Nov. 19, 1968 E. I. ASTROV ET AL 3,411,566

DEVICE FOR SUPPLYING POWDERED MATERIAL INTO A MOLD OF A CONTINUOUS CASTING MACHINE

Filed Feb. 20, 1967

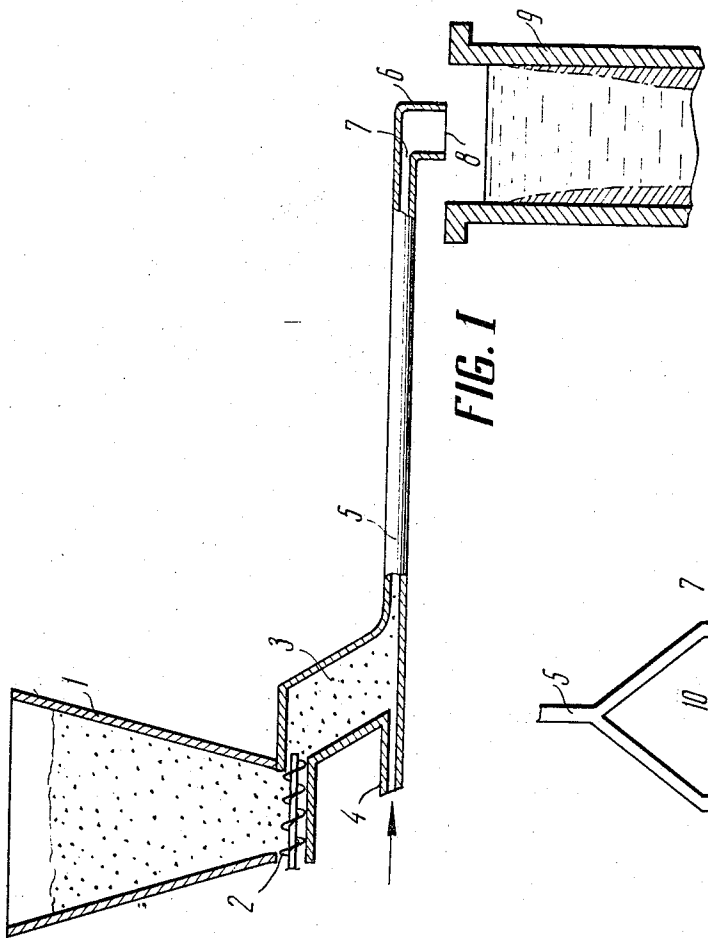


FIG. 1

FIG. 2

United States Patent Office

3,411,566
Patented Nov. 19, 1968

3,411,566

DEVICE FOR SUPPLYING POWDERED MATERIAL INTO A MOLD OF A CONTINUOUS CASTING MACHINE

Evgeny Ivanovitch Astrov, Moskovskoe Chaussee 135, kv. 52, Gorky, U.S.S.R.; Vyacheslav Vasilievitch Vostokov, Ul. Scherbakovskaya 57, kv. 257; Dmitry Petrovitch Evteev, Sirenevy Blvd. 27, korp. 3, kv. 45; and Boris Nikolaevitch Katomine, Sirenevy Blvd. 27, korp. 3, kv. 51, all of Moscow, U.S.S.R.; Anatoly Dmitrievitch Klipov, Ul. Gastello 15, kv. 12; Nicolai Alexeevitch Pakhomov, Ul. Lyadova 38–a, kv. 13; and Nicolai Alexandrovitch Polushkine, Moskovskoe Chaussee 89, kv. 30, all of Gorky, U.S.S.R.; and Victor Sergeevitch Pravdine, 13 Parkovaya ul. 38, korp. 1, kv. 7; and Victor Savelievitch Routes, 7 Parkovaya ul. 15, kv. 12, both of Moscow, U.S.S.R.

Filed Feb. 20, 1967, Ser. No. 617,354
1 Claim. (Cl. 164—281)

ABSTRACT OF THE DISCLOSURE

Powdered slag material is delivered to a mold by a gaseous carrier the speed of which is decreased at delivery by an enlargement of the pipe through which the carrier flows.

The present invention relates to metallurgy, and more particularly to devices for supplying a powdered material to the mold of a continuous casting machine.

