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MOLD MOUNTING FOR CONTINUOUS CASTING

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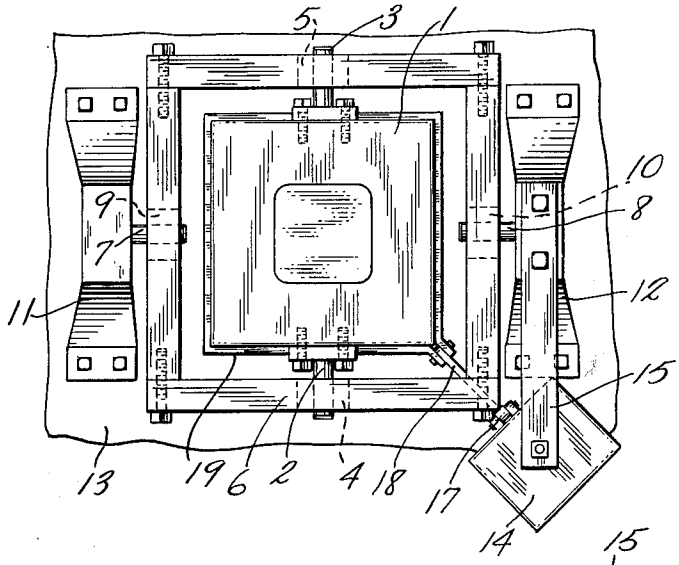

FIG. 2.

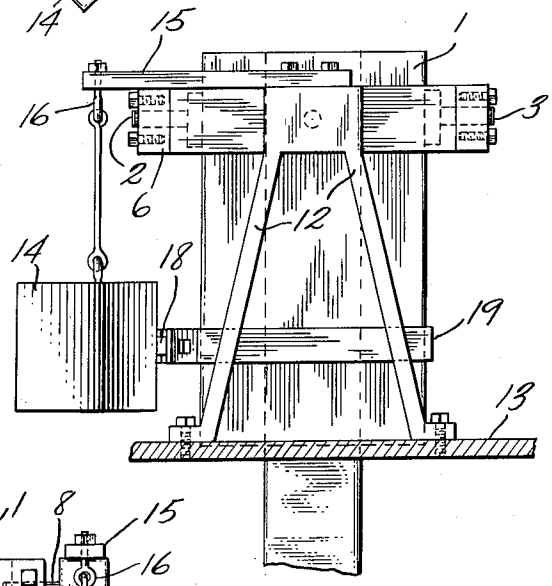

FIG. 3.

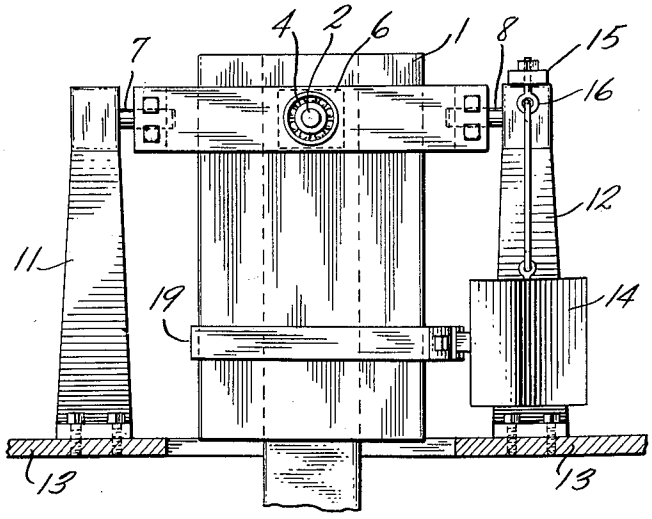

FIG. 1.

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MOLD MOUNTING FOR CONTINUOUS CASTING

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2 Claims. (Cl. 22—57.2)

This invention relates to the art of continuous casting of metal and pertains particularly to a mold mounting adapted to facilitate the casting process and to improve the quality of the casting.

