April 21, 1925. 1,534,266

E. HOTTER

DIE CASTING MACHINE

Filed Oct. 29, 1923 2 Sheets-Sheet 1

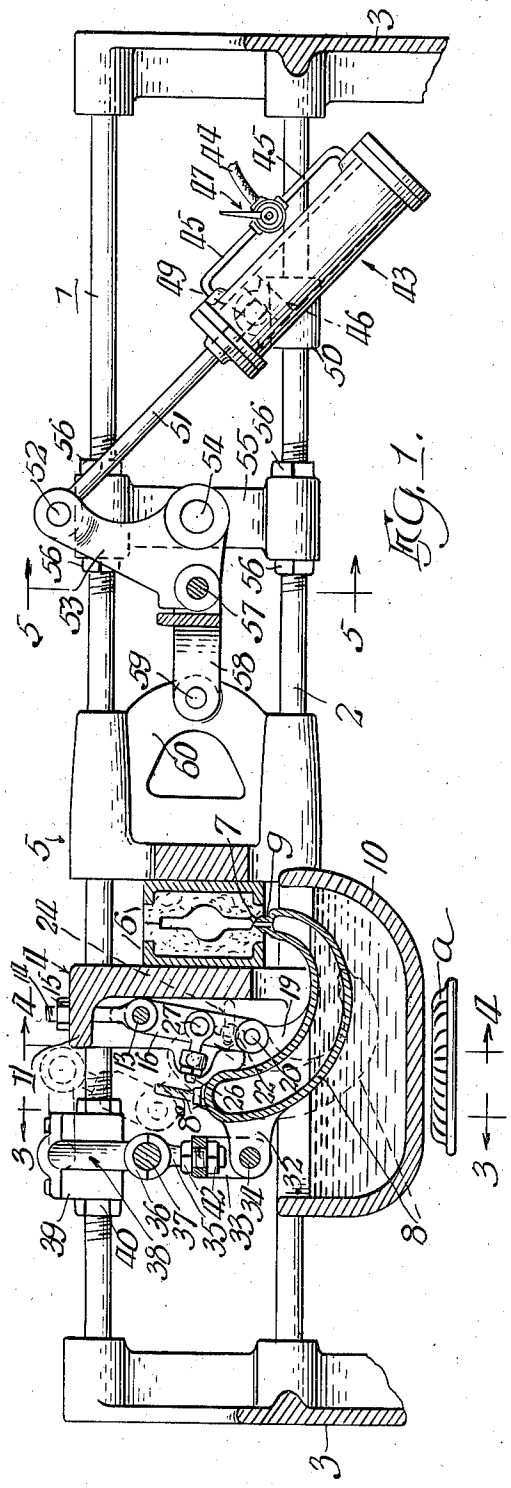

FIG. 1.

