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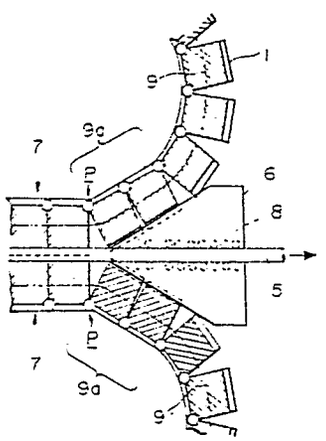
(54) Continuous casting installations.

(57) A continuous casting installation comprises a plurality of mould blocks (1) arranged in two endless movable tracks. The two tracks have respective runs (7) which extend parallel to one another and together define a mould cavity along which the mould blocks (1) of the two tracks move in the same direction. At the downstream end of the two runs (7) the paths (9) of the mould blocks (1) of the two tracks extend in diverging straight lines (9a) from the points (P) at which the two tracks begin to diverge. A support device (6) for the casting (5) is positioned adjacent the two tracks in the gap between the downstream ends of the two tracks whereby the length of the casting (5) which is unsupported is minimised.

Fig.2



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"CONTINUOUS CASTING INSTALLATIONS"

The present invention relates to continuous casting installations of endless track type, that is to say of a type comprising a plurality of mould blocks arranged in two endless movable tracks, the two tracks having respective runs which extend parallel to one another and together define a mould cavity along which, in use, the mould blocks of the two tracks move in the same direction.

A known continuous casting installation of endless track type is shown diagrammatically in side elevation in Figure 1 in which a plurality of mould blocks 1 are interconnected in two vertically spaced loops, thereby forming a pair of endless tracks 2. The upper and lower runs of the lower and upper endless tracks 2 are disposed in parallel opposed relationship such that the opposing mould blocks 1 define a continuous mould cavity 3 whose longitudinal ends are open. In use, molten metal 4 is poured in at one end of the mould cavity 3 and the opposing mould blocks 1 are moved in the same direction and a casting 5 is withdrawn from the other end of the mould cavity 3. At the casting outlet, the mould blocks 1 of the endless tracks 2 are moved apart along a respective semicircular path and then along a respective straight path towards the pouring inlet of the mould cavity 3. At the casting outlet, there is a support device (or so-called knife device) 6 arranged to peel or shear the casting 5 positively away from the mould blocks of the upper and lower endless tracks 2, and to support the casting 5 thus sheared during its transport to subsequent treatment or handling apparatus.

The casting 5 withdrawn from the mould assembly initially has molten metal within a solidified shell and thus does not have a sufficient degree of strength and therefore needs support by the support device 6 immediately after the casting 5 has moved out of contact with the mould block assembly. However, the casting outlet is initially very narrow so that the support device 6 cannot be positioned sufficiently deeply within the casting outlet. It follows therefore that there is a relatively long section of the casting which still has molten metal within it and which is not supported by the support device 6. Thus qualitative problems arise due to the fact that the casting 5 withdrawn from the mould block assembly which initially does not have a sufficient degree of strength may be ruptured or subject to interior cracking due to bulging caused by ferro-static pressure or may be subject to peripheral cracking by attempting to remedy the bulging.

It is thus an object of the present invention to provide a continuous casting installation of the type referred to above in which a large support space is defined at the casting outlet so that a support or knife device may be inserted into the casting outlet more deeply than previously, thereby shortening the length of the casting which is not supported.

According to the present invention a continuous casting installation of the type referred to above is characterised in that at the downstream end of the two runs the paths of the mould blocks of the two tracks extend in diverging straight lines from the points at which the two tracks begin to diverge.

Thus in the known casting installation the paths of the mould blocks are of semicircular shape from the points at which the tracks begin to diverge which means that initially the angle of divergence is very small indeed and thus the width of the gap between the downstream ends of the two tracks initially increases only very slowly. However, in the construction of the present invention the paths of the mould blocks extend in diverging straight lines which means that the width of the gap between the tracks increases very much more rapidly. This enables a tapered or wedge-shaped support device to be inserted further into the gap with its surfaces adjacent to the mould blocks than in the known installation whereby the length of the casting which remains unsupported is extremely short.

