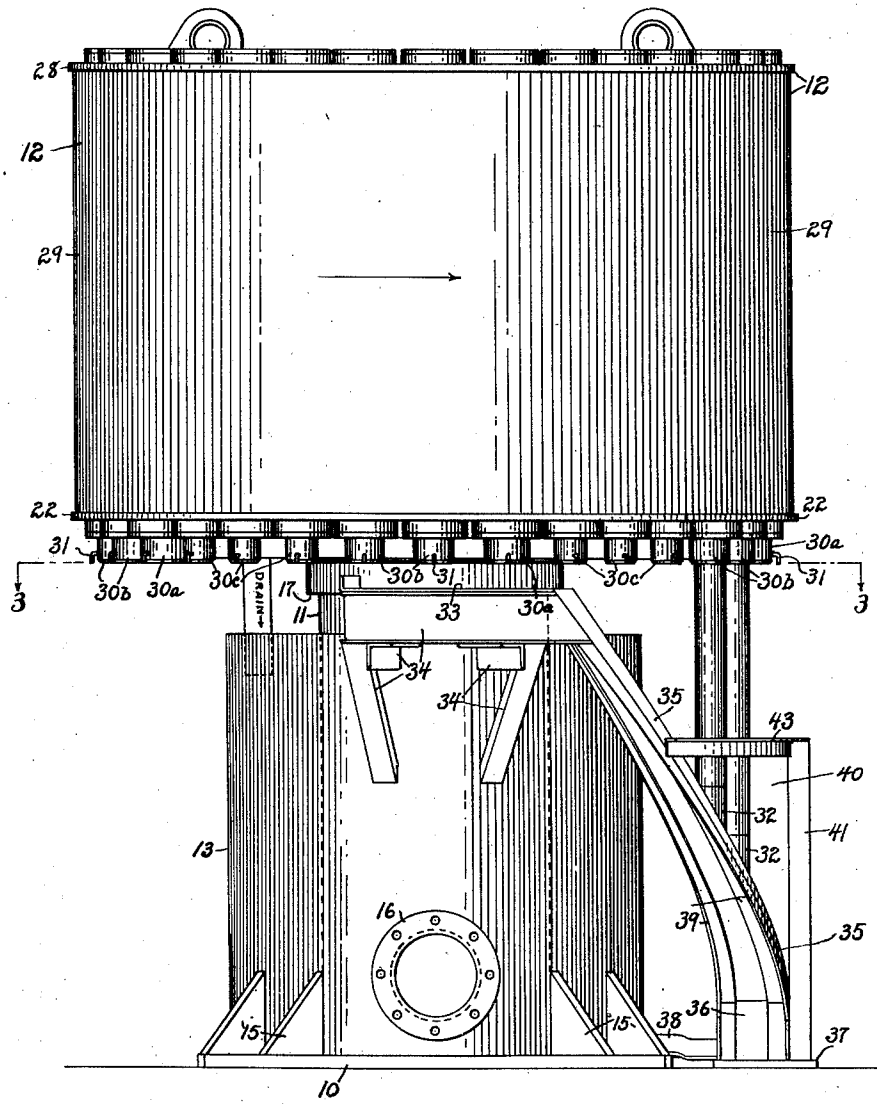
Dec. 23, 1947. M. J. DEMPSEY ET AL 2,433,032

MULTIPLE-MOLD ROTARY CASTING APPARATUS

Filed March 28, 1945 3 Sheets-Sheet 1

Fig. 1.



INVENTORS
MICHAEL J. DEMPSEY AND
FREDERICK W. REHER
By Seymour, Earle & Nichols
ATTORNEYS

Dec. 23, 1947. M. J. DEMPSEY ET AL 2,433,032

MULTIPLE-MOLD ROTARY CASTING APPARATUS

Filed March 28, 1945 3 Sheets-Sheet 2

Fig. 2.

