

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number:

0 332 348
A1

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: 89302109.7

(51) Int. Cl.4: **B22D 11/08**

(22) Date of filing: 02.03.89

(30) Priority: 07.03.88 GB 8805376

(43) Date of publication of application:
13.09.89 Bulletin 89/37(84) Designated Contracting States:
FR GB(71) Applicant: **DAVY McKEE (SHEFFIELD) LIMITED**
Prince of Wales Road
Sheffield S9 4EX(GB)(72) Inventor: **Stonecliffe, David**
42 Vicarage Lane Dore
Sheffield 17 Yorkshire(GB)(74) Representative: **Kirk, Geoffrey Thomas et al**
BACHELLOR, KIRK & EYLES 2 Pear Tree
Court Farringdon Road
London EC1R 0DS(GB)(54) **Continuous casting machine dummy bar.**

(57) The dummy bar according to this invention comprises a plurality of sub-bars 1, 10, adapted to be rigidly co-axially joined together in series, by hydraulic rams 4, 5. Each sub-bar 1, 10 can be provided in different sizes in order to enable different sizes of casting to be drawn from a continuous casting machine.

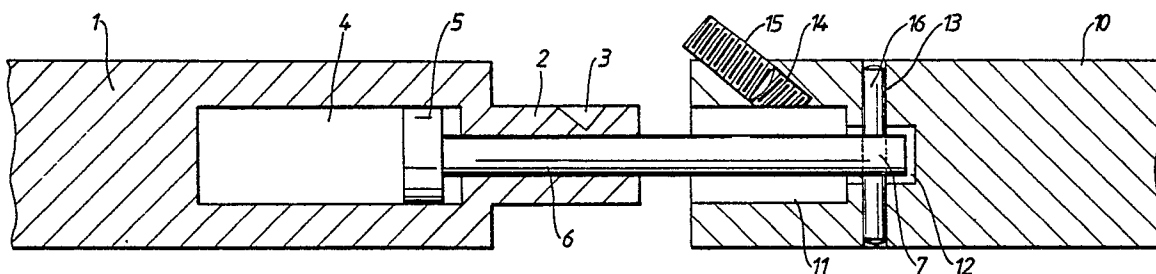


Fig.1.

EP 0 332 348 A1

Continuous Casting Machine Dummy Bar

The present invention relates to a bar for use as a dummy bar in a continuous casting machine.

It is well known to use rigid dummy bars in the initial phase of a casting operation in a vertical, horizontal, or curved mould continuous casting machine. Such rigid bars are difficult to handle because they are usually very long, typically 10 to 20 m. Where different sizes are to be cast it is necessary to have a dedicated dummy bar for each size, or to use interchangeable taper adaptations at the mould end.

According to a first aspect the invention provides a dummy bar made up of a plurality of sub-bars each having a spigot on one end and a recess in the other end, so that sub-bars can be interconnected in series with the spigot of one sub-bar engaging in the recess of the next sub-bar, in order to provide a dummy bar made up of a number of sub-bars.

In order to prevent working of the joints between the sub-bars when subject to the large reversing cyclic load in a continuous casting machine it is necessary for the joints between the said bars to be very stiff. Also for practical purposes, the joints need to be capable of being easily assembled and disassembled.

According to another aspect the invention provides a dummy bar comprising: a first sub-bar having at one end a recess, a second sub-bar having at one end a spigot for engaging the recess of the first sub-bar to interconnect the sub-bars and hydraulic means for urging the sub-bars to interconnect with one another.

Preferably the hydraulic means is the form of a hydraulic piston and cylinder assembly mounted within one of the sub-bars, and interconnectable with the other sub-bar in use.

A preferred embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings, wherein:

Figure 1 is a cross-sectional view through two adjacent sub-bars of a dummy bar prior to interconnection;

Figure 2 is a similar view to Figure 1 but with the two sub-bars of the dummy bar interconnected.

