

[54] **MOULD FOR ELECTROSLAG REMELTING OF METALS**

2,740,177 4/1956 Smart..... 164/85
 3,349,838 10/1967 Baier..... 164/281
 3,650,311 3/1972 Fritsche 164/52

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[52] U.S. Cl. **164/252, 164/281**

[51] Int. Cl. **B22d 27/02**

[58] Field of Search 164/52, 252, 85, 281

[57] **ABSTRACT**

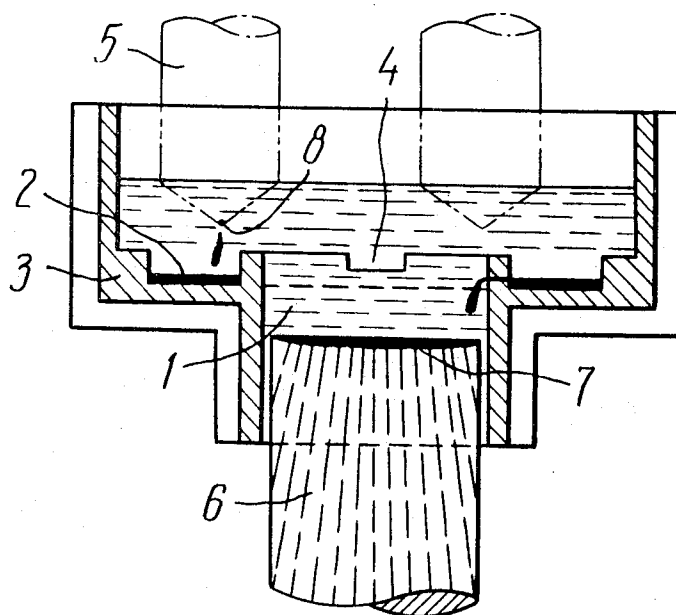
A mould for electroslag remelting of metals is disclosed, said mould comprising a space for forming an ingot, whose height is smaller than that of the ingot, and an intermediate tank filled up with molten metal and communicated with the space by ducts made in the flange of the mould, the outlets of the ducts being disposed as close as possible to the inner wall of the space to provide for a uniform delivery of the molten metal to the wall of the working space of the mould and, therefore, to make it possible to carry out the remelting process without using a deep metal bath with a flat bottom and to obtain ingots homogeneous in their structure and chemical composition. The mould can be used for producing ingots of a large cross section, for example, 800-3000 mm in diameter.

[56] **References Cited**

UNITED STATES PATENTS

2,445,670 7/1948 Hopkins..... 164/252

2 Claims, 2 Drawing Figures



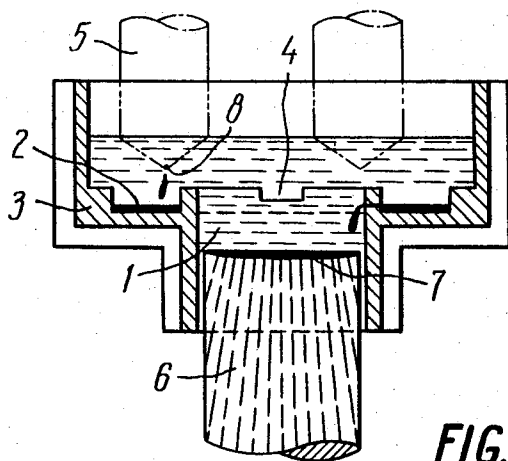


FIG. 2

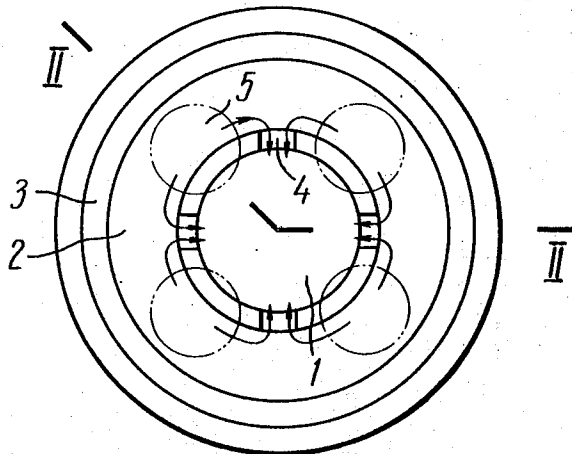


FIG. 1

MOULD FOR ELECTROSLAG REMELTING OF METALS

PRIOR APPLICATIONS

This is a continuation of U.S. Ser. No. 242,832, filed 5 Apr. 10, 1972, which was a continuation of U.S. Ser. No. 92,401, filed Nov. 24, 1970, now abandoned.

BACKGROUND OF THE INVENTION

The present invention relates generally to the field of 10 electrometallurgy and more particularly, it relates to a mould for electroslag remelting of metals.

Known in the art is a mould for electroslag remelting of metals, comprising a space accommodating a metal bath for the ingot being formed, and a coolable intermediate tank for refining the liquid metal melted at the ends of consumable electrodes by slag, mounted in the zone of melting above the metal bath (cf. U.S. Pat. Nos. 2,380,238, 1945 and 2,445,670, 1948).

