(No Model.)

N. WASHBURN.

METALLIC MOLD.

No. 401,804. Patented Apr. 23, 1889.

Fig: 1.

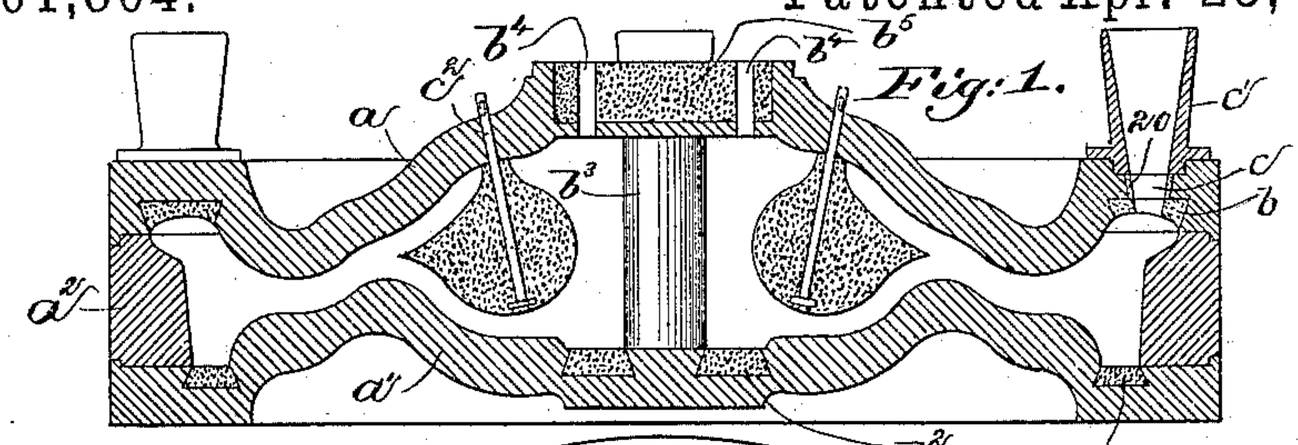