Referring first to Figure 1, a dummy bar is made up of series of sub-bars the ends of only two of which are shown. The end of one sub-bar 1 has a spigot 2 with a notch 3. Within the sub-bar 1 is a chamber 4 in which slides a piston 5 connected to a rod 6 which projects through the spigot 2 and at the end of the rod 6 is an eye 7. In the end of the other sub-bar 10 is a recess 11 with a secondary

recess 12 at the back of the recess 11. Transversely through the sub-bar 10 extends a hole 13 which meets the sub-recess 12. Also there is an inclined threaded hole 14 joining the recess 11, which receives a grub screw 15. The hole 13 through the sub-recess 12 receives a pin 16, in use.

It is to be appreciated each sub-bar has at one end a spigot and associated piston cylinder assembly, and recesses with associated holes at its other end.

The interconnection of two sub-bars will now be described, first hydraulic pressure is applied to the chamber 4 in the sub-bar 1 to move the piston and associated rod 6 to the right as shown in the Figures where the rod 6 projects from the spigot 2. The eye of the rod 6 is positioned in the sub-recess 12 in the other sub-bar 10 and the pin 16 inserted into the hole 13 to interlock the rod 6 and sub-bar 2. By applying hydraulic fluid to the opposite part of the chamber 4, i.e. the right hand side of the piston 5, the two sub-bars will be drawn together so that the spigot 2 engages in the recess 11. It is appreciated that by means of the hydraulic piston cylinder arrangement the two sub-bars can be brought together firmly. While still being held tightly together by the hydraulic pressure the grub screw 15 is tightened into the notch 3 in the spigot 2 to secure the two sub-bars 1 and 10 together, this is a situation illustrated in Figure 2.

The two sub-bars can be separated by a reverse procedure involving removing the pin 16 and applying hydraulic pressure into the left hand side of the chamber 4 to move the piston and piston rod to the right as shown in (Figure 2), thereby separating the two sub-bars from one another.

In an alternative embodiment, the hydraulic arrangement could be temporarily secured by means of bolts to the outside of the sub-bars to draw them together and once the sub-bars are secured by means of the grub screw engaging the notch in the spigot, the hydraulic mechanism could be removed from the interconnected sub-bars.

Claims

1. A dummy bar characterised in that said bar is made up of a plurality of sub-bars (1,10) each having a spigot (2) on one end and a recess (11) in the other end, so that the sub-bars (1, 10) can be interconnected in series with the spigot of one sub-bar engaging in the recess of the next sub-bar and releasably secured therein, in order to provide a dummy bar made up of a number of sub-bars.

2. A dummy bar according to claim 1 characterised in that fastening means is provided to secure the spigot in the recess.

3. A dummy bar according to claim 2 characterised in that the fastening means comprises a screw (15) threadedly mounted at an angle inclined to the axis of the dummy bar, in the body of the sub-bar defining the recess to extend into the recess and engage in a notch (3) provided in the spigot (2) received therein in order to secure the sub-bars together.

4. A dummy bar according to any one of the preceding claims characterised in that hydraulic means is provided to urge the sub-bars (1, 10) together.

5. A dummy bar according to claim 4 characterised in that the hydraulic means comprises a piston (4) and cylinder (5) assembly mounted within one of the sub-bars, a rod (6) extending from said piston (4) and securing pin (16) whereby the end of the rod (6) remote from the piston is secured in the recess or a further recess provided in the next sub-bar.

6. A dummy bar according to claim 4 characterised in that the hydraulic assembly is engageable with the exterior of the sub-bars to urge to sub-bars together to be removable once the bars are interconnected.

