CONSUMABLE HOT TOP WITH TIE-DOWN MEMBERS

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1 Claim.

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This invention relates to hot tops as used in conjunction with ingot molds to form a heat retaining extension at the top of the mold which serves to retain a bath of molten metal during the solidifying of the ingot. The effect is to prevent or minimize piping and the formation of other defects in the head of the ingot.

The principal object of the invention is the provision of a consumable hot top incorporating means for direct engagement with the stripper lugs in the ingot mold.

A further object of the invention is the provision of a consumable hot top incorporating a rectangular enclosure for registry in the upper open end of an ingot mold and incorporating support means engaging the mold end extensions thereof secured to the opposite sides of the mold to prevent the consumable hot top from floating when molten metal is poured therein.

A further object of the invention is the provision of a hot top formed of material suitable for total granulation and/or consumption through ignition.

A still further object of the invention is the provision of a consumable hot top incorporating consumable material means to produce a temperature when burning less than that of the hot metal contained in the hot top.

The improved hot top hereinafter disclosed possesses a number of advantages as compared to prior art hot tops and among these are combustibility, lightness which permits easier labor in placing the hot top, ease of manufacture from inexpensive materials with direct production economy, increased heat insulating and supplying characteristics and the incorporation of means positioned in the hot top and extending outwardly therefrom and resting on the top of the ingot mold, together with extensions of said means extending downward and around the stripper lugs on the opposite outer sides of the mold and which means positively locate and support the consumable hot top in the ingot mold.

Most hot tops used in pouring of metal ingots as, for example, in the steel industry, have heretofore comprised hot tops formed of ceramic materials and it is well known that such hot tops are heavy, difficult to position, fragile when handled and often permit the chilling of the metal in the hot top to proceed at a rate comparable with that in the body of the ingot mold which thereby considerably reduces their effectiveness in maintaining a pool of molten metal to preclude the formation of piping and other defects in the chilling ingot. Consumable hot tops as heretofore known in the art have required an extremely careful application to an ingot mold and the pouring of molten metals within a specified temperature range in order that the consumable hot tops would be effective in use.

The present invention overcomes the several difficulties and provides a consumable hot top which is relatively light in weight, easy to handle, relatively indestructible and is assembled as a unitary structure only when it is positioned on or partly within an ingot mold. The device includes means comprising rods formed integrally with or applied to the wall portions of the hot top so that the rods extend outwardly of the sides of the hot top and provide means by which the hot top may be supported on the ingot mold. The rods are provided with hook configurations and detachable extensions hooked thereto extend outwardly to the sides of the ingot mold and downwardly and in under the stripper lugs which are commonly formed thereon. Thus the consumable hot top disclosed herein for the first time provides a consumable hot top having all of the advantages thereof and positive means for securing it in position in the ingot mold.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being the intention to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention.

The invention is illustrated in the accompanying drawing, wherein:

FIGURE 1 is a perspective view of a portion of an ingot mold and a hot top positioned thereon.

FIGURE 2 is a vertical section on line 2—2 of FIGURE 1.

By referring to the drawings FIGURE 1 in particular, it will be seen that an ingot mold generally indicated by the numeral 10 with a hollow interior 11 extending vertically therethrough is shown. The ingot mold 10 has oppositely disposed stripper lugs 12, 13 on its oppositely disposed sides. A consumable hot top 15 in the generally rectangular shape and tapered vertically in the embodiment illustrated is shown in position partially within the hollow interior 11 of the ingot mold 10 and supported in such desirable position by a plurality of transversely positioned rods 14, 15 which are formed integrally with the hot top 13 by being embedded therein adjacent longitudinal grooves 15, 15 in the opposite sides thereof. Bands 16 positioned in the grooves 15, 15 are used to hold the component parts of the consumable hot top in assembled relation as will occur to those skilled in the art.

By referring to FIGURE 2 of the drawings and the cross sectional portion thereof, a side elevation of one of the support rods 14 may be seen in complete detail, and it will be observed that it is embedded in the hot top side wall by being cast therein when the wall of the hot top is formed and located under the transverse channel 15 in which the band 16 is located. Rod 14, which is a steel rod, adequately supports and secures the hot top 13 in desired relation partly within the top of the ingot mold 10. As seen in both FIGURES 1 and 2, wire ties 17 having hooked ends engaged on the hooked ends of the rods 14 extend outwardly across the top surfaces of the ingot mold 10 and downwardly and in under the stripper lugs 12 which are common in ingot mold construction and provided to enable the stripper crane to lift the ingot mold relative to the ingot so as to free the same therefrom.

It will thus be seen that an improved consumable hot top has been disclosed which incorporates integral strengthening reenforcing rods, the outer ends of which provide support for the hot top and additionally provide means by which the attachment means 17 may be affixed thereto so as to positively locate the hot top relative to the ingot mold. Those skilled in the art will observe that the hot top disclosed herein can be and preferably is formed of four sections of suitable consumable material which sections are assembled to form the single unit as shown. Rods embedded in the narrow sections are provided and arranged to have projecting and engaging openings in the sides of the wider sections.

In FIGURE 1 of the drawings, for example, the front right surface and the back left surface are the wider sides and the front left section and back right section are the narrower portions and all portions have tapered outer surfaces on their lower ends as seen in FIGURE 2 of the drawings so that they will fit downwardly into the open end of the ingot mold 10. It will also be seen that the particular support rod and tie-down assembly disclosed herein may be employed in ingot molds as described or otherwise.
It will also occur to those skilled in the art that the construction disclosed herein may be used in various types of hot tops, and the particular embodiment of hot top disclosed herein is that so-called tapered hot top used on a big end down ingot.

It will thus be seen that a consumable hot top having novel hold down means has been disclosed and which hot top is capable of being formed of suitable consumable material with or without exothermic material added and directly incorporating support rods which in turn facilitate the use of the tie-down means as disclosed herein.

The hot top disclosed herein meets the several objects of my invention, and having thus described my invention, what I claim is:

A hot top for an ingot mold having stripper lugs, said hot top comprising a generally rectangular walled structure formed of a plurality of wall sections two of which are opposed end sections, and two of which are opposed side sections, said end sections extending between and in contact with the inner faces of said side sections, each of the end sections having groove means formed in the outer face thereof, each of said side sections having groove means formed in the outer face thereof and defining slots at the ends thereof registering with the groove means in the said end sections, means for supporting said hot top on said ingot mold and comprising a pair of strengthening and reinforcing rods each of which is embedded within the lower portion of one of said end sections and which has oppositely disposed end portions extending outwardly beyond the associated side sections to rest on said mold to support the hot top in operative position, band means disposed completely about the walled structure and disposed in said groove means and said slots in the end and side sections for holding the walled structure in assembled relation, and tie-down members secured to said end portions of the rods and extending beneath the stripper lugs on the ingot mold for positively securing the hot top in position in the ingot mold.

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