Dec. 17, 1940. L. H. MORIN 2,224,978

MELTING POT FOR CASTING MACHINES

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Fig. 1.

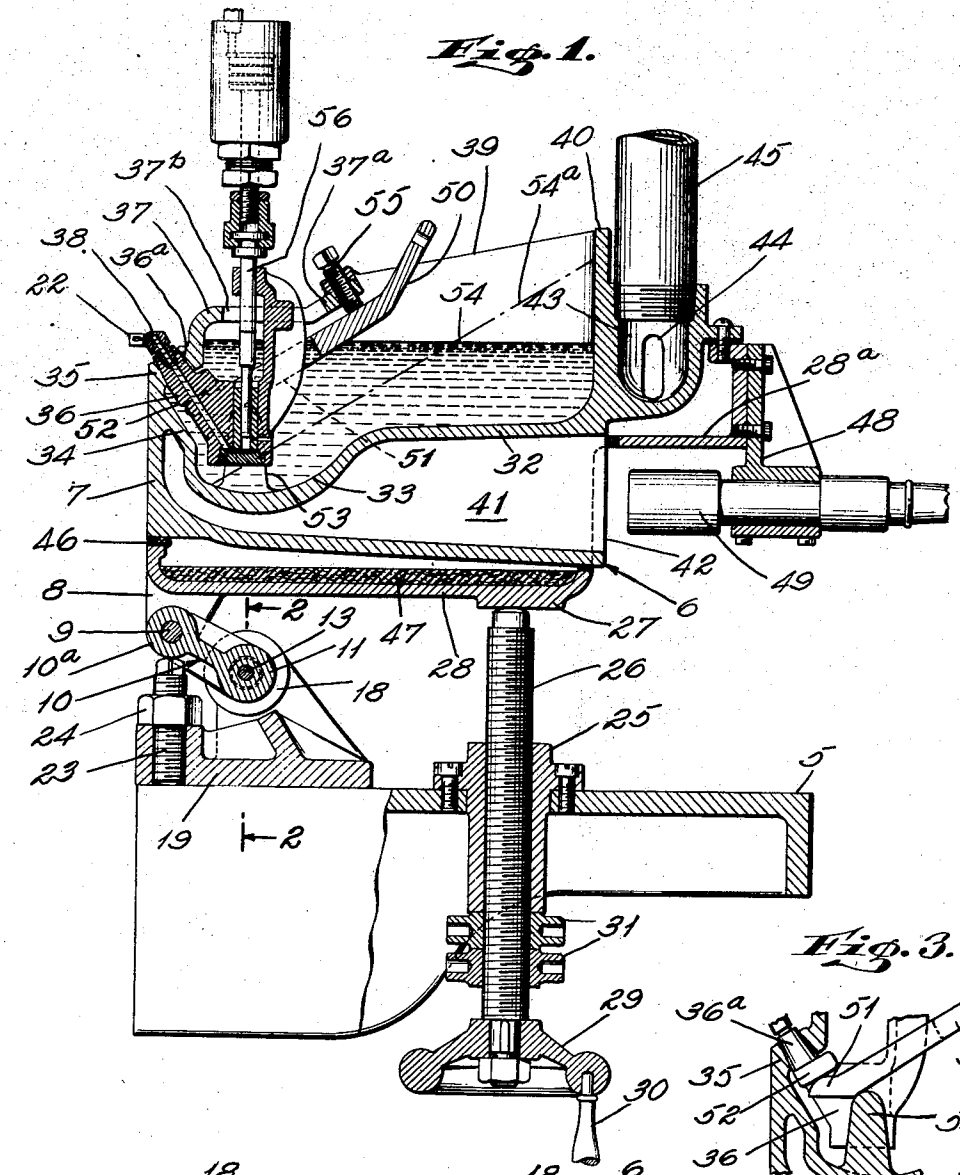
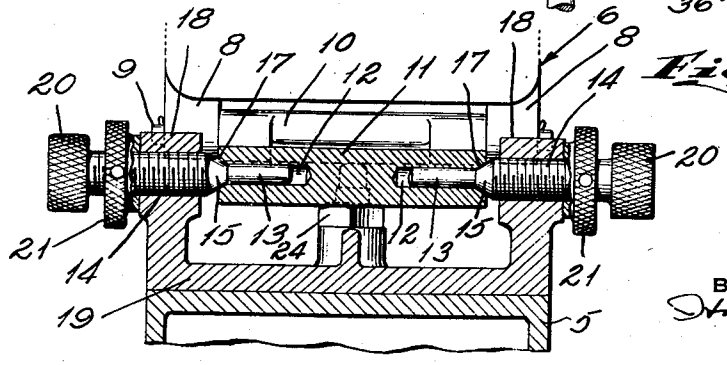


Fig. 3.

