(No Model.) 3 Sheets—Sheet 1.

A. L. WALKER.

APPARATUS FOR CASTING METALS.

No. 597,367. Patented Jan. 11, 1898.

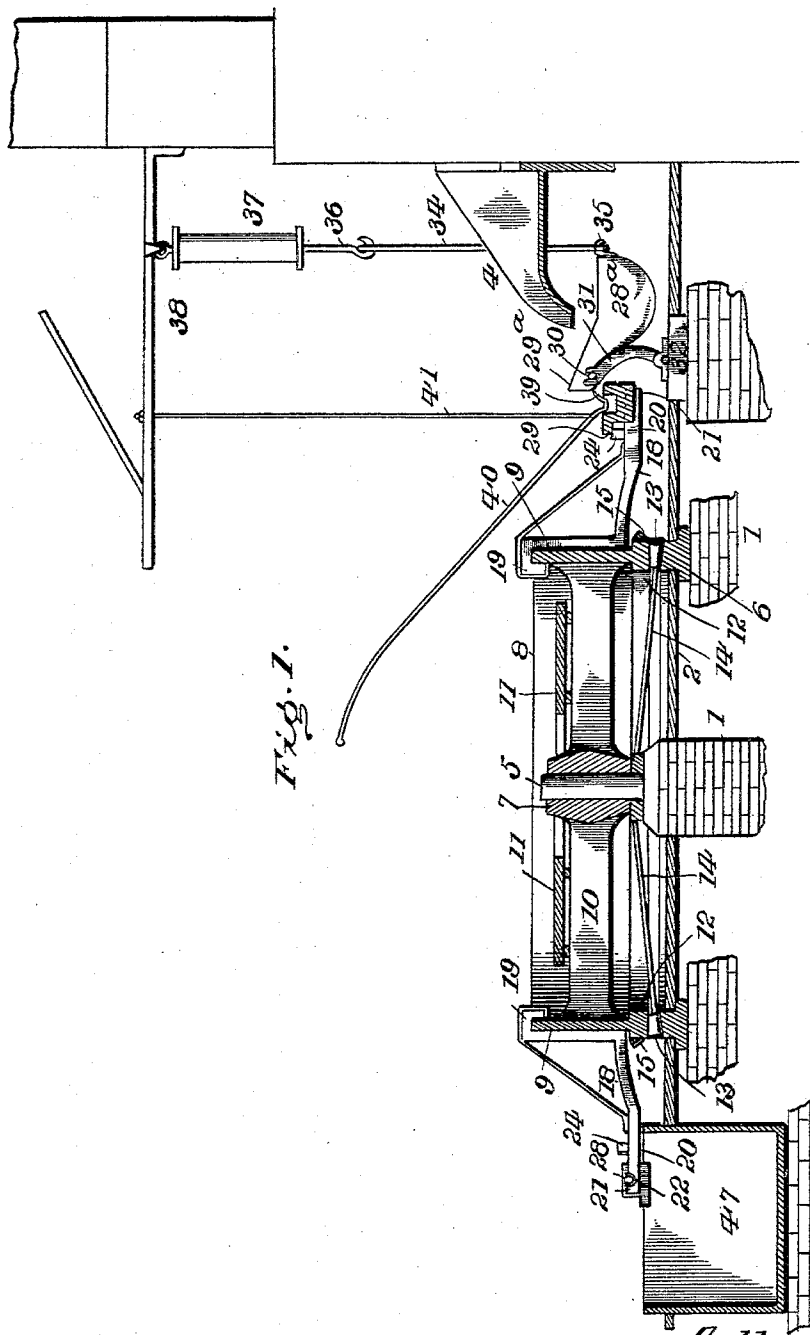

Fig. 1.

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(No Model.) 3 Sheets—Sheet 2.

