

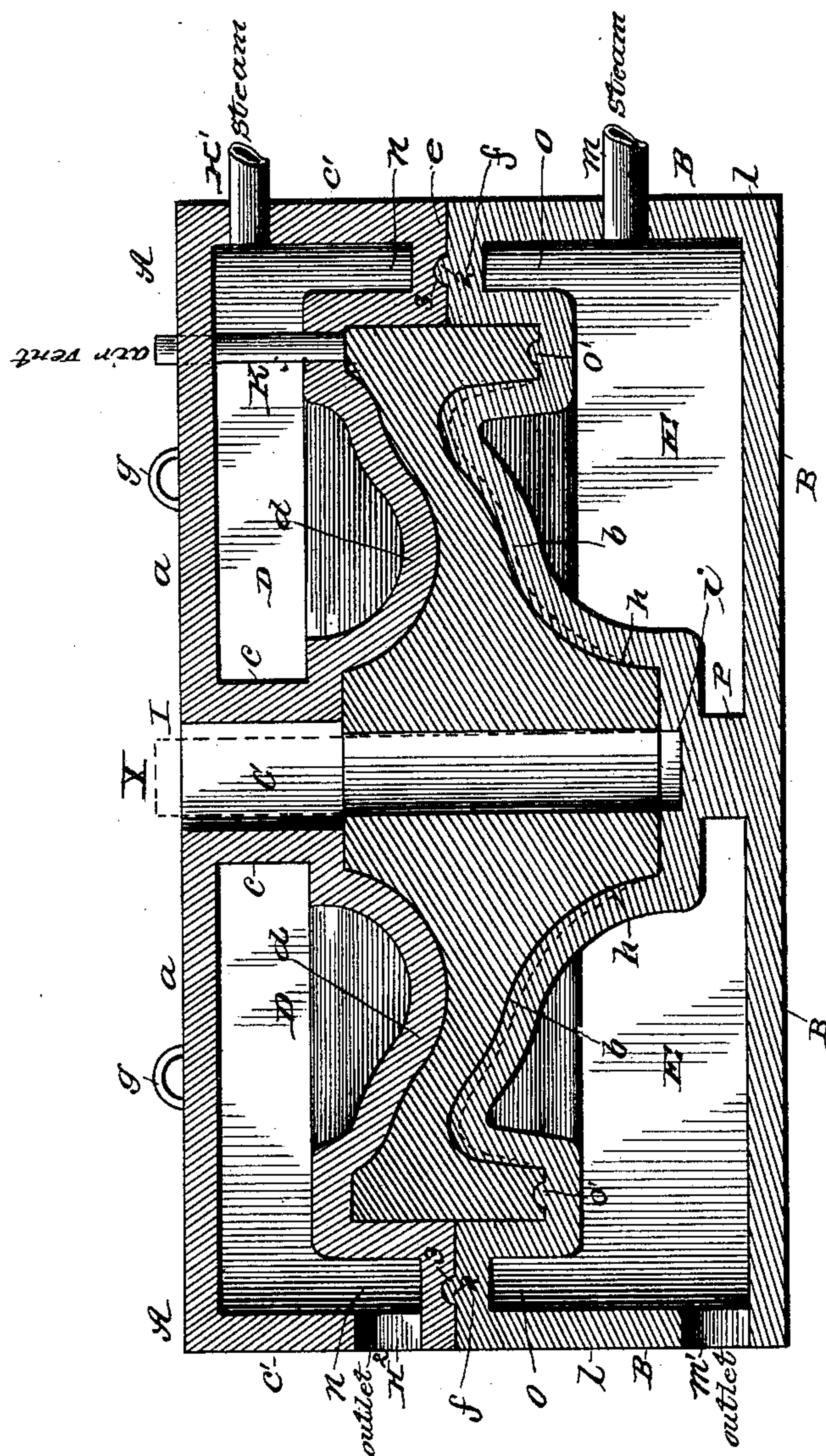
(No Model.)

J. RIGBY.

METALLIC MOLD FOR CASTING CAR WHEEL BODIES.

No. 406,854.

Patented July 9, 1889.



Witnesses,

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UNITED STATES PATENT OFFICE.

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METALLIC MOLD FOR CASTING CAR-WHEEL BODIES.