Fig. 2.



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MELTING POT FOR CASTING MACHINES

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10 Claims. (Cl. 22—71)

This invention relates to die casting machines and particularly to machines of the character described employing novel casting pot and gooseneck structure as well as adjustable means for supporting the pot in the machine. More particularly, the invention relates to a pot and gooseneck construction wherein a relatively high level of casting material can be maintained in the pot and at a point adjacent the nozzle discharge of the gooseneck to provide more efficient transmission of casting material to the impression of the dies in forming die castings. The novel features of the invention will be best understood from the following description and annexed drawing, in which one embodiment of the invention is disclosed and in which the separate parts of the device or apparatus are designated by suitable reference characters in each of the views, and in which:

Fig. 1 is a sectional view through the melting pot of a die casting machine, and illustrating supports for the pot in the machine.

Fig. 2 is a partial section on the line 2—2 of Fig. 1, and

Fig. 3 is a detail sectional view of a part of the structure shown in Fig. 1 illustrated with certain parts in full line.

The metal pot and associated parts forming the subject matter of this application constitutes a continuation in part of the structure disclosed in a prior application filed by me Feb. 8, 1938 Serial No. 189,309. While the melting pot and other structural features associated therewith are applicable to the casting machine disclosed in said earlier application, it will also appear that the same is adapted for use in conjunction with die casting machines of various types and kinds.

In casting machines of the kind under consideration, it has been the common practice to provide melting pots and gooseneck constructions wherein the casting metal has been maintained at a relatively low level in the pot. In other words, the gooseneck discharge nozzle has been disposed well above the level of metal in the pot so that intermediate successive casting operations, that is to say, intermediate successive injections of the heated casting material into the die, the heated casting material would drop an appreciable degree in the gooseneck. This would cause a considerable suck-back of air into the gooseneck resulting in excessive oxidization of the casting material, thus requiring repeated cleaning and replacement of the gooseneck, and also materially effecting the formation of perfect castings by reason of the storage of air in front of the casting material in the gooseneck. While the above objectionable features have not been serious in the conventional type of slow speed casting machine, it is nevertheless decidedly objectionable in the high speed casting machines, and especially so in casting machines producing five hundred to one thousand successive castings per minute, in accordance with the teachings in the prior application hereinbefore referred to.

My improved pot and gooseneck construction forming the subject matter of this application is devised to overcome such objectionable features and is further devised to provide means for quickly tilting the entire pot structure for the purpose of replacing or repairing goosenecks from time to time, without the necessity of removing the heated casting material from the pot. Further, my invention provides adjustable supports for the pot to properly aline the discharge nozzle of the gooseneck with the impression of the die, in a vertical and horizontal direction.

In the accompanying drawing I have indicated at 5 a part of the table or bed-plate of the casting machine, in connection with which a pot 6 is adjustably supported. The lower end of the pot has adjacent the front wall 7 thereof and also at opposite sides of the pot, downwardly projecting lugs 8 in which a pivot pin 9 is supported. The pin also passes through a wide link 10 arranged between the lugs 8, note Fig. 2.

The link 10 has a cylindrical bearing 11 at its lower end having pivot apertures 12 at opposite sides thereof to receive adjustable pivot pins 13 having screw ends 14 joining the pins 13 in beveled portions 15 which are adapted to seat in corresponding sockets 17 at the outer end of the apertures 12. The screws 14 are adjustable in upwardly extending bearings 18 at opposite sides of a bracket 19. The screws 14 are adjusted through the medium of knurled heads 20 and are retained in different positions of adjustment by milled lock nuts 21. The purpose of this construction is to centralize the pot 6 in the machine for proper horizontal alinement of the gooseneck nozzle, later described, with the admission passage or gate of the die 22, note Fig. 1.

