May 23, 1933. W. J. DURING 1,911,111

DIE CASTING MACHINE

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FIG. 1.

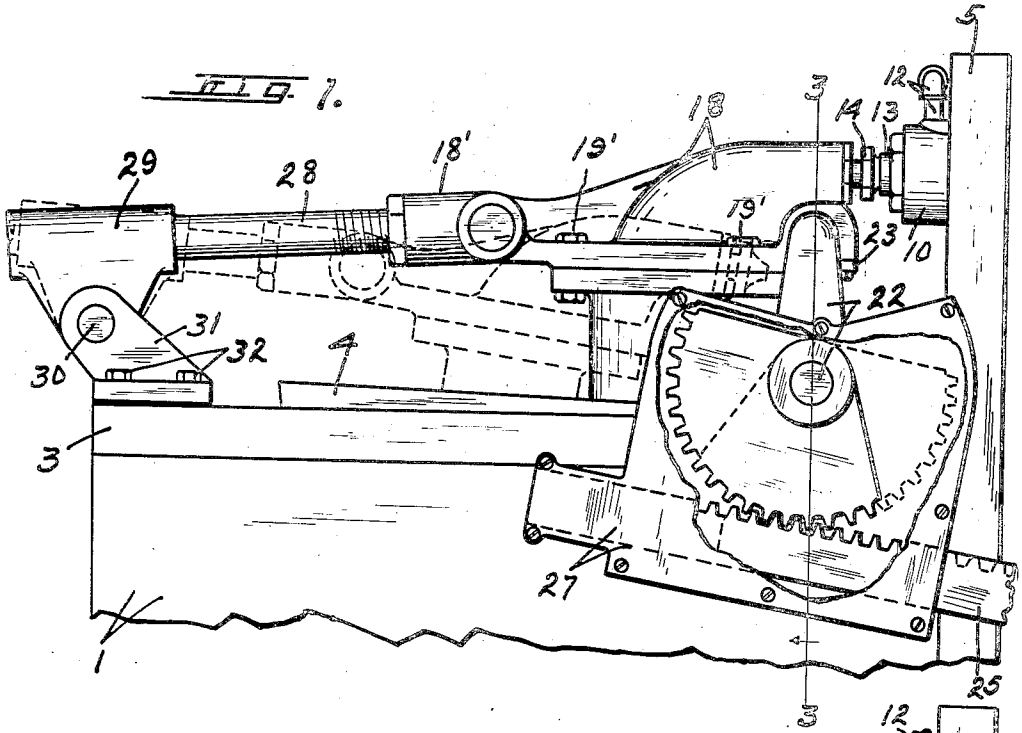
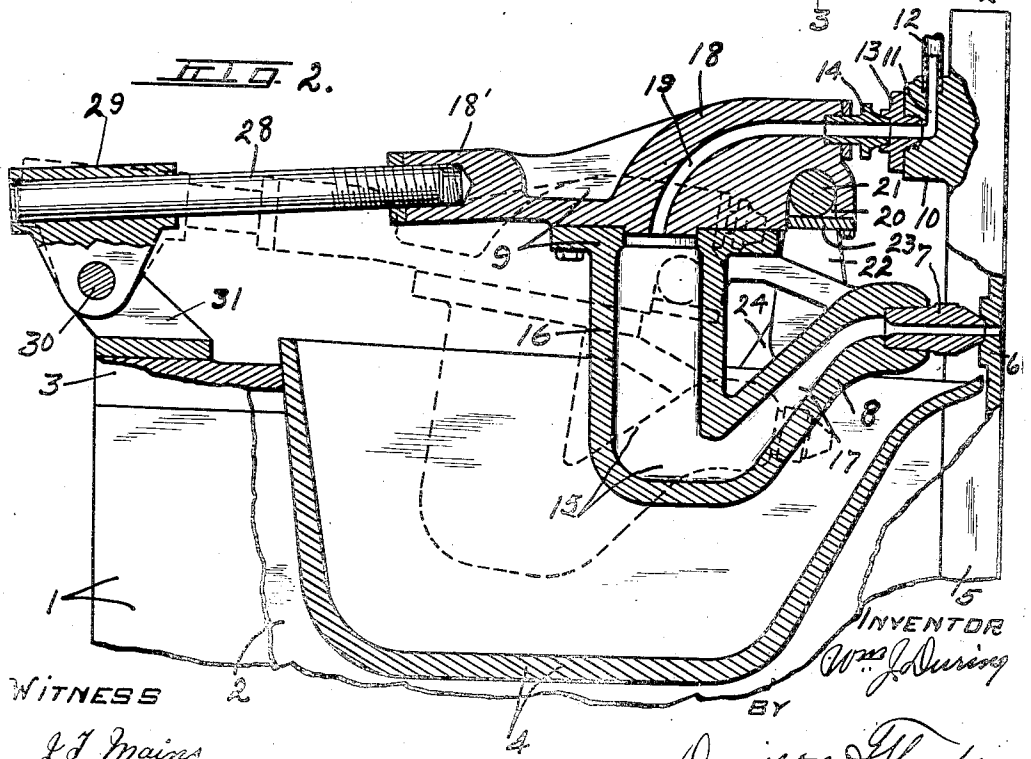


