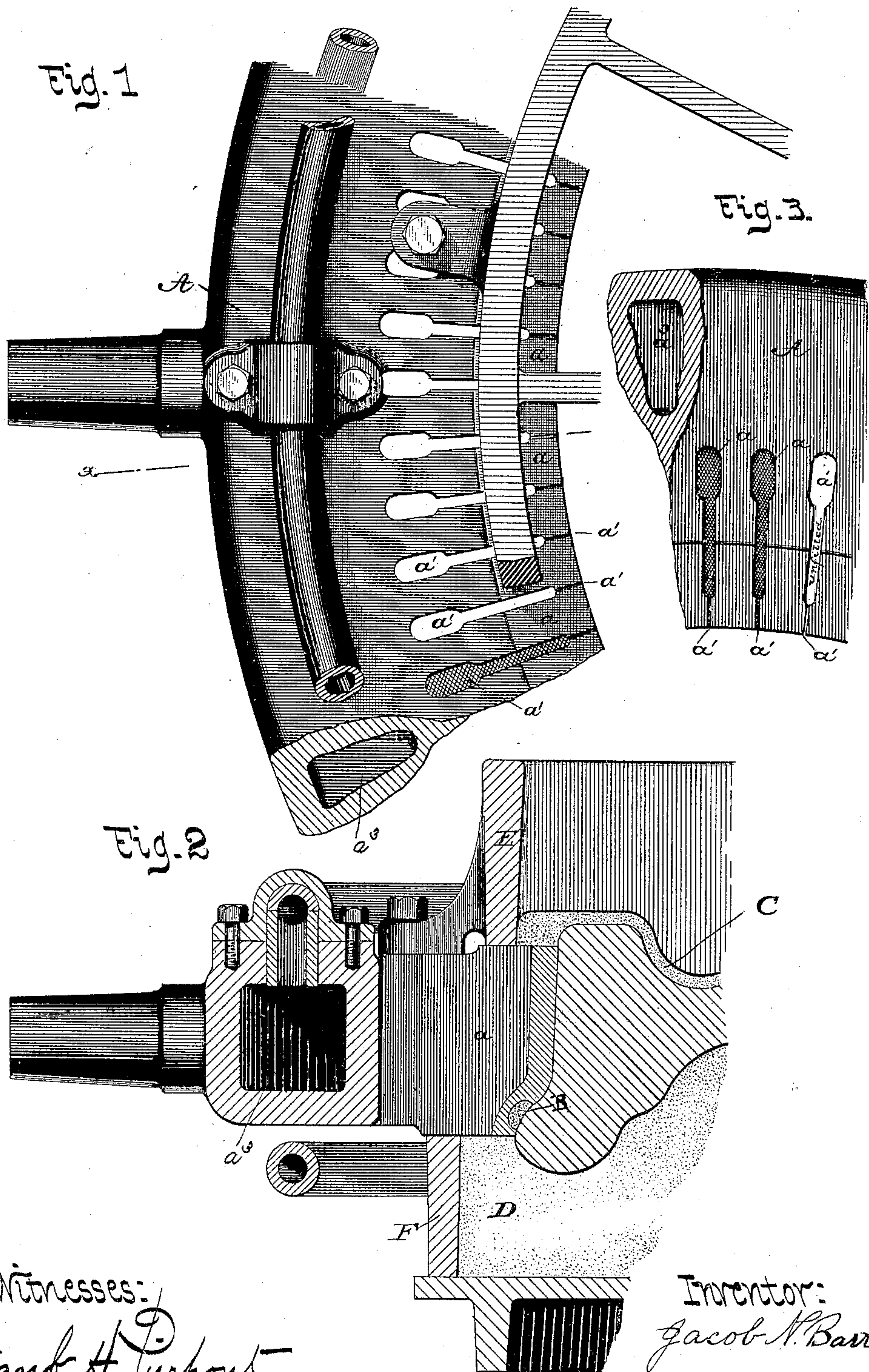


(No Model.)

J. N. BARR.
CONTRACTING CHILL.

No. 411,369.

Patented Sept. 17, 1889.



Witnesses:
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UNITED STATES PATENT OFFICE.

JACOB N. BARR, OF MILWAUKEE, WISCONSIN.

CONTRACTING CHILL.

SPECIFICATION forming part of Letters Patent No. 411,369, dated September 17, 1889.

Application filed April 26, 1888. Serial No. 271,953. (No model.)

To all whom it may concern:

Be it known that I, JACOB N. BARR, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Chills, of which the following is a full, clear, and exact specification.

My invention has reference to chills employed in the production of car-wheels; and it relates more particularly to what are known as "contractile chills," the active surfaces of which are formed of a large number of segments or sections separated by narrow radial slits, and in the most common form connected with an external cooling pipe or chamber, by which the segments are caused to move inward toward the center, in order that they may maintain the contact with the tread of the wheel as the latter contracts during the casting and chilling operation. In order to permit the requisite contraction of the chill, it is necessary to construct the slits or spaces between the sections of a width so great that the molten metal will escape into them unless the slits are suitably closed.

