Dec. 6, 1938. A. H. JUNG 2,139,191

INGOT MOLD

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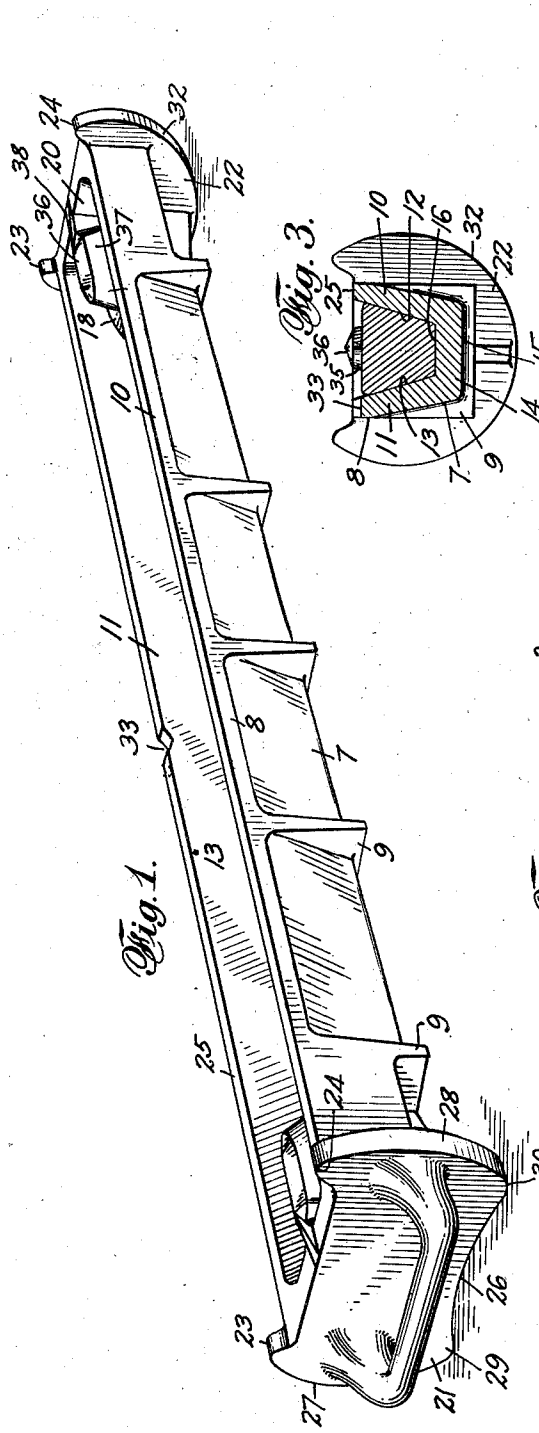

Fig. 1.

Fig. 3.

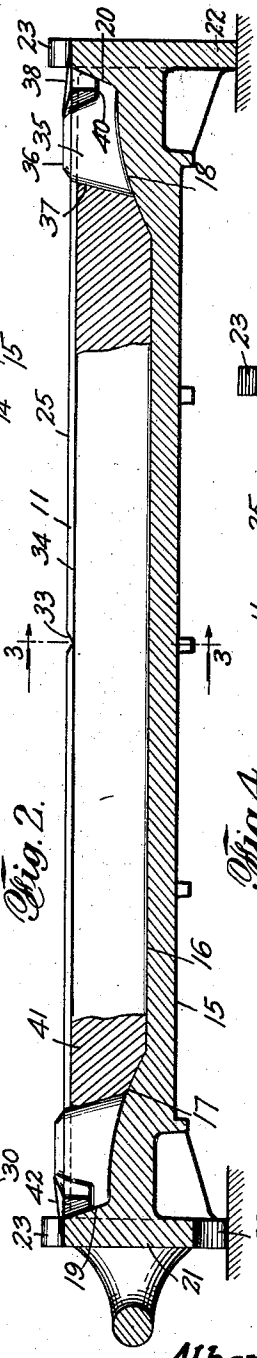

Fig. 2.