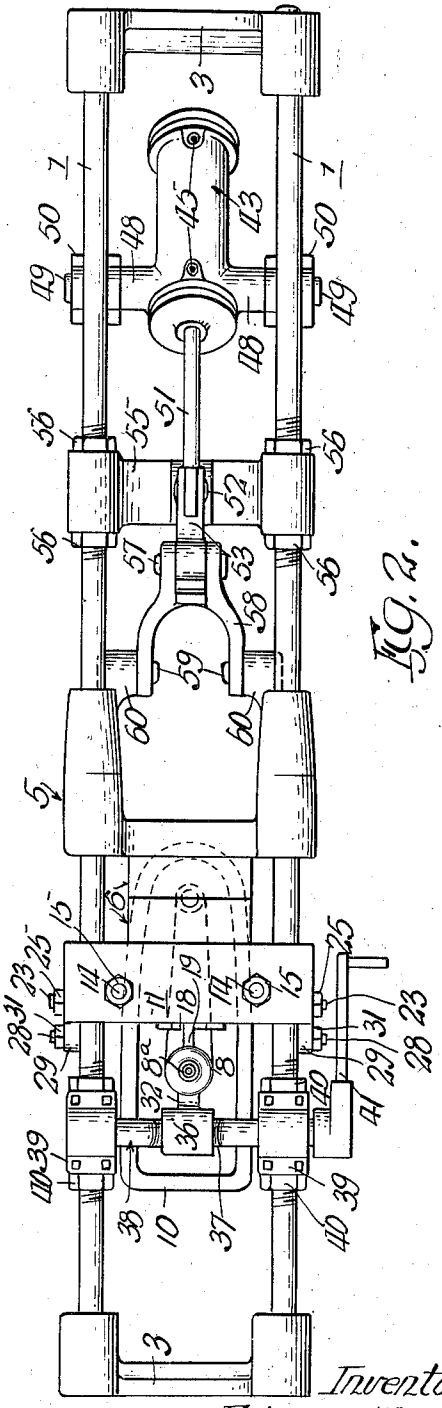

FIG. 2.

Inventor
Edward Hotter
by Edgar Cramer Atty

April 21, 1925. 1,534,266

E. HOTTER

DIE CASTING MACHINE

Filed Oct. 29, 1923 2 Sheets-Sheet 2

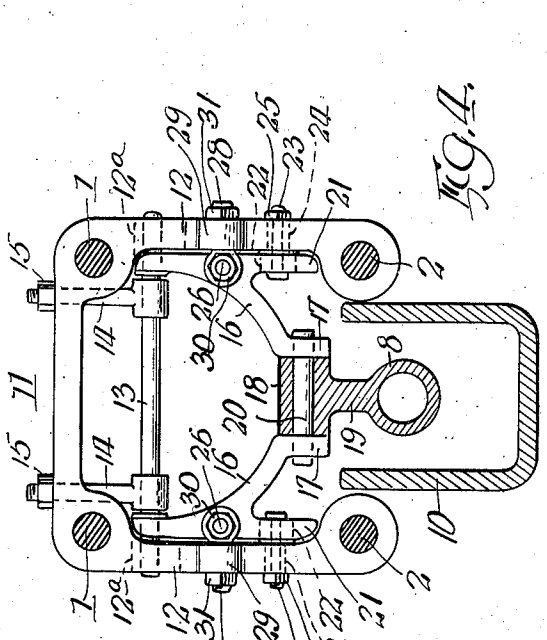

FIG. 4.

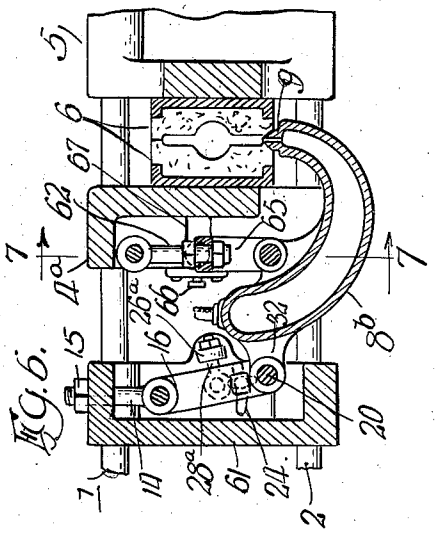

FIG. 6.

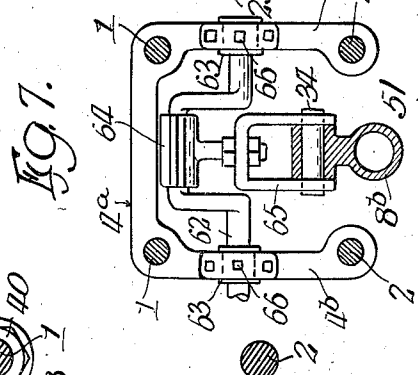

FIG. 7.