Fig: 2

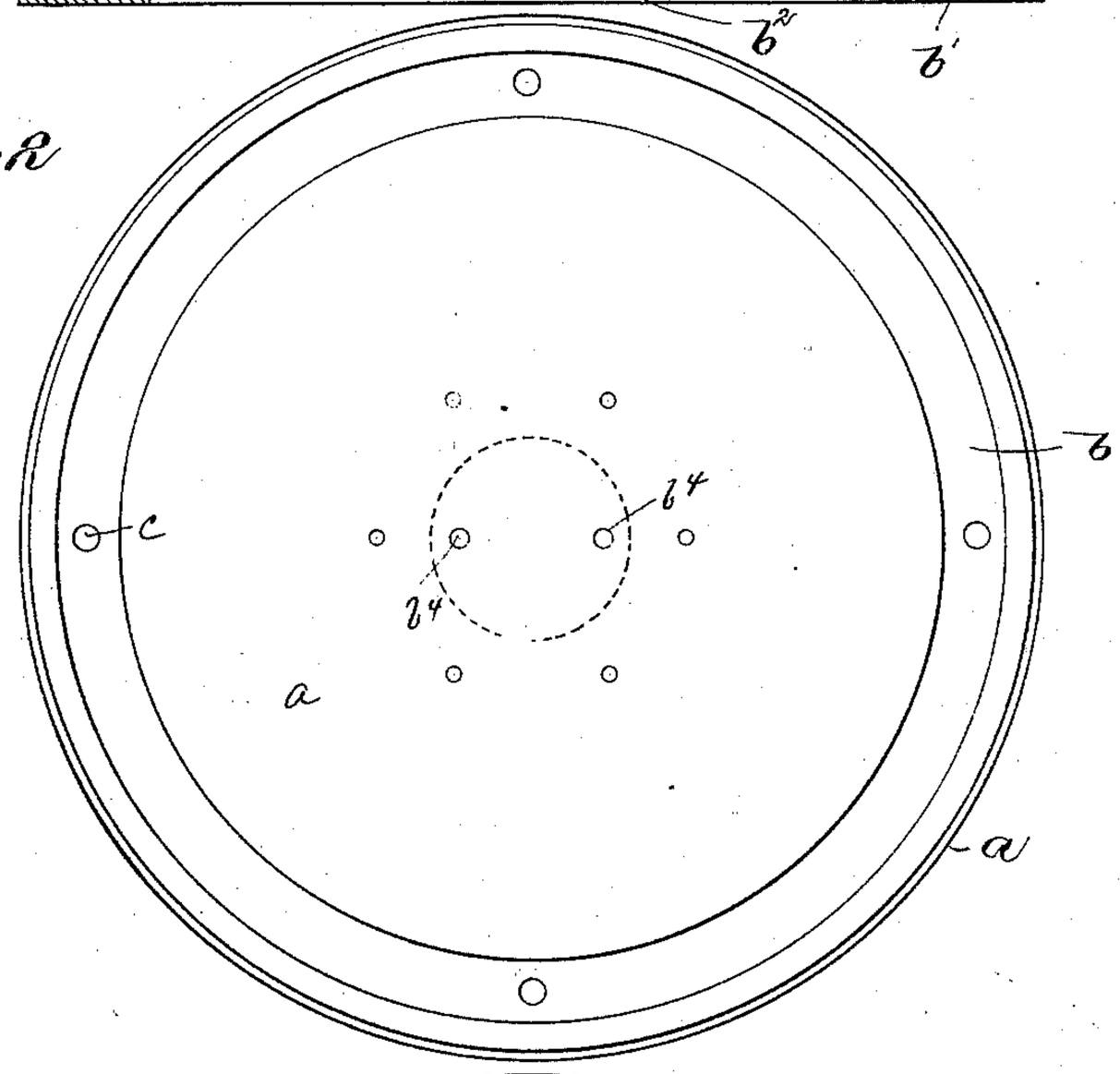
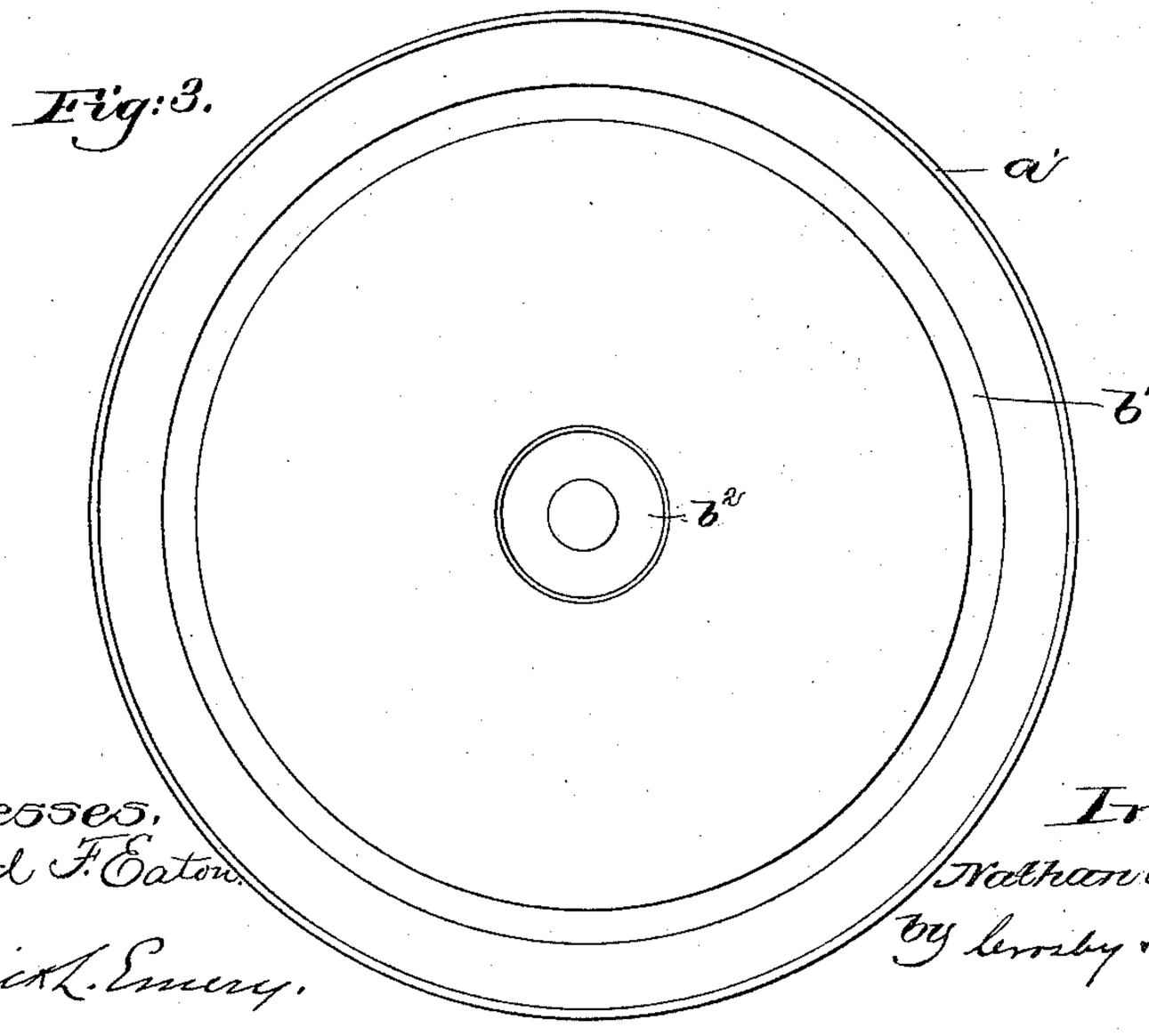


