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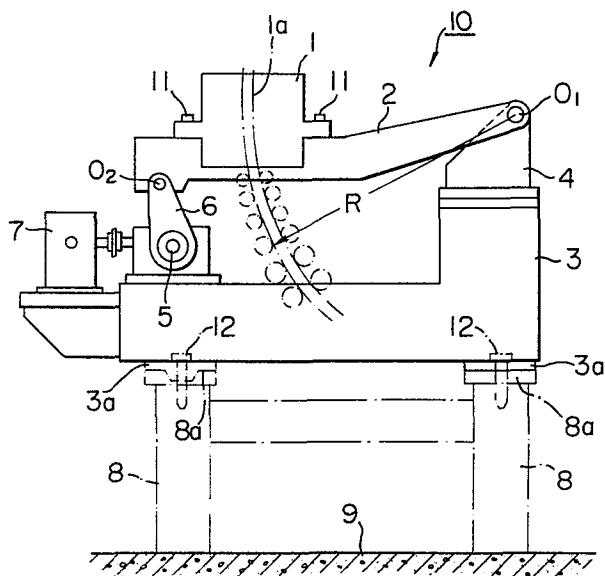
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54 **A mold oscillation apparatus for curved-type continuous casting machines.**

57 An apparatus 10 serves to oscillate a mold 1 for curved-type continuous casting machines, and comprises a base frame 3 detachably mounted on a structure 8, a bracket 4 secured to the base frame and having a fulcrum corresponding to a center O_1 of curvature for a path 1a of cast metal in the mold 1, an oscillation lever 2 having its one end pivotally mounted at the fulcrum to the bracket 4, and an oscillation drive lever 6, to which the other end of the oscillation lever 2 is pivotally mounted at a loading point O_2 . The mold 1 is detachably fixed to the oscillation lever 2 as by bolts 11 with its center O_1 of curvature corresponding to the fulcrum of the bracket 4. The oscillation drive lever 2 is swingingly driven by a drive motor through a reduction gear 7, so that the mold 1 can oscillate about the center O_1 of curvature.



A MOLD OSCILLATION APPARATUS FOR CURVED-TYPE
CONTINUOUS CASTING MACHINES

This invention relates to an apparatus for oscillating a mold for curved-type continuous casting machines, and more particularly to an apparatus for oscillating a mold having a small radius of curvature.

In order to prevent cast strands from sticking to molds in continuous casting, there have been conventionally employed measures in which a mold in curved-type continuous casting machines is caused to oscillate by a stroke along a locus having a radius R of curvature. In these measures, precision for the locus of oscillation having a radius R of curvature must be strict to some extent in order to reduce surface defects on cast strands to the minimum. To this end, it is necessary to devise constructions or mechanisms for ensuring precision of locus having a radius R of curvature in oscillation of molds. In the prior constructions or mechanisms, guide rolls or single lever are utilized. However, these prior art constructions or mechanisms involve various problems such as the reduction in precision due to abrasion of guide surfaces and the difficulty in ensuring precision of locus due to the fact that position of fulcrum for the single lever is shifted upon deformation of the building structure

1 to a part of which the fulcrum of the single lever is
secured. Another problem involved in the prior art
constructions or mechanisms resides in that repair or
maintenance of driving mechanism and the like must be
5 performed in a small area within the continuous casting
machine.

It is an object of the invention to solve the
above problems involved in the prior art constructions
10 or mechanisms.

It is another object of the invention to provide an apparatus in which precision of oscillation for a mold is ensured for a long period of time and which can be completely repaired from the outside.

15 It is a further object of the invention to provide an apparatus which is advantageously applied to continuous casting machines with a small radius of curvature.

The invention as claimed provides:

An apparatus for oscillating a mold for curved-type continuous casting machines, said apparatus comprising a base frame having a fulcrum corresponding to a center of curvature for a path of cast
5 strands in said mold and detachably mounted on a structure; an oscillation lever having its one end pivotally mounted at said fulcrum to said base frame; an oscillation drive means operatively connected to the
10 other end of said oscillation lever and fixed to said base frame.

An illustrated apparatus of the invention is basically a single lever type construction to ensure motion along a perfect circular arc, and comprises a base frame of adequate rigidity, an oscillation lever mounted at its
15 fulcrum on said base frame, a cam mechanism for oscillation mounted on said base frame, and a drive motor mounted on said base frame, said base frame being detachably mounted on a structure which in turn is
20 securedly supported on a concrete foundation.

