Aug. 12, 1941. J. TROST 2,252,220

INGOT CASTING APPARATUS

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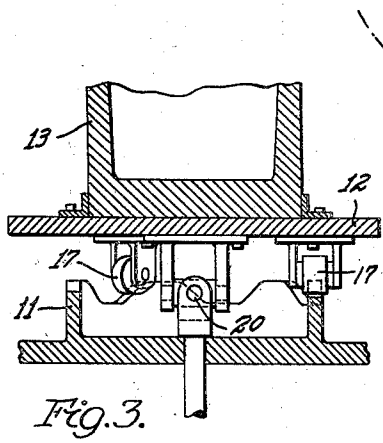


Fig. 3.

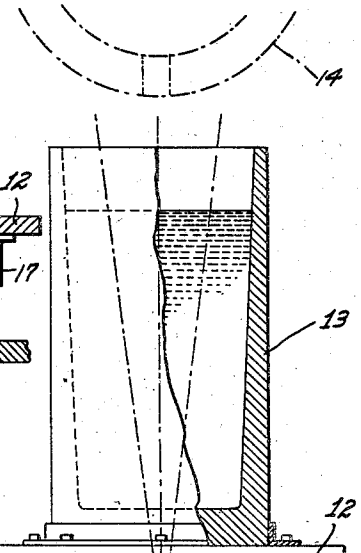
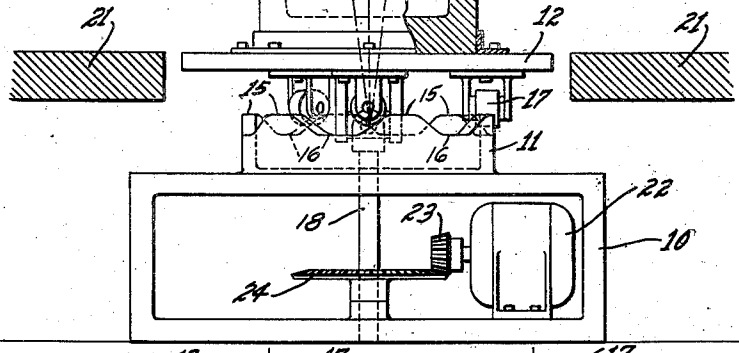


Fig. 1.



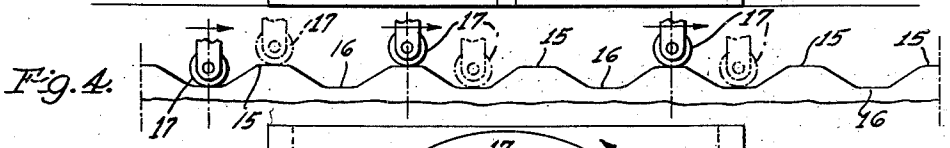


Fig. 4.

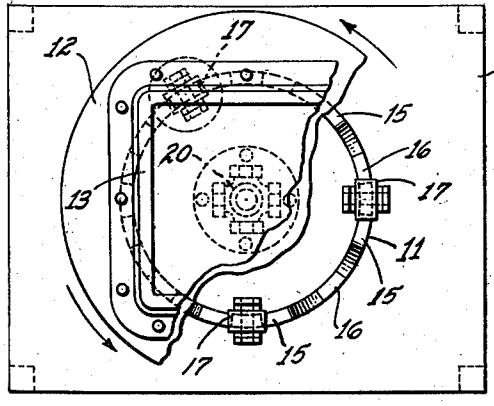


Fig. 2.

Inventor

John Trost,

By Otto F. Barthel

Attorney

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INGOT CASTING APPARATUS

John Trost, Detroit, Mich.

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6 Claims. (Cl. 22—57)

This invention relates generally to the making of metallic ingots and more particularly to ingot shaker devices.

In the casting of metallic ingots, the more rapid cooling of the metal at the surface thereof and resultant formation of crust tends to trap gases within the molten metal and form so-called blow holes. This is, of course objectionable as such blow holes render the ingot defective. Then again, the molten mass usually contains foreign matter or impurities which are also undesirable and should be concentrated at the surface of the metal. In the past, it has been proposed, among other things, to overcome the above objections by providing shaker devices for the ingot molds, but these shaker devices have been complicated, expensive devices and otherwise have not been entirely satisfactory.

Accordingly, it is an object of the present invention to provide a new and improved ingot mold shaker device which will be efficient in operation and simple in construction.

Another object of the invention is to provide a new and improved ingot mold shaker which operates to agitate the molten metal in a manner to release thoroughly the gases therefrom.

Another object of the invention is to provide an ingot mold shaker operable to impart a new and particular kind of motion to the mold to treat the molten metal therein to prevent blow holes and to concentrate foreign matter at the surface of the molten mass.

Other objects of the invention will become apparent from the following description taken in connection with the accompanying drawing wherein—

Fig. 1 is a view shown partly in elevation and partly in section of my improved ingot mold shaker;

Fig. 2 is a plan view of the shaker having parts broken away;

Fig. 3 is a view in vertical central section of the shaker, and

Fig. 4 is a view illustrating the development of a camlike track of the shaker device.