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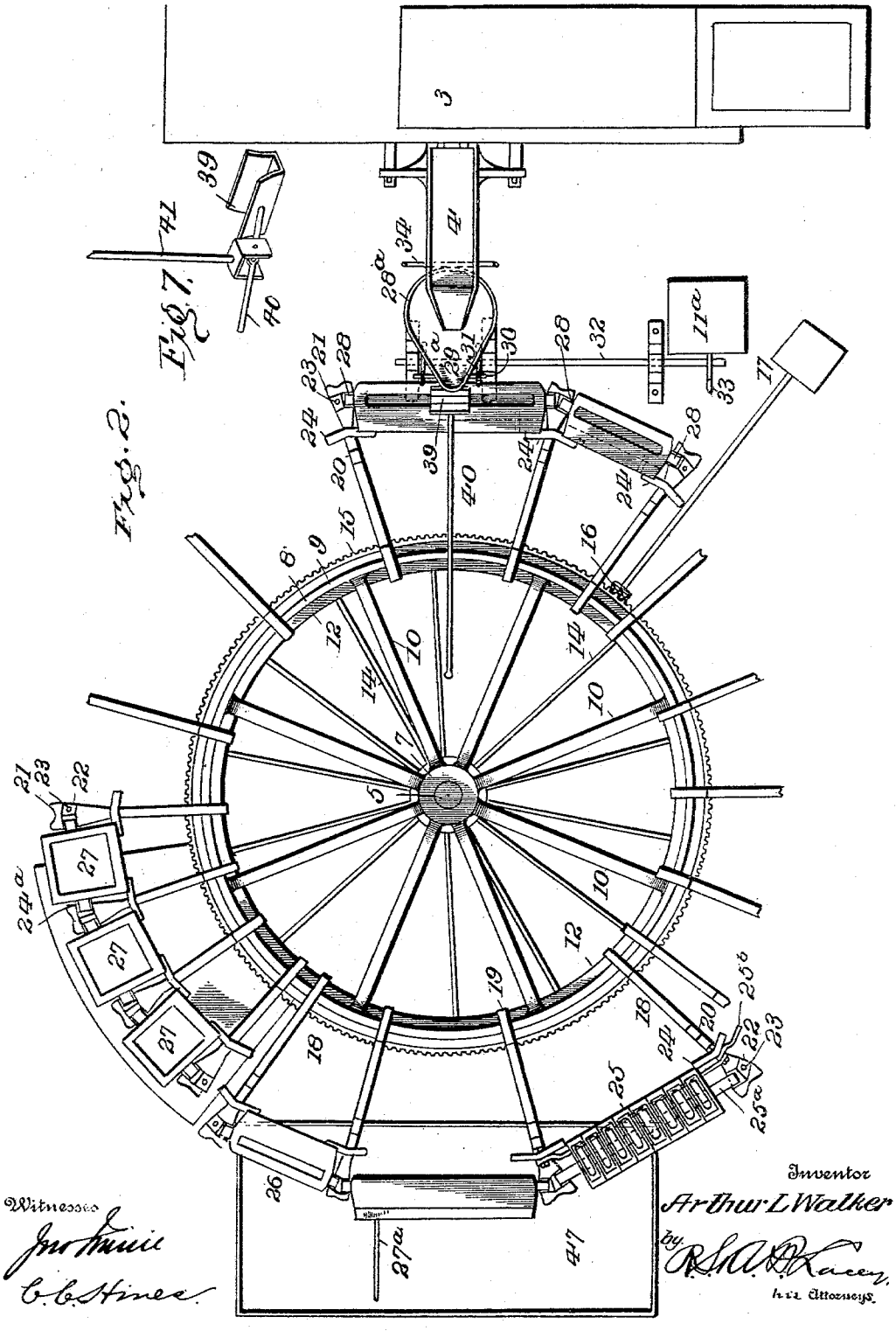

Fig. 2.

Fig. 7.

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(No Model.) 3 Sheets—Sheet 3.

A. L. WALKER.

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Fig. 3.