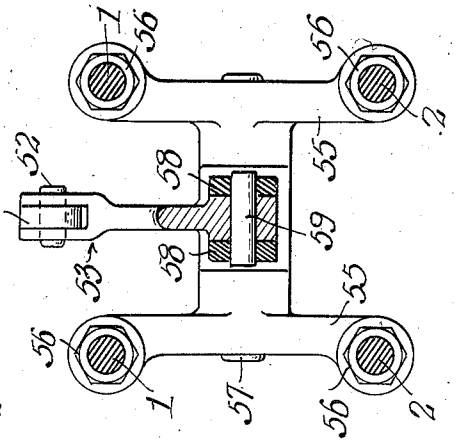

FIG. 5.

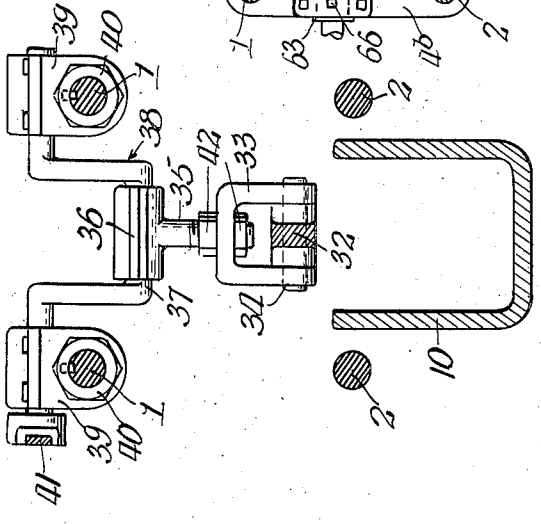

FIG. 3.

Inventor
Edward Hotter
By Eugene Braun Atty.

Patented Apr. 21, 1925. 1,534,266

UNITED STATES PATENT OFFICE.

EDWARD HOTTER, OF CHICAGO, ILLINOIS.

DIE-CASTING MACHINE.

Application filed October 29, 1923. Serial No. 671,287.

To all whom it may concern:

Be it known that I, EDWARD HOTTER, a citizen of the present government of Austria, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Die-Casting Machines, of which the following is a specification.

This invention relates to die casting machines.

One object of my invention is to provide a mount for the so-called "goose-neck" permitting vertical as well as horizontal adjustment of the same to bring its discharge nozzle into accurate registration with the inlet openings of mold members of various sizes.

A further object of my invention is to provide an improved means for moving the goose-neck into and out of engagement with the mold members and to employ such means as a lock to hold the goose-neck against movement when engaged with the mold members for discharging a batch of molten metal into the same.

Other and further objects of my invention will appear from the following specification taken in connection with the accompanying drawings, in which—

Fig. 1 is a side view, with parts in section, of a die casting machine structure of my invention;

Fig. 2 is a top plan view of the same;

Figs. 3, 4, and 5 are vertical sectional views taken on lines 3—3, 4—4, and 5—5, respectively, of Fig. 1;

Fig. 6 shows a modified form of structure; and

Fig. 7 is a vertical sectional view on line 7—7 of Fig. 6.

In the drawings, I have shown only that portion of the machine embodying the features of my invention. This structure includes a pair of top rods 1, 1 and a pair of bottom rods 2, 2. These rods are arranged horizontal and have their ends supported in upright standards 3, 3 or other parts of the machine frame or base. The rods constitute the supporting means of my invention and mounted on them are two members 4, 5 carrying separable mold members 6, 6, which when brought together have their inlet opening 7 in the under side thereof, as shown in Fig. 1. In the structure shown, the member 4 is fixed against movement on the rods 1, 2 and that makes the mold member 6 carried thereby the fixed mold member. The member 5, on the other hand, is slidably mounted on the rods and is movable toward and from the fixed member 4 by a mechanism to be presently described.