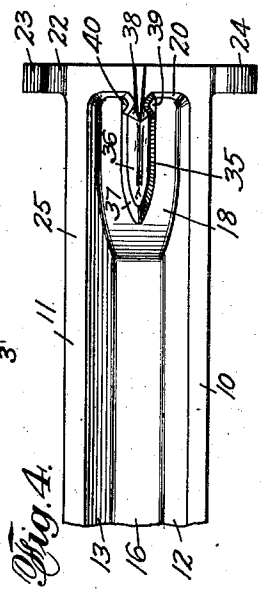

Fig. 4.

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INGOT MOLD

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9 Claims. (Cl. 22—139)

This invention relates to ingot molds and particularly to that type designed to cast type metal ingots of the kind that are fed gradually into the pot of a typesetting and casting machine and such as is shown, for example, in my patent for Ingot for typesetting machine feeders, No. 2,083,913, dated June 15th, 1937.

My invention contemplates the provision of a simple, inexpensive, but efficient mold preferably for use in the casting of individual ingots of the type above described at the printing plant where such ingots are used. The ingots are customarily cast of the metal obtained from remelting printing slugs or characters. The ingot produced by the mold of the present invention is of the proper shape and size to be used in the feeding machines and may be readily hung on the hook of such machines, while the extreme ends of the ingot are so shaped that they automatically drop into the pot by gravity and thereby avoid heating of the hook of the machine, the ingot having other advantages such as requiring no attention on the part of the operator.

My invention further contemplates the provision of a mold which is self-levelling and cannot shake or wabble when resting on a supporting surface, particularly during the operation of pouring metal thereinto.

My invention further contemplates the provision of a mold from which the ingot may be readily discharged by a simple turning operation and without the necessity for striking the mold.

My invention further contemplates the provision of a mold provided with gauge means for insuring the casting of ingots of the proper size, and reinforced against warping, and provided further with means for insuring the formation of a proper hook-receiving and completely open slot, which slot cannot be filmed over or "finned" and in which, therefore, the casting operation may be quickly and efficiently performed.

My invention further contemplates the provision of a mold designed to occupy a minimum amount of space when not in use and in which the mold surfaces are protected from the accumulation thereon of dust, dirt, water, or other foreign matter which not only might contaminate the ingot cast in the mold, but which might result in injury to the operator when molten metal is poured thereinto.

The various objects of the invention will be clear from the description which follows and from the drawing, in which,

Fig. 1 is a perspective view of my improved mold.

Fig. 2 is a vertical longitudinal section thereof showing the ingot cast therein, partly in section.

Fig. 3 is a vertical section of the same taken on the line 3—3 of Fig. 2.

Fig. 4 is a top plan view of one end portion of the mold.

In the practical embodiment of my invention which I have shown by way of example, the mold is preferably, though not necessarily, made of a single piece of suitable metal as by casting or the like. The sides 10 and 11 are each provided with a flat and downwardly and inwardly tapered inner surface as 12 and 13 respectively. The bottom 14 of the mold is provided with a substantially flat outer surface 15 and with a flat inner surface 16 extending through the mid-portion of the mold. At the end parts of said surface 16, the convexly upward bottom surfaces 17 and 18 are provided, said surfaces joining the tapered end mold surfaces 19 and 20 to the remainder of the bottom surface 16. The sides and bottom of the body of the mold are preferably reinforced to prevent warping, as by means of the ribs 9 arranged at spaced intervals throughout the length of the mold body, and projecting outwardly beyond said sides and beyond said bottom. The outer surfaces of the sides 10 and 11 may in part be vertical as shown at 8, and in part inclined or tapered as shown at 7.

