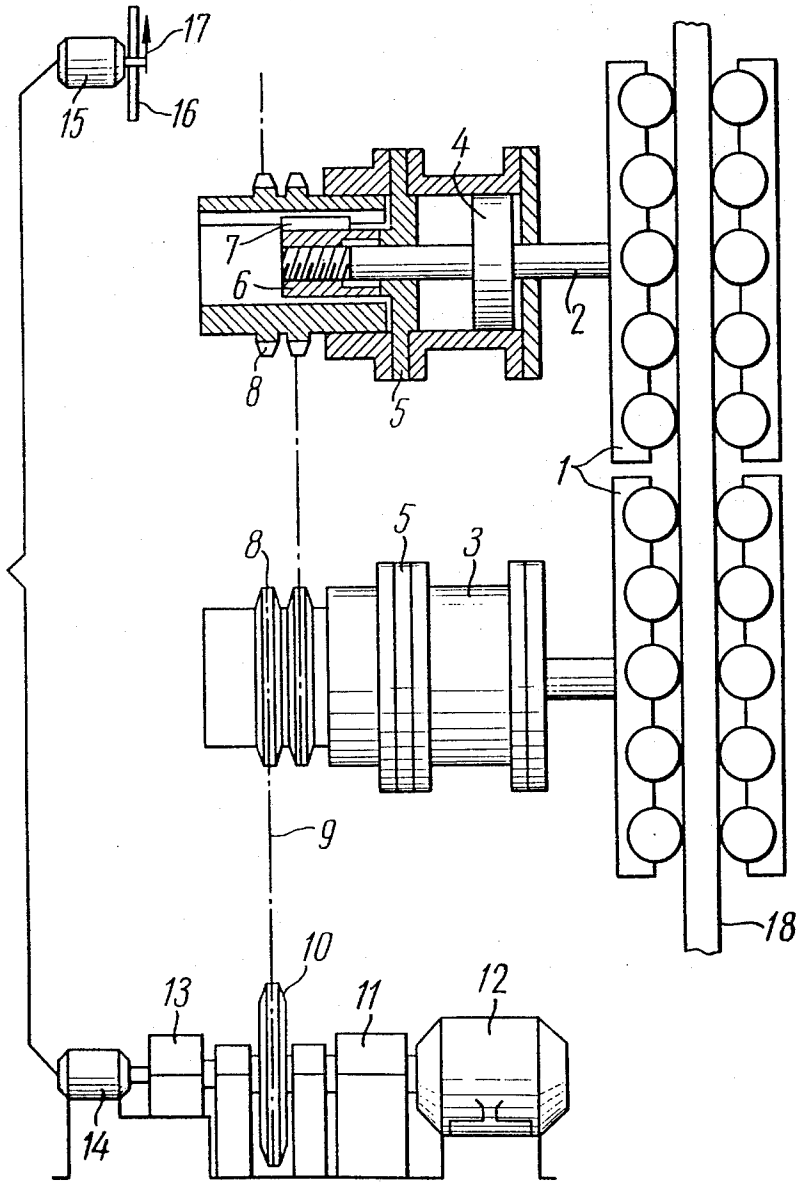
April 15, 1969 V. A. BUTKEVICH ET AL 3,438,425

GUIDING DEVICE FOR INGOTS IN SECONDARY COOLING ZONE IN CONTINUOUS CASTING PLANTS

Filed Feb. 17, 1966



United States Patent Office 3,438,425 Patented Apr. 15, 1969

3,438,425

GUIDING DEVICE FOR INGOTS IN SECONDARY COOLING ZONE IN CONTINUOUS CASTING PLANTS

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Filed Feb. 17, 1966, Ser. No. 528,228
Int. Cl. B22c *19/04, 25/00;* B22d *11/00*
U.S. Cl. 164—150 5 Claims

ABSTRACT OF THE DISCLOSURE

A device for adjusting the position of hydraulically controlled sections of a secondary cooling device of continuous casting apparatus, wherein the rods of the hydraulic cylinders are threadably engaged with respective nuts which are slidably engaged in associated drive members which are driven in synchronized rotation.

The present invention relates to devices, employed in continuous casting plants, preferably for casting steel.

Known in the art are devices comprising individual sections, moved by hydraulic cylinders. Before starting the casting, the sections are mounted at a distance corresponding to the size of an ingot being cast. The hydraulic cylinders are intended to prevent the skin of the crystallizing ingot from swelling, to protect the elements of the guiding device from overload, and to draw the sections of the guiding device far apart to effect assembly and repair.

In this device, however, the mechanized adjustment of sections in accordance with the varying sections of ingots being cast is not possible.

Attempts have been made to provide, in a zone of secondary cooling, a guiding device which permits mechanized setting of sections to the size of an ingot being cast. This device is comprised of sections of supporting rollers, suspended on rods, forming articulated parallelograms, with the sections bearing upon wedges, interconnected in pairs with lead screws.