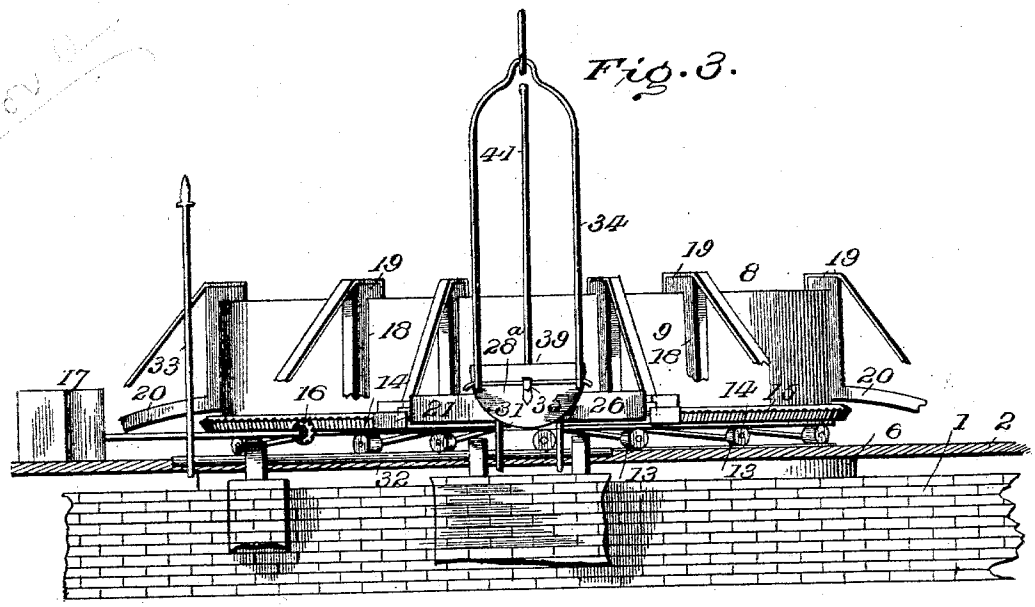


Fig. 5

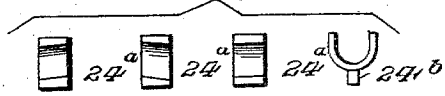


Fig. 4.

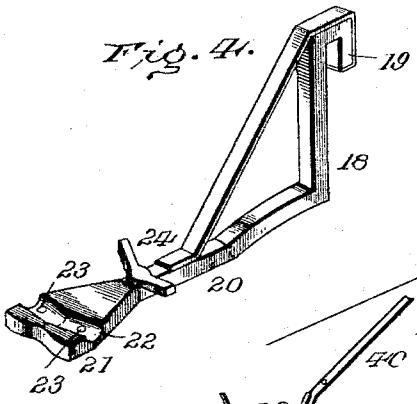
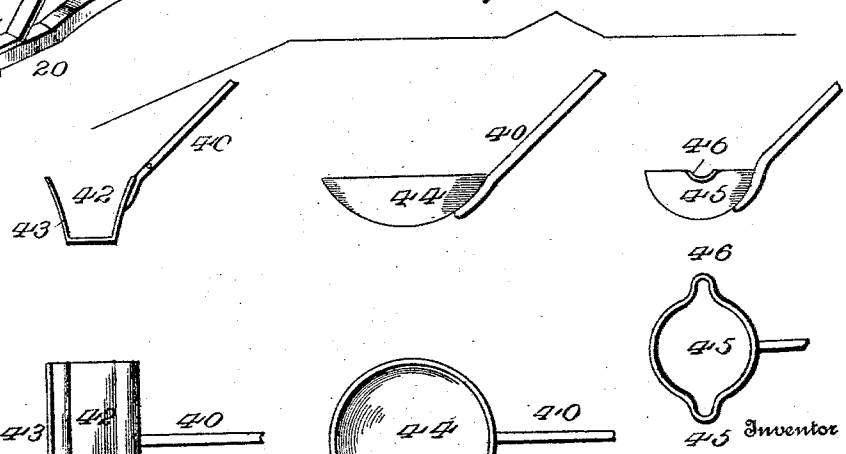


Fig. 6.



Witnesses

Inventor

Arthur L. Walker

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Attorneys

UNITED STATES PATENT OFFICE.

ARTHUR L. WALKER, OF BALTIMORE, MARYLAND.

APPARATUS FOR CASTING METALS.

SPECIFICATION forming part of Letters Patent No. 597,367, dated January 11, 1898.

Application filed July 22, 1897. Serial No. 645,588. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR L. WALKER, a citizen of the United States, residing at the city of Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Apparatus for Casting Metals; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has reference to improvements in apparatus for casting metals, especially those which are ladled or tapped out of the furnace, such as copper, and poured into molds; and it relates more particularly to casting apparatus of that type wherein the molds are mounted upon a rotary table or carrier and are thereby successively brought into position to receive the molten metal from the ladle and thence conveyed to the bosh or a dry pit, where the castings are dumped.

The object of the invention is to improve generally the construction of casting apparatus of this character and to provide improved ladling and mold-carrying mechanism whereby the successive operations of casting on a large scale may be accomplished with great rapidity, safety, at small cost, and with a minimum amount of labor and without waste.

With this and other objects in view the invention consists in the novel constructions and combinations of parts hereinafter more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a sectional elevation of a casting apparatus constructed in accordance with my invention; Fig. 2, a plan view of the same; Fig. 3, an elevation looking toward the front; Fig. 4, a detail perspective view of one of the mold-supporting brackets; Fig. 5, a detail view showing the bushings. Fig. 6 is also a detail view showing the forms of metal-deflectors employed. Fig. 7 is a detail of the hanger-rod and deflector device.