SPECIFICATION forming part of Letters Patent No. 406,854, dated July 9, 1889.

Application filed November 6, 1886. Renewed December 28, 1888. Serial No. 294,909. (No model.)

To all whom it may concern:

Be it known that I, JAMES RIGBY, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Metallic Molds for Casting Car-Wheel Bodies; 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.

This invention relates to a metallic mold for casting car-wheels or their bodies with molten wrought-iron or steel preparatory to being worked up while hot in suitable dies.

The object of my invention is, first, to make tough, clean, and sharp castings of car-wheel bodies from molten wrought-iron or steel in metallic molds which are kept hot on all sides, so that the casting of soft homogeneous metal may be removed from the mold while hot and without a chilled surface and directly worked up or subjected to hammering in suitable dies, corresponding approximately in shape to the shape of the castings.

Another object is to provide for casting the car-wheel bodies much more rapidly than heretofore, and thus greatly increase the number produced in a given time, and at the same time greatly lessen the usual expense for patterns, sand-molds, and skilled labor.

Another object is to provide a hollow or double-walled metallic mold having heating-chambers, and means for the supply and discharge of steam or other heating-fluid and a central core for the axle-opening, all suitable for casting car-wheel bodies from molten wrought-iron or steel and keeping them hot till they can be removed and placed in dies for after-treatment, as hereinafter more fully described.

Having stated the nature and object of my invention, I will now more particularly describe it with reference to the accompanying drawing, which represents a vertical section through the two-part hollow or double-walled metallic mold with the car-wheel body in position.

Each part A B of the mold is formed independent of the other, and is a core-casting having double walls and heating-chamber.

The upper removable part A of the mold is formed with the flat circular top *a*, having a central opening *x*, at which portion it is joined by the annular neck *c* with the inner wall *d*, which forms one face of the mold. The outer circumferential wall *c'* joins the top *a* with the inner wall *d*, and with such parts and neck *c* forms the heating-chamber D. The inner wall is made of the desired configuration with suitable curves, angles, and depressions to give the desired shape to one face or half of the casting, and has a flat horizontal rim *e* projecting circumferentially beyond the mold-cavity to the outer wall, by which the upper part A rests upon a similar rim *f* of the lower part B of the mold. The faces of these rims are turned true, so as to form a tight joint, and the upper rim is preferably provided with an annular groove 3, while the lower rim is provided with an annular bead 2, of proper dimensions, to fit into the groove when the two parts of the mold are placed in position for use.

The upper part A is provided on top with the eyes or lugs *g*, cast or otherwise secured thereto, and is also provided with a steam-inlet port II' of smaller diameter, and an outlet-port II² of larger diameter, to which the supply and discharge pipes are to be connected. The port II' is preferably of a size to receive a connecting steam-pipe of about three-quarters of an inch diameter, while port II² is of suitable diameter to receive discharge-pipe of about one inch and a half diameter.

The supply and discharge pipes are made of the above relative size for the reason that the three-quarter inch supply-pipe will admit all the steam required, and when the mold is highly heated by the molten metal, the steam in chamber D will rapidly expand into a large volume by the increased heat, and the larger discharge-pipe is thus required to carry off the increased volume, and thus keep up the desired circulation through chamber D to prevent overheating and injury of the metallic mold. A vent-pipe K connects with the mold-cavity at its outer portion and passes up through chamber D and cover *a* for the escape of air and gases when pouring the molten metal into the mold. The upper portion A is provided centrally with the opening or passage C formed by metallic neck *c*. This

passage serves for the insertion of the core I (shown in dotted lines) for forming the axle-opening and for pouring in the molten metal when casting. The lower part B of the mold is composed of the bottom plate *b*, the inner wall *h* of the proper configuration to form one-half of the mold-cavity for casting a car-wheel body and the outer wall *l*. This mold-wall connects by means of the annular rim *f* with the outer circumferential wall *l*, which joins said rim with base-plate *b*, forming the steam-heating chamber E.

Steam-supply port *m* and discharge-port *m'* are provided in the circumferential wall *l*, of about the same dimensions and relative proportions as the ports *H'* *H''*, above described, the discharge-port *m'* being larger than port *m* for the purpose also above described.