An end flange as 21 is provided at one end of the mold while a differently shaped end flange 22 is provided at the other end. Each of said flanges, however, projects transversely beyond the sides 10 and 11 and below the bottom 14, and is further provided with an upwardly extending pair of projections as 23, 24, disposed above the top surface 25 of the sides. The end flange 21 is preferably made concave inwardly at its lower edge 26, the side edges 27 and 28 of said flange 21 being curved convexly to provide rolling surfaces designed to engage the surface which supports the mold when said mold is rotated about its longitudinal axis. One of the lower corners 29, 30 of the flange 21 serves as a fulcrum point for such rotation, which can be readily effected, by means of the handle 31 when it is desired to discharge the hot ingot. The flange 22 is provided with a curved peripheral edge 32 extending between the projections 23, 24 thereof.

It will be understood that when the mold is arranged in the position of Fig. 1, it rests on the corners 29 and 30 of the end flange 21 and also on the lowermost point of the edge 32, thereby providing a three point support for the mold and insuring the self-maintenance of the mold in its proper level position on the supporting surface. It will also be understood that by reason of its three point support, said mold is perfectly supported against wabbling or shaking due to the unevenness of the supporting surface.

It will further be understood that owing to the curvature of the edges of the rocker flanges, it becomes unnecessary to lift the mold to overturn it when the ingot cast therein is to be discharged,

but instead, the operator after grasping the handle 31 need only rotate the mold either in a clockwise or counter-clockwise direction for a sufficient angle, greater than 90°, to carry the handle 31 past a vertical position, whereafter on release of the handle 31, the mold will drop into an inverted position on to the supporting surface, to come to rest on the projections 23, 24 of the end flanges. By dropping the mold in its thus inverted position in the last part of its rotation by the handle, a shock or blow is given to the mold, which in most cases is sufficient to jar the ingot out of the mold and cause the ingot to drop on to the supporting surface without the necessity for additionally striking the mold on any manner, or attempting by other means to free the hot ingot from its frictional contact with the mold surfaces.

When the mold is thus inverted, neither the top surface 25 thereof nor any of the mold surfaces comes into contact with the supporting surface, which may have dirt or water thereon, whereby the mold is kept clean and need only be rotated back to the position shown in Fig. 1 ready for a repetition of the operation.

Gauge means are provided for insuring the casting of ingots of the proper size. As illustrated, said means takes the form of the preferably V-shaped notch 33 made in one of the sides as 11, the bottom of said notch determining the highest level of the molten metal. When pouring, the operator need merely watch the notch 33 without paying any attention to the remaining parts of the mold and he need merely stop pouring when the metal level 34 reaches the bottom of the notch. Should he inadvertently continue the pouring of metal, excess metal will escape through said notch without increasing the ingot height and without danger of closing up the slots intended to be formed in the ingot. By the provision of said notch, the operator need pay no attention to the cores, later to be described, for forming the ingot slots.

Each of said slots is formed in the ingot by means of a suitable core member 35 upstanding integrally from each of the mold surfaces 17 and 18 at the ends of the mold. Since each of the cores 35 and the parts associated therewith are identical, a description of one will suffice for both. The top surface 36 of the core member 35 is made preferably of generally pyramidal or wedge form, the uppermost point, apex or edge thereof being slightly above the surface 25, but below the uppermost points of the projections 23 and 24. The pitch thus given to said top surface 36 prevents the adhesion of any metal thereto, should such metal be inadvertently poured thereon during the operation of pouring metal into the mold. Furthermore, should the mold become slightly tilted so that molten metal rises higher than it should along the lateral surface 37 of the core 35, the additional height of said core, given to it by means of the sloping surface 36, prevents the bridging of the top of said core by metal, so that the casting of a suitable slot in the ingot is assured, regardless of accidents, or carelessness on the part of the operator, or due to the mold being out of level.