Referring to the drawings, 1 represents a suitable brick or stone foundation, 2 a floor laid thereon, and 3 a furnace from which the molten metal is discharged by means of a spout 4. 5 is a fixed shaft projecting up from said foundation, and 6 a circular track-rail laid on the floor concentric with said shaft. On this shaft is loosely mounted the hub 7 of a horizontal rotary carrier wheel or table 8. This wheel or table comprises a broad rim 9, secured to the hub by radial arms 10 and provided with a deck-platform 11 and a broad base-bearing 12, and antifriction cone roller-bearings mounted upon the shafts 14 are interposed between the track-rail and said base-bearing. The carrier-table may be revolved by the provision of any suitable mechanism, but in the present instance I have shown the rim provided on its outer face with a rack 15, with which gears a pinion 16 on the armature-shaft of a motor 17.

18 represents mold-carrying brackets which are each provided at its upper end with a hook 19 to engage the upper edge of the wheel-rim and at its lower end with an arm 20, having at its outer end a flaring head 21, formed with an angular transverse recess 22 and pivot-openings 23. At the rear end of said head each arm is provided with an angular cross-bar 24.

The wire-bar molds 26 and cake-molds 27 are of unequal length and different shape, as usual, but of like construction, each having trunnions 28, which are journaled in the recesses 22, and rear bearing-flanges 29, adapted to rest upon the said cross-bar. The trunnions 28 are located between the center of gravity of the mold and the front end thereof, and the mold is normally held supported by its flange resting upon the cross-bar 24. The ingot-molds 25, instead of having trunnions, are provided with a carrying bar or shaft 25^a, on which they are adapted to revolve. The ends of the carrying bar or shaft are laid in the bushings (hereinafter described) in the same manner as the trunnions of the wire-bar and cake molds, and the ingot-mold when in horizontal position rests at its rear end on a bar 25^b, bolted to two adjoining supporting-arms, as shown. The different molds denoted are of unequal length, and when the brackets are adjusted to receive a long or short mold a bushing 24^a is inserted in the recess 22. These bushings are formed with a lug or projection 24^b to pivot in the openings 23 and with angular slots, whereby provision is made for changing the angles of the slot to compensate for the differences in the angles

made by the axes of different lengths of molds relatively to the body of the bracket. Thus provision is made to enable any size or shape of mold to be used in this apparatus. If it is desired to support two brackets in fixed relation, a cross connecting-bar 25^b is employed, and such a construction is preferably adopted when an ingot-mold is being supported, as hereinbefore described, for the reason that while the shaft of the same is very long comparatively the body and flange are relatively too short to rest upon the cross-bar 24. An ordinary dumping-hook will be used for tilting and dumping small molds, while a bar 27^a will be used for dumping heavy molds, as shown.

Interposed between the carrier-wheel and furnace is the ladle 28^a. This ladle is formed with a contracted upwardly-inclined spout 29^a, having a narrow pouring-lip and trunnions 30 at opposite sides adjacent said lip. These trunnions are journaled in the upper ends of curved bearing-arms 31, mounted upon a shaft 32, and a lever 33, secured to said shaft, is provided for oscillating the shaft to move the inclined spout and pouring-lip of the ladle to a horizontal position. By this construction it will be seen that the arc described by the ladle-spout in assuming a pouring position to discharge the metal into a mold is very small and that the metal flows directly from said spout upon the deflector and cannot on account of its inconsiderable fall splash or chill. The rear end of the ladle is supported by a yoke-hanger 34, the lower cross-bar of which engages a hook 35 thereon. The upper end of said yoke is connected with the plunger-rod 36 of a hydraulic lift supported by a bracket-arm 38, the function of said hydraulic lift being to raise and lower the body portion or rear end of the ladle. Suitable operating mechanism for controlling the action of the hydraulic lift will be provided and located so as to be accessible to an attendant standing on the platform 11^a. The mouth or pouring-lip of the ladle is arranged adjacent to the path of rotation of the molds, and owing to its peculiar construction and manner of hanging has such a limited movement that the flow of molten metal discharged therefrom is smooth or uninterrupted, and splashing of the same is thereby prevented. In order to further insure the delivery of the metal to the mold and obviate all liability of clinging, splashing, or "cold-setting," I have provided a guide or deflector 39, adapted to receive the metal flowing from the ladle and secured to a handle 40, pivoted to a hanger-rod 41, suspended from the bracket-arm 38, said handle being accessible to an attendant standing on the carrier-platform 11. By this construction and arrangement the attendant on the platform 11^a may control the hydraulic lift and lever 33 and the attendant on the rotary-carrier platform hold the deflector in position to guide the flowing molten metal and at the same time operate the mechanism controlling the rotation of the carrier.