FIG. 2.



WITNESS

J. I. Mains

INVENTOR

Wm. J. During

BY

Denison & Thompson

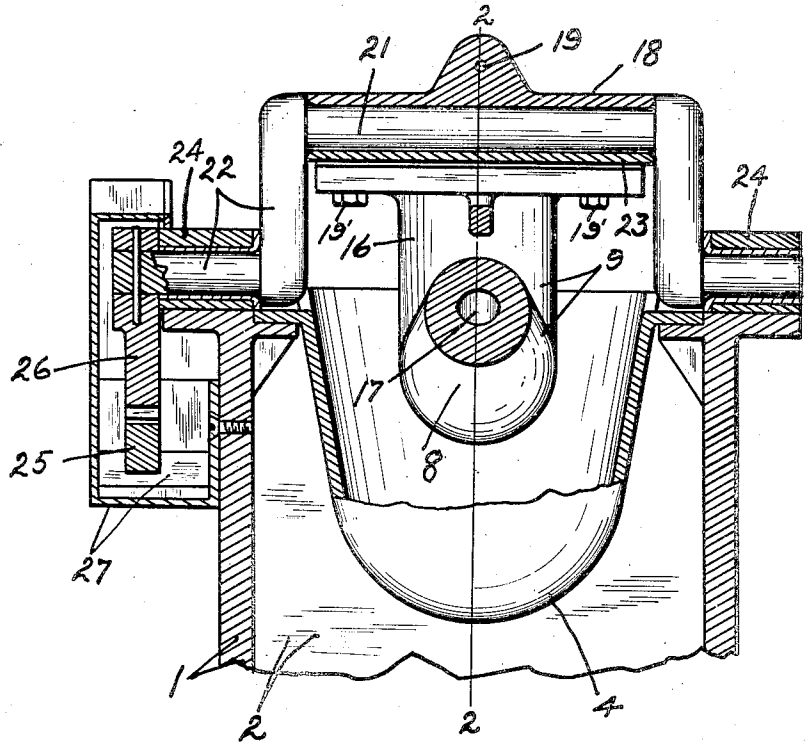
ATTORNEYS

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FIG. 3.



WITNESS

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Patented May 23, 1933 1,911,111

UNITED STATES PATENT OFFICE

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DIE-CASTING MACHINE

Application filed November 14, 1929. Serial No. 407,157.

This invention relates to certain new and useful improvements in die casting machines and more particularly to the construction and operation of the delivery pot for conveying the molten metal from the melting pot to the die or mold.

The main objects of the invention are to produce a die casting machine which will be durable in construction, positively and easily operated at a maximum degree of safety to the operator.

In carrying out these objects, I have constructed a ladle or delivery pot of the gooseneck type having a pressure chamber therein adapted to contain molten metal, and an operating mechanism for moving the pot from a submerged position in the molten metal contained in a melting pot into casting relation with a die or mold and return to the original submerged position for charging said ladle with the molten metal.

Another feature of the invention is to provide means for connecting the delivery pot chamber with a suitable source of fluid, as air under pressure, when the delivery pot is in the casting position for the purpose of utilizing said fluid for discharging the metal from the pot.

Other objects and advantages relating to the structure and relation of the parts and the operation thereof will more fully appear from the following description taken in connection with the accompanying drawings, in which:—

Figure 1 is a side elevation of a portion of a die casting machine embodying the various features of this invention.

Figure 2 is a longitudinal vertical sectional view of the device as shown in Figure 1 taken in the plane of the line 2—2, Figure 3.

