(No Model.)

W. WILMINGTON.

METHOD OF CASTING CAR WHEELS.

No. 273,658. Patented Mar. 6, 1883.

Fig. 1

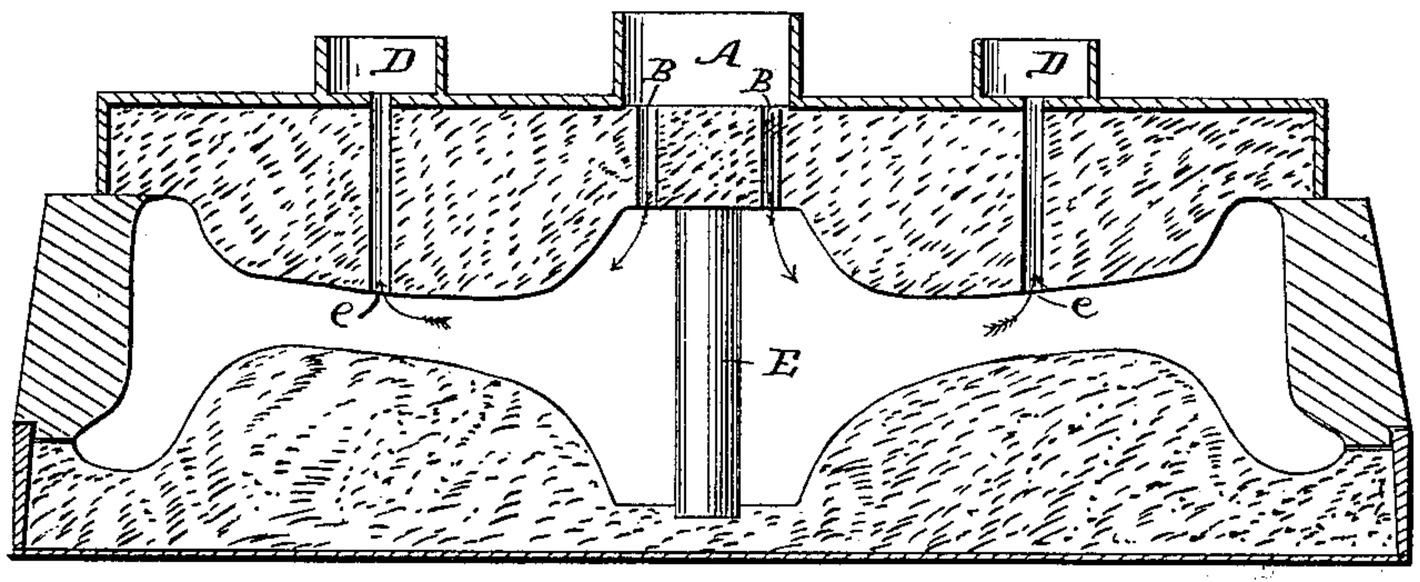


Fig. 2.

