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METHOD OF MAKING COMPOSITE CASTINGS

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My invention aims to provide an improved method of producing homogeneous, composite castings and more particularly to a method of producing a strong union between the different metals in a composite casting.

I have shown in a copending application one form of rocking grate bar which is made of white iron reinforced with steel rods which are placed in the casting mold before the molten iron is poured. As one exemplification of my method, I shall here explain how it is applied to such castings with the understanding that it may be employed in the manufacture of various articles and is not limited in its application to cast iron and steel.

To produce a firm union in the nature of an alloy between the steel and cast iron in my grate bars I coat the steel rods with a thin coat of copper that adheres thereto preferably by the well known electrolytic method and, before placing them in the mold, I cover the coating of copper with a suitable flux, preferably borax, conveniently by immersing the rods in a borax solution and then permitting them to dry so that the coating is evenly distributed. I then place the rods in the mold and pour the molten cast iron into the mold around them.

The molten metal envelopes the rods and immediately thereafter the boric oxide formed floats to the top of the metal leaving clean molten metal adjacent to the copper. The film or coating of copper melts before the cast iron congeals or "freezes", the melting point of copper being about 1900° Fahrenheit and the "freezing" point of white iron being about 2100°. After the copper melts and the rods are heated to a high temperature, it penetrates into the pores thereof and into the freezing cast iron forming an alloy with both metals.

I next prefer to place the castings in a soaking pit so that they cool gradually and thereby eliminate cracking due to uneven chilling strains.

By my improved method a strong bond or union between two metals of different characteristics may be produced, the alloy between the metals and copper being sufficiently strong to withstand great stresses. Moreover, the danger of complete separation of one metal from the other due to slight differences between their coefficients of expansion is practically eliminated.

I have here selected for exemplification, the manufacture of white iron grate bars reinforced with steel rods because it is very important that the rods carry a greater part of the transverse stresses thereon, the white iron being inherently unsuited for grate bars because of its small transverse strength.

It is distinctly understood that my method is applicable to the manufacture of various composite castings and that the method is capable of various changes.

What I claim and desire to secure by Letters Patent is:

1. The method of making cast iron castings which comprises, electrolytically coating a reinforcing steel rod with a thin coat of copper adapted to act as a bond whereby a firm union between the steel and cast iron is produced, immersing the rod in a borax solution flux, permitting it to dry so that the borax is evenly distributed, placing the rod in a mold, pouring molten cast iron into the mold around the rod whereby the borax is formed into boric oxide and floats to the top of the metal leaving clean molten metal adjacent the copper, the heat of said cast iron melting the copper, allowing the rod to be heated to a high temperature as the cast iron congeals, whereby the molten copper penetrates into the pores of the rod and the congealing cast iron thus forming an alloy with both metals, as and for the purpose described.

2. The method of making reinforced castings which comprises electroplating steel reinforcing elements with copper, applying a coating of borax to the copper coating and

pouring molten cast iron thereon, leaving clean molten metal adjacent the copper, the heat of said cast iron melting the copper, causing the elements to be heated to a high temperature as the cast iron congeals, whereby the molten copper penetrates into the pores of the elements and the congealing cast iron, thus forming an alloy with both metals.

In testimony whereof, I have signed my name to this specification.

CHARLES M. WALKER.