Adjustably supported in the front of the base 19 is a vertical alinement screw 23 retained in different positions of adjustment by a lock nut 24. The upper end of the screw 23 engages the cylindrical portions 10a of the link 10 through which the pin 9 passes, and actually forms a seat upon which the forward end of the pot rests. By raising and lowering the screw 23, the vertical

alinement between the gooseneck nozzle and the die 22 may also be accurately maintained.

Arranged in the bed-plate 5 rearwardly of the bracket 19 is a vertical bearing 25 internally threaded to receive a pot tilting and supporting screw 26, the upper surface of which is adapted to rest upon a flat surface 27 on an insulated casing 28 arranged around the pot 6. The lower end of the screw 26 is provided with an operating wheel 29 having a handle member 30 to facilitate rotation of the screw to quickly raise and lower the same in the operation of dropping or tilting the pot for purposes later described. At 31 is shown two lock nuts cooperating with the screw 26 to securely retain the screw 26 in its operative position.

The pot 6 has a bottom wall 32 having a downwardly tipped portion 33 adjacent the front wall 7. The downwardly tipped portion 32 extends upwardly and forwardly to join the front wall 7 as at 34. The upper portion of the front wall is beveled or tapered inwardly and upwardly as seen at 35 to form a support for the discharge end portion of a gooseneck 36, said end portion being tapered to fit in a corresponding tapered socket in the part 35. Inwardly of the part 35 is an upwardly and inwardly curved front wall portion 37 which extends well above the discharge nozzle 38 of the gooseneck 36. The portion 37 joins upwardly extending side walls 39 of the pot and joins with the back wall 40 thereof, the upper end of said back wall being materially higher than the front wall portion 37, as is clearly illustrated in Fig. 1 of the drawing.

Around the bottom, side, front and back walls of the pot are outer wall portions forming circulating chamber for the products of combustion, the admission chamber being shown at 41 with the admission opening at 42. The products of combustion extend along the bottom wall 32 to the front of the pot and then backwardly along the side walls and open into an exhaust chamber 43 through side ports 44. An exhaust pipe or stack 45 communicates with the chamber 43. This particular structure of the pot may be in accordance with the teachings in my prior Patent #2,106,505 granted January 25, 1938, and is modified only sufficient to adapt the same to the different structure of the pot here employed.

The outer insulating casing 28 is not only insulated from the pot where it contacts the pot as at 46, but also may have an asbestos or other insulating lining 47 so as to prevent heat flow from the pot to the other parts of the machine. This is also true of the rear end portion 28a of the outer casing or jacket. On this portion is supported a bracket 48 for supporting a gas burner nozzle 49 in position to register with the admission opening 42 of the combustion chamber 41, again in accordance with the teachings in the prior patent heretofore referred to.

In the present construction, the gooseneck is detachably supported in the pot through the medium of a long lever 50 having a forked end portion 51 adapted to bear upon a shoulder 52 adjacent the beveled or tapered end portion 36a of the gooseneck 36, the lever seating upon inwardly extending bearings 53 at opposite sides of the pot, as is clearly seen in Fig. 3 of the drawing. The upper end portion of the lever protrudes above the level of molten metal 54 arranged in the pot. A screw 55 is adjustably supported in a top wall portion 37a to depress the upper end portion of the lever 50 so as to raise the end 51, thus firmly forcing and supporting the tapered end 36a in the wall part 35. It will thus appear that by loosening the screw 55, the gooseneck may be quickly attached by removing the lever 50 and then moving the end portion 36a including the nozzle 38 into the pot and slipping the same outwardly through the opening 37b in said top wall.

It will of course be understood that in the above operation, the usual plunger 56 which operates in the gooseneck to control the discharge of molten metal through the nozzle 38 into the die 22, must first be detached from the means for supporting and operating the same, as will be apparent. This means and the other structure of the gooseneck forms no particular part of the present invention and for this reason no specific reference is here deemed to be necessary.

