April 2, 1935. H. G. LINDNER 1,996,623

FURNACE

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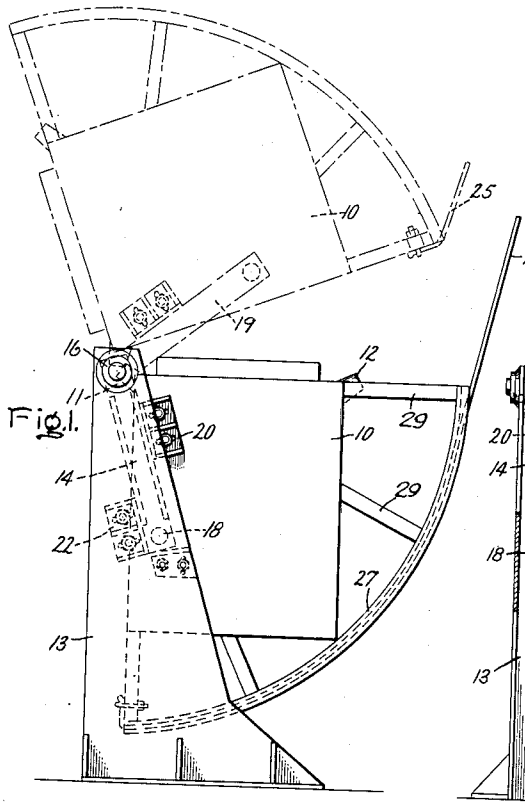


Fig. 1.

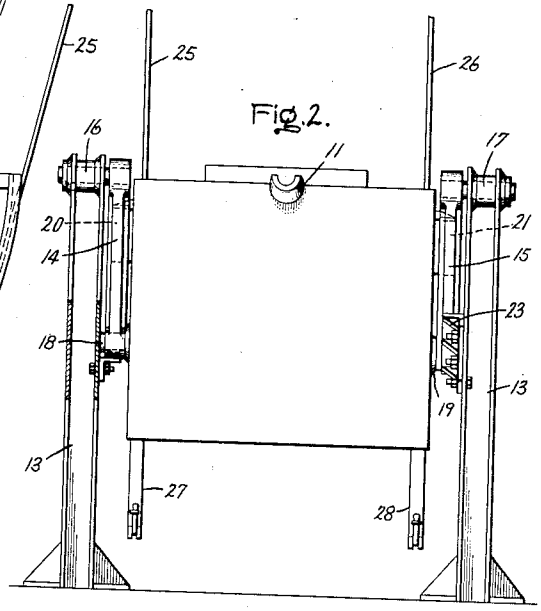


Fig. 2.

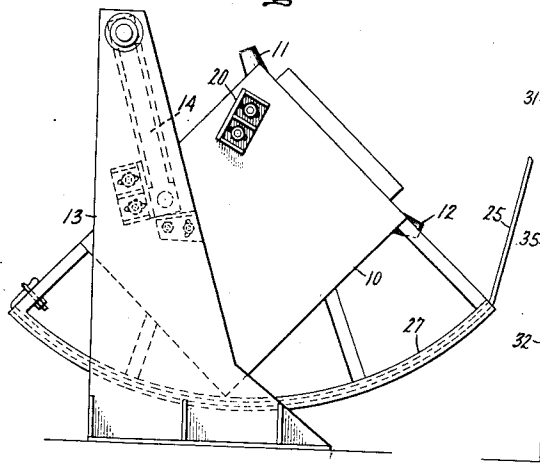


Fig. 3.

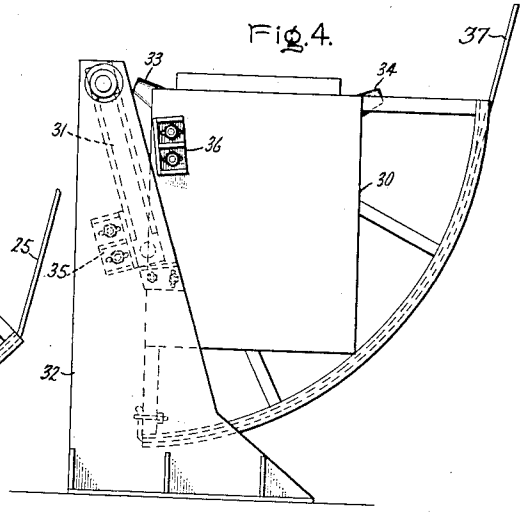


Fig. 4.

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FURNACE

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3 Claims. (Cl. 263—12)

This invention relates to furnaces and the like.