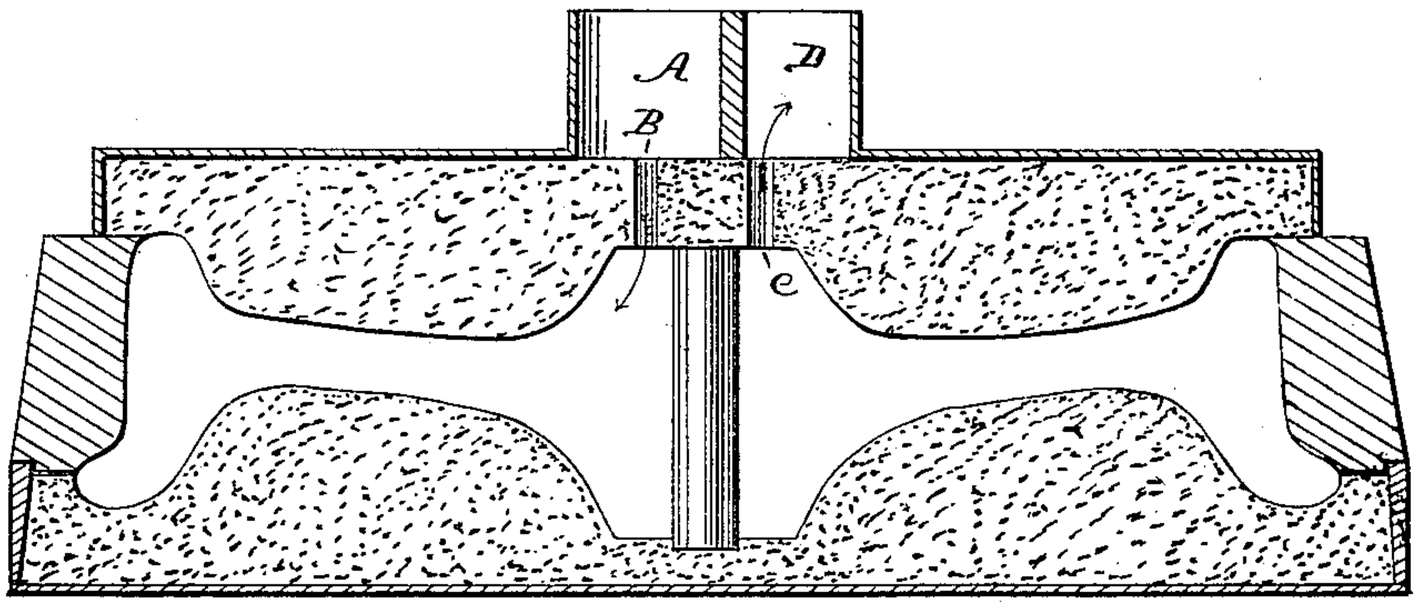
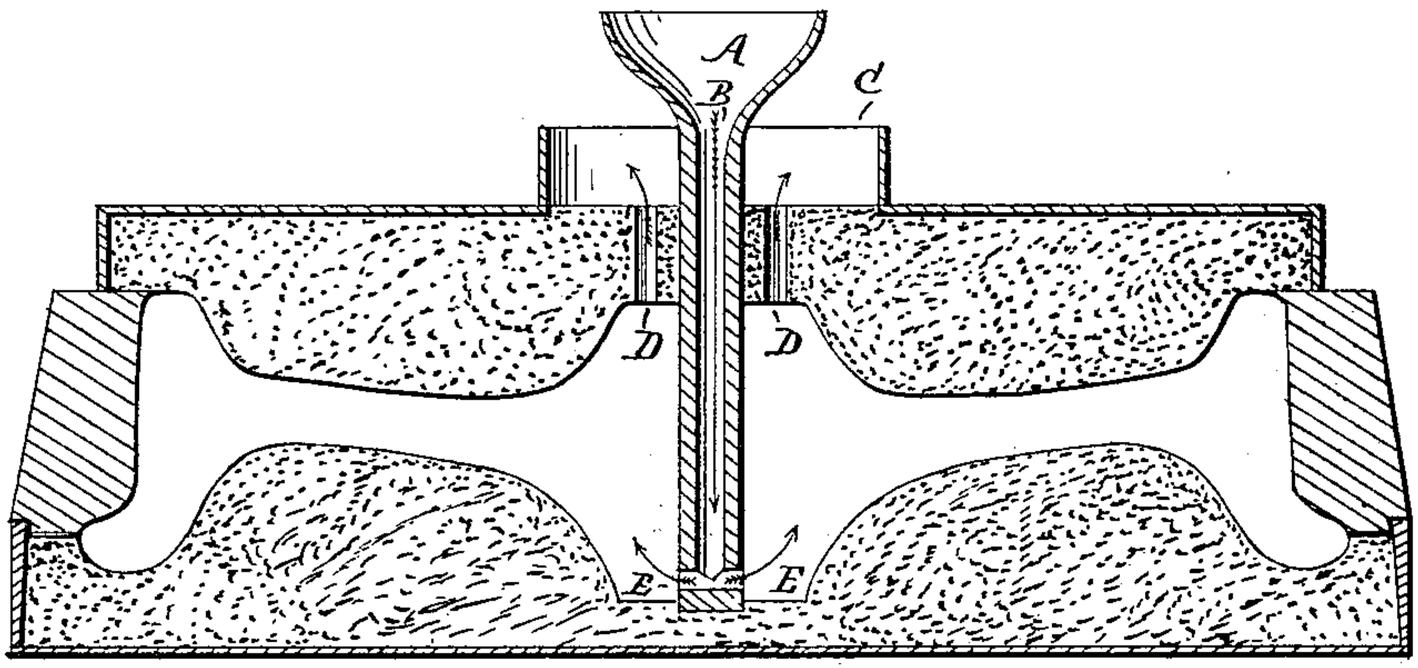


