(No Model.)

W. G. RICHARDS.

PROCESS OF CASTING STEEL CAR WHEELS.

No. 459,048. Patented Sept. 8, 1891.

Fig. 1

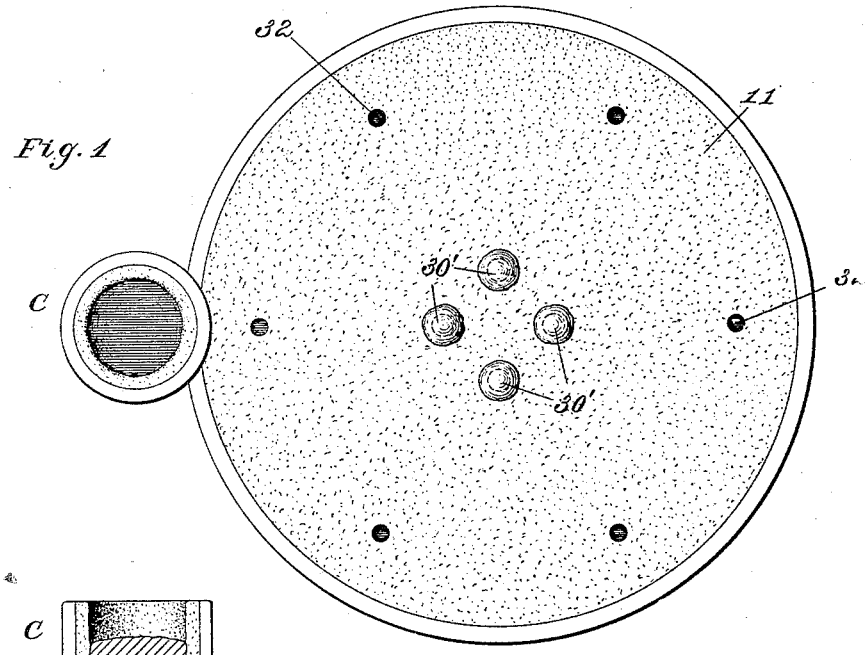


Fig. 2

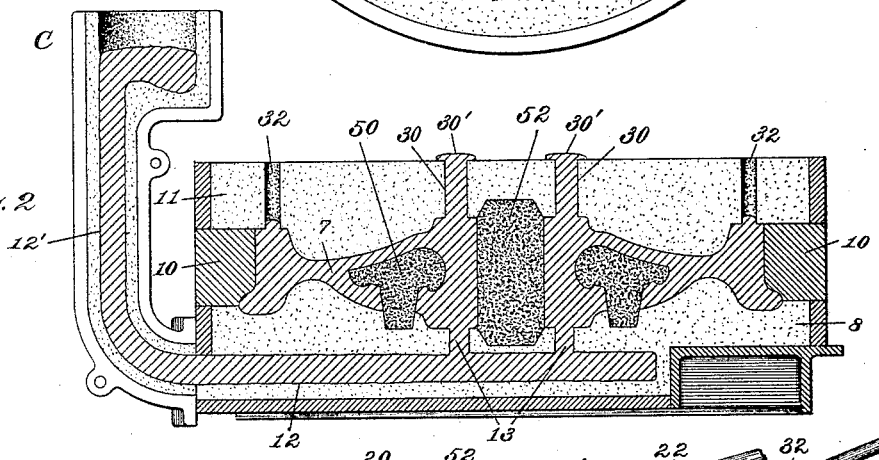
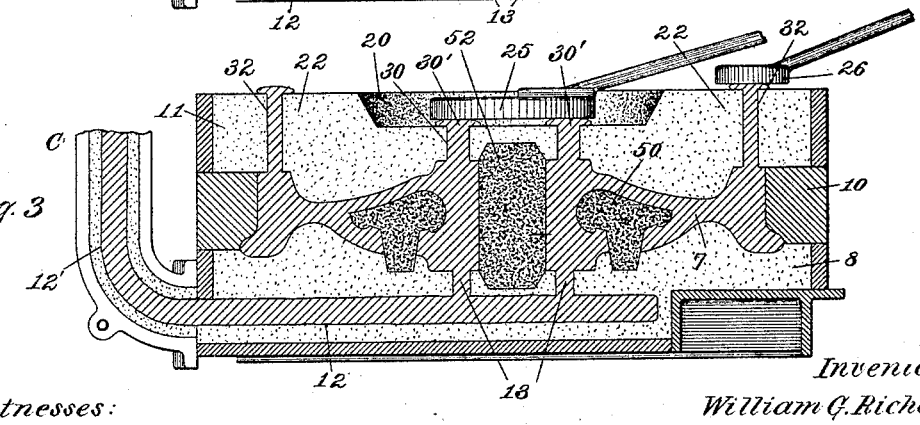


Fig. 3



Witnesses:
H. Mallmer
Henry L. Rockard.

Inventor:
William G. Richards.
By his Attorney,
F. A. Richards

UNITED STATES PATENT OFFICE.

WILLIAM G. RICHARDS, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE AMERICAN STEEL WHEEL COMPANY, OF NEW JERSEY.

PROCESS OF CASTING STEEL CAR-WHEELS.

SPECIFICATION forming part of Letters Patent No. 459,048, dated September 8, 1891.

Application filed April 11, 1891. Serial No. 388,439. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM G. RICHARDS, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Processes of Casting Steel Car-Wheels, of which the following is a specification:

This invention relates to the manufacture of steel car-wheels by the method of casting, the object being to furnish a method wherein the molds are overflowed in the casting operation for properly freeing the mold of impurities and the feeding of the rim of the wheel-casting.

