United States Patent

Novikov et al.

[15] **3,683,998**

[45] **Aug. 15, 1972**

[54] **METHOD FOR WITHDRAWING COPPER INGOTS FROM MOLDS DURING CONTINUOUS CASTING**

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[22] Filed: **June 17, 1969**

[21] Appl. No.: **833,968**

[52] **U.S. Cl.** **164/82,** 164/282

[51] **Int. Cl.** **B22d 11/12**

[58] **Field of Search** 164/82, 282

[56] **References Cited**

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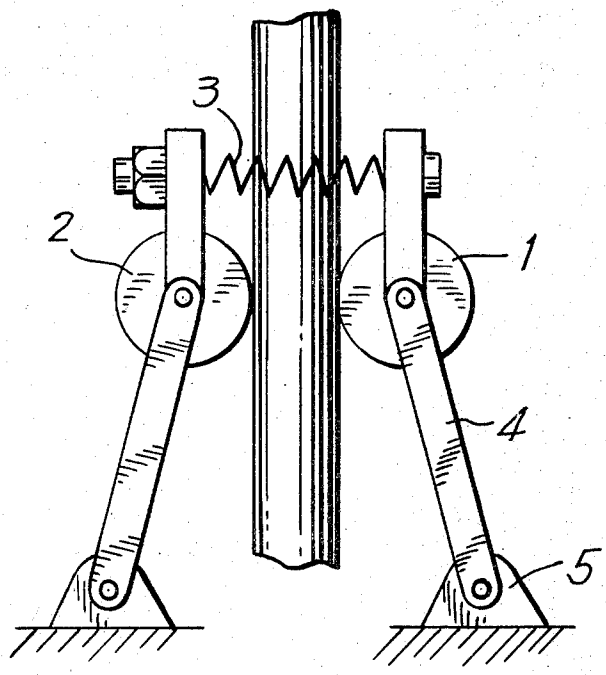
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[57] **ABSTRACT**

Oxygen-free copper ingots are withdrawn from a mold during continuous casting by applying a contact pressure of from 1 to 3 kg/mm². The contact pressure is applied through surfaces having a smaller modulus of elasticity than the ingots.

3 Claims, 2 Drawing Figures



PATENTED AUG 15 1972

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FIG. 1

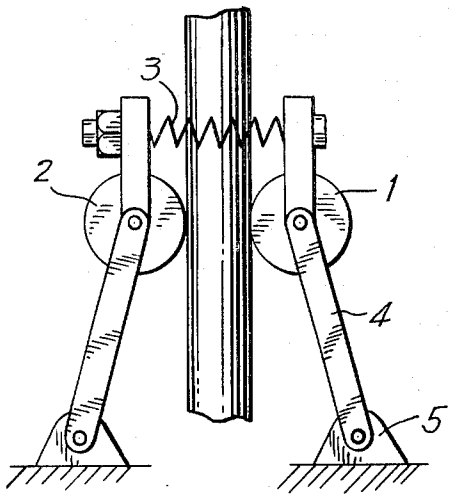
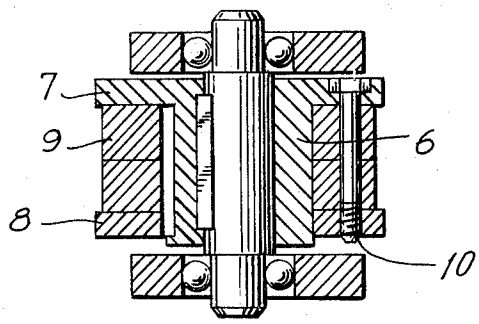


FIG. 2



METHOD FOR WITHDRAWING COPPER INGOTS FROM MOLDS DURING CONTINUOUS CASTING

FIELD OF INVENTION

The present invention relates to methods of manufacturing oxygen-free copper ingots in continuous casting plants and, more particularity to methods for withdrawing oxygen-free copper ingots from a molds.