Fig. 3.



WITNESSES:

Thos. Houghton.

Edw. U. Byrn.

INVENTOR:

Wm. Wilmington

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

WILLIAM WILMINGTON, OF TOLEDO, OHIO.

METHOD OF CASTING CAR-WHEELS.

SPECIFICATION forming part of Letters Patent No. 273,658, dated March 6, 1883.

Application filed January 20, 1883. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WILMINGTON, of Toledo, in the county of Lucas and State of Ohio, have invented a new and useful Improvement in Methods of Casting Car-Wheels; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to an improvement in casting wheels for railway-cars, the object of which is to modify the chilling qualities of the cast-iron last poured, and prevent it from becoming too hard and rigid in the hub and the inner-plate portions of the wheel, which hardening occurs from the molten iron forming these parts being too suddenly cooled by contact with the moist sand and the cold compact cores of the mold. The prevention of this hardening at the hub and inner-plate parts of the wheel by an admixture of another quality of metal at this point will secure a degree of softness to the hub and elasticity to the plates, the advantages of which are well known.

Heretofore Letters Patent of the United States have been granted me at different times and for different methods of casting car-wheels from two different qualities of molten cast-iron, melted in separate cupolas and poured separately into the mold from different ladles. The object of this general method was by a second pouring into the mold of a soft and strong iron to modify the chilling qualities of the first metal poured forming the hub and inner plates of the wheel. These different methods have all been unsatisfactory from various causes, in part from the difficulty to operate in unison two cupolas to melt the different qualities of irons at the proper times to fill the mold of the wheel. Furthermore, the use of two cupolas made it necessary to have two sets of operatives when pouring the wheel, which increased the cost of the wheel and made such methods objectionable.

To avoid these difficulties, lessen the cost, and improve the quality of car-wheels is the object of my present invention, which consists in first nearly or quite filling a mold of any form of a car-wheel with suitable molten chill-hardening cast-iron, having the proper proportion of partially-combined carbon in its composition that will, when brought in contact with the chill of the mold, be quickly solidified, thereby making the metal forming the tread white in color and very hard. Then immediately after the mold is filled I place in the central receiving-basin of said mold, with the molten metal remaining in the same, finely-powdered or granulated metal known in commerce as "ferro-manganese," in quantity, by weight, of about two per cent. of the molten metal, to be afterward poured into the basin from the same ladle that the mold had been filled from. I then wait about half a minute for the powdered ferro-manganese to be melted by contact with the molten metal in the basin, and also for the purpose of permitting the molten iron in contact with the chill of the mold to solidify. I then pour into the basin about one-twentieth the quantity of molten iron first poured, which iron last poured carries with it the ferro-manganese into the mold, which has been melted by contact with the molten iron in the basin. The inflow of this last metal into the mold will cause a partial displacement of the metal forming the hub and the inner-plate parts of the wheel, (a portion of the metal in the mold being permitted to flow out of the mold), and will cause the ferro-manganese to be disseminated in these portions of the wheel. This last inflow of metal, having a large percentage of silicon and carbon imparted to the same by the ferro-manganese, will modify the chilling qualities of the molten iron forming the hub and the inner-plate portions of the wheel. To accomplish this same result of softening the hub and plate portions of the wheel in some qualities of chill-hardening irons, I use, instead of ferro-manganese, powdered or granulated spiegeleisen, in about the same quantities as the former metal and in the same manner. In other qualities of chill-hardening irons having less partially combined carbon in their composition I use granulated metal made from argillaceous or black band ores of iron having in its composition a large amount of silicon and uncombined carbon. This variety of granulated metal I prefer to place in the ladle after the first pouring with the molten iron from which the mold has been filled, a quantity of the metal from argillaceous or black band ore, by weight about four per cent. of the molten iron to be poured last. However, this will de-