Further features and details of the present invention will be apparent from the following description of one preferred embodiment which is given by way of example with reference to Figure 2 of the accompanying drawings, which is a scrap diagrammatic side elevation of the downstream end of a continuous casting installation in accordance with the present invention.

The installation is generally similar to that shown in Figure 1 and comprises a plurality of mould blocks 1 connected together in upper and lower endless tracks 7 which are maintained in vertically symmetrical relationship. A support device 6 which is provided with a plurality of rollers 8 for engaging the casting 5 is provided at the outlet between the two tracks at the point at which they diverge. In this embodiment, the path or locus 9 of the mould blocks at the casting outlet for each of the upper and lower endless tracks 7 is defined as follows:

The mould blocks 1 of the adjacent runs of the two endless tracks move parallel to one another until they reach the point P whereafter they diverge. From the point P the locus or path 9 becomes generally semicircular but in fact includes an initial straight portion 9a so that as the blocks begin to diverge they are moving in a straight line and not along a semi-circular line. Each straight

portion is preferably inclined by at least 20° and more preferably about 40° to the preceding run of the associated endless track by the two straight portions are preferably inclined by at least 40° and more preferably by about 80°.

It follows therefore that due to the provision of the straight sections 9a, the mould blocks 1 move away from the casting 5 at a greater angle after the separation or starting point P than in the known installation which increases the size of the spaces above and below the casting 5. This enables the leading inner end of the support device 6 to be inserted further into the outlet space.

Thus in the installation of the present invention, the paths of the mould blocks includes a straight section or portion immediately after the separation or starting point at which the mould blocks start to move apart, that is to say start to move along the generally semi-circular pathway at the downstream ends of the tracks, so that the paths immediately define a relatively large angle with one another and with the central plane of the mould cavity and the mould blocks thus rapidly moving away from the casting on both sides. The casting outlet is thus increased in size so that it becomes possible to insert the inner leading end of the support device 6 into the casting outlet more deeply than previously. The distance over which the casting is withdrawn without being supported after it ceases contacting the mould block assembly is therefore shortened. Thus, the stability of the casting whose strength is not sufficient at the casting outlet is improved, the operation of the continuous casting installation is stabilised and the installation made more compact and higher quality castings can be obtained.

Claims

1. A continuous casting installation comprising a plurality of mould blocks arranged in two endless movable tracks, the two tracks having respective runs which extend parallel to one another and together define a mould cavity along which, in use, the mould blocks of the two tracks move in the same direction, characterised in that at the downstream end of the two runs (7) the paths (9) of the mould blocks (1) of the two tracks extend in diverging straight lines (9a) from the points (P) at which the two tracks begin to diverge.

2. An installation as claimed in Claim 1 characterised by a support device (6) of tapering external shape which affords a cavity for receiving and supporting a casting (6), the support device (6) being positioned in the gap between the blocks (1) of the two tracks at the downstream end thereof and adjacent to the blocks (1) with its end of smaller thickness being inserted further into the gap than its other end.