For filling the cavity between the mold members 6, 6 when closed together, there is a charge carrying container 8, which as shown in the drawings is in the form of the so-called goose-neck or ladle, as in machines of this character. Said container 8 has a nozzle 9 at its discharge end to enter the inlet opening 7 in the mold members 6. The container 8 is lowered into a pot or crucible 10 containing molten metal for filling, as usual in these machines. A suitable burner *a* is shown as a source of heat for keeping molten the metal in the pot.

The means of my invention for moving the container 8 in a manner permitting both vertical and horizontal adjustment includes the member 4. This member 4, as shown in Fig. 4, is in the form of an open frame with a top bar 11 and two side bars 12, 12. The latter are connected at their upper ends with the top bar, as shown. Extending across the member 4 between its side members 12 is a bar or shaft 13. Said bar 13 has its ends in vertical slots 12^a in the side members 12 and is suspended from the top bar 11 by depending bolts 14, 14. These bolts have their threaded upper ends extended through the top bar 11 and there receive clamp nuts 15, by means of which the bolts may be adjusted vertically. The lower ends of the bolts 14 are apertured or eyed for the bar 13 to pass through, as shown in Figs. 1 and 4.

Engaged with the bar 13 outside of the bolts 14 are arms 16, 16. These arms have their upper ends apertured for the bar 13 to extend through and their lower ends are bent downward to provide lugs 17 spaced apart, as shown in Fig. 4. Between these lugs 17 extends a boss 18 on an upright web 19 provided on the container 8, as shown. A bolt 20 pivotally fastens the boss 18 between the lugs 17 and thus pivotally connects the container 8 with the arms 16, 16. Each arm 16 is provided with a depending side section 21, in which is an elongated vertical slot 22 to receive a bolt 23 extending through a horizontally arranged, arcuate slot 24 in the adjacent side member 12. As indicated in Fig. 1, the vertical slot 22 across the horizontal slot 24 and the bolt 23 extending through both of them, permits the arms 16

to be adjusted back and forth about the cross bar 13 as an axis and also up and down with the vertical bolts 14. The arms 16 are clamped in any position of this adjustment by nuts 25 on the bolts 23.

To enable the arms 16 to be adjusted back and forth after loosening the nuts 25, I provide the following construction: To the rear of the arms 16, 16 are bolts 26, of eye form and connected with studs or pins 27 (Fig. 1) on the associated arms 16. These bolts 26 extend through the eyes of cross bolts 28 pivoted or journaled in rearwardly extending lugs 29 on the side members 12 of the frame. Adjustment of the bolts 26 is effected by nuts 30 on them and bearing against the eyes of the bolts 28. Turning these nuts 30 adjusts the arms 16 back and forth, depending on the direction of turning the nuts after the nuts 25 on the bolts 23 are loosened. When the desired adjustment of the arms 16 has been had, the nuts 31 on the bolts 28 are tightened and the arms 16 held fixed in their adjusted position.

By the construction described, it is possible to change the position of the pivot 20 of the container 8 to properly register the nozzle 9 on the container with the inlet opening 7 in the mold members 6, 6. It is usual to make the nozzle with a beveled end and give the inlet opening 7 a like shape so that the parts when in proper register will fit without leakage. When the mold members 6, 6 have a certain dimension, the container 8 may be adjusted forward or backward as well as up or down, as the case may require, to properly center the nozzle 9 to enter the opening 7 in the mold members, so that when a batch of molten metal is forced into the mold members by air pressure admitted through the pipe 8^a, a proper fitting of the nozzle in the inlet opening of the mold will not allow leakage of the metal during the discharge into the mold members. The container 8 being capable of these adjustments permits adjusting the container to mold members of various sizes as may be carried on the fixed and movable members 4 and 5, respectively. Consequently, proper functioning of the machine may be had at all times, due to the fact that the nozzle 9 may be adjusted to completely enter and fill the inlet opening in the mold members, regardless of the size of the same.

