(No Model.)

R. W. OSWALD.

METHOD OF MANUFACTURING CHILLED CAR WHEELS.

No. 422,435. Patented Mar. 4, 1890.

Fig 1.

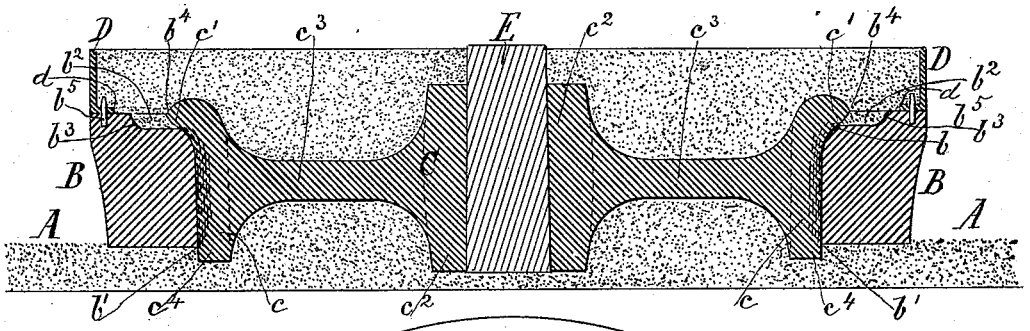
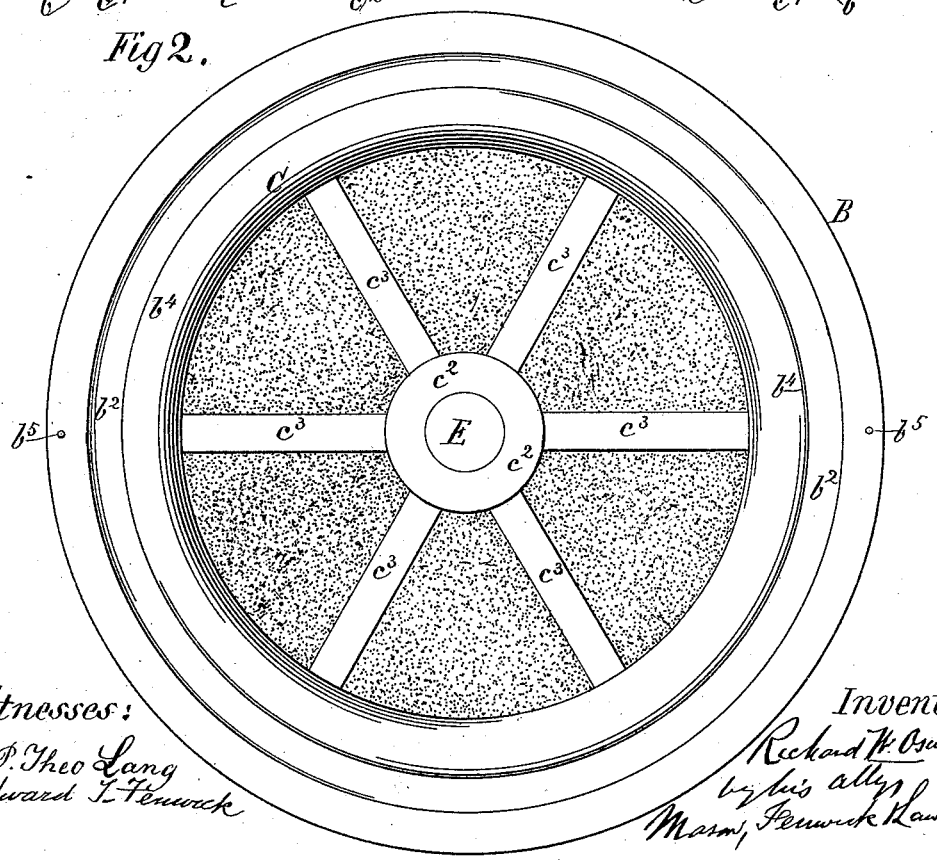


Fig 2.



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UNITED STATES PATENT OFFICE.

RICHARD W. OSWALD, OF BLOOMSBURG, PENNSYLVANIA.

METHOD OF MANUFACTURING CHILLED CAR-WHEELS.

SPECIFICATION forming part of Letters Patent No. 422,435, dated March 4, 1890.

Application filed September 6, 1889. Serial No. 323,190. (No model.)

To all whom it may concern:

Be it known that I, RICHARD W. OSWALD, a citizen of the United States, residing at Bloomsburg, in the county of Columbia and State of Pennsylvania, have invented certain new and useful Improvements in Methods of Manufacturing Chilled Car-Wheels; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the molding and casting of car-wheels in such manner as to produce a chilled tread on the same and leave unchilled a portion of the flange and the felly or rim, and to means by which such result is very cheaply and speedily effected, as will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a vertical central section of a wheel-pattern, a chill-ring, an upper cope, the molding-sand, and central cone, as they appear before the wheel-pattern is removed. Fig. 2 is a top view of the chill-ring and the wheel-pattern as they appear after the molding-sand has been rammed under and between the wheel-spokes up to the surfaces of the same and before the cope is placed upon the chill-ring.