Said core member 35 does not extend to the adjacent flange 21 or 22 of the mold, but is connected thereto by a comparatively short and much narrower neck 38, the walls of which neck extend downwardly a distance less than the height of the core to form a pair of substantially flat surfaces 39 and 40. Said surfaces are arranged about midway between the surface 18 and the horizontal plane passing through the liquid level 34. The various surfaces of the core 35 and of the neck 38 are given a substantial taper so that the lugs 42 formed on the ingot by filling with metal the spaces above the surfaces 39, 40 and adjacent the neck are properly beveled and rounded to provide a minimum hook-engaging surface.

It will be noted that the ingot 41 cast in the mold is provided with double lugs as 42 having rounded edges adapted to engage the hook of the feeding machine along a minimum area and of such shape that when the ingot is melted to the bottom of the slot formed by the core member 35, the end arm portions of the ingot readily slip off the hook into the pot of the typographical machine.

When not in use, the mold stands upright and rests on the flat surface provided by the outer face of the flange 22 and therefore occupies a minimum amount of floor space, the mold surfaces being also protected to a substantial extent from the accumulation of foreign matter therein as would be the case if the mold were to rest on the floor in the usual manner. Nor can the mold surfaces come in contact with any water which may have been spilled on the floor and which is a source of danger when molten metal is poured into the thus wet mold. When the mold is to be used, it is merely turned into the position of Fig. 1 to rest on the corners 29 and 30 and on the bottom of the flange 22 so that it cannot wabble. The operator now pours the molten metal into the mold, watching only the notch 33. Should metal be inadvertently poured on the core member 35, such metal because of the shape of the top surface 36, runs off the core back into the mold and cannot form a film or fin to close the slot in the resulting ingot. When the liquid metal has reached the bottom of the notch 33, the pouring is stopped, though should any additional metal be inadvertently poured into the mold, it will nevertheless fail to close the slot of the ingot but will escape through the notch. After the metal has solidified sufficiently, the handle 31 is merely rotated, thereby rocking the mold on to the surface 27 or 28 of the end flange 22, the mold also rocking on the curved edge 32 of the flange 21. When turned sufficiently to overcome the tendency of the mold to turn back to its initial position, the handle 31 is released whereupon the mold drops with considerable force the rest of the way into its inverted position, producing a hammering effect thereupon when striking the supporting surface, that is, when the corners 24 fall on to said surface. The ingot, due to the jarring effect thus produced, drops out of the mold whereupon the mold may be turned back to its pouring position and the operation repeated.

It will be seen that I have provided a simple, though efficient and easily manipulated and safe mold, having the advantages hereinbefore pointed out over molds heretofore known and particularly designed to insure the casting of a slotted ingot and without danger of the slot being closed or partly closed.

While I have shown and described certain specific embodiments of my invention, I do not wish to be understood as limiting myself thereto, but intend to claim the invention as broadly as may be permitted by the state of the prior art and the scope of the appended claims.

I claim:

1. In a one-piece ingot mold, means for rocking the mold part way from its operative position toward an inverted position and to permit the mold to drop into its inverted position to jar the ingot therefrom, said means comprising a pair of end flanges on the mold each having at least one curved edge adapted to contact with the mold-supporting surface when the mold is rocked, and each having a pair of transversely spaced projections on its upper edge extending above the remainder of the mold and above the remainder of said upper edge, and a handle on one of said end flanges, one of the projections of each pair contacting violently with said supporting surface when the handle is turned through an angle greater than 90° and then released.

2. In an ingot mold, a body part open at its top, core means integral with and arranged at both ends of the body part, and a pair of transversely arranged end flanges each extending beyond the top, sides and bottom of the body part, one of said flanges having a pair of projections extending from its bottom edge, said projections being in transverse spaced relation and separated by a recess in said bottom edge, and each of said flanges having a pair of spaced upstanding projections in its top edge adapted to support the mold on a supporting surface with the body part in spaced relation to said surface when the mold is inverted.