To swing the container 8 into and out of the crucible or pot 10 for filling, I provide the following construction. The container 8 is provided with a rearwardly projecting web 32, which extends into a yoke 33 pivoted thereto by a pin or bolt 34, as shown in Fig. 3. This yoke 33 is suspended from the lower end of a vertical rod 35 having at its upper end a split bearing 36 to be clamped about the crank 37 of a crank shaft 38. Said shaft 38 has its ends journaled in boxes 39 keyed or otherwise fixed to the upper rods 1, 1, as shown in Figs. 1 and 3. The boxes are held in position on the rods by clamp nuts 40, 40 on opposite sides of the same, the rods being threaded as shown. The crank shaft 38 is turned by a handle 41, shown in Fig. 2. This handle is outside of the adjacent rod 1, so as to be accessible to the operator for turning.

When the container 8 is in the position shown in full lines in Fig. 1, the crank shaft 38 is in a position at right-angles to the rods 1, 1 and with its crank 37 below the same. The container 8 has been raised into engagement with the mold members 6, 6 so that a batch of metal may be forced from the container into the mold members by air pressure admitted to the conduit 8^a in accordance with the usual operation of a die casting machine. By using the crank shaft 38 as the means for raising or swinging the container 8 into this position and having the crank shaft come to the position shown in the drawings, the crank shaft is on center and locked against accidental swinging movement and thus holds the container 8 engaged with the mold members during the filling operation of the latter. After filling the mold members 6, 6 with a batch of molten metal from the container 8, it is swung about the pivot bolt 20 by turning the crank shaft 38 in a direction to cause its crank pin 37 to travel a quarter turn forward and upward, as shown in dotted lines in Fig. 1. This raises the rear end 32 of the container 8 and lowers the forward end into the pot or crucible 10 until the nozzle 9 is submerged below the level of molten metal in said pot, whereupon a new batch of metal enters by gravity to supply the container for the next mold filling operation. The container 8 in this position is shown by dotted lines in Fig. 1.

Vertical adjustment of the container 8 through the bolts 14, 14 raises or lowers, as the case may be, the pivot 20, about which the container is swung into and out of engagement with the mold members 6. To adjust the crank shaft 38 to this change in fulcrum, I thread the lower portion of the connecting rod 35 and on it place clamp nuts 42, 42, by means of which the pivot pin 34 may be raised or lowered to accommodate the adjustment of the fulcrum 20. Also in adjusting the container 8 forward and backward to accommodate it to molds of various thicknesses through the horizontal slots heretofore described, the bearing boxes 39 may be adjusted on their rods 1 through the medium of the clamp nuts 40, 40.

The means for moving the movable mold member 6 into and out of engagement with

the fixed one so as to open and close the mold, comprises a power driven means, which in the form shown in the drawings consists of a cylinder 43 supplied with compressed air or other motive fluid through a conduit 44 and pipes 45, 45. The supply of motive fluid to these pipes for reciprocating the piston 46 in the cylinder is through the medium of a suitable hand operated valve 47, or other preferred means. The cylinder 43, as shown in Fig. 2, is provided at its sides with outwardly projecting lugs 48 carrying trunnions 49, 49 journaled in boxes 50, 50 fixed or otherwise clamped to the lower rods 2, 2. The piston rod 51 extends through the forward end of the cylinder 43 and is connected at its forward end by a cross-pin 52 with the upper end of a triangular shaped link 53. This link is connected by a cross-pin 54 at its lower end with a member 55 supported by all the rods 1 and 2 and fixed or clamped against movement thereon by nuts 56, as shown. The link 53 is connected at its forward end by a pin 57 with a straight link 58, which in turn is pivoted to the slidable member 5. As shown in Fig. 2, the link 58 is in the form of a yoke having its arms connected by pins 59, 59 with the adjacent side portions or bosses 60, 60 of the member 5.