Figure 3 is a vertical transverse sectional view taken in the plane of the line 3—3, Figure 1.

As illustrated in the drawings, the device consists of a frame or fire box —1— having a furnace chamber —2— therein. The upper portion of the furnace chamber —2— is closed by a cover plate —3— secured to the top surface of the frame —1—. A suitable melting pot, as —4—, adapted to contain molten metal, is secured to the plate —3— and disposed within the furnace chamber.

A suitable die-supporting plate —5— adapted to have secured thereto the sprue die section of a suitable die or mold, may be either secured to the frame —1— or mounted on a suitable carriage for movement to and from the casting position in any well known manner.

The plate —5— is provided with a gate —6— which registers with the inlet port of the die and is adapted to be engaged by a suitable metal delivery nozzle —7— which is secured to the forward end of a spout —8— provided on the delivery pot —9—.

The plate —5— is also provided with a rearwardly extending boss —10— which, in this instance, is positioned in vertical alignment with the gate —6— and may be secured to or be made integral with the rear vertical face of the plate —5— and positioned in a plane above the gate —6—. The boss —10—, in this instance, is provided with a passageway or duct —11— which extends inwardly from the rear face of the boss, a short distance and then upwardly to the top outer surface thereof. The top or upper end of the duct —11— may be connected by a suitable conduit —12— to any suitable control means or valve, not shown, for the fluid, which in turn may be connected to a convenient source adapted to supply fluid, as air, under pressure, when the delivery pot is in the casting position for discharging the molten metal from said pot into the die or mold.

The other or rear end of the duct —11— is in communication with a fluid discharge nozzle —13— which is secured to the rear

portion of the boss —10— and adapted to be engaged by a fluid receiving nozzle —14— which is secured to the upper portion of the delivery pot —9—.

The delivery pot —9—, in this instance, is of the goose-neck type and is provided with a vertically disposed pressure chamber —15— provided in the vertical major portion —16— of the delivery pot. The bottom portion of the chamber —15— is connected with the metal delivery nozzle —7— by duct —17— which is provided in the spout —8—.

A supporting bracket —18— is secured to the upper portion of the vertical end —16— of the delivery pot by screws or bolts —19'—. The bracket —18— extends upwardly from said portion —16— and forwardly therefrom and has the fluid receiving nozzle —14— secured to the upper forward portion of the bracket —18— in a plane above and parallel with the metal delivery nozzle —7— and spaced therefrom a distance equal to the vertical distance between the gate —6— and fluid delivery nozzle —13— so that when the delivery pot is in the casting position with the metal delivery nozzle —7— engaging the gate —6—, the fluid-receiving nozzle —14— will be in operative engagement with the fluid delivery nozzle —13— for receiving fluid, as air under pressure, to discharge the molten metal from the chamber —15—, said fluid-receiving nozzle —14— being connected with the chamber —15— by a duct —19— provided in the bracket —18— and which extends from the nozzle —14— to the upper end of the chamber —15—.

The bracket —18—, in this instance, extends forwardly beyond the vertical portion —16— of the delivery pot —9— and is provided with a horizontally disposed U-shaped slot —20— in the under-surface thereof, said slot being adapted to receive therein the crank —21— of a crank-shaft —22—.

The weight of the delivery pot will normally maintain the bracket in operative engagement with the shaft but a plate —23— may be secured to the under-surface of the bracket —18— adjacent the slot —20— to prevent the accidental displacement of the bracket upon the shaft.

The crank shaft —22— is provided to support the delivery pot —9— and also to move it from the submerged or charging position within the melting pot —4— to the casting position with the nozzles —7— and —14— in engagement with the gate —6— and nozzle —13— respectively. The shaft —22— extends transversely of the machine and is journaled in suitable bearings —24— positioned one at either side of the machine and secured to the face of the cover plate —3— and positioned at the rear of the die-supporting plate —5—, at such a distance that when the pot —9— is in the casting position, the crank —21— will extend upwardly in a vertical plane from the axis thereof so that by rocking the shaft in an anti-clockwise direction Figures 1 and 2, the delivery pot will be carried rearwardly and downwardly from the casting position about the axis of the shaft to bring said pot in the submerged position within the melting pot —4—. The crank-shaft —22— may be rocked by any suitable means as by a rack —25— and a gear segment —26—. The gear segment —26— is secured to one end of the crank-shaft —22— which extends outwardly beyond the adjacent bracket —24— while the rack —25— is slidably mounted in a supporting bracket —27— which is secured to the adjacent side of the frame —1— for maintaining the rack in meshing engagement with the gear segment —26— during the reciprocating movement of said rack.

