

[54] **POURING APPARATUS WITH
SUBMERGED DEFLECTOR PLATES
FOR CONTINUOUS CASTING**

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[22] Filed: **Oct. 23, 1970**

[21] Appl. No.: **83,426**

[30] **Foreign Application Priority Data**

Nov. 20, 1969 Germany.....P 19 59 097.7

[52] U.S. Cl.....164/281, 164/134

[51] Int. Cl.....B22d 11/10

[58] Field of Search164/281, 337, 82, 134;
239/520

[56]

References Cited

UNITED STATES PATENTS

3,313,353 4/1967 Williamson et al.239/520 X

FOREIGN PATENTS OR APPLICATIONS

519,175 12/1955 Canada.....164/281

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[57]

ABSTRACT

Particularly oriented deflector plates are disposed in front of submerged ports for charging a mold during continuous casting of steel.

3 Claims, 2 Drawing Figures

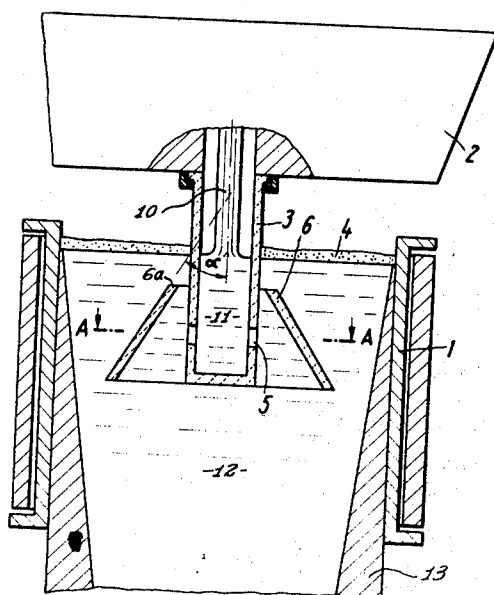


Fig. 1

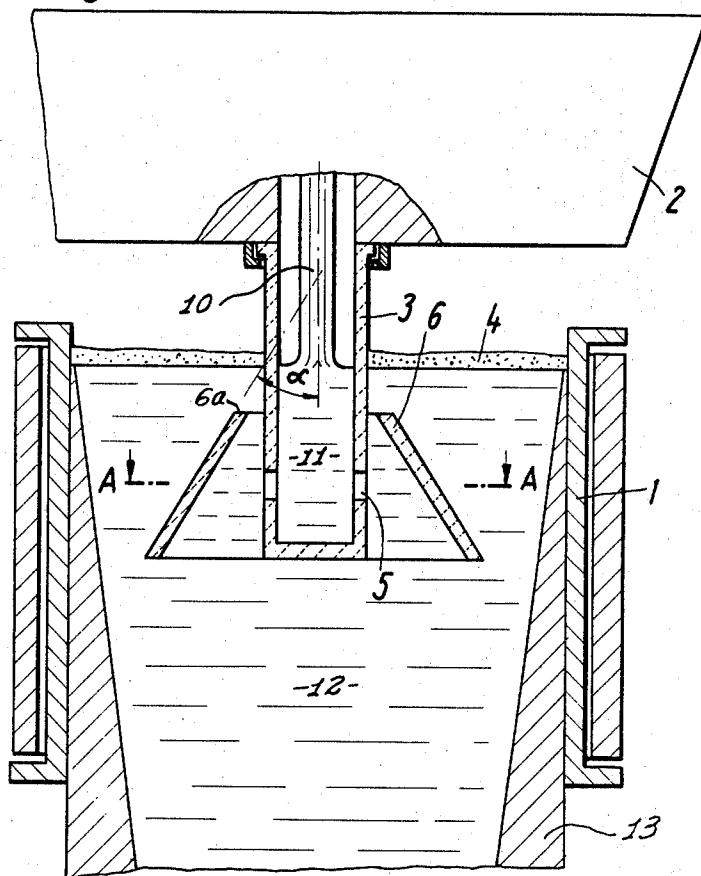
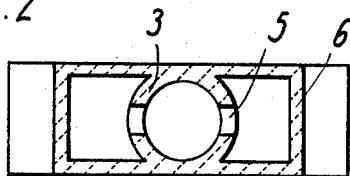


Fig. 2



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POURING APPARATUS WITH SUBMERGED DEFLECTOR PLATES FOR CONTINUOUS CASTING

The present invention relates to equipment and apparatus for introducing and distributing molten material (e.g. steel) in the liquidous head within a mold used for continuous casting.