With the parts as shown in Fig. 2, the cross-head 5 is in a position with its mold member 6 in contact with the mold member 6 on the fixed part 4. At such time the piston 46 is in the upper end of the cylinder 43 and the other parts of the device are in the position shown in Fig. 1. To separate the mold members 6, after they have been filled with a batch of metal and the latter has solidified, motive fluid is admitted to the forward end of the cylinder 43 to drive the piston toward the rear end. This action draws downward on the piston rod 51 and rocks the link 53 downward around its pin 54, drawing upward on the link 58 and, in turn, moving the cross-head 5 away from the fixed member 4, thereby opening the mold members 6 and permitting the cast product to be removed therefrom. The cylinder 43 turns downward on its trunnions 49 in this operation. To close the mold members 6, 6 for refilling in the manner heretofore described, power is admitted to the lower end of the cylinder 43 and its piston 46 driven upward. This acts to rock the link 53 upward and brings the parts again to the positions shown in Fig. 1.

In Figs. 6 and 7, I have shown a modified form of structure, wherein the crank shaft and arm supports of the preceding figures are transposed, the operation and advantages of the machine remaining the same. As illustrated in Fig. 7, I fasten to the rods 1, 2 a fixed cross-member 61 located at the rear web 32 of the container 8^b. Arms 16, as before, pivotally connect the container 8^b with the member 61 and all parts remain the same as in Figs. 1 to 4 with the exception that the adjusting bolts for the arms are in front of them instead of behind as in the first structure. In Fig. 6, these bolts are indicated by 26^a and 28^a, respectively.

When arranged as in Figs. 6 and 7, the container 8^b pivots about its rear end, and to raise and lower the container I provide the crank shaft 62 over the container between its ends. A fixed member 4^a, like the one 4, as shown in Fig. 7, carries the shaft 62, its ends being journaled in boxes 63, 63 fastened to the side mebers 4^b of said frame. The crank of said shaft is connected with a mid-web of the container 8^b by a connecting rod, consisting of a threaded rod 64 and yoke 65, like the corresponding parts in Fig. 3. When raised, the crank is above its shaft, as shown in Fig. 7, and locked against accidental movement by being on center. This holds the container 8^b engaged with the mold members 6, 6. When turned toward the fixed member 61 a quarter turn, the container 8^b has its nozzle end swung downward into the pot 10 for filling, as before.

Adjustment of the container 8^b is accomplished the same as before. In this connection, bolts 66, 66 adjust the boxes 63 in recesses 67 in the side members 4^b, 4^b.

The machine described is simple in operation and construction and has the advantages heretofore set forth.

While I have shown and described herein in detail a die casting machine embodying the features of my invention, it is of course to be understood that the details of construction and arrangement of parts may be variously changed and modified without departing from the spirit and scope of my invention.

I claim as my invention:

1. In a casting machine, the combination of a support, a mold carried thereby and having an inlet opening, a container movably mounted on said support to supply the mold with molten metal and having a discharge nozzle to enter the inlet opening of said mold, means for moving said container to carry its nozzle into and out of said inlet opening, and means for adjusting the container to register its nozzle with inlet openings of molds of different sizes.

2. In a casting machine, the combination of a support, a mold carried thereby and having an inlet opening, a container to supply the mold with molten metal and having a discharge nozzle to enter said inlet opening, means pivoting the container to said support so that the container may be swung to carry its nozzle into and out of said inlet opening, means for moving the

container about its pivot, and means for changing the position of said pivot to adjust the container to register its nozzle with inlet openings of molds of different sizes.

3. In a die casting machine, the combination with a support, of a die carried thereby and having an inlet opening in its underside, a container extending under the die and having an upwardly directed discharge nozzle to register with the inlet opening of the die for supplying molten metal thereto, means for moving the container to carry its nozzle into and out of registry with the inlet opening of the die, and means for adjusting the container to register its nozzle with inlet openings of dies of different sizes.