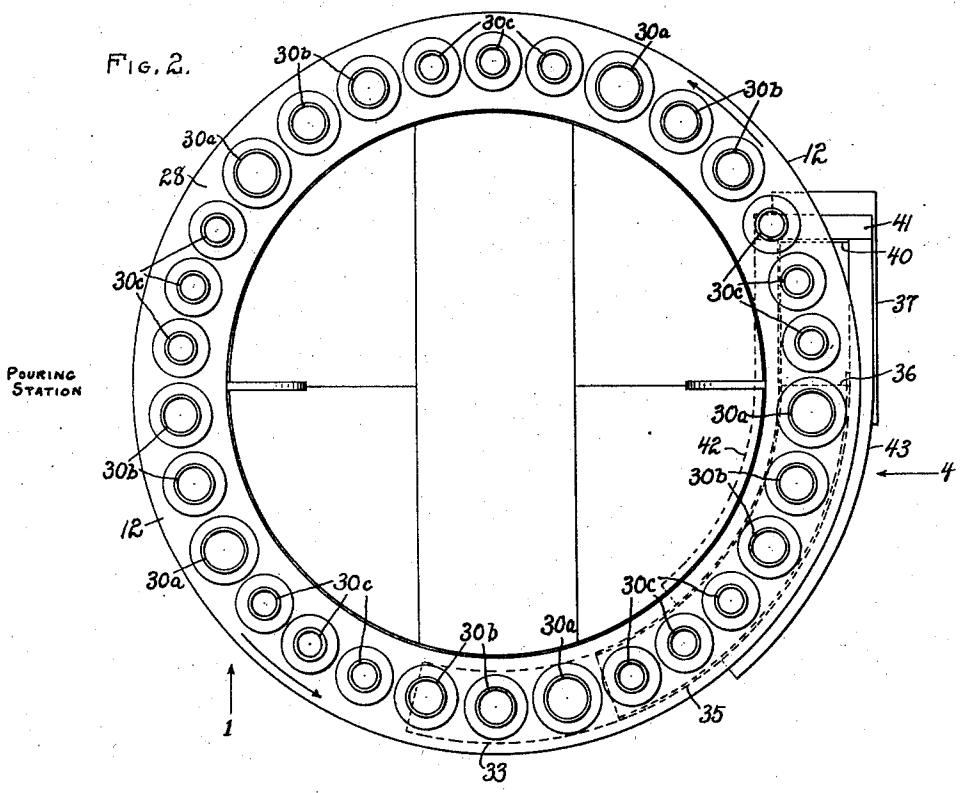
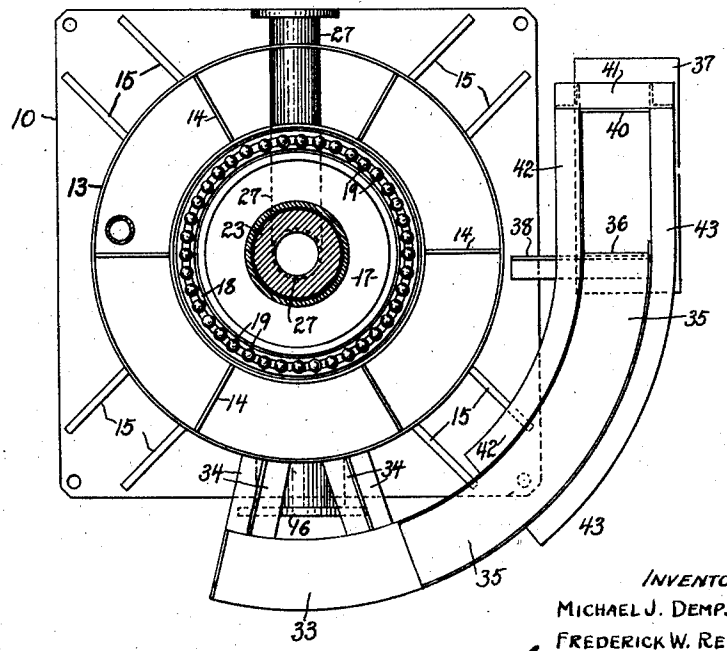


Fig. 3.



