

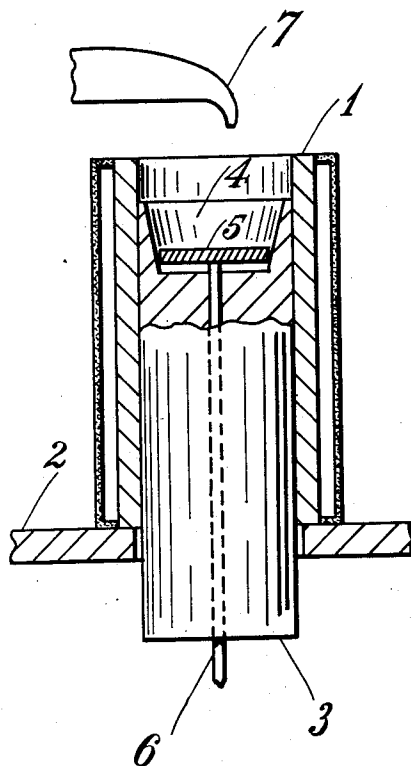
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CONTINUOUS METAL-CASTING APPARATUS

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CONTINUOUS METAL-CASTING APPARATUS

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1 Claim. (Cl. 22—57.2)

This invention relates to improvements in continuous metal-casting apparatus.

In one way of continuous casting, a fixed mould, open at both ends, is arranged vertically with a movable bar, hereinafter referred to as a starting bar, which fits the cross section of the mould and is located initially with its upper surface a short distance below the upper end of the mould. The upper surface of the starting bar thus forms a temporary base for the upper part of the mould and, after a certain amount of molten metal has been poured into the mould, is withdrawn downwardly at a rate which is proportional to the rate at which molten metal is supplied to the top of the mould.

During its passage down the mould, the metal congeals and becomes sufficiently rigid to be withdrawn from the bottom of the mould by pinch rollers or other suitable means.

It has been found that when the first portions of the molten metal fall on the exposed upper surface of the starting bar, a considerable amount of splashing occurs with the formation of liquid droplets, some of which freeze on the exposed inner side of the top of the mould with the result that the surface of the cast bar is rendered defective and the bar has a tendency to stick in the mould.

In starting bars of the prior art, no means were provided to prevent metal splashes from striking the mould wall. These splashes (or droplets) caused by the splashing molten metal, tend to adhere to the chill surface of the mould wall, and will eventually become embedded in the surface of the congealing metal, and scratch the surface of the mould. This reduces the useful life of the mould.

An object of the present invention is to obviate this difficulty and to provide a construction which will overcome the tendency of the metal to splash, or will at least minimise any ill effects caused by such splashing.

According to the invention, the starting bar in a continuous-casting apparatus has its upper surface shaped in such a way as to prevent or at least to minimise splashing of the molten metal which impinges thereon and the consequent deposition of drops of the said metal on the inner surface of the mould.

In one form, the starting bar is provided with a recess in its upper surface into which recess the initial metal is poured, so that the effect of any splashing that may occur will be confined to the walls of the said recess.

In a preferred form, the recess in the end of the starting bar is formed with walls which taper upwardly to facilitate separation of the cast bar from the starting bar.

Preferably, a false bottom is placed in the recess in the upper surface of the starting bar and means, such as a detachable stem passing downwardly through an aperture in the starting bar, are provided to retain the false bottom in place while the metal in the recess in the starting bar is in a molten state.

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In another form of the invention, the upper surface of the starting bar may be raised in the centre to an apex at the point where the molten metal falls so as to form a kind of cone with inwardly curved walls.

The starting bar may be in one piece or may be built up so as to leave parts hollow for lightness and to reduce unwanted transfer of heat. It may have any shape, such as square, round, rectangular, etc. The invention is in no way limited to the geometrical shape of the starting bar.

In order that the invention may be clearly understood, one way of carrying it into effect will be described with reference to the diagrammatic drawing, accompanying the provisional specification, which shows in midsection a mould for continuous casting of metal such as iron.

In the drawing, the upper part 1 of a mould having hollow walls rests on a support 2. A starting bar 3 is a sliding fit in the mould, passes freely through the support 2 and has an inverted truncated conical recess 4 in its upper surface.

A false bottom 5 rests in the base of the recess 4 and is connected to a rod 6 which passes freely through and projects beyond the base of the starting bar 3.

A pouring spout 7 overhangs the middle of the recess 4. In operation, the starting bar 3 with its false bottom 5 is moved to a position a little below the upper edge of the mould 1.

Molten metal is then poured from the spout 7 to fall initially on the false bottom 5 and any splashing which may take place during the first stages of pouring will take effect on the sloping sides of the recess 4. A pool of metal forms first in the recess 4 and afterwards in the upper part of the mould 1.

During this time, the splashing, which first occurs when the metal first falls on the false bottom, diminishes rapidly in intensity until it practically ceases when the molten metal rises in the mould proper.

When the molten metal reaches a predetermined level near the top of the mould, the starting bar is moved downwardly at a rate which, in conjunction with the rate at which molten metal is poured into the mould, maintains the upper surface of the metal at a constant level near the top of the mould.

The metal in contact with the starting bar solidifies as the bar moves downwardly and finally emerges continuously through the bottom of the mould and the support 2.

The starting bar can then be separated from the cast bar, for instance, by striking upwardly and then detaching the rod 6, leaving the detachable false bottom 5 adhering to the cast bar.

The starting bar can then be used again with a new false bottom piece 5 fixed to the rod 6.

Having thus described my invention, I claim:

In continuous casting apparatus, a starting bar having a recess in the upper end defined by a generally flat bottom spaced from the end, and sidewalls surrounding said bottom and extending upwardly to said end, said flat bottom being comprised of a movable member and being exposed to the direct fall of molten metal as it is initially poured into said apparatus and a detachable stem fastened to the lower side of said member and passing downwardly through an aperture in the starting bar to retain said member in position when metal is first poured.

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