4. In a die casting machine, the combination with a support, of a die carried thereby and having an inlet opening in its underside, a container extending under the die and having an upwardly directed discharge nozzle to register with the inlet opening of the die for suplying molten metal thereto, means pivotally connecting the container with the support so that the container may be swung about a horizontal axis to carry its nozzle into and out of registry with the inlet opening of the die, and means for changing the position of said pivot to adjust the container either vertically or horizontally to register its nozzle with inlet openings of dies of different heights and widths.

5. In a die casting machine, the combination with a support, of a die carried thereby and having an inlet opening in its underside, an arcuate container having its front end extending under the die and there provided with a discharge nozzle to register with the inlet opening of the die for supplying molten metal thereto, means pivotally connecting the container adjacent its rear end with the support so that the container may be swung about a horizontal axis to carry its nozzle into and out of registry with the inlet opening of the die, operating means for swinging the container and acting thereon adjacent its rear end, and means for changing the position of said pivot for adjusting the container to register its nozzle with inlet openings of dies of different sizes.

6. In a die casting machine, the combination with a support, of a die thereon and having an inlet opening, a fixed member on said support at one side of the die, a cross-rod carried by said fixed member, a pair of arms pivotally carried by said rod, a container pivotally carried by said arms and having a discharge nozzle to enter the inlet opening of the die for supplying molten metal thereto, means for swinging the container about its pivot, means for adjusting the arms about said rod for adjusting the container to register its discharge nozzle with dies of different widths, and means for raising and lowering the rod for adjusting the container to dies of different heights.

7. In a die casting machine, the combination with a support, of a die thereon and having an inlet opening, a fixed member on the support at one side of the die, a cross-rod carried by the fixed member, a pair of arms pivotally carried by said cross-rod, a container pivotally carried by said arms and having a discharge nozzle to enter the inlet opening of the die for supplying molten metal thereto, means for swinging the container about its pivot, means for adjusting the arms about said rod for adjusting the container to register its nozzle with inlet openings of molds of different widths, said adjusting means including crossing, elongated arcuate and straight slots in the fixed member and arms, respectively, and bolts passing through the crossing slots to hold the arms in adjusted position, and means for raising and lowering said rod for adjusting the container to dies of different heights.

8. In a die casting machine, the combination with a support, of a die thereon and having an inlet opening, a fixed member on the support at one side of the die, vertically adjustable depending bolts carried by said member, a cross-bar carried by said bolts, a pair of arms pivotally carried by said bar, said fixed member and arms having crossing elongated arcuate and straight slots respectively, bolts extending through said slots for holding the arms in adjusted positions, means carried by the fixed member and engaging the arms for adjusting the same about said bar, a container pivotally carried by the arms and having a discharge nozzle to enter the inlet opening in the die for supplying molten metal thereto, and means for swinging the container about its pivot.

9. In a die casting machine, the combination with a support, of a die carried thereby and having an inlet opening in its under side, a container extending under the die and having an upwardly directed discharge nozzle to register with the inlet opening of the die for supplying molten metal thereto, means pivotally connecting the container to the support so that the container may be swung about a horizontal axis to carry its nozzle into and out of registry with said inlet opening, and operating means acting on the container adjacent its rear end for swinging the container about its pivot, said operating means including devices imparting a downward thrust on the container when the same is swung toward the die and automatically locking the container against accidental movement when its nozzle reaches the inlet opening in the die.

10. In a die casting machine, the combination with a support, of a die thereon and having an inlet opening in its under side, a container extending under the die and

having a discharge nozzle to enter the inlet opening of the die for supplying molten metal thereto, means pivotally connecting the container to the support so that the container may be swung to carry its nozzle into and out of said inlet opening, means for changing the position of said pivot to adjust the container to dies of different sizes, a member in the form of a crank shaft journaled on said support for swinging the container about its pivot, and a connecting rod connecting the container with the crank of said shaft so that when the crank is on center the container will be locked in a position with its discharge nozzle in the inlet opening of the die.