3. In a one-piece ingot mold, a pair of transversely arranged solid end flanges each extending beyond the sides and bottom of the mold, one of said flanges having a pair of convex side edges each terminating at its lower end in a downwardly extending projection, and at its upper end in an upwardly extending projection, and the other of said flanges having a convex edge extending around its sides and bottom and terminating at its upper ends in upwardly extending projections.

4. In a one-piece open top ingot mold, a pair of sides, one of said sides having a notch in the upper edge thereof determining the maximum liquid level of material poured into the mold, a flat bottom mold surface terminating in an upwardly convex portion at each end thereof, a core upstanding from each of said portions, the top surface of said core being convex and above said sides and above the ends of the mold, and extending to said ends, a reduced neck joining the core to the adjacent end of the mold, said neck being shorter than the core and terminating at its bottom in a substantially flat horizontal surface arranged approximately midway between said convex portion and the top surface of said sides, and a transverse flange at each end of the mold, each of said flanges being wider and higher than the remainder of the mold, one flange having a pair of convex side edges, a concave bottom edge joining said side edges and providing a pair of transversely spaced mold-supporting points on said end flange, and the other flange having a convex peripheral edge extending around the bottom and sides thereof, each of said flanges having a pair of upstanding spaced projections on its upper edge.

5. In an ingot mold adapted to be inverted from its normal casting position to an inverted position to discharge a casting therefrom, a pair of end rockers, one of said rockers having a pair of spaced mold-supporting points separated by a recess in its lower edge and the other having a curved mold-supporting lower edge, each of said rockers having a pair of spaced projections extending from its upper edge, the said points cooperating with the curved edge to support the mold in its normal casting position, and the projections supporting the mold in its inverted position.

6. In an ingot mold, a pair of end rockers, one of said rockers having a pair of spaced mold-supporting projections extending from its lower edge and the other having a curved mold-supporting lower edge, each of said rockers having a pair of convex side edges and a pair of spaced projections extending from the upper edge thereof and above the remainder of the mold adjacent said convex side edges.

7. In a one-piece ingot mold, a pair of downwardly converging sides, each of said sides having a substantially vertical upper portion and substantially vertical end portions coplanar with the vertical upper portion, longitudinally spaced ribs extending transversely from said sides and having outer faces coplanar with said vertical upper and end portions of the sides, one of said sides having a notch in the upper edge thereof determining the maximum liquid level of material poured into the mold, a bottom molding surface flat at its mid-part and terminating at each end in an upwardly convex surface, a core upstanding from said convex surface, a reduced neck extending between an end of the mold and the upper part only of said core, said neck terminating at its bottom above said convex surface, a pair of spaced upstanding projections at each end of the mold extending above said sides and said core, one of said mold ends having convex sides and a convex bottom and the other mold end having convex sides and a concave bottom, and a handle on said other end.

8. An ingot mold for casting ingots suitable for use with a type metal ingot feeder, comprising walls forming a cavity corresponding to the body portion of the ingot, an end portion comprising walls, web, and core corresponding to a perforated and slotted ingot end, the web being formed integral at its ends with the walls and the core and being formed with depressed portions in its sides, whereby adjacent ingot ends, each of a transverse sectional area having adjacent boundaries including an extending portion, of relatively great eccentricity of disposition of center of gravity result.

9. An ingot mold for casting ingots suitable for use with a type metal ingot feeder, comprising walls forming a cavity corresponding to the body portion of the ingot, an end portion comprising walls, web, and core corresponding to a perforated and slotted ingot end, the web being formed integral at its ends with the walls and the core and being formed with depressed portions in its sides, whereby adjacent ingot ends, each of a transverse sectional area having adjacent boundaries including an extending portion, of relatively great eccentricity of disposition of center of gravity result, and an opposite end portion formed substantially similar to the first mentioned end portion whereby the resulting ingot may yet be associated with the said feeder even though one relatively fragile end be injured without the necessity for recasting and whereby the resulting ingot may be more readily handled.

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