The important features in the present conception are the general arrangement of a gooseneck in the pot, including the manner of quickly coupling and uncoupling the same to be consistent with one of the distinctive features of the support for the pot; that is to say, the screw support 26. It will be understood that by lowering the screw 26, the rear end of the pot 6 will tilt downwardly. In this operation the molten metal will assume a level in the pot substantially as is indicated by the dot and dash line 54a, Fig. 1, so as to clear the nozzle structure and permit the removal of the nozzle and the replacement thereof for repair, renewal or other purposes, and in accomplishing this result without shutting down the machine or the necessity of chilling the pot and then reheating the same which would cause a long delay of time in which the machine would be rendered useless. In operating casting machines of the type and kind under consideration, and especially those operating at the higher speeds, it is found desirable from time to time to renew the goosenecks or to replace the same with cleaned or repaired goosenecks so as to insure high efficiency in operation of the machine, and to make this change not necessarily when a machine becomes inoperative, but at more or less regular time periods or intervals to inspect the goosenecks and determine that the same are in proper operating condition and to make such repairs as are necessary to put them in perfect operating condition.

By mounting the discharge or nozzle end portion of the gooseneck in a wall part as at 35 and at a point below the upper front wall portion 37, it is possible to maintain a high level of the heated casting material 54 in the pot and at a point just below the discharge orifice of the nozzle, so that the heated casting material is maintained at the discharge orifice of the nozzle or relatively close thereto at all times during the operation of the machine. This prevents the exposure of an excessive amount of the air to the nozzle or gooseneck passages and the material therein, thus eliminating to a large degree, oxidization, while at the same time maintaining the heated casting material at a point for immediate delivery into the impression of the die and without contending with a column of air in front of the injected metal.

It will of course be apparent that in the tilting as well as adjustable movement of the pot 6, the burner nozzle 49 will move therewith, flexible connections or piping being employed to permit this operation. It will also appear that the adjustment of the screw 26 will maintain the levelling of the pot so that the discharge nozzle will fit squarely upon the surfaces of the dies to insure a

proper seal, the dies being moved toward and from the nozzle in the casting operations.

It will of course be apparent that the gooseneck construction and through the medium of the plunger operated in any desired manner or by any suitable means, will provide for the pressure discharge of the heated casting material or molten metal **54** from the container through the discharge nozzle **38** into the impression of the dies **22** in each pressure discharge or injection stroke of the plunger in forming a successive series of die castings.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a die casting machine of the class described, a molten metal container in which casting material is adapted to be placed for pressure discharge therefrom, a nozzle detachably supported in connection with said container and adapted to register with the casting impression of relatively movable dies, said nozzle extending through an aperture in said container below the normal level of casting material therein, means for heating the container and the casting material therein, a swivel mounting adjacent the nozzle end of said container for adjusting the position of the container in the machine toward and from the dies, and a manually adjustable support for tilting the entire container in the machine about said swivel mounting to remove the casting material from the nozzle end of the container in the repair and replacement of parts of the container.

2. In a die casting machine of the class described, a molten metal container in which casting material is adapted to be placed for pressure discharge therefrom, a nozzle detachably supported in connection with said container and adapted to register with the casting impression of relatively movable dies, said nozzle extending through an aperture in said container below the normal level of casting material therein, means for heating the container and the casting material therein, means adjustably supporting the nozzle end portion of the container in several directions for alinement of the nozzle with respect to the impression of the dies, other means adjustably supporting the other end portion of the container, said first named means comprising a link pivoted to said container and to a stationary support to swing freely therein, means for adjusting the container and link laterally with respect to said stationary support, and adjustable means on the stationary support cooperating with the free end portion of the link for selectively supporting the same in different positions of rotation with respect to the stationary pivotal support of the link.

3. In a die casting machine of the class described, a molten metal container in which casting material is adapted to be placed for pressure discharge therefrom, a nozzle detachably supported in connection with said container and adapted to register with the casting impression of relatively movable dies, said nozzle extending through an aperture in said container below the normal level of casting material therein, means for heating the container and the casting material therein, means adjustably supporting the nozzle end portion of the container in several directions for alinement of the nozzle with respect to the impression of the dies, other means adjustably supporting the other end portion of the container, said first named means comprising a link pivoted to said container and to a stationary support to swing freely therein, means for adjusting the container and link laterally with respect to said stationary support, adjustable means on the stationary support cooperating with the free end portion of the link for selectively supporting the same in different positions of rotation with respect to the stationary pivotal support of the link, and the second mentioned means comprising a vertically adjustable screw for tilting the rear end portion of the container to substantially remove the molten metal from the forward nozzle end portion of the container when the container is in tilted position.