1 An apparatus according to the present inven-
tion can be advantageously incorporated into a curved-
type continuous casting machine having a small radius of
curvature since it becomes compact in construction due
5 to the fact that the length of the oscillation lever is
reduced with smaller radius of curvature.

 In one aspect of the invention, the oscilla-
tion lever has its center of oscillation corresponding
to the center of curvature of a mold, so that the mold
10 oscillates about the center of curvature to provide an
accurate circular arc, thereby saving the trouble of
locating the center of curvature of the mold anywhere on
the building where the continuous casting machine is
mounted. According to the invention, the center of cur-
15 vature of a mold is immune from any displacement which
would be caused by distortion of the building in the
prior art, so that the mold can oscillate along an
accurate circular arc.

 In another aspect of the invention, a mold
20 having its center of curvature fixed thereto can be
attached to a continuous casting machine only by
mounting a base frame on a structure, and various ele-
ments provided on the base frame can be completely
repaired at a location away from the continuous casting
25 machine to improve an efficiency of repair work.

1 One way of carrying out the invention is
described in detail below with reference to the drawing
which illustrates only one specific embodiment and is
an elevational view of apparatus constructed according
5 to the invention.

Referring now to the drawing, there is shown
an apparatus for oscillating a mold 1 of a curved-type
continuous casting machine (not shown). The apparatus
is generally designated by numeral 10, and comprises an
10 oscillation lever 2 for the mold 1, a base frame 3, a
bracket 4 secured to said base frame, an oscillation cam
shaft 5 rotatably mounted on said base frame, an oscillation
drive lever 6 oscillatorily mounted on said cam
shaft, a reduction gear 7 for oscillation drive, and a
15 drive motor (not shown). These components constitute an
integral oscillation unit. The mold 1 has a path 1a for
cast strands, which path has a radius of curvature R,
and is detachably secured to the oscillation lever 2 by
bolts 11 such that a center O_1 of curvature of the path
20 1a corresponds to a fulcrum at which the oscillation
lever 2 is pivotally mounted on the bracket 4. The
oscillation lever 2 is also pivotally attached at a
loading point O_2 to the oscillation drive lever 6 to
oscillate about the fulcrum, that is, the center O_1 of
25 curvature. The loading point O_2 is located on a line
passing through the center O_1 of curvature. The
oscillation drive lever 6 is swingingly driven by the
oscillation cam shaft 5 which is in turn driven by the

1 drive motor (not shown) through the reduction gear 7
for oscillation drive.

The oscillation unit thus constructed is provided at the underside of the base frame 3 with a plurality of positioning liners 3a, through which the unit is
5 positioned on top support surfaces 8a of a structure 8 and is detachably secured to the structure 8 by means of cotter pins 12. The structure 8 is rigidly mounted on a concrete foundation 9.

10 While this invention has been described in conjunction with a preferred embodiment thereof, it is obvious that modifications and changes therein may be made by those skilled in the art without departing from the spirit and scope of this invention, as defined by
15 the claims appended hereto.

WHAT IS CLAIMED IS

1. An apparatus 10 for oscillating a mold 1 for curved-type continuous casting machines, said apparatus comprising a base frame 3 having a fulcrum corresponding to a center O_1 of curvature for a path 1a of cast strands in said mold and detachably mounted on a structure 8; an oscillation lever 2 having its one end pivotally mounted at said fulcrum to said base frame; an oscillation drive means operatively connected to the other end of said oscillation lever and fixed to said base frame.
2. An apparatus as set forth in claim 1 wherein said oscillation drive means comprises an oscillation drive lever 6, to which the other end of said oscillation lever 2 is pivotally mounted.
3. An apparatus as set forth in claim 1 or 2 wherein said base frame 3 comprises a bracket 4, to which the one end of said oscillation lever is pivotally mounted.
4. An apparatus as set forth in claim 3 wherein said mold 1 of the curved-type continuous casting machine is detachably fixed to said oscillation lever 2.



DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
A	<u>DE - B2 - 2 329 561</u> (SCHLOEMANN-SIEMAG AG) * claim 1 * & US - A - 3 886 995	1	B 22 D 11/04 B 22 D 11/14
A	<u>DE - A - 1 458 011</u> (CONCAST AG) * fig. 1 *	1	TECHNICAL FIELDS SEARCHED (Int.Cl. 3)
A	<u>FR - A - 1 549 548</u> (MANNESMANN AG) * fig. 1 *	1	
A	<u>US - A - 3 881 544</u> (BOTTA et al.) * abstract ; fig. *	1	B 22 D 11/00
			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
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
Berlin	09-11-1982	GOLDSCHMIDT	