INVENTORS
MICHAEL J. DEMPSEY AND
FREDERICK W. REHER
By Seymour, Carter Nichols
ATTORNEYS

Dec. 23, 1947. M. J. DEMPSEY ET AL 2,433,032

MULTIPLE-MOLD ROTARY CASTING APPARATUS

Filed March 28, 1945 3 Sheets-Sheet 3

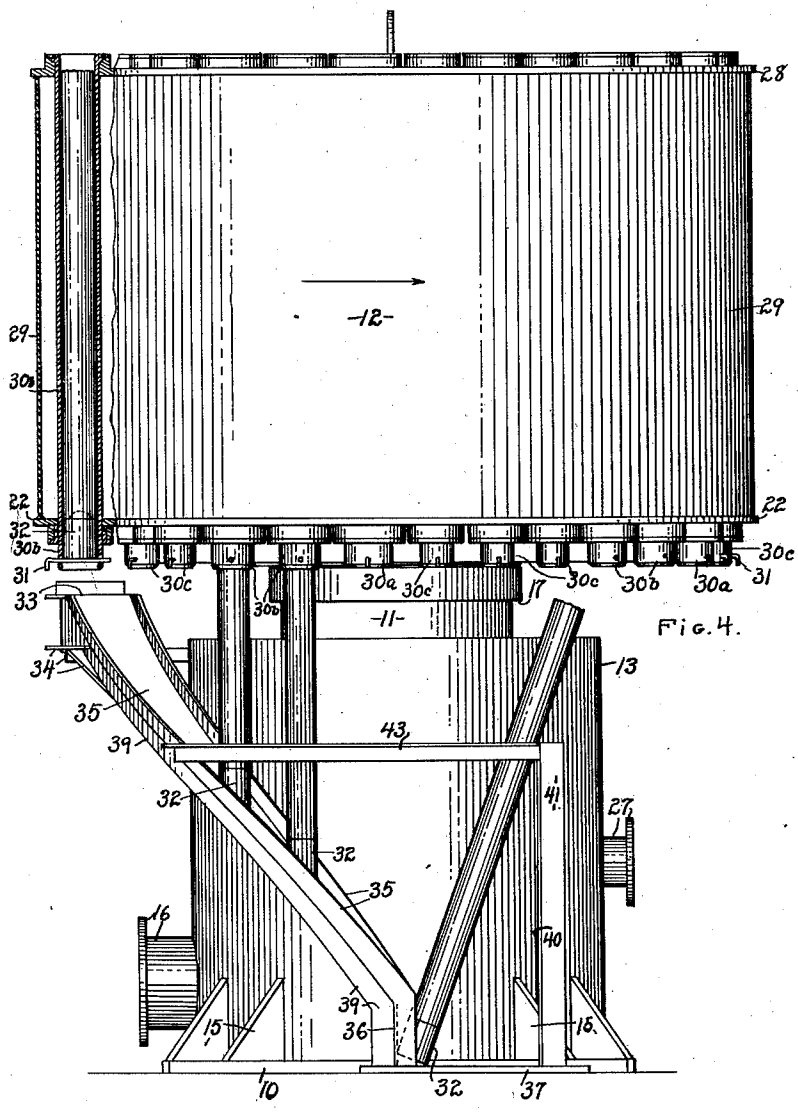
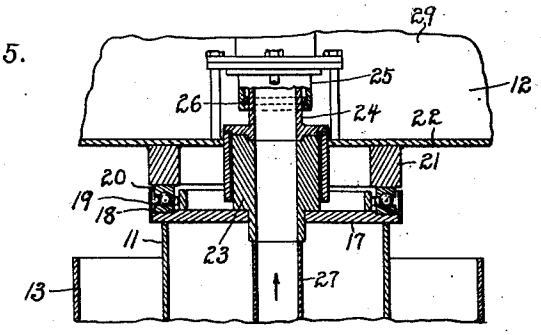


Fig. 4.