In the drawings accompanying and forming a part of this specification, Figure 1 is a plan view of the mold. Fig. 2 is a vertical section through the mold, showing the metal overflowing over the hub-space thereof. Fig. 3 is a similar view showing the metal overflowing at the rim-space of the mold after the overflow of the hub-space has been checked. In this view the mold has its middle portion, which is over the hub-space, of less elevation than the surrounding portions that are over the rim.

Similar characters designate like parts in all the figures.

For carrying my improvements into effect I may use the mold described and claimed in my application, Serial No. 358,657, filed July 14, 1890, said mold being the same, substantially, as the mold shown in the drawings forming a part of this application. The mold consists of or may consist of the nowel 8, the chill 10, set on the nowel, and the cope 11, set on the chill, substantially as indicated in the drawings, and having two sets of vents or overflow-passages, one set 30 being over the hub-space, while the other set 32 is over the rim-space of the mold. The usual cores, comprising the arch-core 50 and the central core 52, are suitably fixed in the mold in the usual manner. In the nowel there is formed a runner 12, extending along under the mold beyond the hub-space thereof and connecting with the hub-space through connecting-channels 13. The mold is filled through a pouring-head C, attached to one side of the mold at or near the base thereof and having its channel 12′ connecting with said horizontal runner 12. The pouring-head C extends to a point somewhat above the top of the mold, so as to obtain sufficient head for causing a rapid flow of metal into the mold. For a more particular description of these several features of the mold in their preferred form reference is made to my aforesaid prior application.

In carrying out my improved method I pour the metal into the mold continuously from the beginning to the end of the pouring operation, and when the mold is properly constructed therefor the metal will overflow through the hub-vents before the rim is entirely filled and before the feeding of the rim is entirely finished. That result is obtained by making the set of hub-vents 30 to have a less "resistance" than the rim-vents 32, their position and distance from the mold-filling passages 13 being considered, and this may be accomplished by suitably graduating the size of the respective overflow-passages 30 and 32. The molten metal being poured into the pouring-head enters the mold at the under side of the hub-space, and therefore naturally fills the central part of the mold most rapidly until it overflows the freer hub-vents 30 30, in the meantime flowing outward through the plate-space 7 of the mold, and at a later moment rising through the rim-vents 32, and finally overflowing the rim. One stage of this operation is illustrated in Fig. 2, where the metal is shown at 30′ overflowing the hub-vents 30, while the rim is only just filled and not yet overflowed. At this moment, during the pouring operation, the workman suddenly checks the overflow at the hub-vents, which may be done by means of a chill, as 25, Fig. 3, placed on the outflowing metal over said vent. This chill by suddenly abstracting heat from the overflowed metal instantly checks the overflow, so that after a very brief time the chill may be removed. Later in the pouring operation and as a sub-process therein the rim-vents are suddenly checked, thereby bringing the full pressure of the head of metal onto the rim for the feeding of the same after the plate-spaces and hub-space are fully filled. For checking the rim-vents the same chill 25 may be used as for the hub-vents, or, if more

convenient, a separate smaller chill, as 26, Fig. 3, may be employed, this being used by the same or by another workman.

The overflow at the hub is an important aid to the making of sound wheels, since it tends to dislodge and carry out of the metal certain impurities; but it is detrimental to the later feeding of the rim. Accordingly during the pouring operation and after the hub-overflow has sufficiently proceeded I check the hub-vents, and thereby direct the momentum of the moving fluid mass toward the rim, thus giving to the metal an impetus which materially promotes the effectiveness of the operations of filling and feeding the rim by more perfectly through-flowing the plate-and-rim juncture after the hub-space is filled and the plate has begun contracting.

Another feature of my improvements (shown in Fig. 3) consists in constructing the molds with the middle portion 20 of the cope of less elevation than the surrounding portions 22 22, which are over the rim, thus making the hub-vents of less height, so that a copious overflow is secured from the inner series of vents before the outer part of the mold is completely filled. By this means more time is obtained between the checking of the hub-overflow and the commencing of the rim-overflow. In practice this feature enables the workman to accomplish the desired result with less haste, and consequently in a more effective manner, insuring a more thorough washing out of the upper and central part of the mold.

Having thus described my invention, I claim—

1. That improvement in the art of casting steel car-wheels which consists in forming the mold with top vents arranged in two sets, one set being over the hub and the other over the rim, pouring the mold to overflowing, and checking the hub-vents after the overflow, whereby an additional impetus is given to the flow of metal toward the rim.

2. That improvement in the art of casting steel car-wheels which consists in forming the mold with top vents arranged in two sets, one set being over the hub and the other over the rim, pouring the mold to overflowing, checking the hub-vents after the overflow, and continuing the rim-overflow after the checking of the hub-overflow.

3. That improvement in the art of casting steel car-wheels which consists in forming the mold with top vents arranged in two sets, one set being over the hub and the other over the rim, pouring the mold to overflowing, checking the set of hub-vents in advance of the other and during the pouring, whereby an additional impetus is given to the overflow at the unchecked vents, and then checking the set of rim-vents while continuing the filling of the mold, thereby directing the momentum of the stream of metal to the feeding of the rim.

WILLIAM G. RICHARDS.

Witnesses:
CORNELIUS DONOHUE,
FRANK MAHERN.