(No Model.)

# N. S. BOUTON.

## CHILL.

No. 421,899. Patented Feb. 25, 1890.

Fig. 1.

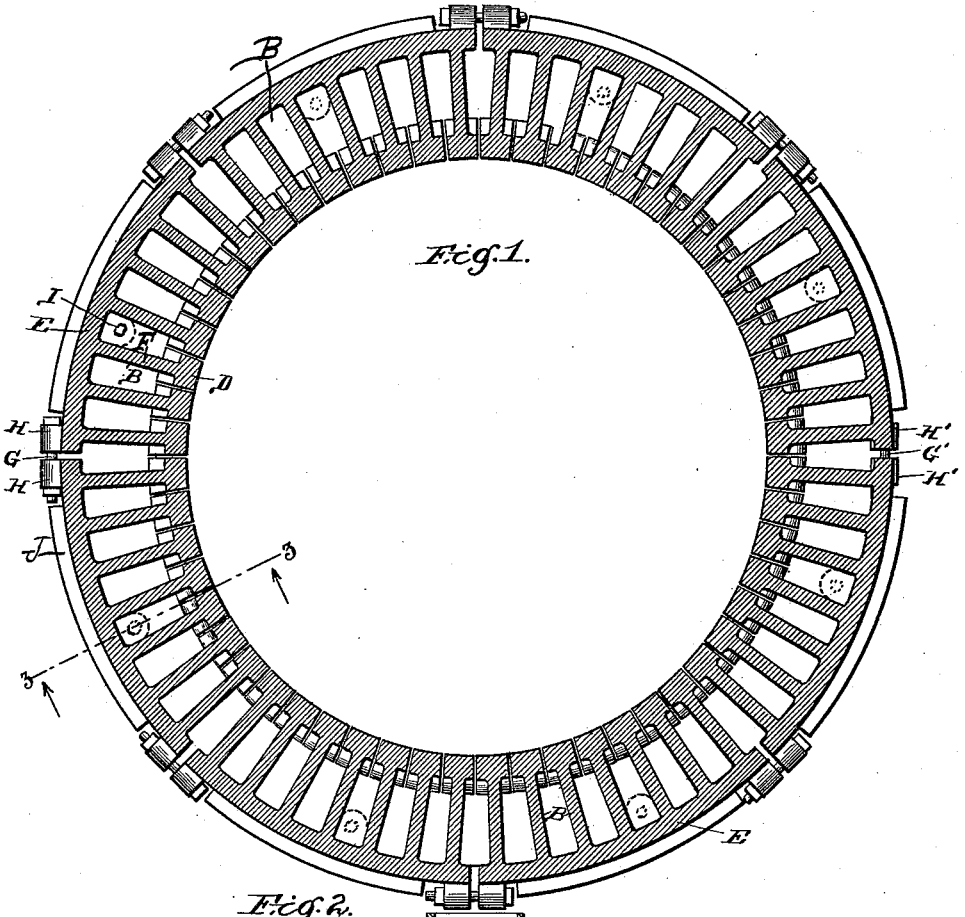



Fig. 2.

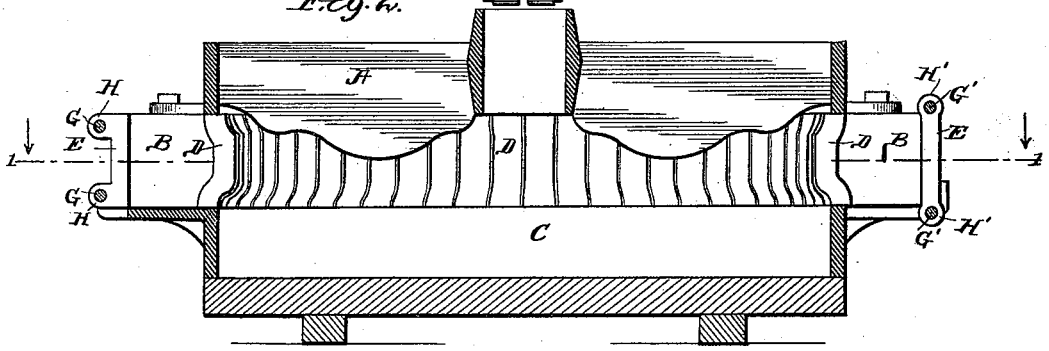
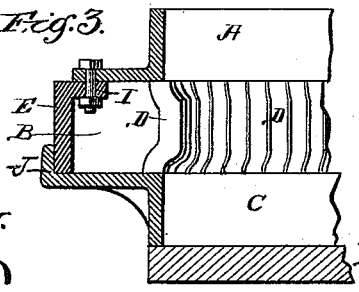



Fig. 3.




Witnesses.
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# UNITED STATES PATENT OFFICE.

NATHANIEL S. BOUTON, OF CHICAGO, ILLINOIS.

## CHILL.

SPECIFICATION forming part of Letters Patent No. 421,899, dated February 25, 1890.