Fig. 5.



INVENTORS
MICHAEL J. DEMPSEY AND
FREDERICK W. REHER
By Seymour, Carter & Nichols
ATTORNEYS

Patented Dec. 23, 1947

2,433,032

UNITED STATES PATENT OFFICE

2,433,032

MULTIPLE-MOLD ROTARY CASTING APPARATUS

Michael J. Dempsey and Frederick W. Reher, Waterbury, Conn., assignors to Chase Brass & Copper Co. Incorporated, Waterbury, Conn., a corporation

Application March 28, 1945, Serial No. 585,212

2 Claims. (Cl. 22—77)

1

The present invention relates to improvements in casting-apparatus and relates more particularly to multiple-mold rotary casting-apparatus wherein a plurality of substantially-vertical molds may be sequentially presented at a loading- or pouring-station and subsequently turned and brought to an unloading- or discharge-station.

One of the objects of the present invention is to provide a superior multiple-mold rotary casting-apparatus wherein provision is made for discharging the cast billets or the like from the bottom of the molds.

Another object of the present invention is to provide a superior apparatus of the character referred to and having superior means whereby the cast billets or the like may be conveniently removed from the mold and placed in position for convenient handling as may be required to transport such billets or the like to other machinery for further treatment.

A further object of the present invention is to provide a superior multiple-mold rotary casting-apparatus embodying a construction and arrangement of parts whereby billets or the like may be discharged from the bottom of the mold and automatically and safely placed in a convenient position for handling, as an automatic incident to the turning of the rotary mold-carrier to sequentially bring the mold into position for being charged with molten metal.

With the above and other objects in view, as will appear to those skilled in the art from the present disclosure, this invention includes all features in the said disclosure which are novel over the prior art.

In the accompanying drawings, in which certain modes of carrying out the present invention are shown for illustrative purposes:

Fig. 1 is a view in side elevation looking in the direction of the arrow 1 of Fig. 2, of one form of multiple-mold rotary casting-apparatus embodying the present invention;

Fig. 2 is a top or plan view thereof;

Fig. 3 is a horizontal sectional view taken on the line 3—3 of Fig. 1;

Fig. 4 is a view in side elevation of the apparatus looking in the direction of the arrow 4 of Fig. 1, with a portion of the mold-carrier broken away and shown in vertical section, together with one of the mold-tubes; and

Fig. 5 is a fragmentary view in vertical central section showing the bearing by which the rotary mold-carrier is supported on the supporting-column, together with adjacent features of the apparatus.

2

The particular multiple-mold rotary casting-apparatus herein chosen for purposes of illustrating one form of the present invention, includes a bed-plate 10 which is adapted to rest upon a floor or other supporting-surface and which has centrally welded or otherwise secured thereto, a tubular supporting-column 11 surmounted by a relatively-large rotary mold-carrier 12. The central supporting-column 11 is surrounded by a relatively-large-diametered cylindrical tank-wall 13 which is secured at its lower end to the bed-plate 10 in a watertight manner, so as to provide a ring-like water-receiving space between its inner surface and the outer surface of the supporting-column 11.

In order to provide mutual support, the inner surface of the tank-wall 13 is connected to the outer surface of the supporting-column 11 by a plurality of radial vertically-extending plates 14 as is shown in Fig. 3. The outer lower-portion of the tank-wall 13 is anchored to the upper surface of the bed-plate 10 by means of a plurality of inclined brace-plates 15.

The lower-portion of the tank-wall 13 has welded or otherwise secured to it, the inner end of a flanged pipe-fitting 16, adapted to have its flanged outer end connected to a drain-pipe to provide for carrying off cooling water from the interior of the tank-wall 13, for purposes as will hereinafter appear.

Welded or otherwise secured to the upper end of the supporting-column 11, is a head-plate 17 which supports on its upper surface adjacent its perimeter, a lower raceway 18 in which rides an annular series of ball-bearings 19. Resting upon the upper surface of the series of ball-bearings 19 is an upper raceway 20 which, in turn, is secured to the under face of a base-ring 21 forming a feature of the mold-carrier 12 and welded or otherwise secured to the under face of the bottom wall 22 thereof.