This device, however, proves to be inadequate, since lead screws, wedges and hinge joints, disposed in a hot zone of the secondary cooling, rapidly fail under the action of steam and high temperature. Additionally, the high forces to which the device is subjected by the ingot tend to produce failing of its separate components.

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

The principal object of the present invention is the provision of a guiding device with a setting mechanism, which is reliable in operation and ensures rapid readjustment of units when the sections of ingots being cast varies, and which is immune from the effects of heat and steam and permits increase of the productivity of continuous casting plants.

Another object of the present invention is to provide a device which permits remote control of the casting procedure and of the size of ingots being cast.

Said objects are accomplished by the provision of a guiding device with a mechanism for setting the sections to the required size of ingots being cast, said device of the invention comprising synchronously rotating driving gears, and nuts threaded on the rods of the hydraulic cylinders and engaged with said gears by means of sliding guides.

The setting mechanism may be provided with a remote control, effected by means of a transducer mounted on the drive, said transducer being connected via a transmission system with an instrument, indicating the position of sections of the guiding device.

The present invention will become more fully apparent from a consideration of the following description of the device, taken in conjunction with the appended drawing, showing an elevation view of said device partially cut-away.

The guiding device comprises sections **1** of a secondary cooling unit coupled to rods **2** of hydraulic cylinders **3**, whose pistons **4** are capable of moving within the limits established by rests **5**. Fitted on the end of each rod **2** is a nut **6** of the setting mechanism together with a sliding guide **7**, interacting with a driven sprocket **8**, which is connected by a chain **9** with a driving sprocket **10**, a reducing gear **11**, and an electric motor **12**.

Besides, the electric motor **12**, via reducing gears **11** and **13**, is connected with a selsyn transmitter **14** and a selsyn receiver **15** of an indicating instrument, having a scale **16** and a pointer **17**.

The device functions as follows.

EXAMPLE 1

The electric motor **12** is actuated with pistons **4** of the hydraulic cylinders **3** retracted and in contact with the rests **5**. Said electric motor, via the reducing gear **11**, the driving sprocket **10**, chains **9**, the driven sprockets **8**, and sliding guides **7**, drives the nuts **6** in rotation. The rotating nuts thread in a synchronous manner on the rods **2** of the hydraulic cylinders **3**. The electric motor **12** operates until the nuts **6** arrive at a predetermined position. Upon deactivation of the electric motor **12**, the hydraulic cylinders **3** are actuated while the pistons **4** together with rods **2** and sections **1** continue to move until the nuts **6** contact the rests **5**, which ensures the position of sections **1** of the guiding device, corresponding to the size of the ingot **18** being cast.

EXAMPLE 2

With the pistons **4** of the hydraulic cylinders **3** retracted into contact with the rest **5**, the electric motor **12** of the setting mechanism is actuated from a control panel, which, via the reducing gear **11**, the driving sprocket **10**, chains **9**, the driven sprockets **8**, and the sliding guides **7**, causes the nuts **6** to rotate to the required adjusted position, as controlled by the operator on the control panel according to readings of the instrument with the scale **16** and pointer **17**. Via the selsyn-receiver **15**, the instrument is electrically connected with the selsyn-transmitter **14**, which is mechanically connected, via the reducing gears **13** and **11**, with the electric motor **12**. When the electric motor **12** is deactivated, the hydraulic cylinders **3** are actuated, causing their pistons **4** to move until the nuts **6** engage the rests **5**, which establishes the position of sections **1** of the guiding device, corresponding to the size of the ingot **18** being cast.

The driving sprocket **10**, chains **9** and the driven sprockets **8**, forming the chain transmission, may be replaced by other types of transmissions, for example, a gear train, which does not change the principle of the proposed device. The latter is capable of simultaneously setting any number of sections, and enables the operator of the control panel to effect both the remote adjustment of sections and the control of their working position.

We claim:

1. An ingot guiding device mounted in a secondary cooling zone of a continuous casting apparatus, said device comprising a plurality of sections for engaging the continuously cast ingot to prevent the ingot from swelling, hydraulic cylinders including rods connected to respective

sections, and means for adjusting the position of said sections for various size ingots, the latter means comprising nuts threaded on said rods, rotatable drive members for each cylinder, means for driving said drive members together in synchronous rotation, and means coupling said drive members with their respective nuts for common rotation while permitting relative axial movement of the nuts and thereby of the rods.

2. A guiding device as claimed in claim **1** wherein said means coupling the drive members and nuts comprises a guide member on each nut slidably engaged in an axial groove provided in an associated drive member.

3. A guiding device as claimed in claim **2** comprising a rest member fixed to each cylinder for engaging an associated nut to limit the movement of the piston rod.

4. A guiding device as claimed in claim **3** wherein said nuts and drive members are mounted on a side of the cylinders which is opposite said sections.

5. A guiding device as claimed in claim **1** comprising indicator means for the position of said sections, said means for driving said driving members in rotation including a motor drive means and a remote controlled transducer coupled to said motor drive means, said indicator means being coupled to said transducer.

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U.S. Cl. X.R.

164—282; 92—13