The rack —25— may be reciprocated at the desired time by any suitable means as by the main driving mechanism of the machine, not shown.

The delivery pot —9— is also supported against undue rocking movement about the crank arm —21— by a shaft —28— secured at one end to a rearwardly extending arm —18'— provided on the bracket —18— and is slidably mounted at the outer end thereof in a swivel arm —29— which is positioned at the rear of the delivery pot and is pivotally mounted at —30— to a bracket —31— which is secured to the cover plate —3— at the rear portion thereof by bolts or screws —32—.

In operation with the delivery pot in the casting position, as illustrated in Figures 1 and 2, the delivery pot —9— may now be moved to the charging position by operating the rack —25— to rock the shaft —22— in an anti-clockwise direction. This will carry the pot —9— rearwardly and downwardly and the supporting shaft —28— will be also carried rearwardly through the arm —29— and at the same time, will rock about the pivot —30— which will carry the delivery nozzle —7— downwardly into the submerged position within the melting pot —4— as illustrated by dotted lines in Figure 2.

This will permit the molten metal to flow through the delivery nozzle —7— and duct —17— into the chamber —15— thereby charging said chamber with the molten metal. Then by moving the rack in the opposite direction to rotate the shaft —22— in a clockwise direction, the delivery pot will be brought upwardly and forwardly and at the same time, the pot will be rocked about the axis of the crank arm —21— by the action of the supporting shaft —28— as it moves through the swivel arm —29— to bring the metal delivery nozzle —7— into casting engagement with the gate —6— and the fluid-receiving nozzle —14— into registration with the fluid delivery nozzle —13—.

The pot —9— is now in position to receive the fluid under pressure which may be admitted through the duct —12—, nozzles —13—, —14— and duct —19— to the upper portion of the chamber —15— for discharging the molten metal from said chamber through the duct —17—, nozzle —7— and gate —6— into the interior of the die or mold, after which the pot —9— is again ready to be returned to the submerged or charging position within the melting pot —4—. This return movement of the delivery pot will cause the fluid-receiving nozzle —14— to be disengaged from the nozzle —13— and thereby disconnect the chamber —15— from the source of fluid supply which will automatically prevent the fluid from being used to act upon the metal contained in the chamber —15— although the control valve for said fluid may be accidentally or unintentionally opened which would permit the fluid to pass through the conduit —12—, duct —11— and out through the nozzle —13— to the atmosphere and thereby prevent accidents or injury to the operator.

Although I have shown and particularly described the preferred embodiment of this invention, I do not wish to be restricted to the exact details of the structure shown as various changes may readily be made both in the construction of the parts and the relation thereof, without departing from the spirit of this invention, as set forth in the appended claims.

I claim:

1. In a die casting machine in combination with a melting pot for containing molten metal, a delivery pot having a pressure chamber therein and a delivery nozzle connected with said chamber, a crank shaft pivotally secured to the forward portion of the pot said shaft being disposed transversely of the melting pot and journalled at opposite sides thereof, operating means connected with the shaft to cause the delivery nozzle to be moved from the submerged position within the melting pot to a position above said melting pot and return, and means secured to the rear portion of the delivery pot and slidably supported to rock about a fixed axis for determining the position of the delivery nozzle during the rising and lowering movements of the delivery pot.

2. In a die casting machine in combination with a melting pot for containing molten metal, a delivery pot having a pressure chamber therein and a delivery nozzle connected with said chamber, supporting means, comprising a crank shaft pivotally secured to the forward portion of the delivery pot said shaft being disposed transversely of the melting pot and journalled at opposite sides thereof operating means connected with the shaft to cause the delivery nozzle to be moved from the submerged position within the melting pot to a position above said melting pot and return, and guide means for the delivery pot comprising a shaft secured to the rear portion of the delivery pot and slidably mounted for longitudinal movement in a pivoted bracket and adapted to rock about the fixed axis of said bracket to determine the position of the delivery nozzle during the rising and lowering of the delivery pot.

In witness whereof I have hereunto set my hand this 29th day of October, 1929.

WILLIAM J. DURING.