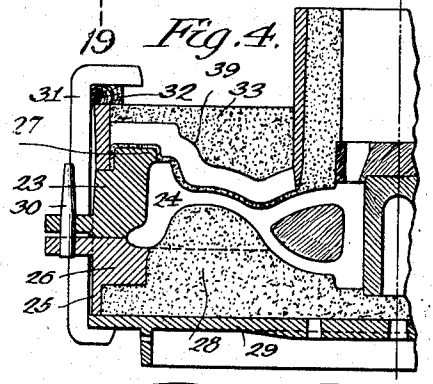


Fig. 4.

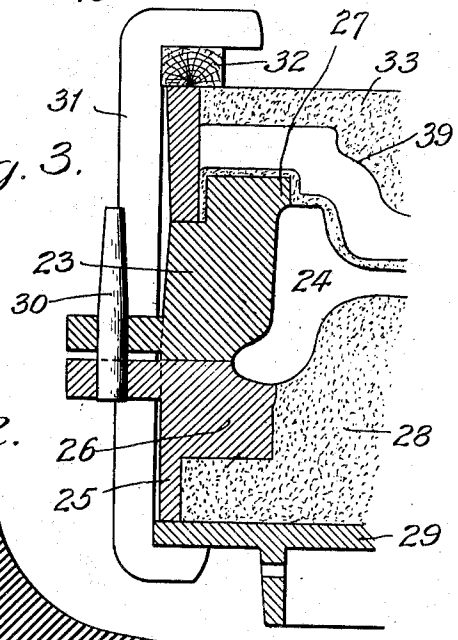
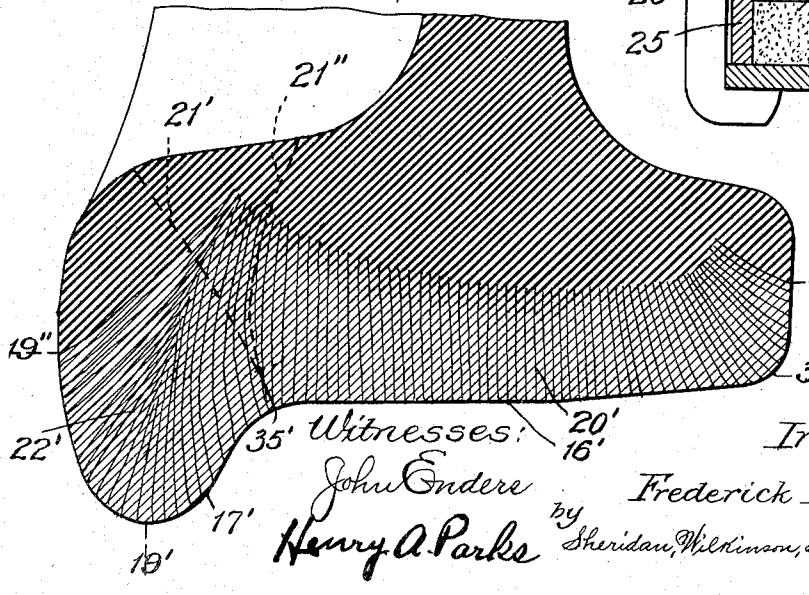


Fig. 3.

Fig. 2.



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UNITED STATES PATENT OFFICE.

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CAR-WHEEL MOLD AND METHOD OF MAKING CAR-WHEELS.

1,015,362. Specification of Letters Patent. Patented Jan. 23, 1912.

Application filed January 24, 1911. Serial No. 604,370.

To all whom it may concern:

Be it known that I, FREDERICK K. VIAL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Car-Wheel Molds and Methods of Making Car-Wheels, of which the following is a specification.

The principal object of my invention is to provide a mold comprising a chiller wherein iron car wheels may be cast so as to produce a superior product in respect to strength and durability.

Another object of my invention is to provide an improved method for casting iron car wheels whereby they shall be made of superior strength and durability.

Another object of my invention is to provide a method for casting iron car wheels in which the "grain" of the chilled metal is directed so as to strengthen the wheel with respect to certain stresses that may be imposed upon it.

Another object of my invention is to provide apparatus to be used in practicing said method.

These and various other objects of my invention will be made apparent in the following specification and claims, taken in connection with the accompanying drawings, in which for the purpose of making a clear explanation, I have shown one specific embodiment of my invention.