Fig: 3.



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UNITED STATES PATENT OFFICE.

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METALLIC MOLD.

SPECIFICATION forming part of Letters Patent No. 401,804, dated April 23, 1889.

Application filed December 21, 1888. Serial No. 294,248. (No model.)

To all whom it may concern:

Be it known that I, NATHAN WASHBURN, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Metallic Molds, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object the production of a novel metallic mold for casting steel car-wheels, preferably made from manganese steel—that is, steel containing a substantially large amount of manganese.

Prior to my present invention attempts have been made to cast car-wheels and similar objects in a metallic mold; but such attempts have resulted in failures, owing to the sudden cooling of the molten metal cast into the mold, more especially at the rim, where the metal first tends to set. In my experiments I have discovered that the steel which is to form the flange and rim of the wheel may be made to retain its heat sufficiently long to prevent the metal from setting before the mold is filled with molten steel by providing the metallic mold at the points or places where the molten metal strikes the mold and tends to immediately set—namely, at the flange and rim—with a layer or lining of non-metallic refractory and preferably non-heat-conducting material—such, for instance, as a mixture of ganister, plumbago, and clay. The layer or lining referred to, located at the flange and rim of the mold, being non-heat-conducting, the molten steel poured into the mold is not cooled or set, but retains its heat, so that as the steel in the mold cools and contracts fresh molten steel supplied from the risers or feeders maintains the mold full of steel, so that a uniform setting and contraction of the wheel takes place.

My improved metallic mold is made of independent pieces or parts easily detachable one from the other, so that after the molten steel has partially set the said parts may be moved, as will be described, to relieve the metal wheel from strain as it further contracts, thus preventing the metal wheel from shrinking upon the parts of the mold.

