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CENTRIFUGAL CASTING

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2 Claims. (Cl. 22—65)

It is known to vertically cast under centrifugal action metal bodies with core-holes by axially withdrawing a cylindrical core from a rotating mould during the pouring of the molten metal into the mould, in such a manner, that the core is prevented from being clamped by the already solid metal. In this known process the core is either rotated or kept stationary. In both cases there is a relative motion between the core and the mould, whereby during the solid solidification of the poured-in metal, if the latter adheres more or less to the mould or the core, considerable stresses may be developed in the metal, which stresses are detrimental in themselves and moreover during the casting process may give rise to holes and fissures in the casting.

It has been proposed to remove the said drawbacks by keeping the core freely rotatable, i. e. to allow the core to rotate or to remain stationary according as the metal takes it along or not, in order, if the metal might adhere to the core, that the core may rotate along, with the object of avoiding the stresses or fissures referred to above. However, if it is taken into account that this measure is carried out in a process, in which during the casting operation the core is axially withdrawn from the rotating mould, then it will be clear, that if the metal adheres to the core, and, by reason of the fact that the core rotates along with the metal, will adhere thereto gradually stronger, the simultaneous removal of the core in axial direction will again give rise to internal stresses in the metal, since the withdrawal of the core is not postponed until the metal has been completely solidified. The remedy is here worse than the trouble.

In the process according to the invention a positively stationary core is used, i. e. a core which neither rotates, nor during the casting operation is withdrawn axially from the mould. According to the invention this core is provided with a fireproof layer, e. g. a layer, having a minimum fire resistance of 600° C., which layer may be smeared on and may be a paste like substance such as e. g. is obtained by mixing graphite with water or machine oil. Essentially the layer should be such that the core is capable of withstanding corrosion by the hot metal. During the casting process the core is, namely, heated by the metal in liquid condition and with thick walled castings this heating may be carried on to red-hot. Thereby the core will expand to a maximum, whereby in conjunction with the shrinking of the metal during the cooling a rolling action on the metal will be exerted.

By reason of the fact that the core becomes red-hot and is kept stationary it is highly subjected to corrosion by the molten metal already solidified. Now, it is surprising, that the step referred to above, smearing of the core with the layer in question enables to use a positively stationary core without any danger for corrosion, so that the core, which may have the same overall thickness, may leave the metal after having exerted thereon throughout the entire length its rolling action and without giving rise to undesired stresses in the metal.

Preferably, when the mould is filled and the metal already begins to solidify, the core is not directly withdrawn from the mould but is permitted to exert its rolling action on the metal for some time. According to the known process referred to above, the core is already removed from the mould during the casting operation, i. e. under circumstances, under which the metal wall still has a loose structure, in which metal particles having a low melting point will have a tendency to be extruded.

The invention has the further advantage that the core, after use, shows at the utmost a minimum deflection from the original rectilinear position and even in many cases correction is not at all necessary. Further the core is preferably not internally cooled so that unequal stresses therein are not developed.

The invention is in particular adapted to the vertical centrifugally casting of high standard phosphor alloys in the form of thick-walled cylinders, and specially of nickel alloys and monel alloys. The castings, made by the carrying out of the process according to the invention excel in uniformity and compactness of the internal surface due to the rolling action of the core and the complete prevention of any corrosion.

We claim:

1. A method of vertically centrifugally casting hollow metal bodies by means of a rotating mould and a stationary metal core of steady shape, in which prior to lowering the core into the mould the core is coated with a smeared on thin layer of refractory material, the core being then lowered into the mould, the centrifugal casting process started and the core being left in the casting in a stationary position until solidification of the casting has taken place and the shrinking has commenced.

2. A method of vertically centrifugally casting hollow metal bodies by means of a rotating mould and a non-rotating metal core of steady shape, covering said core, prior to lowering it into the mould, with a thin smeared on refractory layer, lowering the core into the mould, starting the casting process, and keeping the core in stationary position in the core until the casting has entirely solidified and shrinking has commenced, so that the core is removed only after cooling and after the interior surface of the casting has been rolled.

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