Referring to the drawing by characters of reference, the present device includes a hollow supporting base 10 having an upstanding tubular portion or continuous flange 11 on the upper end of which is provided a cam-like track for a rotatable support or table 12 on which is rigidly mounted an ingot mold 13. Above the upper open end of the mold 13, a ladle 14 is illustrated in part, from which molten metal, such as steel, is poured into the mold, the mold preferably being substantially square in horizontal cross section. The mold may be rigidly secured to the table 12 by rivets or by bolts and nuts or by any other suitable means.

Referring now to the cam-like track, this track is formed having a plurality of equally spaced risers or high surfaces 15 which consequently results in the provision of a like number of low surfaces 16, and rigidly secured to the underside of the mold supporting table 12 are three radially, but unequally spaced rollers 17 arranged to ride on the track. A vertical driven shaft 18 extends upwardly through the top of the base 10 and is connected to the supporting table 12, by a suitable universal joint 20, the pivots of this joint being located substantially midway between the high and low surfaces 15 and 16 respectively of the cam track surface providing for free rotation and tilting of the ingot mold. Since ingot molds are quite high, the base 10 is preferably located below the floor 21 and disposed within the base, an electric motor 22 drives the shaft 18 through meshing speed reducing bevel gears 23 and 24.

In order to insure a thorough shaking up of the molten metal and further to insure rise of foreign matter to the surface thereof, the high and low track surfaces 15 and 16 are flattened, as shown, these flattened surfaces preferably lying in a common horizontal plane. With this form of track it will be seen that, when the rollers 17 either riding up or down on the flat portions, impart a jarring motion to the molten metal along with a sudden tilting of the mold which results in inducing rise of gas bubbles and of foreign matter to the surface of the molten mass. The three rollers 17 are unequally spaced such that one interval two of the rollers are on the high cam track surfaces 15 and the other is on a low surface 16 and at a following interval the said one roller rides up onto a high surface and the other two ride down onto low surfaces. Thus, it will be seen that as the mold 13 is rotated it is tilted with a jar a number of times each revolution, and although the drawing shows six high surfaces providing for six tiltings and jarrings of the mold per revolution, it will be understood that the cam track may be provided with more or less of such surfaces, as may be desired.

While I have shown and described my invention in detail it is to be understood that the same is to be limited only by the appended claims for many changes may be made without departing from the spirit and scope of the invention.

What I claim is:

1. In a shaker device for casting metallic ingots, a rotatable tiltable supporting member for the mold, a stationary cam member having a continuous cam surface having equally spaced risers, an ingot mold mounted on said supporting member and having an axis of rotation coincident with the axis of rotation of said supporting member, a plurality of unequally spaced bearing members carried by said supporting member and arranged to ride on said cam surface, and drive means in the vertical axis of said mold and support to rotate said supporting member.

2. In a shaker device for an ingot mold, a rotatable and tiltable supporting member for the mold, a cam member having a continuous cam surface including equally spaced risers having flattened upper surfaces, a plurality of unequally spaced bearing members carried by said supporting member and arranged to ride on said cam surface, one of said members being rotatable to tilt said supporting member, and drive means to rotate said supporting member on said bearing and cam members.

3. In a shaker device for an ingot mold, a rotatable and tiltable supporting member for the mold, a stationary cam member having a continuous cam surface including equally spaced risers, a plurality of unequally spaced bearing means carried by said supporting member and arranged to ride on said continuous cam surface, the spacing between said bearing means being different than the spacing between said risers, drive means to rotate said supporting member, and a universal joint operatively connecting said drive means and said supporting member.

4. In a shaker device for an ingot mold, a rotatable and tiltable supporting member for the mold, a stationary track having a continuous track surface provided with a plurality of high and low flattened surfaces, unequally spaced rollers secured to and beneath said supporting member and arranged to ride on said track, drive means to rotate said supporting member, and a universal joint operatively connecting said drive means and said supporting member and having its joint located substantially midway between said high and low track surface, and having an axis of rotation coincident with the axis of rotation of said supporting member.

5. In a shaker device for casting metallic ingots, a circular track member having an upwardly facing continuous track provided with equally spaced upper flattened surfaces and intermediate lower flattened surfaces, an ingot mold having a longitudinal axis, three rollers equally spaced from the axis of said mold, said rollers mounted on a platform supporting the mold and arranged to ride on said track, said rollers being radially and unequally spaced such that during rotation of the mold one roller will be on an upper surface when the other two are on a lower surface and reverse so as to tilt the mold a plurality of times each revolution of the mold, and means to rotate the mold in its vertical longitudinal axis.

6. In a shaker device for an ingot mold, a hollow base having an upwardly facing continuous track, said track having equally spaced alternately high and low flattened surfaces, a tiltable and rotatable support for the mold, a plurality of unequally spaced rollers secured to the underside of said support and arranged to ride on said track, a vertically extending driven shaft having an axis of rotation coincident with the axis of the support and mold, a universal connection between said shaft and said rotatable support, and drive means for said shaft.

JOHN TROST.