While not limited thereto, this invention has particular application to furnaces for melting metals, and one of the objects of the invention is to provide an improved furnace having a crucible provided with a pair of pouring lips and arranged so that the crucible can be moved in one direction for the removal of slag, etc., from one of the lips, and in the opposite direction for the removal of the molten metal from the other lip. It is another object of this invention to provide common operating means for moving the crucible in both directions to effect the removal of material from the pouring lips selectively.

For a complete understanding of this invention, reference should be had to the accompanying drawing in which Fig. 1 is a side elevation of a furnace arranged in accordance with this invention, the crucible being shown in solid lines in one operative position and in dotted lines in another operative position; Fig. 2 is an end elevation of the furnace shown in Fig. 1; Fig. 3 is a side elevation of the furnace shown in Fig. 1, but shown in still another operative position; and Fig. 4 is a side elevation of a furnace of modified form arranged in accordance with this invention.

Referring to Figs. 1–3 inclusive, this invention includes a crucible denoted by the numeral 10 which may be heated in any well known manner such, for example, as by an emersion heater or by induction. The crucible has a pair of pouring lips 11 and 12 arranged opposite to one another in the two end walls of the crucible.

The crucible 10 is supported upon a suitable base or frame 13 comprising upright standards, as shown, by means of a pair of links 14 and 15 arranged on opposite sides of the crucible.

The links 14 and 15 are pivotally mounted at their upper ends in suitable bearings 16 and 17 provided for them in the upper ends of the standards 13 so as to support the links for movement in planes parallel with the plane containing the pouring lips 11 and 12. The lower ends of the links are pivotally connected to the side walls of the crucible, as shown in Figs. 1, 2 and 3. For this purpose, the crucible is provided with stud shafts 18 and 19 which are received in bearings provided for them in the lower ends of the links, respectively. The stud shafts 18 and 19 are arranged in the same positions in their side walls respectively, and preferably are located somewhat below the horizontal central line of the crucible. By reason of this arrangement, the crucible is supported to rotate on the lower ends of the links on an axis parallel with, but below and removed a substantial distance from the axis through the upper ends of the links.

These two axes are so arranged that the axis passed through the upper ends of the links will have such a position that when the crucible is moved in a counter-clockwise direction, as viewed in the figures, the pouring lip 11 will pass through this upper axis. It is contemplated that when the crucible is moved in this direction so as to pour from the lip 11, the lip will be supported substantially in this upper axis so that the stream of material passing from the lip will not change its position materially as the crucible is tilted.

In order to effect this operation of the crucible, suitable stop members 20 and 21 are provided on opposite sides of the crucible arranged to engage the links 14 and 15 respectively when the crucible is rotated on its lower axis in a counter-clockwise direction, as viewed in the figures. It will be observed that when the crucible is rotated on its lower axis, the stops 20 and 21 necessarily must engage the links 14 and 15 and that when the stops and links are in engagement and the crucible is rotated, the crucible and links will be rotated as a military structure about the axis passed through the upper ends of the links. It will also be observed that when the crucible is thus rotated with the links as a unitary structure, the pouring lip 11 will pass substantially through this upper axis, irrespective of how far the crucible is moved in an upward direction. It will be observed that the stops 20 and 21 are so positioned that they will engage the links 14 and 15 when the crucible is substantially in a vertical position.

In order to effect pouring of the material from the lip 12 it is contemplated that the crucible will be rotated in the opposite direction on its lower axis passing through the lower ends of the links. To accomplish this, suitable stops 22 and 23 are provided on the standards 13 and positioned so as to engage the links when the crucible is allowed to move downwardly to its substantially vertical position shown in Fig. 1.

It will be observed that when the crucible is in this position, the stops 22 and 23 will engage the links so as to prevent any further clockwise motion of the links on the standards. The crucible, however, can be rotated from its vertical position in a clockwise direction on its lower axis passing through the lower ends of the links while the links are held in a stationary position by the stops 22 and 23. In this manner, the crucible can be moved from the position shown in Fig. 1 to the

position shown in Fig. 3 so as to effect pouring of the material in the crucible from the lip 12.

The stops 20 and 21, and 22 and 23 will be adjustable on the crucible and standards 13, respectively so that the positions of the stops can be changed to compensate for wear and also to control the inclination of the crucible at the moment in which the axis of rotation of the crucible changes.

It is contemplated that a common operating means be provided for moving the crucible in its two directions. This means comprises suitable cables or ropes 25 and 26 which pass over suitable curved guide rails 27 and 28, respectively, rigidly secured to the crucible 10. As shown, these guide rails are rigidly secured to the crucible by means of suitable spoke-like members or arms 29. The cables preferably will be wound upon suitable cable drums (not shown) and preferably will have a common drive. It will be understood, of course, that chains, rods or other suitable improvements may be used instead of the cables 25 and 26.