pend upon the percentage of silicon and uncombined carbon in its composition. In still other combinations of chilling-irons used for car-wheels I obtain better results by combining, in about equal portions, granulated ferro-manganese, spiegeleisen, and the metals made from argillaceous ores, placing the combinations of granulated metals in the central basin, or in the ladle with molten iron from which the mold was filled. However, I do not confine myself to the use of the exact proportions named of the granulated metals referred to, but use such proportions of each, singly or in combination, as in practice will produce the best results in softening the central portions of the wheel by the method described.

In order that my invention may be better understood, I have represented in the accompanying drawings several different molds for casting a single-plated car-wheel, with which molds are combined the necessary appliances for conducting out of the mold the displaced chill-hardening iron.

Figures 1, 2, and 3 represent vertical sections of a car-wheel mold.

Fig. 1 in the drawings represents a cross-section of a mold for a single-plated car-wheel. Letter A shows the central receiving-basin. Letters B are the openings by which the molten iron enters the mold. Letters *e* are the outlet-openings by which the chill-hardening iron is displaced from the mold by the inflow of the last-poured metal. Letters D represent receptacles formed by inclosing the sides of the openings to retain the outflowing metal.

Fig. 2 represents a modification of the appliances for displacing the chill-hardening iron and the reservoir for holding the same. Letter A represents the receiving-basin, constructed near the central part of the mold. Letters B are openings in the bottom of the same for the admission of the molten iron into the mold. Letter *e* represents an outlet-opening by which a displacement takes place of a portion of the chill-hardening iron at the hub part of the mold. Letter D is the reservoir for receiving this displaced chilling-iron.

Fig. 3 represents a cross-section of another modification of the receiving-basin and the reservoir for the reception of the displaced chill-hardening iron. Letter A represents the receiving-basin. Letter B is an opening leading down through the body of the central core. Letters E are outlets from the same, forming ways for the metal to enter the mold. Letters D are openings leading out of the mold into the reservoir, letter C, to receive the discharged chill-hardening iron.

I disclaim as my invention in this application the methods of casting car-wheels from two different qualities of molten cast-iron melted in separate cupolas or furnaces and poured separately into the mold, and filling the same, for these methods have been practiced to some extent. I also disclaim as my invention the form of the molds and their appliances; also, the form of the wheel to be cast therein, for these have long been in use. I furthermore disclaim all methods of alloying molten iron or steel by an admixture of ferro-manganese, spiegeleisen, or metals made from argillaceous ores when the same is melted in a furnace, cupola, or crucible, for this is common.

What I claim as my invention is—

The method of casting car-wheels, which consists in nearly or quite filling the mold with melted chill-hardening cast-iron having partially-combined carbon in its composition, and then placing in the receiving-basin of the mold finely-powdered or granulated ferro-manganese or its equivalent, as described, having a large per cent. of silicon and carbon in its composition, allowing this to become melted and disseminated through the iron in the basin and the molten iron in contact with the chill of the mold to solidify, then pouring a small quantity of molten iron into the receiving-basin to carry the ferro-manganese into the mold, causing its diffusion and admixture with the first-poured iron in the hub and inner-plate parts of the wheel by a partial displacement of the iron first poured, which is discharged from the mold in the manner described.

WILLIAM WILMINGTON.

Witnesses:
LINCOLN HAYES,
ALEXANDER WEBER.