BACKGROUND

Widely known in the prior art are methods for withdrawing oxygen-free copper ingots from molds which consist of techniques whereby an ingot is withdrawn at a specific contact pressure exceeding 3 kg/mm² by means of an appliance provided with working members in the form of drive withdrawal rolls manufactured of a material, the modulus of elasticity of which exceeds that of copper.

To avoid the slipping of ingots in the prior art appliance, conventional pressing devices are employed for pressing the withdrawal rolls to an ingot being withdrawn. However, copper ingots, being strained in the course of their withdrawal by a value within a range of 0.3 to *1* percent, are subjected to residual deformation and are subject to cracking during the first pass of the hot-rolling procedure, which results in the copper wire being often broken off during drawing.

To avoid the cracking of oxygen-free copper ingots, phosphorus or oxygen is added to copper, but these additions are likely to decrease the electrical conductivity of copper.

SUMMARY OF INVENTION

A primary object of the invention is to provide a method for withdrawing oxygen-free copper ingots by using A specific contact pressure and by using techniques which allow manufacturing copper ingots without cracks and having a low oxygen content within a range of 0.0002 percent and lower.

This is achieved, in a method of withdrawing oxygen-free copper ingots from a mold in continuous casting process, by extracting the ingots with a contact pressure not exceeding 3 kg/mm².

Such contact pressure when used for withdrawing an ingot from a mould permits excluding residual deformation of an oxygen-free copper ingot and, hence, avoiding the formation of cracks during the rolling thereof.

In the appliance intended for carrying out the method of the invention, there are provided working members for withdrawing an ingot from a mold, a surface of which contacts the ingot and is made of a material, the modulus of elasticity of which is smaller than that of the ingot being extracted.

It is advisable to employ texto-lite as the material forming the surface of the working members which contact the ingot.

The fact that the working surfaces contacting the ingot are made of such a material as texto-lite, for example, having a modulus of elasticity which is smaller than that of the ingot being extracted, allows the ingot to be withdrawn by applying thereto a specific pressure not exceeding 3 kg/mm² without any residual deformation in the ingot.

BRIEF DESCRIPTION OF DRAWING

The following detailed description and accompanying drawings illustrate a preferred embodiment of the present invention. In the drawing;

FIG. 1 is a schematic diagram of an appliance for withdrawing an oxygen-free copper ingot from a mold according to the invention; and

FIG. 2 is a cross-sectional view of the appliance of FIG. 1.

DETAILED DESCRIPTION

In conformity with the invention, the method for withdrawing copper ingots from a mold in the course of their continuous casting consists in that the ingots are extracted at a specific contact pressure not exceeding 3 kg/mm², which prevents residual deformation from being induced in the ingot.

To this effect, the specific contact pressure applied to the ingot, should not exceed 3 kg/mm² and as illustrated is applied transversely of the ingot.

According to the invention, the appliance for carrying out the method of withdrawing oxygen-free copper ingots from a mold comprises working members **1** and **2** (FIG. 1) designed as rolls pressed toward each other by means of a spring **3** producing the required clamping force between these rolls. The rolls **1** and **2** are mounted on bearings secured on uprights **4** that are articulated to a casing **5** of take-off rollers.

On the rolls **1** and **2**, there is rigidly fitted a hub **6** (FIG. 2) having rim **7** and a pressing disc **8** which is freely mounted thereon. Accommodated therebetween is a texto-lite hoop **9**, which is secured thereto by means of a bolt **10**.

What we claim is:

1. A method for withdrawing an oxygen-free copper ingot from a mold in the course of the continuous casting of said ingot without introducing residual deformation into said ingot, said method comprising withdrawing the ingot by applying thereto a withdrawal means contact pressure not exceeding 3 kg/mm².

2. A method as claimed in claim **1** wherein said pressure is applied transversely of said ingot.

3. A method as claimed in claim **1** wherein said pressure is applied through pressure applying members having a smaller modulus of elasticity than the casting.

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