Different forms of deflectors are preferably employed for guiding the metal to different kinds of molds. The deflector 42, having the curved guide-lip 43 and open sides, is employed in connection with wire-bar molds, which are long enough to enable the metal to flow thereinto from both sides of the deflector. The semihemispherical deflector 44 is employed in connection with cake-molds and the deflector 45, having the pouring-lips 46 at opposite sides, with ingot-molds, which require the metal to be poured into them, the double lips of the ingot-deflector enabling the metal to be poured into the mold-chambers on opposite sides of said deflector with ease and facility. By the provision of these deflectors and the peculiar construction and manner of hanging the ladle all liability of the flowing metal to cold-set or core, splash, or cling is obviated and the casting of a solid cake, bar, or ingot insured.

The operation is as follows: The molten metal is allowed to run out of the spout 4 into the ladle until the latter is full or contains a sufficient amount for use. The ladle is then tilted to discharge the metal into the mold on the rotary carrier opposite it and under its lip, and when said mold is filled the ladle is lowered and the rotary carrier revolved to bring the next mold into operative position to be filled in the same manner until one-half of the molds are filled. The position of the molds and correlative parts is such that by the time the filled mold reaches the water-bosh or dry pit 47 the castings are solid, and the molds are then dumped, in the manner hereinbefere described, to discharge the castings and are then cooled with water and prepared to be filled again when next under the ladle. The castings may be lifted out of the bosh or dry pit by any approved means, such as a lift or conveyer. An important advantage is that in my apparatus the molten metal is handled and cast at a position remote from the water-bosh, thus rendering the operation very much safer.

From the above description, taken in connection with the accompanying drawings, it will be seen that I have provided a casting apparatus by which a large number of castings may be quickly and cheaply made without flaws and a large amount of time and labor saved over the ordinary casting operation, thus reducing the cost considerably. With my apparatus the entire operation of casting may be carried out by two attendants, one standing on the carrier-platform 11 and the other on the floor-platform 11^a.

I desire it understood that I do not limit myself to the specific details of construction herein shown and described, but reserve to myself the right to make such changes in the form and arrangement of the various parts of the apparatus as fairly fall within the spirit and scope of my invention.

Having thus fully described my invention, what I claim as new and useful, and desire to secure by Letters Patent of the United States, is—

1. In casting apparatus, the combination with a ladle, of a circular track laid upon a fixed foundation, a shaft fixed to said foundation and arranged concentric with said track, a carrier-wheel resting on and supported wholly by the track and mounted on said shaft to have a determined or fixed plane of rotation, mold-carrying brackets adjustably hung upon the rim of said carrier-wheel, and a mold mounted in two adjacent brackets, whereby a series of removable molds of different kinds may be supported upon the rim of the carrier-wheel, substantially as described.

2. In casting apparatus, the combination of a shaft, a carrier-wheel rotatably mounted thereon, mold-carrying brackets hung upon the rim of said wheel and adjustable thereon relatively to each other, and a mold mounted in two adjacent brackets, whereby a series of removable molds of different kinds may be supported upon the rim of the carrier-wheel, substantially as described.

3. In casting apparatus, the combination of a shaft projecting up from a fixed floor-foundation, a circular track laid upon said foundation and arranged concentric with the shaft, a carrier-wheel rotatably mounted on said shaft and having its rim formed on its under side with a base-bearing and on its outer side with rack-teeth, conical antifriction-rollers 13 mounted on shafts 14 and interposed between said track-rail and the base-bearing of the carrier, a driven gear-wheel meshing with said rack-teeth, mold-carrying brackets adjustably connected with the rim of the wheel, and a mold mounted in two adjacent brackets, whereby a series of removable molds of different kinds may be supported upon the rim of the carrier-wheel, substantially as described.

4. In casting apparatus, the combination of a circular track, a shaft arranged concentric therewith, a carrier-wheel consisting of a hub rotatably mounted on said shaft, spokes or arms radiating therefrom and a broad annular rim secured to said arms and provided with a broad base-bearing, antifriction-bearings interposed between said base-bearing and the track, detachable mold-carrying brackets, each provided with a hook engaging the rim of the carrier-wheel and adjustable thereon, and a mold mounted in two adjacent brackets, whereby a series of removable molds of different kinds may be supported upon the rim of the carrier-wheel, substantially as described.