It is the object of my invention to provide for the closure of these slits in such manner that the metal will be excluded therefrom without preventing the contraction of the chill; and to this end my invention consists in combining with the chill a filling for the cracks of such character that while it will resist the pressure of the metal and be unaffected in bulk by the action of the heat, it will, on the other hand, be susceptible of compression between the chill-sections as the latter are drawn together by the contraction.

In order to meet the practical requirements, it is necessary that the filling material shall possess a suitable rigidity, that it shall be adapted for compression, as before mentioned, and that its conductivity of heat shall be practically the same as that of the metal composing the chill. Unless the conductivity of the filling and the metal are substantially the same the tread will be unevenly chilled—that is to say, the portions opposite the metal sections will be harder or softer than the portions opposite the intermediate filling, and the result will be not only an inequality or

irregularity in the surface of the wheel, but inequality in its wear.

In practice I have found that the desired result may be secured by applying the filling of suitable material in a plastic condition and hardening it in place previous to the casting operation. I have found that the most satisfactory results are attained by the use of a filling composed of wheat or rye flour and sharp sand, in proportions of one to fourteen, or thereabout. It is possible, however, to vary the composition somewhat and still obtain advantageous results. The sand may be combined with iron-filings and other substances with suitable cementing material, such as resin or silicate of soda.

After the filling is placed in position it is hardened or solidified, preferably, by the application of heat. This result may be secured either by admitting steam or other heating fluid into the chill, or by applying the material to the chill immediately after the casting operation, when its temperature is such as to cause a suitable baking of the filling.

My invention is applicable in all contracting chills in which there is a series of inwardly-movable chill-blocks with intervening slits or spaces.

For the purposes of illustration I have shown the invention applied to one of various equivalent forms of chill now in common use.

In the accompanying drawings, Figure 1 is a top plan view of a portion of a flask and contracting chill for car-wheels with my improvement applied thereto. Fig. 2 is a cross-section of the same on the line $x x$ with the wheel therein. Fig. 3 is a plan view, on a larger scale, of a portion of the chill with my compressible filling therein.

Referring to the drawings, A represents the annular metal chill, having in its outer portion the chamber or passage a^3 , to receive a cooling or heating fluid, and having on the inner side the inwardly-projecting segments or chill-blocks a , separated by slits or openings a' . The ends of the segments or chill-blocks stand side by side in a circular row and are curved on their inner faces to correspond with the circumference of the required wheel, so that they present jointly a circular metal surface adapted to act like an ordinary

chill on the tread of the wheel. The metal chill-surface is, however, interrupted or broken by the slits a' , as in other contracting chills now in use. It is to the closure of these
 5 slits in a practical manner, so that the chill will present a smooth unbroken surface of suitable character and at the same time be free to contract, that my invention is directed. To this end I fill the slits or spaces a' with
 10 the compound of wheat or rye flour and sand or the equivalent compounds, taking care to rub the same firmly in place flush with the inner face of the chill. After the filling is in place the filling is hardened, as before referred to.

It is found that the composition of sand and flour possesses practically the same degree of conductivity as the metal of the chill-blocks, and that therefore the chilling action is practically uniform and the metal of uniform
 20 hardness throughout the circumference of the tread. It is also found that the compound permits the chill to contract, that it is not burned out under the influence of molten
 25 metal or compressed under the pressure of the metal, so as to leave ridges on the wheel, and that it does not squeeze out under the face of the chill, so as to produce depressions in the wheel. In short, my hard compressible
 30 filling serves, when used in connection with the contracting chill, to produce a practically uniform and uninterrupted chilling-surface which follows the surface of the contracting wheel inward, so as to maintain the contact
 35 therewith.

A contracting chill provided with my improvement prevents, on the one hand, the production of chill-cracks in or ridges upon the wheel, and, on the other hand, prevents the
 40 chilled surface from shrinking away from the chill, so as to be annealed and softened by the heat transmitted from the central and highly-heated portion of the wheel. It also admits of the metal being poured at a much
 45 higher temperature than usual, which is very advantageous.

In some cases wheels are liable to have fine cracks at or near the flange, and also to some extent in the tread, although my filling is used unless steps are taken to equalize the
 50 contraction of the chilled surfaces. In such cases I provide the chill at the shoulder next to the flange of the wheel with a sand-filled groove B, similar to that shown in my Patent No. 225,549. It is found that there is a joint
 55 action of this feature with those above described, or, in other words, that there is a co-operation between the sand belt and the contracting-filled chill. The one appears to have some modifying influence upon the action of
 60 the other. The results attained indicate that there is in the action something more than the sum of the results due to the independent action of the features.

In the drawings, C D represent the molding-
 65 sand in the flask above and below the wheel, as usual, and E F the usual annular flask applied above and below the chill.

Having thus described my invention, what I claim is—

1. A contracting chill having the chill blocks or segments separated by slits or spaces, in combination with a hardened filling of sand and flour in said slits.

2. The contracting chill consisting of the
 75 outer ring and the separated chill-blocks extending inward therefrom, in combination with a hard compressible filling, substantially such as described, seated between the chill-blocks and flush with their inner faces.

3. The contractible chill having the separated chill-blocks and the groove at the shoulder, in combination with the compressible filling between the blocks and the sand in the groove.

This invention signed and witnessed this
 85 17th day of April, 1888.

JACOB N. BARR.

Witnesses:

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