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MEANS FOR CASTING METALS

Filed Feb. 9, 1931

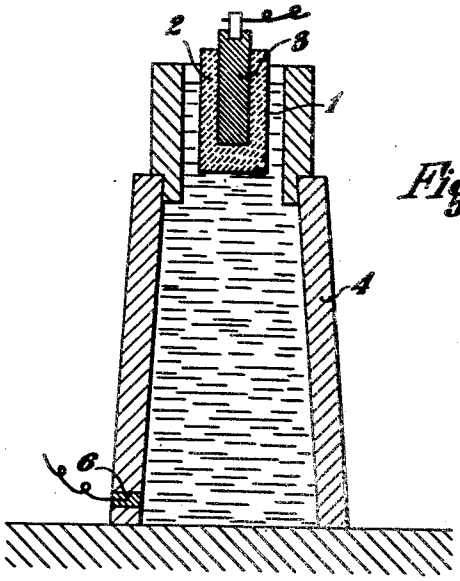


Fig. 1

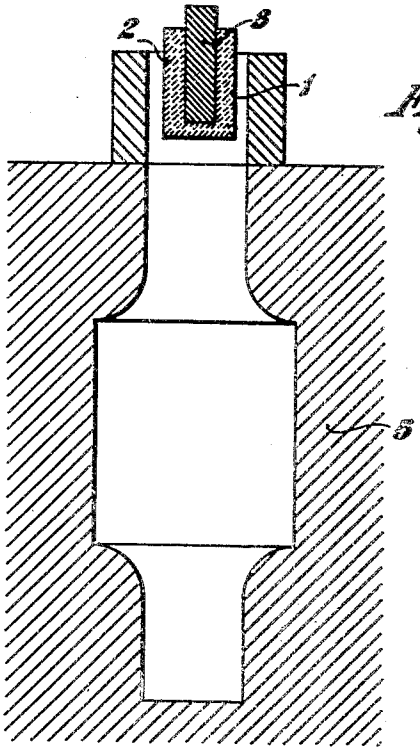


Fig. 2

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MEANS FOR CASTING METALS

Application filed February 9, 1931, Serial No. 514,582, and in Switzerland August 26, 1930.

This invention relates to a method and to means for casting metals and particularly to the production of steel ingots and has as its object to prevent piping in the cast metal in the ingot mold due to too rapid cooling of the upper layers of the metal in the mold.

According to the invention a plunger body consisting of such refractory material which is electrically insulating at ordinary temperature, but becomes conducting at high temperature, is previously heated and then inserted into the cast metal in the upper part of the mold and then an electric current is made to pass through the refractory material in order to heat the plunger body by the effect of joule, so that heat is transmitted to the upper layers of the liquid metal in the mold to prevent too rapid cooling of these upper layers.

The invention will now be described with reference to the accompanying drawing in which,

Figure 1 shows an ingot mold in section with a plunger body placed in the upper part of the mold.

Figure 2 is a section through a mold for casting a roller also provided with a plunger body in its upper part.

In the figures, 1 indicates a plunger body of such refractory material 2 which is electrically insulating at ordinary temperature but becomes conducting at high temperature, such as for example magnesia which at ordinary temperature is non-conducting but is of low conductivity at elevated temperature. The refractory block 2 encompasses a core 3 which may consist of graphite for example. Before being introduced into the upper part of the mold as shown in the drawing, the plunger body 1 is heated to about the temperature of the liquid steel in the mold 4 and then it is inserted into the upper part of the mold as shown. After being inserted, the block 1 is made to be traversed by an electric current by connecting one pole of a source of current to the steel cast in the mold at 6 and the other pole to the core 3. Since the resistance of the material 2 is rather high, also at high temperatures, the opposition offered by the plunger body to the passage through it of an electric current converts a portion of the electric energy into heat, this heat maintaining the block 1 at its initial temperature or still increasing this temperature. The block 1 transmits a part of its heat by conductivity to the upper layers of the liquid metal in the mold and prevents these upper layers from being too abruptly cooled whereby any production of piping in the cast metal is prevented.

Instead of using the core 3, the plunger body 1 could be hollow and filled with a conducting liquid.

In Figure 2 the same plunger body 1 of refractory material 2 and with a conducting core 3 is inserted into the upper part of the mold 5.

We claim:

An electric heater for regulating solidification of molten metal cast in a mold, comprising a body adapted for immersion into the molten metal in the mold and including a core of electrically well conducting material and an outer refractory layer of an electric resistance material becoming conductive at high temperature, said outer refractory layer separating the well conducting core from the metal in the mold, means on said core for connecting the core to a source of electric current, and means for connecting the metal in the mold to said source of current, whereby the circuit of the source will be closed upon molten metal making contact with said layer of resistance material and a current will flow from said core across the layer to the metal in the mold to thereby heat said resistance material.

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