Rigidly mounted centrally in the head-plate 17 at the top of the supporting-column 11, is a tubular post 23 provided at its upper end with a cylindrical neck 24 located within the hollow interior of the mold-carrier 12 at a point above the bottom wall 22 thereof, as is shown in Fig. 5. The neck 24 just referred to fits within a swivel-fitting 25 located within and rigidly secured to the mold-carrier 12. Any suitable packing such as 26 may be installed within the swivel-fitting 25 to provide a watertight joint between the same and the stationary neck 24 of the post 23, while permitting the said swivel-fitting to turn with the mold-carrier 12.

Communicating with and secured to the lower end of the hollow tubular post 23 is an L-shaped inlet-pipe 27 which extends downwardly and then turns radially outwardly, as indicated in Fig. 3. The horizontal portion of the inlet-pipe 27 extends through the wall of the supporting-column 11 and through the tank-wall 13, both in a watertight manner. The flanged outer end of the said inlet-pipe 27 is adapted to have connected thereto any suitable pipe leading from a source of water for the purpose of introducing cooling water into the interior of the mold-carrier 12 in any suitable manner.

In addition to its bottom wall 22, the mold-carrier 12 also includes a top wall 28 and a cylindrical side-wall 29. Extending vertically between the bottom wall 22 and the top wall 28 at a point slightly within the cylindrical side wall 29 of the mold-carrier 12, is a plurality of mold-tubes as will be presently described.

In the particular instance shown, it may be assumed that the casting-apparatus is designed to cast billets of brass or the like, of various diameters such, for instance, as billets respectively 3¼", 4" and 5" diameter.

With mold sizes as above set forth, it has been found convenient to arrange five sets of mold-tubes in a circular series in the mold-carrier 12. Each of the said five sets of mold-tubes includes one 5" or large mold-tube 30*a*, two 4" or intermediate mold-tubes 30*b* and three 3¼" or small mold-tubes 30*c*. Each of the said mold-tubes 30*a*, 30*b* and 30*c* are open at both their respective upper and lower ends and extend above and below the top wall 28 and the bottom wall 22 of the mold-carrier 12. Each of the said mold-tubes is suitably connected to the said top and bottom walls in any suitable watertight manner which will prevent cooling water from leaking past the said tubes out of the interior of the hollow mold-carrier.

Closely adjacent its lower end, each of the mold-tubes 30*a*, 30*b* and 30*c* is diametrically perforated to receive a removable retaining-pin 31 which normally supports a cylindrical plug or bit having an outside diameter closely fitting the inside diameter of the particular mold-tube into which it is inserted. The said plugs or bits 32 may be formed of cast iron or other suitable material, in the event that brass or the like is the metal to be cast.

Located at one side of the tank-wall 13 is an arcuate unloading-platform 33 arranged concentrically with the mold-carrier 12 in a position directly below the path of travel of the lower ends of the various mold-tubes 30*a*, 30*b* and 30*c*. The said unloading-platform is located but a short distance beneath the lower ends of the said mold-tubes and is of a length in a circumferential direction sufficient to underlie a plurality of the said mold-tubes, as is especially well shown in Fig. 1. The said unloading-platform is rigidly attached to and supported by the tank-wall 13 by means of a bracket-structure 34 which may be welded to the said unloading-platform and to the said tank-wall 13.

Welded or otherwise secured to the counterclockwise end of the unloading-platform 33 is the upper end of a helically-inclined billet-lowering ramp 35 which is so curved that while it is inclined continuously downwardly from the unloading-platform 33, its center-line substantially remains beneath the center-line of the annular series of mold-tubes 30*a*, 30*b* and 30*c*. The lower or counterclockwise end of the billet-lowering ramp 35 terminates in a vertical-portion 36 of 8" or so in height, as is especially well shown in Fig. 4. The lower end of the vertical-portion 36 is welded or otherwise rigidly attached to the upper surface of a base-plate 37 located outwardly with respect to the edge of the bed-plate 10 and rigidly attached thereto by a substantially-radial connecting-bar 38.