The mould has a great disadvantage which lies in the fact that it does not allow the forming of ingots of a large cross section, which are homogeneous in their chemical composition and without any defects in their macrostructure because such a mould does not provide for a uniform delivery of liquid metal into the metal bath at a close distance from the wall of the space in which an ingot is being formed.

Meanwhile, in order to obtain ingots having a homogeneous structure and no liquation defects, it is desirable to preliminary cool the molten metal of the consumable electrodes and to uniformly supply the molten metal into the metal bath as close as possible to the wall of the space accommodating the metal bath. This makes it possible to carry out the remelting process without using a deep metal bath having a flat bottom, which provides for most favorable conditions for obtaining a homogeneous ingot of a high quality. This is especially important when melting ingots of large cross sections.

SUMMARY OF THE INVENTION

It is an object of the present invention to eliminate the above-mentioned disadvantage.

The main object of the present invention is to provide a mould for electroslag remelting of metals, in which drops of the molten metal that has been preliminary cooled are uniformly supplied into the metal bath as close as possible to the wall of the space accommodating the metal bath.

This object is accomplished by the provision of the mould according to the present invention, which is unlike the above-said mould. According to the invention, the coolable intermediate tank has a hole whose vertical axis is aligned with that of the ingot being formed and dimensions are close to the size of the cross section of the ingot, and ducts along which the molten metal that has been preliminary cooled in the tank is uniformly supplied from the latter into the metal bath along the perimeter thereof and as close as possible to the inner wall of the space of the mould.

It is expedient to dispose the intermediate tank and the ducts connecting the tank with the space of the mould in the upper flange of the space of the mould. A mould built in accordance with the present invention successfully solves the task set forth.

BRIEF DESCRIPTION OF THE DRAWINGS

To make the subject matter of the present invention readily understood, the following detailed description of an exemplary embodiment of the mould for electroslag remelting is given with reference to the accompanying drawings, in which:

FIG. 1 shows a top plan view of the mould; and

FIG. 2 shows a section of the same mould, taken 10 along vertical plane II—II.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

As it can be seen from FIGS. 1 and 2, the mould has space 1 whose height is smaller than that of the ingot being formed therein, and intermediate tank 2 filled up with molten metal and fashioned as a recess made in the upper flange 3 of the mould.

The intermediate tank 2 is communicated with the space 1 by means of four ducts 4 made in the flange 3 and arranged equidistantly along the perimeter of the section of the space 1 of the mould. The number of the ducts may be different.

From consumable electrodes 5 the metal in the form of drops is delivered into the intermediate tank 2 disposed outside the section of ingot 6, where it is refined by slag and preliminary cooled, and then is moved along the tank 2 to the ducts 4 whose outlets are either aligned with the inner wall of the space 1, or are disposed as close as possible thereto, and through the ducts further along wall of the space 1 into metal bath 7. The outlets of the ducts 4 may be disposed, for example, at a distance of 100 mm from the wall of the space 1. The direction of movement of the metal in the horizontal plane along the tank 2 towards the ducts 4 is shown in FIG. 1 by arrows.

In order to eliminate excessive losses of the metal remaining in the tank 2 after completion of the melting process, it is advisable to make the intermediate tank 2 small. The solidified metal can be used many times when melting ingots of one and the same chemical composition. The width of the intermediate tank 2 should be at least such as to make top ends 8 of the consumable electrodes be disposed above the intermediate tank 2, which provides for supply of the metal into the tank 2 in the course of remelting. Thus, the depth of the metal bath 7 is decreased due to the fact that the metal is supplied along the ducts 4 made in the flange 3 of the mould and along the wall of its space 1, and also due to its preliminary cooling in the intermediate tank 2.

The above-described mould makes it possible to remelt metals without using a deep metal bath with a flat bottom, and to obtain ingots homogeneous in their structure and chemical composition.

It is most expedient to use the mould for producing ingots of a large cross section, for instance, 800–3000 mm in diameter.

We claim:

1. A mould for electroslag remelting of metals, said mould comprising:

a space accommodating a metal bath for the ingot being melted;

a preliminarily coolable intermediate tank for refining liquid metal melted at the ends of a plurality of consumable electrodes by slag, said intermediate tank being circumferentially disposed in the zone

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of melting around the metal bath of the melted
 ingot so that the level of the metal in said inter-
 mediate tank is higher than the level of metal bath of
 the melted ingot;
 an annular wall disposed between the metal in said 5
 intermediate tank and the metal bath of the melted
 ingot; and
 a plurality of ducts disposed uniformly along the
 perimeter of said wall and between adjacent ones
 of said consumable electrodes for delivering the 10

liquid metal from said intermediate tank into the
 metal bath of the melted ingot whereby the liquid
 metal flows to said metal bath in a circular manner
 from under the electrodes towards the respective
 adjacent ones of said ducts in said wall.
 2. A mould as claimed in claim 1, wherein said inter-
 mediate tank and said ducts disposed uniformly along
 the perimeter of said wall are provided in an upper
 flange of said space.

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