UNITED STATES PATENT OFFICE.

HERBERT B. ATHA, OF EAST ORANGE, NEW JERSEY.

PROCESS OF PREPARING SAND MOLDS FOR STEEL CASTINGS.

SPECIFICATION forming part of Letters Patent No. 698,889, dated April 29, 1902.

Application filed November 22, 1901. Serial No. 83,312. (No specimens.)

To all whom it may concern:

Be it known that I, HERBERT B. ATHA, a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Processes of Preparing Sand Molds for Steel Castings; 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to certain improvements in that class of inventions represented by that described in my prior patent, No. 686,189, dated November 5, 1901.

More specifically, this invention relates to certain improvements I have invented and discovered in the art or process of preparing sand molds for manufacturing steel castings, the object being to effectually resist the high temperature of the molten steel and prevent the solid matter of the wash or covering applied to the sand from melting, and thus injuring both the mold and the casting.

The invention consists in the improved process of forming or preparing sand molds for steel castings, all substantially as will be hereinafter set forth, and finally embraced in the clauses of the claim.

In carrying out the invention I apply to the surface of the molded sand a composition consisting of a fine carbonate of magnesium, a highly volatile or inflammable liquid, such as alcohol, gasolene, benzin, naphtha, or other liquid having higher volatility than water and rosin, the latter being preferably included.

In usual practice I first shape the mold employing "green" or damp sand common in making molds for steel castings. The sand is suitably packed about the pattern and the latter is withdrawn from the sand after the customary manner. The surface of the green sand mold is then washed with the composition described specifically hereinafter.

In preparing the wash I prefer to first dissolve in twelve parts of naphtha five parts, by bulk, of rosin, and to one part of this solution I add two parts of clear naphtha and three parts of a carbonate of magnesium. The rosin serves to hold the carbonate of magnesium in suspension in the liquid, so that the painting may be more uniform and effective. The composition or wash having been applied to the surface of the sand mold, the carbonate of magnesium enters into the interstices between the particles of sand, filling the same to a greater or less extent, close to and at the surface of the mold, while the liquid of the composition enters more deeply into the said mold. Fire is then applied to the surface, so that the imflammable carbonaceous fluid is quickly consumed, while the carbonate of magnesium remains, forming with the sand a smooth crust, giving firmness to the surface of the mold. The smoothness of surface is of course conducive to smoothness in the finished casting.

The fluid of the composition may be allowed to evaporate without ignition to secure the desired smooth crust.

When the liquid steel in finally poured into the prepared mold, the heat of said steel serves to drive off the carbonic-acid gas from the carbonate, converting the residual coating into an oxid of magnesium, which latter is infusible at the high temperature of the molten steel. The gas passes off through the sand or passages provided therefor.

Having thus described the invention, what I claim as new is—

1. The process of preparing sand molds for casting therein herein described, which consists in first pressing the sand about a pattern, then withdrawing the pattern and applying to the surface of the mold, a wash or paint of carbonate of magnesium, and a highly volatile or inflammable liquid, and finally igniting the liquid, substantially as set forth.

2. The art of making sand molds for steel castings, consisting in applying to the surface of the molded sand a mixture of carbonate of magnesium and an inflammable liquid and igniting such liquid, substantially as set forth.

3. The art of preparing green-sand molds for steel casting, consisting in applying to the surface of the molded sand a mixture of carbonate of magnesium, rosin and an imflammable liquid and igniting such liquid and heating the said surface, and thus drying the

dampness from the green sand at said surface, substantially as set forth.

4. The art or process of making steel castings, which consists in preparing a green-sand mold, applying to the surface thereof a wash consisting of carbonate of magnesium and a volatile fluid vehicle therefor and, after the volatilization of such medium, casting the steel in said mold, substantially as set forth.

5. The art or process of making steel castings, which consists in preparing a green-sand mold, applying to the surface thereof a wash consisting of carbonate of magnesium and a fluid, removing said fluid and casting the liquid steel and thereby driving off the carbonic-acid gas generated from the carbonate and convert the residual carbonate into an oxid of magnesia, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 21st day of November, 1901.

HERBERT B. ATHA.

Witnesses:
CHARLES H. PELL,
C. B. PITNEY.