Known equipment includes means for charging a mold through lateral openings below the surface level of the molten material and deflector plates are disposed in front of the openings. Equipment of this type is, for example, disclosed in "Handbuch des Stranggiessens" (Handbook of Continuous Casting) by Herrmann, 1958, p. 328, FIG. 1, 107.

The problem solved by the present invention is to provide deflecting plates in front of exit ports of a submerged distributor but at such an orientation that a particularly oriented flow is generated in the mold which flow is metered in accordance with casting rate and capacity, whereby, on one hand, the surface level remains liquidous, and, on the other hand, a favorable distribution of nonmetallic inclusions is produced as it is particularly necessary for continuous casting of steel.

For practicing the invention, a pipe or the like is also used for charging the mold. In accordance with the present invention it is suggested to dispose deflector plates in front of laterally oriented, submerged ports of the pipe through which the mold is charged with molten steel, the plates being oriented at an angle to be inclined in down direction and having particularly an angle of 10° to 45° relative to the direction of casting. Preferably the distance of the upper (submerged) edge of the deflector plate or plates from the pipe amounts to about 5 to 40 millimeters. The inclination of these plates depends upon the quality of steel, capacity and rate of casting and upon the temperature of the molten material. Generally, a higher capacity, other parameters being similar, requires a larger angle and also smaller spacing between upper deflector edge and pipe.

As a consequence of these provisions molten material flowing through the ports into the mold are deflected by the particular plates underneath the surface level of the liquid materials in the mold. Due to the deflection, and in dependence upon the said angle and spacing a certain portion of the outflowing material is caused to flow in the direction opposite to the direction of withdrawing the continuous cast product from the mold, and around the deflector plates while the remainder flows directly toward and into that direction.

While the specification concludes with claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention, it is believed that the invention, the objects and features of the invention and further objects, features and advantages thereof will be better understood from the following description taken in connection with the accompanying drawings in which:

FIG. 1 illustrates a longitudinal section through the upper portion of apparatus for continuous casting improved in accordance with the preferred embodiment of the present invention; and

FIG. 2 illustrates a section view taken along line A—A in FIG. 1.

Proceeding now to the detailed description of the drawing

in FIG. 1 thereof is illustrated a continuous casting mold 1 charged from a distributor ladle 2. The head 12 of the product to be cast is still liquidous in the mold, and the casting product (billet, slab etc.) is withdrawn from a bottom opening of mold 1, a solidified shell 13 is formed around the still liquidous core, slag 4 accumulates at the surface level of the molten steel in the mold.

A stream 10 of steel pours from ladle 2 into the interior chamber 11 of a particular charge pipe 3 which is suspended from the bottom of distributor ladle 2 and dips into the head 12 liquid steel in mold 1. Exit openings or ports 5 of pipe 3 are submerged, i.e., they are located underneath the surface level of the molten steel in the mold. The bottom of pipe 3 is closed.

Deflector plates 6 are provided in front of the oppositely laterally oriented ports 5. The deflector plates 6 are disposed at an angle α relative to the vertical, α being about 10° to 45°. The upper edges 6a of deflector plates 6 are submerged, and they are respectively spaced from pipe 3 by about 5 to 40 millimeters. As a consequence of this provision steel 10 pours continuously from distributor ladle 2 into pipe 3 and exits through ports 5. A portion of the outflow is branched off to flow in up direction over and around the submerged edges 6a of deflection plate 6. The relative amount of the up flow is determined by the angle α of deflection plates 6 as well as by the escape openings between upper edges 6a of deflection plates 6 and pipe 3. The bulk of the steel flowing from port 5 is deflected in down direction and flows toward and into the continuous cast ingot as extracted from mold 1 in the same direction.

The invention is not limited to the embodiments described above but all changes and modifications thereof not constituting departures from the spirit and scope of the invention are intended to be included.

I claim:

1. Apparatus for distributing molten steel in a mold used for continuous casting, the casting product being extracted and withdrawn from the mold in a downwardly direction, comprising:

a closed end pipe having lateral ports adapted to be submerged in the molten steel in the mold, the molten steel being charged into the mold through the pipe and through the submerged ports; and

submerged deflector plates mounted in front of the ports in the mold, the plates each having an outwardly inclined angle of 10° to 45° relative to the direction of casting so as to deflect the bulk of the molten steel leaving the ports into a downwardly direction, the plates having upper edges respectively spaced from the pipe and adapted to be submerged so that part of the molten steel leaving the ports flows up toward the surface level of molten steel as sustained in the mold.

2. Apparatus as in claim 1, the upper edge of each deflector plate having distance from the pipe of 5 to 40 millimeters.

3. Apparatus as in claim 1, there being two ports directed laterally to the direction of casting and in opposite directions to each other.

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