The billet-lowering ramp 35 above referred to is of trough-shaped form in cross section, with its side flanges extending upwardly, and is also reinforced on its lower side by suitable means such as angle irons 39, as is shown in Figs. 1 and 4. Spaced in a counterclockwise direction from the vertical-portion 36 of the billet-lowering ramp 35 adjacent the far end of the base-plate 37, is a vertical retaining-plate 40 suitably reinforced around its edges by a vertical reinforcing-structure 41. Located about midway vertically between the base-plate 37 and the unloading-platform 33 are two retaining-rails 42 and 43 extending horizontally and respectively located in vertical alignment with the respective inner and outer edges of the billet-lowering ramp 35, as is especially well shown in Fig. 3. The clockwise ends of the retaining-rails 42 and 43 are respectively secured to the inner and outer edges of the billet-lowering ramp 35 about midway the length thereof and are curved to conform thereto. The counterclockwise ends of the retaining-rails 42 and 43 are substantially straight and are rigidly secured to both the vertical retaining-plate 40 and the reinforcing-structure 41.

Operation

For purposes of convenience of description, let it be assumed that it is desired to fill a mill order for 4" billets. Under these conditions, it may be assumed that the pouring-station is at a point indicated in Fig. 2 and that each of the intermediate mold-tubes 30*b* has had a plug or bit 32 inserted into its lower end and retained therein by one of the retaining-pins 31 before the said mold-tubes sequentially arrive at the pouring-station as the mold-carrier 12 is turned relative to the supporting-column 11.

As each of the mold-tubes 30*b* is presented at the pouring-station, it may be charged with molten metal to a point closely adjacent its top. The water flowing within the hollow interior of the mold-carrier 12 around each of the mold-tubes 30*b* (as well as the mold-tubes 30*a* and 30*c*) will serve to cause the cast metal to sufficiently solidify within the said mold-tubes 30*b* to enable the resultant billet to be removed from the said mold-tubes by the time the latter reach a position over the unloading-platform 33.

When a given charged mold-tube 30*b* reaches a position over the unloading-platform 33, the retaining-pin 31 may be withdrawn from the lower end of the mold-tube, to thus permit the plug or bit 32, together with the cast billet, to descend until the bottom end of the said plug rests upon the upper surface of the unloading-platform 33.

Following the operation just above described, the mold-carrier 12 will continue to be turned in step-by-step movement to bring its successive mold-tubes 30*b* into registry with the pouring-station, and this turning movement will carry the billet just released from its mold-tube 30*b* as above described, along the upper surface of the unloading-platform toward the upper end of the inclined billet-lowering ramp 35. The said billet upon reaching the upper end of the ramp 35, will descend thereon as the mold-carrier 12

is rotated as described, and will ultimately reach a point where the said billet will drop off the lower end of the ramp 35 and past the vertical-portion 36 onto the upper surface of the base-plate 37. This dropping of the billet will completely withdraw its upper end from the lower end of the mold-tube 30b in which it has just been cast. As the upper end of the given billet clears the lower end of the mold-tube, it will be free to fall into an inclined position as indicated at the right of Fig. 4, against the retaining-plate 40 or laterally against one or the other of the retaining-rails 42 or 43.

The fully-discharged cast billet may now be removed from within the boundaries provided by the retaining-plate 40 and the retaining-rails 42 and 43 in any suitable manner, such for instance as by first sliding the lower end of the said billet laterally along the base-plate 37 and then withdrawing the billet completely from within the boundaries of the said retaining-rails 42 and 43 and the retaining-plate 40, for further processing or storage.

The billets cast in any one of the mold-tubes 30a, 30b or 30c may be released and lowered in the same manner as that above described in connection with a billet from one of the mold-tubes 30b.