It is well known that, to provide a slag layer on a metal meniscus, powdered material is fed into the mold by the aid of a scoop or shovel. The uniform distribution of the powdered material, however, is thereby not insured all over the surface of the metal meniscus, and it is not possible to maintain the thickness of the slag layer constant with varying casting speed. Besides there are observed accumulations of the powdered material on top of the metal in the mold, resulting in a decrease of the slag fluidity and in an occurrence of defects both on the surface of the cast section and inside it, such as ripples, cracks, and slag inclusions entrapped below the surface of the section.

An object of the present invention is to eliminate the above-said disadvantages.

Other objects and advantages of the invention will become more fully apparent from a consideration of the following description thereof.

A principal object of the present invention is to provide a device insuring a uniform distribution of a powdered material on top of metal in a mold during the process of continuous casting and providing a possibility of maintaining the fluidity of the slag layer, as well eliminating the occurrence of defects both on the section surface and inside it.

This object is achieved due to the provision of a device for feeding a powdered material into a mold of a continuous casting machine, realized according to the present invention, said machine being provided with a pipe-line supplying the powdered material by means of a gaseous carrier, said pipe-line being connected to distributing nozzles, at least one nozzle reducing the velocity of the mixture of the gaseous carrier and powdered material supplied thereinto and ensuring the dissipation of said material emerging therefrom over the surface of the metal in the mold.

The nature of the present invention will become more fully apparent from a consideration of the following description of an exemplary embodiment of the present invention, taken in conjunction with the accompanying drawings, in which:

FIG. 1 illustrates the device in a partial cross-sectional view; and

FIG. 2 is a plan view of the nozzle of said device.

The device has a bin 1 (FIG. 1) for powdered material, and a dosing arrangement 2 of the screw type for supplying said material into a mixing chamber 3 to which is connected a pipe-line 4 for the supply of a gaseous carrier. The chamber 3 is connected through branch pipes 5 to two distributing nozzles 6. The area of the lateral inlet hole 7 of each nozzle 6 is considerably smaller than the area of its outlet hole disposed below the same. Such an arrangement and ratio of dimensions of the inlet and outlet holes of the nozzle provide for a drastic decrease in the velocity of the mixture of the gaseous carrier and powdered material, as well as for its uniform distribution when it is being discharged from the nozzle.

The device operates as follows. The powdered material, for example, an exothermic mixture of readily fusible powders, is supplied from the bin 1 by the screw-type dosing arrangement 2 into the mixing chamber 3 to which is attached the pipe-line 4 whereby it is entrained by a stream of the gaseous carrier (for example, nitrogen, propane, butane) and transferred through the branch pipes 5 into the nozzles 6 arranged over the metal meniscus in the mold 9 near an arrangement 10 for feeding metal to the mold.

The velocity of the material is slowed down in the nozzles, and it is poured gently through holes 8 onto the metal meniscus thereby not rendering irregular (not blowing off) the thickness of the slag layer, which is present from the moment the supply of the powdered material is initiated. The melting of the material supplied occurs at a fast speed, and allows a layer of fluid slag to be constantly maintained on the metal meniscus, which layer is intended to protect metal against oxidation and cooling, and hence contributes to an improvement in the quality of the section thus obtained.

Depending upon the casting speed, the amount of the powdered material to be supplied into the mold is controlled by varying the amount of the gaseous carrier supplied, or the feed of the powdered material is varied by the aid of the dosing arrangement.

In accordance with the invention, the distributing nozzle may be, for example, circular, or it may be provided with a mesh bottom.

Though the present invention is described in connection with its preferred embodiment, it is evident that there may be modifications and variants that do not depart from the idea and scope of the invention, which will be readily understood by those skilled in the art.

What is claimed is:

1. Apparatus for applying slag onto a metal meniscus in a mold, said apparatus comprising a source of powdered slag material, a chamber, means to deliver the material from said source to said chamber, a horizontal delivery pipe coupled to said chambers and leading to

the mold, a source of gaseous carrier coupled to said chamber at a position spaced from the pipe to force material from the chamber through said pipe, and a delivery nozzle means on said pipe over said meniscus for substantial reduction of the speed of the carrier whereby the material is gently deposited on the meniscus, the nozzle means including nozzles which depend perpendicularly from said pipe and are of a substantially greater cross-sectional area than the pipe to provide for said reduction in speed, the first said means including a helical screw, said pipe including a plurality of branches with one said nozzle on each said branch.

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J. SPENCER OVERHOLSER, *Primary Examiner.*

V. K. RISING, *Assistant Examiner.*