H. WIARD, W. R. BULLOCK & L. W. HALL.

Device for Cooling Casting.

No. 219,130. Patented Sept. 2, 1879.

Fig. 1.

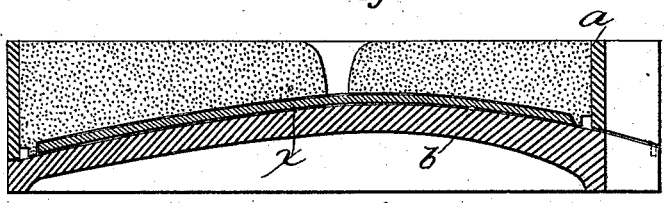


Fig. 3.

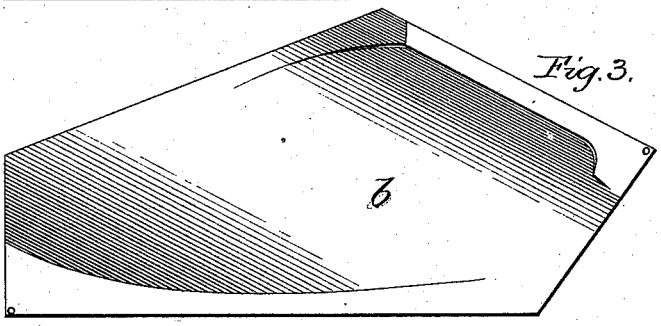


Fig. 4.

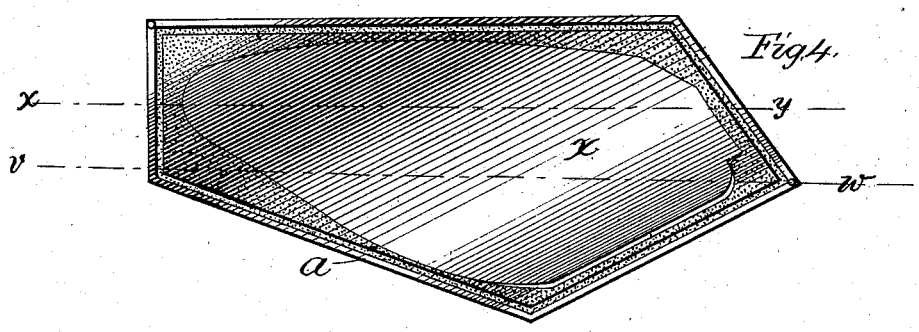
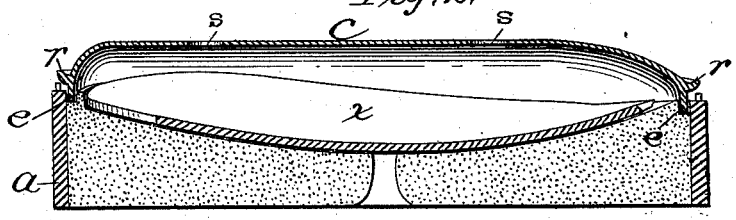


Fig. 2.



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UNITED STATES PATENT OFFICE.

HARRY WIARD, WILLIAM R. BULLOCK, AND LEVI W. HALL, OF SYRACUSE, NEW YORK.

IMPROVEMENT IN DEVICES FOR COOLING CASTINGS.

Specification forming part of Letters Patent No. **219,130**, dated September 2, 1879; application filed April 25, 1879.

To all whom it may concern:

Be it known that we, HARRY WIARD, WILLIAM R. BULLOCK, and LEVI W. HALL, of Syracuse, New York, have invented certain Devices for Cooling Iron Castings for Mold-Boards of Plows and other purposes, of which the following is a specification.

Several devices have been essayed for cooling chilled cast-iron mold-boards, car-wheels, &c., such as a heated plate placed upon the surface of the casting, or the free admission of external air thereto; and such castings have been buried in sand or combustible matter, none of which devices are our invention, and fail, so far as our experience has proved, to effect the object of preventing undue strain, breakage, or other injury to the casting or drawing the chill in the process of casting.

Castings made on the principles heretofore patented we have found to more or less shrink and warp and crack in cooling, rendering them liable to break afterward.

The most approved methods that we have known and heretofore employed were to cover the chilled surface of the casting, after removing the chill, with heated sand, or with some carbonaceous or other solid matter of analogous character tending to increase the heat. We have found the following practical difficulties in their use: It is impossible to thereby equalize and control the heat, cooling all parts alike; and when combustible matter is employed it is ignited, and not only increases the heat most at those points where the casting is the hottest, but somewhat draws the chill unequally at the surface, where it should be most perfect, and the result is an unequal contraction, and consequently a strain or breakage and loss of castings, by any of these methods.

By our device we attain the cooling of castings without breakage or strain from unequal cooling or injury to the chilled surface thereof, giving the castings greater strength, and rendering the process of casting more certain, cheap, and convenient.

The following is a description of our device, referring to the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section through the mold on the line *x y* of Fig. 4, showing the parts in place just after the casting is poured. Fig. 2 is a similar section of the mold, on the line *v w* of Fig. 4, after the chill is removed, and with the cover in place upon the mold, forming the close air-chamber over the casting; Fig. 3, plan of the chill *b*. Fig. 4 is a plan view of the mold with the casting in it.

The upper flask, *a*, Fig. 1, containing the sand mold, is placed upon the lower one or chill, *b*, and the casting is poured in the usual way. As soon as the metal has set the flasks are turned over and the chill *b* removed. The cover *c* is then placed over the mold and casting, covering the whole exposed surface thereof and fitting down closely all around outside the casting, with a projecting rim on the cover, that sinks into the sand of the mold, or otherwise makes a tight joint, and forms an air-chamber over the casting, inclosing a stratum of highly-heated air over the whole surface of the casting, which, by its mobility within the chamber, produces currents and keeps all the parts of the casting equally hot, abstracting heat from the hottest parts and distributing it to the cooler parts, so as to bring and keep all parts to an equal temperature, and thus prevent unequal contraction and strain in any part in cooling.

To retard the cooling to any desired degree, the cover can be heated more or less before being put on, and heated air may be introduced, if required.

To further assist in retaining the heat, the cover *c* can be covered with a layer of non-conducting material, a rim, *r*, being formed on it to hold the same.

To inspect the casting in the process of cooling, one or more apertures, *s*, may be made in the cover *c* and covered with mica.

By the above-described device the cooling process is governed and the heat more equally distributed over the whole surface of the casting than in any other way with which we are acquainted, and more cheaply and conveniently.

We are aware that the casting of car-wheels has been essayed in which the chill for the rim has been removed and the coping sur-

rounding it has been replaced, leaving the space occupied by the chill to be occupied by air inclosed within it for retarding the cooling of that part, while the center of the wheel is exposed to currents of air to equalize the cooling of the entire wheel by removing the center portion of the mold for that purpose, which is not our invention.

Having thus fully described our improvements in cooling castings, we claim—

The combination of a flask containing a mold, and yet hot-chilled casting remaining in the mold, and a cover covering one surface of the casting, being the chilled surface, and surrounding the exterior edge of the casting, secluding it practically from the outer air and forming an air-chamber, whereby a body of confined hot air is secured against the casting, substantially as and for the purposes described.

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WILLIAM R. BULLOCK.
LEVI W. HALL.

Witnesses:
J. J. GREENOUGH,
J. P. MUNRO.