5. In casting apparatus, a rotatable mold-carrier wheel, a series of mold-supporting brackets adjustably hung on the rim of said wheel, each bracket having an arm projecting beyond said rim and provided with a bearing, and a mold provided with trunnions adapted to be mounted in the bearings of two adjoining bracket-arms, whereby an annular series of removable molds of different kinds may be supported upon said bracket-arms around the outer circumference of the rim of the wheel, substantially as described.

6. In casting apparatus, a rotatable mold-carrier wheel, a series of mold-supporting brackets adjustably connected with the rim of said wheel, each bracket having an arm provided with an angular bearing-recess, a mold provided with trunnions mounted in the bearing-recess of two adjoining arms, and bushings adapted to be inserted in said bearing-recesses to vary the angles of inclination thereof, whereby molds of different length may be supported, substantially as described.

7. In casting apparatus, a rotatable mold-carrier wheel, a series of mold-supporting brackets adjustably connected with the rim of said wheel, each bracket having an arm provided with a bearing-recess and a cross-bar in rear thereof, and a mold provided with trunnions arranged between the center of gravity and the front end thereof, and journaled in said recesses, and provided with a bearing-flange at its rear adapted to rest upon said cross-bar, substantially as described.

8. In casting apparatus, a rotatable mold-carrier wheel, a series of mold-supporting brackets adjustably connected with the rim of said wheel, each bracket having an arm provided with a bearing-recess and a cross-bar in rear thereof, a mold provided with trunnions arranged between the center of gravity and front end thereof and journaled in said recesses and provided with a bearing-flange at its rear adapted to rest upon said cross-bar and means for tilting the molds to dump the castings, substantially as described.

9. In casting apparatus, the combination with a furnace having a discharge-spout, of a mold-carrier, a tilting ladle arranged between the spout and mold-carrier, a supporting bracket-arm above said ladle, a lift supported by said bracket-arm, a connection between said lift and the rear end of the ladle, a hanger suspended from the bracket-arm, and a deflector device 39 connected with said hanger and provided with a handle 40 projecting toward said mold-carrier, substantially as described.

10. In casting apparatus, the combination with a furnace, of a rotatable mold-carrying wheel provided with mold-supporting brackets, a rock-shaft, bracket-arms rigidly secured to said shaft, a ladle interposed between the furnace and mold-carrier and having a mouth provided on opposite sides with trunnions journaled in said bracket-arms, and means for supporting and tilting the rear end of the ladle, substantially as described.

11. In casting apparatus, the combination with a furnace, of a rotatable mold-carrier wheel provided with mold-supporting brackets, a rock-shaft, bracket-arms rigidly secured to said shaft, a ladle interposed between the furnace and mold-carrier and having a mouth

provided on opposite sides with trunnions journaled in said bracket-arms, a supporting bracket-arm, a connection between the bracket-arm and rear end of the ladle for supporting the same, a lever connected with the rock-shaft, and a deflector suspended from said bracket-arm above the mold and provided with a handle projecting over toward the carrier, substantially as described.

12. In casting apparatus, the combination of a furnace having a discharge-spout, a bracket, a tilting ladle having a contracted mouth and pivoted adjacent to said mouth, a hydraulic lift supported by said bracket, a connection between said lift and the rear end of the ladle, a hanger-rod also supported by said bracket, and a deflector device carried by said rod adjacent the mouth of the ladle, substantially as described.

13. The combination with a furnace, having a discharge-spout, of a rotary mold-carrier provided with mold-supports, a tilting ladle interposed between said spout and carrier and provided with a pouring-lip arranged vertically above the path of rotation of the molds and adapted to discharge the molten metal directly into a mold on said carrier, and a pivoted deflector device comprising a pan or vessel arranged when in operative position to rest within the mouth of a mold, substantially as described.

14. In an organized casting apparatus, the combination with a furnace having a discharge-spout, of a rotary mold-carrier adapted to be given an intermittent, step-by-step movement to successively bring each mold carried thereby in line with said spout, a ladle arranged under the spout with its pouring-lip located just above the path of the molds, and pivoted adjacent to said lip so that when tilted slightly it will discharge the metal directly with a minimum fall into the mouth of the mold beneath it, means for tilting said ladle, and a pivoted deflector device comprising a pan or vessel arranged when in operative position to rest within the mouth of a mold, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ARTHUR L. WALKER.

Witnesses:
DAVID S. POPE,
ALBERT H. WELD.