Figure 1 is a transverse section of a car wheel tread made with a chiller of the usual type. Fig. 2 is a corresponding section of a car wheel tread made with a chiller of my improved type and in accordance with my improved method. Fig. 3 is a corresponding section showing the mold and chiller for making my improved car wheel. Fig. 4 is a section on a reduced scale, showing the mold and chiller more extensively than they appear in Fig. 3.

In the manufacture of a cast iron wheel 15 it has been customary to provide a sand mold having an annular metal chiller in a proper position to lie against the tread face 16 of the car wheel. This chiller has been made to extend across the tread surface 16 and down on the adjacent face of the flange 17; in other words, the chiller has been made to extend between the dotted lines 18 and 19 on Fig. 1.

As is well known by those familiar with the art of making chilled cast iron car wheels, the chilled structure is produced by the rapid abstraction by the chiller of the heat of the molten cast iron. The effect is to produce a large proportion of iron carbid where this chilling occurs. Iron carbid is a white intensely hard substance. As thus produced, it has a certain grain extending in a direction normal to the surface, that is, extending in a direction which is along the lines of flow of the heat to the chiller. This grain is indicated in Fig. 1 by the lines 20. If a chilled car wheel is broken across its tread, so as to give a section like that illustrated in Fig. 1, the white chilled structure with the grain that has just been described is very apparent.

One of the stresses to which a car wheel is subject when in use is a lateral thrust by the head of the rail on which it runs, tending to tear the flange off from the wheel rim. Thus it happens that sometimes a seam starts in the throat 35 and extends up, as indicated by the dotted line 21. The grain of the chilled metal at this point extends in the direction which this seam naturally takes, as indicated by the lines 22.

According to the exemplification of my invention which I describe in this specification, a supplemental chiller is provided, which extends from the dotted line 19′ to the dotted line 19″, so that the entire flange 17′ is cast against a chiller or chillers, as illustrated in Fig. 2. As shown in the particular embodiment of my invention, illustrated in the drawings, the chiller also extends farther around the edge of the rim away from the flange. The entire extent of the chiller is indicated in Fig. 2 by the dotted lines 18′, 19′ and 19″. The lines of flow for the heat of the molten metal on its way to the chiller are designated 20′. In the flange 17′ these lines 22′ take the direction indicated in Fig. 2, the significance of which will be discussed presently. Not only do they have the different direction as indicated, but their entire length is greater than at the main tread surface 16′. This is because the body of metal in the chiller around the flange is relatively greater than the body of metal in the flange itself, and hence more heat is abstracted from the flange, and the chill extends farther back from the junction surface than is the case for the tread part of the wheel, where the

body of metal in the chiller and the body of metal in the wheel (to equal distances from their junction surfaces) are approximately the same.

The dotted line 21′, in Fig. 2, shows the direction that would naturally be taken by a seam starting in the throat 35′ if the metal were chilled in the ordinary manner. As a seam always follows or tends to follow the grain of the chilled metal it is apparent from the figure that a seam will not follow the line 21′ which leads off across the grain, but will tend to follow the dotted line 21″, in which there is a large section of metal, so great as to prevent the fracture extending all the way through the tread, making it very improbable that a flange failure will occur. By my invention the grain is directed and lengthened in the portion of the metal extending back from the throat, so that this grain runs across the direction that would otherwise be taken by a seam starting in the throat, and hence the wheel is made stronger to resist the formation of any such seam.

As is well known, different compositions of iron, carbon and other ingredients may give different depths of chill, and it is considered desirable to use such a composition as will give enough depth of chill to make a durable wearing surface, but not so great depth of chill as to weaken the wheel. The body of the wheel, back from the wearing surfaces, should be of softer, tougher material, as will be the case if its carbon separates out in solidifying in the form of graphite instead of solidifying as iron carbid. Inasmuch as a wheel produced in accordance with my invention has longer chill lines (compare 22′ with 22) in the throat of the wheel where the greatest wear occurs, it follows that a composition for casting can be used which has a slightly less tendency to depth of chill and thus a greater tendency to give tough iron in the body of the wheel. Sometimes car wheels, constructed as indicated in Fig. 1, have a tendency to split off the part of the wheel rim designated 37. The corresponding part 37′ in Fig. 2 is chilled to such a depth and with its grain in such a direction that this tendency is largely obviated.