In prior continuous casting installations, it has been customary either to mount the casting mold in fixed, stationary position, or in the case of a movable mold, to mount it in such fashion that the axis of the mold remains fixed during the casting operation. That is, despite the fact that some casting molds are mounted for reciprocating movement along or parallel to the axis of the mold, as in the casting process disclosed in Junghans Patent No. 2,135,184, for example, the mold has always been secured against lateral or tilting movement.

It is an object of the present invention to provide a universally mounted mold which is free to tilt in any direction, and is free to adjust itself to the casting, therefore, in accordance with the stresses applied to the mold by the casting itself.

It is a further object of the invention to provide means for vibrating the universally mounted mold during the casting operation.

Other objects and advantages of the invention will appear hereinafter.

A preferred embodiment of the invention selected for purposes of illustration is shown in the accompanying drawings, in which,

Figure 1 is a front elevation.

Figure 2 is a top plan view.

Figure 3 is a side elevation.

Referring to the drawings, the casting mold **1** is provided with a pair of trunnions **2, 3** preferably located slightly below the level of the molten metal. Trunnions **2, 3** are carried in bearings **4, 5** in a ring **6** which, in turn, is provided with a pair of trunnions **7, 8**. The axis of the trunnions **7, 8** intersects the axis of the trunnions **2, 3** at a right angle. Trunnions **7, 8** are carried in bearings **9, 10** in standards **11, 12** which are fixed to the platform **13**. The said platform may be stationary or it may be mounted for vertical reciprocation.

A vibrator unit **14** is attached to the casting mold, preferably at a point midway angularly, between the axis of the trunnions **2, 3** and the axis of the trunnions **7, 8** and preferably at a distance below the trunnion level such that, having regard to the moment of inertia of the vibrated mass, the vibratory node will be at or near the trunnion level.

The vibrator unit may be of any desired type, although we prefer to use a vibrator of the electro-magnetic type because of the flexibility of control of both frequency and amplitude of vibration. We have found that a frequency

of 3600 cycles per minute gives good results in most cases.

The vibrator unit may be suspended from an arm **15** by a flexible link **16**, said arm being mounted on the platform so that it will be stationary or will move vertically with the mold if the mold is mounted for vertical reciprocation. The vibrating element **17** of the vibrator is connected to the mold by a link **18**, preferably through a band **19** which encircles the mold.

The universally mounted mold has been found to give very beneficial results, particularly when combined with the vibrator as previously described. Thus, one of the difficulties which frequently arises in continuous casting is a bending or warping of the casting due to temperature differences around the periphery of the casting. The ability of the mold to yield and adjust itself to such bending or warping of the casting has been found to not only reduce the abrasion and wear on the mold, but also tends to correct the bending and warping.

The vibration of the mold not only assists the mold to adjust itself to the casting, and additionally reduces the friction and wear in the mold, but also, when utilized with a universally mounted mold, has a beneficial effect on the cast metal. Not only is the surface quality of the casting considerably improved, but also the crystal structure of the metal is improved, being considerably finer than otherwise.

An added advantage of such vibration lies in the fact that it causes impurities such as dross, slag or the like which may be floating on the surface of the liquid metal in the mold to move rapidly to the mold walls. It is known that if such impurities are allowed to remain on the surface, they coalesce to form lumps, which, unless skimmed off, become embedded in the sides of the casting. With such vibration there is no lumping, and skimming may be dispensed with for the fine particles of impurities leave no perceptible surface imperfection.

It will be understood that the invention may be variously modified and embodied within the scope of the subjoined claims.

We claim as our invention:

1. Apparatus for the continuous casting of metal, comprising, a casting mold, a platform, means including two pairs of trunnions having axes which intersect at a right angle for supporting said mold for universal movement on said platform, and a vibrator connected to said mold at a point midway between said axes and below said axes.

2. Apparatus as claimed in claim 1 in which said vibrator is connected to said mold at a distance below said axes such that the vibratory node will be near the level of said axes.

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