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METHOD AND DEVICE FOR CASTING PLATED INGOTS

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Fig. 1

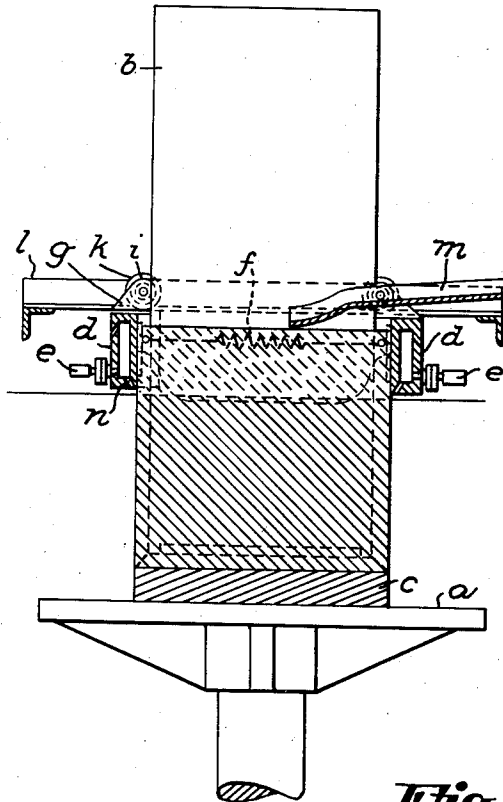


Fig. 2

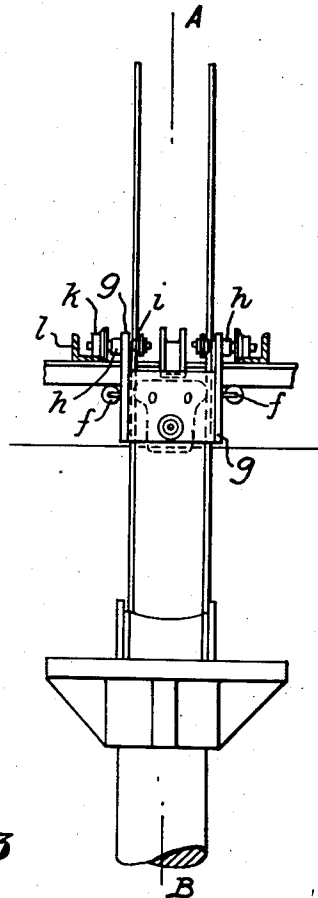
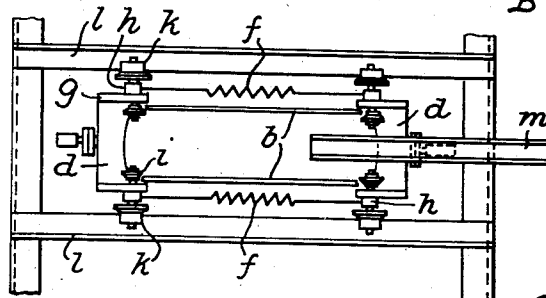


Fig. 3



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METHOD AND DEVICE FOR CASTING
PLATED INGOTSPaul Brenner, Hanover, Germany; vested in the
Alien Property CustodianApplication June 4, 1941, Serial No. 396,640
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10 Claims. (Cl. 22-58)

This invention relates to a method and device for casting plated ingots, in which movable thin sheet metal walls of the mold are separated leave to a longitudinal slot or slots intended for the introduction of a pouring spout, said slot being closed by segments which serve also as holders for the walls.

It is an object of this invention to construct a casting apparatus in which the segments for closing the slots between the sheet metal mold walls are relatively stationary but adjustable to irregularities of the ingot being cast.

Another object of this invention is to construct a casting apparatus in which the segments for closing the slots between the mold walls function as water cooled molds.

Another object of this invention is to produce a method of rapidly casting plated ingots.

Generally these objects of the invention are obtained by using water cooled molds as the closing segments, and mounting these molds so that they are movable in any direction other than the vertical. The thin metal sheet walls are guided by the segments as the ingot is being formed and lowered with the walls into a cooling medium. As the segments are movable, they are self-adjusting to irregularities of the walls, and thus prevent any jamming of the apparatus during the casting of the ingots.

The invention is illustrated by way of example in the accompanying drawing, in which

Figure 1 is a longitudinal section of the device according to the invention on the line A-B, of Fig. 2,

Figure 2, a side view thereof,

Figure 3, a top view thereof.

A vertically movable table *a* is provided with a foot *c* for supporting and holding the plating sheets *b*. Two water-cooled lateral sealing members *d* are equipped with supply and discharge pipes *e* for the coolant, which at their upper part possess on each side guide rolls *i* for the plating sheets *b*, and rollers *k* for the horizontal rails *l*. The guide rolls *i* and the rollers *k* are rotatably mounted on common shafts *h* held by supports *g* secured to the sealing members *d*. These sealing members are held together by springs *f* so as to abut the edges of the sheets *b*, with the side edges of the guide rolls *i* facing the plating sheets *b*. Liquid metal is supplied to the mold by pouring spout *m*.