Fig. 3 shows the arrangement of the mold and chiller for casting my improved wheel. The main chiller 23, the pattern 24, and the flask 25 are fitted together and placed in an inverted position, as compared with Fig. 3. Sand 28 is then tamped in above the pattern 24 and then the bottom board 29 is applied. The parts being held in position by means of the nowel pins 30, the clamp 31 and the wooden wedges 32, the assembled apparatus is inverted so as to bring it into the position shown in Fig. 3. Thereafter the sand 33 is tamped in place. As shown, the bars 39 are provided so that the upper part of the mold can be raised to remove the pattern 24.

The flask 25 is provided with a supplemental chiller 26 forming an integral part thereof, which extends across and around the face of the flange away from the tread. The main chiller 23 is extended in the part 27 around the edge of the wheel rim that is away from the flange. When the cast iron composition is poured in the space formerly occupied by the pattern 24, the heat flows from the molten metal to the complete chiller 26—23—27, the lines of flow being as indicated in Fig. 2.

By the use of my improved mold and by the practice of my improved method, a car wheel is produced, which, with the same weight of material as formerly used, has greater strength to resist certain stresses to which it may be subject in use, and which is accordingly of increased security and durability.

The method or process claimed herein is limited to the making of car wheels of cast iron as distinguished from steel, and where the word "iron" is employed in the claims, "cast iron" is intended, it being the intent to distinguish from steel.

I claim:

1. A mold for casting iron car wheels having a chiller around its periphery and formed elsewhere of material of low heat conductivity, said chiller extending around the side of the flange away from the tread.

2. A mold for casting iron car wheels having a chiller round its periphery and formed elsewhere of material of low heat conductivity, said chiller extending across the tread and around the side of the flange away from the tread.

3. A mold for casting iron car wheels having a chiller around its periphery and formed elsewhere of material of low heat conductivity, said chiller extending across the tread and around the side of the wheel away from the flange.

4. A mold for casting iron car wheels having a chiller around its periphery and formed elsewhere of material of low heat conductivity, said chiller comprising a part extending around the tread and contiguous the face of the flange and a separate part extending around the face of the flange away from the tread.

5. A mold for casting iron car wheels having a chiller around its periphery and formed elsewhere of material of low heat conductivity, said chiller extending across the tread and around the side of the flange away from the tread and extending around the side of the wheel away from the flange.

6. The method of casting an iron car wheel which consists in providing a mold having a chiller for the face of the flange that is away from the tread of the wheel,

pouring the composition of iron into this mold, and thereby causing the grain of the chilled metal to extend generally in a direction back from the extreme edge of the flange toward the body of the wheel rim, and across a normal to the surface in the throat of the wheel.

7. The method of casting an iron car wheel which consists in providing a mold having a chiller extending clear across and around the tread and the flange of the wheel, pouring the composition of iron into this mold, and thereby causing the grain of the chilled metal to extend generally in a direction back from the extreme edge of the flange toward the body of the wheel rim across a normal to the surface in the throat of the wheel and to a comparatively great distance measured along the direction of the grain.

8. The method of casting an iron car wheel which consists in providing a mold having a chiller for the tread surface of the wheel, said chiller extending around the edge of the rim away from the flange, pouring a composition of iron into this mold, and thereby causing the grain of the chilled metal to extend normally to the surface on the tread and around the edge of the rim referred to, thus strengthening said edge of the rim.

9. The method of casting an iron car wheel which consists in providing a mold having a chiller for the face of the flange that is away from the tread of the wheel, pouring the composition of iron into this mold and thereby directing the grain of the chilled metal across the direction in which a seam would tend to start and extend from the throat if the wheel were homogeneous in all directions.

10. A mold for casting an iron car wheel comprising a chiller adjacent to the car wheel flange on the side of the flange that is away from the tread of the wheel, said chiller extending only part-way around said side of the flange.

11. A mold for casting an iron car wheel comprising a chiller adjacent to the car wheel flange on the side of the flange that is away from the tread of the wheel, said chiller extending around said side of the flange such a distance as to make its inner edge have approximately the same radius as the tread surface of the wheel.

In testimony whereof, I have subscribed my name.

FREDERICK K. VIAL.

Witnesses:
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