By means of the billet-lowering ramp 35 or its equivalent, a cast billet may be conveniently lowered without damage from a given mold-tube and completely freed from the said mold-tube as an automatic incident to the turning of the mold-carrier 12. By the construction and arrangement of parts as is shown and described, it is not necessary to follow the usual and costly procedure of either casting loops in the upper ends of the billets to enable them to be withdrawn upwardly from the molds or of supplying a hydraulic ram or its equivalent for pushing the said billets upwardly out of the mold.

Furthermore and when requirements make it desirable, all of the various sized mold-tubes may be loaded and discharged in the sequence in which they are located in the annular series of mold-tubes.

The invention may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention, and the present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are to be embraced therein.

We claim:

1. In a multiple-mold rotary casting-apparatus, including: a carrier-support; a rotary mold-carrier mounted for rotation about a substantially-vertical axis upon the said support in spaced relationship above the bottom of the said carrier-support and having its outer peripheral-portion extending laterally beyond and overhanging the said carrier-support; and a substantially-annular series of substantially-vertical mold-tubes carried by the overhanging outer-portion of the said rotary mold-carrier, each of the said mold-tubes having a unitary peripherally-continuous wall and being open at its upper end for the reception of molten metal and open at its lower end for the reception of a removable plug and to permit the downward axial removal of solidified cast billets therefrom: billet-lowering means comprising an arcuate unloading-platform substantially concentric to said carrier-support, brackets arranged to fixedly support said unloading platform in a substantially-horizontal plane laterally adjacent the said carrier-support and immediately beneath an overhanging-portion of the said mold-carrier in position to receive cast billets from the open lower ends of the said mold-tubes, and a helically inclined trough-shaped billet-lowering ramp leading downwardly from one end of the said unloading-platform and curving in a direction substantially concentric with the path of movement of the plurality of mold-tubes in the said mold-carrier to automatically and progressively lower the cast billets from said platform as said rotary mold-carrier is turned with respect to the said carrier-support.

2. In a multiple-mold rotary casting-apparatus, including: a carrier-support; a rotary mold-carrier mounted for rotation about a substantially-vertical axis upon the said support in spaced relationship above the bottom of the said carrier-support and having its outer peripheral-portion extending laterally beyond and overhanging the said carrier-support; and a substantially-annular series of substantially-vertical mold-tubes carried by the overhanging outer-portion of the said rotary mold-carrier, each of the said mold-tubes having a unitary peripherally-continuous wall and being open at its upper end for the reception of molten metal and open at its lower end for the reception of a removable plug and to permit the downward axial removal of solidified cast billets therefrom: billet-lowering means comprising an arcuate unloading-platform substantially concentric to said carrier-support, brackets arranged to fixedly support said unloading platform in a substantially-horizontal plane laterally adjacent the said carrier-support and immediately beneath an overhanging-portion of the said mold-carrier in position to receive cast billets from the open lower ends of the said mold-tubes, a helically inclined billet-lowering ramp leading downwardly from one end of the said unloading-platform and curving in a direction substantially concentric with the path of movement of the plurality of mold-tubes in the said mold-carrier to automatically and progressively lower the cast billets from said platform as said rotary mold-carrier is turned with respect to the said carrier-support; and a billet-retaining frame located adjacent the lower end of the said billet-lowering ramp comprising a pair of curved rails extending in a substantially-horizontal plane on opposite sides respectively of said ramp and intermediate the upper and lower ends thereof to retain the cast billets which have descended the said inclined billet-lowering ramp.

MICHAEL J. DEMPSEY.
FREDERICK W. REHER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
543,700	Potter	July 30, 1895
1,387,864	Pepper	Aug. 16, 1921
1,490,710	Pepper	Apr. 15, 1924
1,498,971	Ladd	June 24, 1924
1,817,483	Goad et al.	Aug. 4, 1931
1,973,550	Todt	Sept. 11, 1934
2,030,482	Summey	Feb. 11, 1936
2,107,041	Luhrman	Feb. 1, 1938