30

35

40

45

50

55

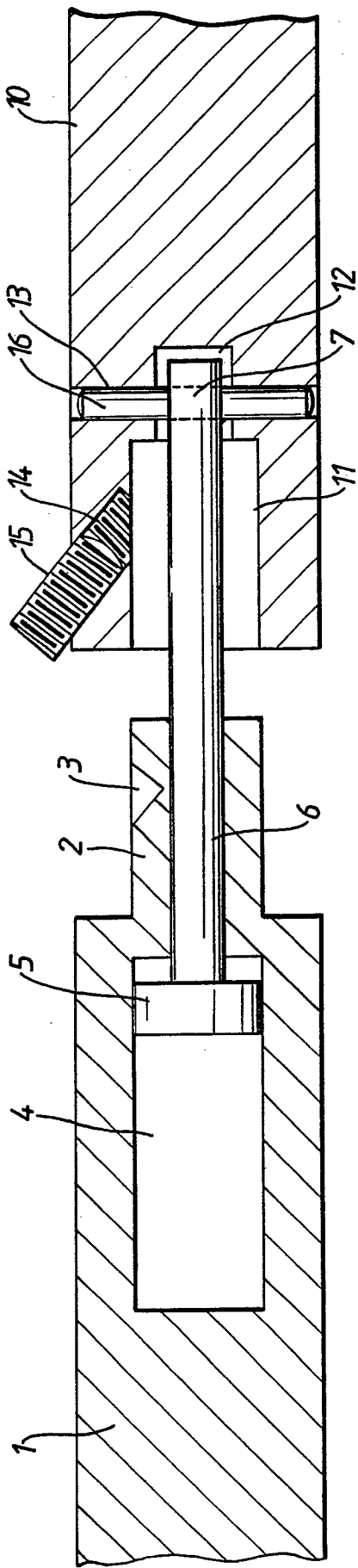


Fig. 1.

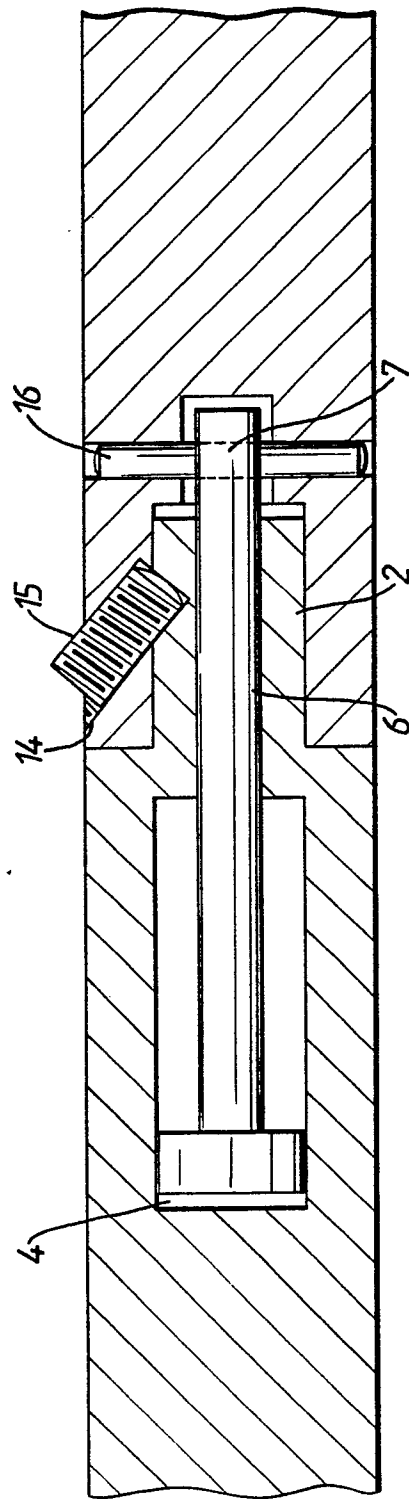


Fig. 2.



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
X	US-A-4 043 383 (ISENBERG et al.) * Figures 2-4a,b; column 2, lines 17-42 *	1,2	B 22 D 11/08
X	FR-A-1 220 316 (B.I.S.R.A.) * Figure; page 2, left-hand column, lines 44-47 * ---	1,2	
X	FR-A-1 070 952 (BÖHLER) * Whole document * ---	1,2	
X	GB-A-1 119 182 * Figures 1-4; page 2, lines 63-93 * -----	1-3	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 22 D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 09-06-1989	Examiner MAILLIARD A.M.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			