The letter A represents a sand foundation; B, a chill-ring; C, a wheel-pattern; D, a cope, and E a core. The sand foundation A consists of a layer of molding-sand spread about one inch high over the ground of the foundry. Upon this sand foundation the chill-ring B, ordinarily of cast-iron, is set. This chill-ring has its inner surface so shaped as to produce the wearing or wheel-tread surface of the car-wheel. This tread extends a suitable distance between the center of the wheel-flange b^4 and the inner face of the rim or felly c—say from b to b'—and surrounds the wheel-pattern C, leaving an annular portion c^4 of the wheel-felly c and another annular portion c' of the outer flange-surface exposed to the surrounding molding-sand. Opposite the portion c' an annular depression b^2 is formed in the upper surface of the chill-ring B, said depression having an outward beveled annular shoulder b^3. This shoulder, preferably, should join the depression with a curve, as shown, so as to facilitate the escape of the gases along the same when the molten iron is poured into the mold. The shoulder b^3 is in about the same line as the edge or dividing-line b^4 of the wheel-flange, and the space between the same is filled with molding-sand, as shown. Upon the chill-ring B the cope D is placed and held in position by means of an inner flange d, formed on the cope, and two or more dowel-pins b^5, fastened in the chill-ring and fitted into holes in the said flange.

When a car-wheel is to be cast, the molding-sand is first spread over the ground, as above described. Upon this sand foundation the chill-ring B is firmly set. Then the wheel-pattern C is inserted into the chill-ring. Then the annular space b^2 between the shoulder b^3 and wheel-flange is filled with molding-sand, which is firmly rammed down into it. Then the spaces between the spokes are filled with molding-sand and the same firmly tucked around the hub c^2, rim c, and under and between the spokes, and made even with their upper surfaces. Upon the thus-prepared lower mold the molding-sand of the upper mold is laid after the cope D has been placed upon the chill-ring, as above described. This sand is firmly tamped in between the cope D, upon the spokes c^3, and around and upon the hub c^2. The usual air and gas vents are then made in the sand, and the cope D, with its mold, is then removed, the wheel-pattern C taken away, center core E put in place, and finally the cope D replaced upon the chill-ring, whereupon the mold is ready for casting. When the molten metal is poured into the mold, the portion c^4 is filled up in the beginning, and as the metal rises and comes in contact with the chill-ring B its contact-surface becomes chilled and extremely hard to a certain depth, about as much of it as is indicated by cross-lines in Fig. 1 of the drawings. Rising above the level of the chill-ring the molten metal comes in contact with the sand held in the annular depression b^2, and there cools slowly, and while so cooling retains its qualities of toughness at the points where it meets with the sand of the mold. When finished, the tread of the wheel from c' to c^4 will be found chilled, while the remaining portion of the same is not chilled.

Steel wheels could be molded and cast in the described manner and with the same result as to greater hardness at the wheel-tread.

I am aware that attempts have been made to accomplish what I have succeeded perfectly in doing—that is, the flange of a car-wheel outside its tread has been molded in sand for the purpose of rendering it tougher and softer than the tread—but in such cases the sand below the rim or parting-line of the flange has been confined between the chill-ring and an annular ring or lid fastened to the chill-ring on or about a level with the dividing-line of the flange, (indicated in my drawings at b^4.) This lid or ring produces an annular chill upon the flange, whereby the flange is rendered liable to crack or break when going over crossings, frogs, or any other obstruction along the track, and therefore it comes short of a complete success. Other constructions having a sand groove in the top portion of the chill-ring produce the same objectionable result, while in my improved wheel-mold this objection is entirely obviated. The defects in the constructions mentioned result from the ordinary imperfect method of molding with the aid of two copes. In this method the wheel is partly molded from one side in one of the copes and the chill-ring united. Then the cope and chill-ring, with mold and wheel-pattern, are turned over, the other cope secured to the chill-ring, and the mold finished on the outer side of the wheel. It is easily seen that were my mold turned over for a similar purpose the sand in the depression b^2 would drop out of it and the mold would be spoiled. It is also evident that with a mold which requires only one cope and is not turned over while being made the casting operation can be accomplished in much less time than with molds of the kind mentioned, and such molds do not require very skilled persons to manipulate them, and the cost of the chill-wheels is very much less.

What I claim is—

The within-described method of molding and casting car-wheels with chilled tread and unchilled flange, consisting in first forming a fixed lower sand-mold section by setting a chill-ring upon a fixed sand foundation, inserting the wheel-pattern from above downwardly into the same, filling an annular depression in the upper surface of the chill-ring up to the edge of the flange with sand, and molding the sand between the hub and rim of the wheel-pattern; second, in forming a removable upper sand-mold section by setting upon the chill-ring a cope and covering the remaining portion of the wheel-pattern within the cope with rammed sand; third, removing the cope and the wheel-pattern, reuniting the two mold-sections, and pouring the metal into the same, substantially as described.

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

RICHARD W. OSWALD.

Witnesses:

E. C. WELLS,

R. B. ANGELL.