My invention therefore consists in a metallic mold for the production of steel car-wheels, it consisting of a metallic top plate, a metallic bottom plate, and a metallic rim detachably connected together, the said top and bottom plates being provided near their circumference with annular layers of non-metallic refractory material, whereby the molten steel poured into the mold retains its heat and is prevented from setting, substantially as will be described.

Figure 1 is a transverse section of a metallic mold embodying my invention for producing steel car-wheels; Fig. 2, an under side view of the top portion or plate of the mold; and Fig. 3, a top or plan view of the bottom portion or plate.

My improved mold is composed, as herein shown, of a top plate, a, a bottom plate, a', and an annular ring, a^2, preferably of cast-iron, the said plates and ring being shaped to conform to the shape of a car-wheel. The top plate, a, and bottom plate, a', are provided with annular channels or grooves to receive layers b b', respectively, of non-metallic and non-heat-conducting material—such, for instance, as a plastic material made of ganister, plumbago, and clay. The bottom plate, a', is also provided, near its center preferably, with an annular channel or groove, into which is fitted a layer, b^2, of the non-metallic non-heat-conducting material. The top plate is provided with a central opening, into which is fitted the plate b^5, of sand, provided with runners b^4, through which the molten steel is admitted into the mold from a supply-basin, in practice located above the runners, and not herein shown.

The top plate, a, near its circumference, is provided, preferably, with a number of channels or ducts, c, through which the molten steel poured into the mold rises into the feeders or risers c', placed on the top plate above the said ducts, the said feeders being shown as dovetailed into the said top plate.

The top plate, a, has secured to it, as herein shown, rods c^2, extended into the mold, and supporting dry-sand cores of sufficient or desired size to form the hollow bell of the wheel.

In casting a car-wheel in my improved mold the steel flows from the basin referred to through the runners b^4 and into the mold. The molten steel first strikes the layer b^2 of refractory material, which prevents the molten steel from cutting into the bottom plate. The

molten steel is poured into the mold until it rises in the feeders or risers c' substantially on a level with the top of the mold. The molten steel strikes the layers b b', and is prevented by the refractory and non-heat-conducting nature of the said layers from parting with its heat, so that the steel in contact with the said layers retains its heat and is maintained in such molten condition as to avoid setting, and as the said steel contracts the molten metal in the feeders or risers descends into the mold, so that when the wheel or casting is set and formed the metal will fill the mold and form a perfect wheel or casting. As soon as the steel in the mold has become set, which in practice takes but a few minutes, the top and rim plates are lifted or removed from the bottom, and the top then lifted from the rim, so that when the steel cools it will be relieved from strain—that is, the said steel is free to contract uniformly.

The interior of the mold will preferably be washed with a non-heat-conducting material to prevent the molten metal from cutting the metallic mold.

After the mold is filled with metal and the car-wheel formed some metal may remain in the risers, the said metal forming what is known to the trade as "sprues." To prevent the sprues from adhering to the sides or walls of the openings c in the top plate, the said openings are provided with a layer or lining of refractory non-metallic material, as shown at 20, Fig. 1.

I claim—

1. A metallic mold for the production of steel car-wheels, it consisting of a metallic top plate, a metallic bottom plate, and a metallic rim detachably connected together, the said top and bottom plates being provided near their circumference with annular layers $b\,b'$ of non-metallic refractory material, whereby the molten steel poured into the mold retains its heat and is prevented from setting, substantially as described.

2. The combination, with a metallic mold for the production of steel car-wheels, consisting of a metallic top plate and a metallic bottom plate, each provided with an annular groove at its outer edge or circumference and a metallic rim, of a layer of non-heat-conducting material in said groove, a second layer, b^2, of non-metallic material near the center of the mold, and a sand or non-metallic core, the top and bottom plates being detachable from the rim, substantially as and for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

NATHAN WASHBURN.

Witnesses:

JAS. H. CHURCHILL,

MABEL RAY.