A center post *P* supports the mold-wall *h* upon the base-plate *b*. The mold-wall *h* has formed centrally in its inner face the circular depression or recess *i*, immediately below passage C, for receiving and holding the lower end of the core I. The mold-wall has formed in its inner face radial grooves indicated by the dotted lines marked *b*, for forming radial ribs upon the face of the casting. Such wall has also upon its inner face, at the outer annular depressed portion, an annular bead *o'*, for forming a groove in the casting.

By means of the flat annular rims *ef* extending from the inner mold-walls to the outer circumferential walls, as shown, annular pockets or recesses *no* are formed around the mold-cavity and in free communication with or as parts of the steam-heating chambers D and E, so that the heating-chambers extend not only over the top and bottom of the mold, but also around its circumferential portion, which is important in making my wrought-iron or steel castings for car-wheel bodies. Every portion of the mold is thus uniformly heated and a better casting thus obtained.

Since the molten metal is run into the mold through the central passage C, around the core, I preferably incase such core in a metallic jacket, so that it may not be washed down when pouring in the molten metal. It is to be noted that each part of the mold is formed of a double-walled metal casting having a heating-chamber inclosing its portion of the mold cavity, and that no bolts or rivets are used in making the mold.

Previous to casting I may coat the interior surface of the mold with a thin solution or wash of graphite and fire-clay, in order to protect the mold and also to protect the casting from oxidation when removed while hot from the mold.

The coating of graphite and fire-clay applied to the surface of my metallic steam-heated mold accomplishes other improved results, since it prevents the too sudden chilling of the surface of the casting. This is important, for the reason that the metal used in my casting is molten wrought-iron or steel,

which are liable to quickly set before a sharp clear casting can be produced, and for the further reason that my castings are to be worked up in dies where a chilled surface is objectionable.

The parts of the mold being adjusted steam is admitted to heating-chambers D and E, and the mold thoroughly dried and heated. The core I is adjusted in opening C and depression *i*, and the molten metal is poured in through opening C, while air and any gases present escape through vent-pipe K. Steam is continuously admitted to chambers D and E and allowed to escape, so as to maintain a circulation thereof till the casting is sufficiently set to remove from the mold. The circulation of steam is maintained to prevent injurious overheating of the metallic mold, and also to prevent chilling of the casting.

Since it is my purpose to make car-wheel-body castings from molten wrought-iron or steel, it is essential to have a hot mold in order to secure a sharp clean casting, and since the casting is to be worked while hot by hammering in correspondingly-shaped dies, it is essential that its surface should not be chilled, and for this reason no water or other cooling medium is used in contact with the mold, but, on the contrary, circulation of steam is maintained in chambers D E till the casting is removed from the mold.

In double-walled metallic molds for casting pipes, heretofore described, the webs connecting the outer and inner walls are unlike my annular rims *ef*, which connect the circumferential mold-wall with the outer wall, and form annular recesses *no*, so that the periphery of the car-wheel casting may be subjected to the same heat as the sides thereof. When steam is passed from one chamber of the hollow mold to the other chamber, it becomes so much superheated in the first chamber that it cools the casting unequally upon opposite sides, and causes a strain upon and weakening of the metal, and I avoid this defect by admitting steam direct from the initial source to each chamber of the mold and conduct it off directly from each chamber, thus securing uniform action on both sides of the casting. By making the outlet-port of each chamber larger than the inlet-port, as above described, the steam as it becomes expanded by the heat of the casting has free escape, and a proper circulation is thereby maintained.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a metallic mold for casting car-wheel bodies, the upper removable hollow portion A, having neck *c*, connecting the outer and inner walls and forming central passage C for insertion of the axle-core and pouring in the molten metal, in combination with the lower hollow portion B, and provisions for fitting the upper and lower portions of the mold together, substantially as described.

2. In a double-walled metal mold for casting car-wheel bodies, the upper removable portion A, having the annular rim *e*, connecting the circumferential mold-wall with the
5 outer wall, and neck *c*, forming central passage C, in combination with the lower portion B, having rim *f*, connecting the circumferential mold-wall with the outer wall, and also central recess *i*, formed in the inner sur-

face of the mold-plate below passage C, for receiving the axle-core I, as described.

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

JAMES RIGBY.

Witnesses:

ANDREW PARKER,
D. W. PATTERSON.