Fig.1

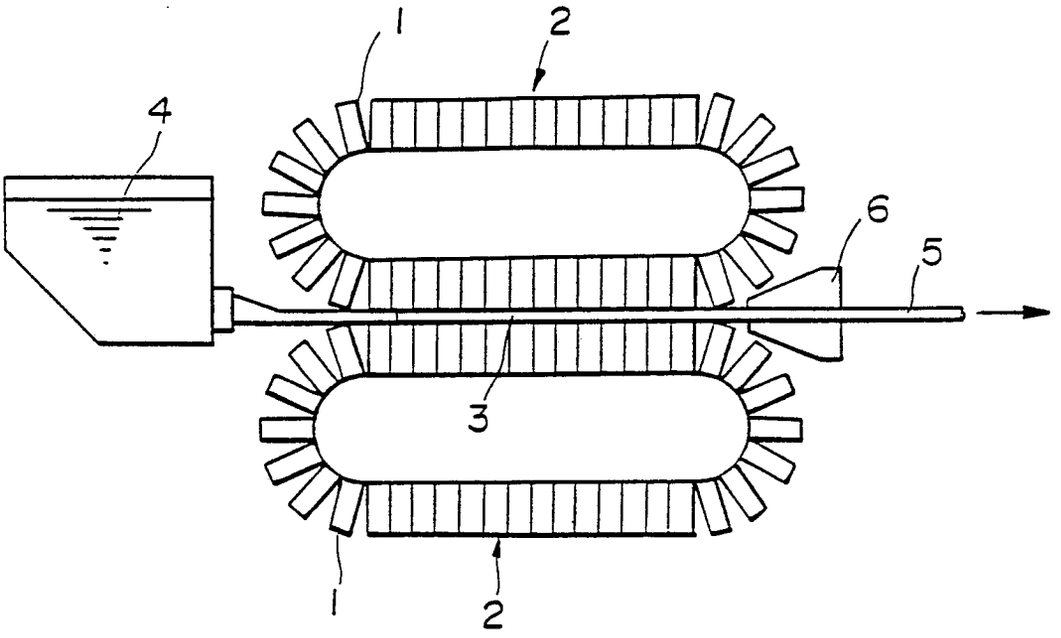
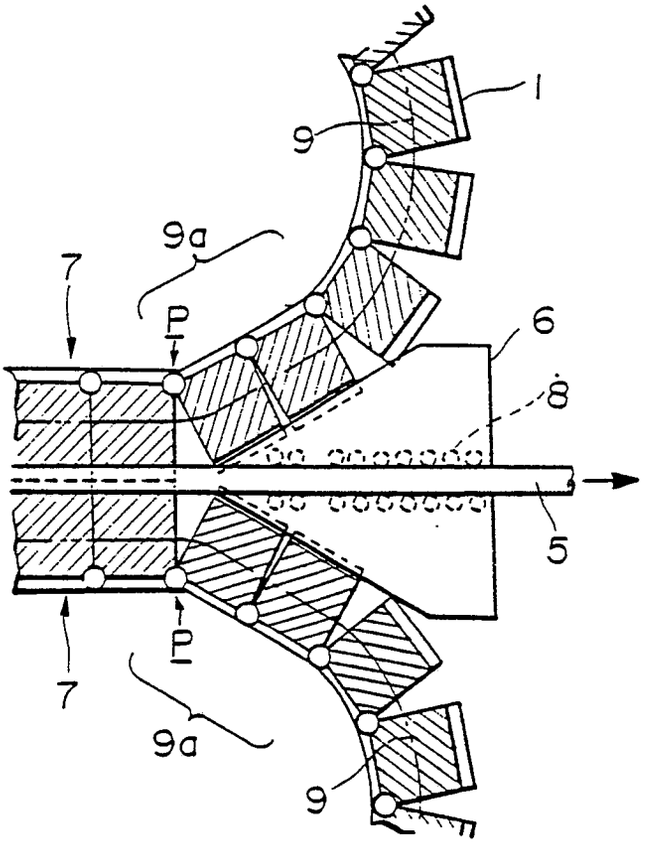


Fig.2



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EUROPEAN SEARCH REPORT

Application Number

EP 87 30 3844

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 Y	US-A-3 981 663 (G.P.H. LUPKE) * Figures 1,3; column 2, lines 50-65 *	1 2	B 22 D 11/06
X	PATENT ABSTRACTS OF JAPAN, vol. 10, no. 109 (M-472), 23rd April 1986; & JP-A-60 240 356 (ISHIKAWAJIMA HARIMA JUKOGYO K.K.) 29-11-1985 * Abstract *	1	
Y	PATENT ABSTRACTS OF JAPAN, vol. 11, no. 21 (M-555) 21st January 1987; & JP-A-61 195 754 (ISHIKAWAJIMA HARIMA HEAVY IND. CO. LTD) 30-08-1986 * Abstract *	2	
X	DE-A-3 200 424 (H.E. OLESCH) * Figure 3; page 8, lines 7-34 *	1	
A	PATENT ABSTRACTS OF JAPAN, vol. 11, no. 28 (M-557)[2475], 27th January 1987; & JP-A-61 199 555 (ISHIKAWAJIMA HARIMA HEAVY IND. CO. LTD) 04-09-1986 * Abstract *	2	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

B 22 D
B 29 C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	15-12-1987	DOUGLAS K.P.R.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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