Application filed September 2, 1889. Serial No. 322,693. (No model.)

*To all whom it may concern:*

Be it known that I, NATHANIEL S. BOUTON, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Chills, of which the following is a full, clear, and exact specification.

My invention is applicable to numerous kinds of chills for producing hard surfaces upon castings, but is especially designed for use in the production of cast-iron car-wheels.

The object of my invention is to secure the contraction of the chills against the casting to be chilled so long as the condition of the casting will be effected by contact with the chill, the contraction being caused by the structure of the chill itself, thereby producing a more perfect casting, having a much harder and more durable chill upon the surface than heretofore produced by the existing methods.

Among the chills heretofore made may be mentioned those which consist of a solid ring metal turned to a form the counterpart of the shape of the chilled surface desired to be produced. When the molten metal is poured into such a chill, there is contact between the metal and the chill only for a very short time after the metal has become solidified, the length of the contact not being sufficient to insure either the full chilling effect on the casting or to insure that the metal shall be so firmly solidified that it cannot lose its perfect shape while hardening. The short duration of the contact is the result of the contraction of the solidified or partially solidified casting as it parts with its heat and the simultaneous expansion of the chill by the heat derived from the casting, the structure of the chill being such as to make its expansion by heat result in an increase of its diameter. To correct this trouble, chills have been made hollow, so that a stream of water could flow through them and absorb the heat.

Chills having the chilling-surface in sections, but connected to an outer solid continuous ring, have been made. Chills having an inner sectional chilling-surface and having devices for passing alternate currents of water or steam through the outer continuous ring, by which to expand or contract the chill at will or to absorb the heat, have also been devised. These devices are improvements on the solid chill, in that the chilling-surface is held a little longer in contact with the casting to be chilled; but the remedy is only partially effective, and the use of steam and water involves additional expense. The heat of the casting is soon communicated to the solid ring of the chill, which is thus increased in diameter and separated from the the casting.

To maintain the contact of the chill by making the movement caused by its expansion to practically all take place toward the face of the contracting casting is the object of my invention.

My invention consists in the parts and combinations hereinafter described and claimed.

In the accompanying drawings, which form a part of this specification, Figure 1 is a sectional plan of a chill constructed in accordance with my invention, the plane of section being indicated by line 1 1, Fig. 2 Fig. 2 is a vertical section of the chill, and Fig. 3 is a section on line 3 3, Fig. 1.

A, Fig. 2, is the cope or top part of a flask for a car-wheel mold in which my improved chill is used.

B is the chill, and C the drag.

The cope and drag are in the main of the ordinary construction, being modified in some particulars to fit them for use with my improved chill, as hereinafter described.

The chill B is composed of an inner ring divided into sections D, and an outer supporting-ring, also divided into sections E, a web F forming a connection from each inner section to the supporting-ring.

The supporting-ring may consist of a variable number of sections, but I have shown it as consisting of eight; but any other number, greater or less, which will attain the desired end may be used. The said sections are held together by bolts or dowels G, which are fitted closely but not tightly in holes through lugs H H at the ends of the sections, thus forming sliding joints. The dowels may be arranged either as at G, Fig. 2, or G′, the object of arranging them as at G′ being to remove them farther from each other, and hence increase their steadying effect.

Attached to the outer ring, near the middle of each section E, is a lug I, (shown in

dotted lines in Fig. 1,) by which each section is loosely fastened to the cope. I fasten the sections to the cope as a matter of convenience, not of necessity. The chill should not be rigidly attached to the cope. The lower edge of the outer ring fits within the flange J of the drag. This flange need not be continuous, but may consist of a number of lugs detached from each other. The sections D of the inner ring may be as numerous as experience teaches is necessrry.

The operation is as follows: When the molten metal is poured into the mold and comes in contact with the chill, the immediate effect is to expand the sections of the inner ring, which, however, does not affect its diameter, because the spaces between the sections afford room for the expansion of the faces of the sections. The heat gradually extends from the sections D to the web F, and thence to the outer sections E. The expansion of the outer sections E does not result in an increase of the diameter of the outer ring, as it would do if the outer ring were continuous, for the spaces between them allow room for their circumferential expansion without their being thereby forced to move radially. The expansion of the webs F, therefore, is fully effective in decreasing the interior diameter of the chill, as it is not neutralized by the expansion or the outer ring, to which they are attached.

I claim—

1. The combination, in a mold for casting, of a chilling-surface divided into sections, a supporting-ring, also divided into sections having spaces between their ends, and a drag having a flange into which the said sectional supporting-ring is fitted, whereby the diametral expansion of said supporting-ring is prevented, substantially as shown and described.

2. The combination, in a chill, of a chilling-surface divided into sections, and a supporting-ring, also divided into sections having spaces between their ends, connections from the outer ring to the chilling-sections, and dowels forming a sliding joint at the ends of the sections, substantially as described.

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