11. In a die casting machine, the combination of a support, fixed and movable members thereon, die members carried by said fixed and movable members, a container for supplying molten metal to the die and having a discharge nozzle to enter the inlet opening of the die, means on the support for swinging the container to carry its nozzle into and out of said inlet opening, a power cylinder pivotally carried on said support and having a piston therein, a piston rod for said piston, and a pivoted link connection between the piston rod and movable member for moving the same toward and from the fixed member in the operation of said piston.

12. In a die casting machine, the combination of a support, fixed and movable members thereon, die members carried by said fixed and movable members and having an inlet opening, a container to supply molten metal to said die, said container being pivotally connected with said support and having a discharge nozzle to enter said inlet opening, means on the support for swinging the container about the pivot to carry its nozzle into and out of said inlet opening, a power cylinder carried by trunnions on said support and having a piston therein, a piston rod for said piston, a second fixed member on the support between the movable member and the cylinder, a substantially triangular shaped link pivotally carried on the fixed member, said piston being pivotally connected with one end of said member, and a straight link pivotally connecting the movable member with the other end of said triangular link.

13. In a die casting machine, the combination of upper and lower pairs of rods constituting a support, fixed and movable members on said rods, separable die members carried by said fixed and movable members, means carried by said rods for discharging a batch of molten metal into the die when closed, a power cylinders carried by trunnions on the pair of lower rods, a fixed member on the rods between the movable member and the cylinder, a piston in said cylinder, a piston rod for said piston, a triangular shaped link pivotally carried on the second fixed member, said piston rod having pivotal connection with the triangular shaped link at one end, a yoke shaped link pivotally connected with the other end of the triangular link, said yoke shaped link having its arms extending toward the movable member and pivotally connected therewith on opposite sides of the same.

14. In a die casting machine, the combination of a support, separable mold members thereon and having an inlet opening, a container to supply molten metal to said mold members and having a discharge nozzle at one end to enter said inlet opening, said container pivotally carried between its ends by said support, means operating on the end of the container opposite its nozzle to swing the container about its pivot and carry its nozzle into and out of said inlet opening, means for changing the position of said pivot to adjust the container to register its nozzle with inlet openings of molds of different sizes, and means for supplying molten metal to said container.

15. In a die casting machine, the combination of a support, separable mold members thereon and having an inlet opening, a container to supply molten metal to said mold members and having a discharge nozzle at one end to enter said inlet opening, said container being pivoted at its end opposite the nozzle to said support, means operating on the container between its ends for swinging the container about its pivot to carry its nozzle into and out of said inlet opening, means for changing the position of said pivot to adjust the container to regulate its nozzle with inlet openings of molds of different sizes, and means for supplying molten metal to said container.

16. In a casting machine, the combination of a support, separable mold members thereon and having an inlet opening, a fixed member on said support at one side of said mold members, a pair of arms pivotally carried by said fixed member, a container to supply molten metal to said mold members and having a discharge nozzle at one end to enter the inlet opening of the mold members, said container being pivoted at its opposite end to a crank shaft journaled on said support between said fixed member and said mold members, a connecting rod connecting the crank of said shaft with the container at a point between the ends thereof for swinging said container about its pivot with said arms, and means permitting adjustment of said arms to change the position of the pivot to said container to register the nozzle thereof with inlet openings of molds of different sizes.

17. In a die casting machine, the combination with a support having a pair of

spaced rods, of a die on said support and having an inlet opening in its under side, a container having its forward end extending under said die and there provided with a discharge nozzle to enter the inlet opening of the die for supplying molten metal thereto, means pivotally connecting the container to said support and having horizontal and vertical adjustment for setting the container for dies of different sizes, bearing boxes on said rods and adjustable endwise thereof, a crank shaft journaled in said boxes, and a link device pivotally connected with the crank of the shaft and said container, said link device being adjustable endwise for shortening and lengthening the same.

In testimony that I claim the foregoing as my invention, I affix my signature, this 26th day of October, 1923.

EDWARD HOTTER.