In Fig. 4 a modified form of the invention is shown wherein the lower axis of rotation of the crucible and the stops on the crucible are so located that when the crucible is held in a vertical position, as shown in Fig. 4, the stops on the crucible will not engage the supporting links, as is the case in Fig. 1. As shown in Fig. 4, a crucible 30 is supported on links 31 pivotally mounted at their upper ends to the standards 32. The lower ends of the links are pivotally secured to the crucible. The crucible is provided with a pair of opposed pouring lips 33 and 34 arranged as are the lips 11 and 12 of Fig. 1. The parts thus far described are arranged similarly to the corresponding parts shown in Fig. 1 so that pouring from the lip 33 is effected by moving the crucible in a counter-clockwise direction, whereas the crucible will be moved in a clockwise direction to effect pouring from the lip 34.

Stops 35 are provided on the frame 32 for engaging the arms 31 to limit the clockwise motion of the arms, and stops 36 are provided on the crucible for engaging the arms so as to limit the counter-clockwise motion of the crucible independently of the arms. The pivotal connections between the crucible and the links and the stops 36 are so located that when the crucible is in its vertical position, as shown in Fig. 4, the stops 36 will not engage the links 31, as do the stops 20 of Fig. 1 engage the links 14 and 15 when the crucible 10 is in its vertical position. In other words, the crucible must be rotated from its vertical position for a relatively small distance in a counter-clockwise direction before the stops 36 engage the links 31. The stops are preferably so arranged that when the crucible comes into contact with the links 31 and the crucible commences to rotate about its upper axis, the level of the molten metal within the crucible will stand approximately at the outlet of the pouring lip 33.

This crucible is operated by cables 37 arranged in the same manner as are the cables 25 and 26 of Figs. 1 to 3.

While I have shown particular embodiments of my invention, it will be understood, of course, that I do not wish to be limited thereto since many modifications may be made, and I, therefore, contemplate by the appended claims to cover any such modifications as fall within the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A furnace comprising a crucible having a pair of pouring lips located opposite to one another, a pair of supporting links for said crucible, means pivotally supporting said links to rotate on an axis passing transversely of said crucible substantially through one of said pouring lips when the crucible is in one position, means pivotally connecting said links to the walls of said crucible at a substantial distance from said axis so that said crucible can be rotated about a second axis substantially parallel with and removed from said first axis for discharging material from the other of said lips, and so that said crucible can be rotated about said first axis passing substantially through said one lip to discharge material from said one lip, and common operating means for moving said crucible about each of said axes.

2. A furnace comprising a crucible having a pair of pouring lips located opposite one another, a pair of supporting links for said crucible, means pivotally supporting said links to rotate on an axis passing transversely of said crucible, means pivotally connecting said links to the walls of said crucible at a substantial distance from said axis so that said crucible can be rotated about a second axis substantially parallel with and removed from said first axis, means for moving said crucible in opposite directions in space, fixed stops for arresting the motion of said links in one direction so that said crucible can be moved on said links in said one direction about said second axis to pour from one of said lips, and stop means on said crucible for engaging said links to arrest the motion of said links relative to said crucible when said crucible is moved in the opposite direction so that said links move with said crucible about said first axis to pour from said other lip, said axes being arranged so that when said crucible is moved with said links about said first axis, the position of the stream poured from said other lip remains substantially unchanged as the crucible is rotated.

3. A furnace comprising a crucible having a pair of pouring lips located opposite to one another, a pair of links on opposite sides of said crucible lying in planes parallel to the plane containing said lips, a base comprising a pair of standards, means pivotally connecting the upper ends of said links to said standards respectively to rotate on an axis transverse of said crucible, means pivotally connecting the lower ends of said links to said crucible walls so that the crucible can be rotated on said links on an axis substantially parallel with and below said first axis, means for moving said crucible in opposite directions in space, stop members on said crucible for engaging said links when said crucible is moved in one direction so that when said crucible is thus moved it will rotate on said lower axis until said stop means engages said links, whereupon said links and crucible are moved as a rigid unitary structure about said first axis to pour from one of said lips, said links being arranged so that when said crucible is thus rotated the position of the stream of material poured from said one lip remains substantially unchanged as the crucible is rotated, and stop members on said standards arranged to engage said links when said crucible is moved in the opposite direction so as to arrest the motion of said links whereby said crucible upon continued movement in said opposite direction is caused to move about said lower axis to pour from said other lip.

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