4. In a die casting machine, a container for the heated casting material employed, a gooseneck, means for supporting said gooseneck at one end portion of the container with the discharge nozzle of the gooseneck arranged outwardly of said end of the container below the top of the wall at said end of the container, the other walls of the container extending above said first named wall whereby a level of heated casting material may be arranged in the container at a point adjacent the discharge of the nozzle of said gooseneck, means for heating the casting material in said container, and means for tiltably supporting the container in the machine to drop the end portion thereof opposed to said gooseneck end, and the extended walls of said container forming a receptacle receiving said casting material when the container is tilted thereby completely exposing said gooseneck without removing the casting material from said container.

5. In a die casting machine, a container for the heated casting material employed, a gooseneck, means for supporting said gooseneck at one end portion of the container with the discharge nozzle of the gooseneck arranged outwardly of said end of the container below the top of the wall at said end of the container, the other walls of the container extending above said first named wall whereby a level of heated casting material may be arranged in the container at a point adjacent the discharge of the nozzle of said gooseneck, means for heating the casting material in said container, means for tiltably supporting the container in the machine to drop the end portion thereof opposed to said gooseneck end, and the extended walls of said container forming a receptacle receiving said casting material when the container is tilted thereby completely exposing said gooseneck without removing the casting material from said container, and means for quickly attaching and detaching the gooseneck with respect to the container.

6. In a die casting machine, a pot for the heated casting material, means involving a removable lever for detachably supporting a gooseneck in one end portion of the pot, means pivotally supporting said end of the pot, means engaging the other end portion of the pot for tiltably supporting the pot to lower the second named end portion thereof, and said second named end portion of the pot having a wall structure providing sufficient capacity to store the heated material of the pot leaving the first named end portion thereof vacant to facilitate insertion and removal of the gooseneck without removing the molten material from the pot.

7. A melting pot for the storage of molten material used in a die casting machine of the class described, a gooseneck detachably supported in wedge-like engagement with one end portion of the pot, and means adjustably and tiltably sup-

porting the pot to lower the other end portion thereof thereby displacing the molten material into the last named end of the pot to permit insertion and removal of the gooseneck without interference with the molten metal contained in the second named end portion of the pot when supported in tilted position.

8. A melting pot for the storage of molten material used in a die casting machine of the class described, a gooseneck detachably supported in wedge-like engagement with one end portion of the pot, means adjustably and tiltably supporting the pot to lower the other end portion thereof thereby displacing the molten material into the last named end of the pot to permit insertion and removal of the gooseneck without interference with the molten metal contained in the second named end portion of the pot when supported in tilted position, and means involving a removable yoke-shaped lever cooperating with lugs on said gooseneck and pot for quickly coupling and uncoupling a gooseneck with the pot.

9. A melting pot for the storage of molten material used in a die casting machine of the class described, a gooseneck detachably supported in wedge-like engagement with one end portion of the pot, means adjustably and tiltably supporting the pot to lower the other end portion thereof thereby displacing the molten material into the last named end of the pot to permit insertion and removal of the gooseneck without interference with the molten metal contained in the second named end portion of the pot when supported in tilted position, and other means adjustably supporting the first named gooseneck end of the pot for alinement of the discharge nozzle of said gooseneck with suitable dies.

10. In a die casting machine, a tiltable pot for the heated casting material, a gooseneck quickly attachable and detachable with respect to the pot when the pot is in tilted position, the pot having a tapered socket in one wall thereof and the gooseneck having a corresponding tapered end fitting said socket, a yoke-shaped lever detachably supported in the pot and cooperating with said gooseneck to firmly support the same in the pot, means in the pot forming a pivot for said yoke-shaped lever, and adjustable means cooperating with the lever to retain the same in operative position.

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