When operating the casting device, the table *a* is first raised up to the lateral sealing members *d*, the plating sheets *b* are mounted thereon and are embraced partly by the foot *c* and part-

ly by the lateral sealing members *d*, and kept straight by the pairs of rolls *i*. In accordance with the amount of inflowing liquid metal the table *a* is gradually lowered preferably in such manner that the surface of the liquid metal in the mold maintains a constant level. The ingot produced in this manner while travelling in downward direction, whose unplated narrow sides externally solidify as it slides along the lateral sealing members *d*, is then completely solidified in a very short time in a water bath located below, or with the aid of some other suitable cooling device. Depending on the thickness of the ingot, the water bath is preferably positioned 100-150 mm. below the surface of the liquid metal.

The water-cooled segments *d* are arranged to be freely adjustable in all directions except the vertical. As they are held together by the springs *f* and are tiltably hung on the shafts *h*, the sealing members *d* can adapt themselves to all variations in the dimensions of the ingots or of the sheets forming the mold due to inaccuracies in production or differences in temperature occurring during casting and solidification of ingots. The performance of the casting process is thus materially facilitated, and casting troubles owing to jamming or seizing of the segments in their guides are avoided.

Furthermore, differences in the width of the two plating sheets *b* cannot interfere with the proper functioning of the casting device, since in this case the lateral sealing members *d* will automatically adjust themselves, due to the pull of the springs *f*, to a somewhat inclined position with the result that the guide rolls *i* will always hug the edges of the plating sheets *b* in a perfectly satisfactory manner.

To facilitate the insertion and holding of the sheets *b* prior to, or at the beginning of, the casting operation suitable additional holding means, as screw-on clamps, etc., may be employed.

The water-cooled lateral sealing members *d*, preferably at their edges contacting below with the ingot, possess nozzles *n* for supplying cooling water. The nozzles *n* may comprise bores inclined approximately 60° relative to the edges of the ingot and disposed in the walls of the lateral sealing members *d*, and are uniformly distributed over the edges of the members *d*. This direct discharge of water at the point where the ingot emerges from the lateral sealing members *d* prevents the possible entrance of steam bubbles into the space between the lateral sealing members *d*

and the solidifying ingot. Cooling by means of the nozzles n counteracts, moreover, the formation of exudations on the side edges of the ingot.

The devices described can be used of course for casting all sorts of metal.

What is claimed is:

1. A method of casting a plated metal ingot comprising erecting a mold upon a vertically movable table, said mold being composed of at least one thin metal sheet adapted to form the plate upon the ingot, and said mold having a vertically extending opening in one side thereof, closing a portion of said opening by a liquid cooled segment, pouring molten metal in the chamber formed by said wall and segment while lowering said table and solidifying said ingot by a cooling medium applied to said mold and said segment.

2. A method as in claim 1, said segment constituting a self-adjusting guide member for said metal sheet forming said mold.

3. In an apparatus for casting a plated metal ingot which comprises a thin sheet metal molded open on one side and adapted to form the plate upon the ingot, means for lowering said mold into a cooling medium, and means for closing a portion of said open side to form a mold chamber into which molten metal is poured as said mold is lowered, said closing means comprising a mold segment, and means mounting said segment for horizontal adjusting movement in conformity with variations in the horizontal dimension of said ingot as it is cast in said chamber.

4. In an apparatus for casting a plated metal ingot which comprises a thin sheet metal mold open on one side and adapted to form the plate upon the ingot, means for lowering said mold into a cooling medium, and means for closing a portion of said open side to form a mold chamber into which molten metal is poured as said mold is lowered, said closing means comprising a mold segment, means mounting said segment for horizontal and tilting movement with respect to said mold, and means for urging said segment into

contact with the edges of said mold forming said open side.

5. In an apparatus for casting a plated metal ingot which comprises a thin sheet metal mold open on one side and adapted to form the plate upon the ingot, means for lowering said mold into a cooling medium, and means for closing a portion of said open side to form a mold chamber into which molten metal is poured as said mold is lowered, said closing means comprising a mold segment, means for applying a cooling medium to said segment, and means mounting said segment for horizontal adjusting movement in conformity with variations in the horizontal dimension of said ingot as it is cast in said chamber.

6. A mold for the casting of a plated metal ingot comprising a thin sheet metal member forming at least one side of said mold and having vertically extending spaced edges defining therebetween a pouring slot, means engaging said edges for closing a portion of said slot to form a mold chamber, and means mounting said engaging means for movement transversely only of said walls.

7. A mold for the casting of a plated metal ingot as set forth in claim 3, said engaging means comprising a water cooled mold segment.

8. A mold for the casting of a plated metal ingot comprising mold walls composed of thin sheet metal, said walls presenting on one side vertically extending spaced edges defining therebetween a pouring slot, a mold segment for closing a portion of said slot to form with said walls a mold chamber, means mounting said segment for both horizontal and tilting movement with respect to said edges, and means for resiliently urging said segment into contact with said edges.

9. A mold as in claim 8, said segment comprising a water cooled mold.

10. A mold as in claim 8, said segment comprising a water cooled mold, and including means for discharging cooling water beneath said segment.

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