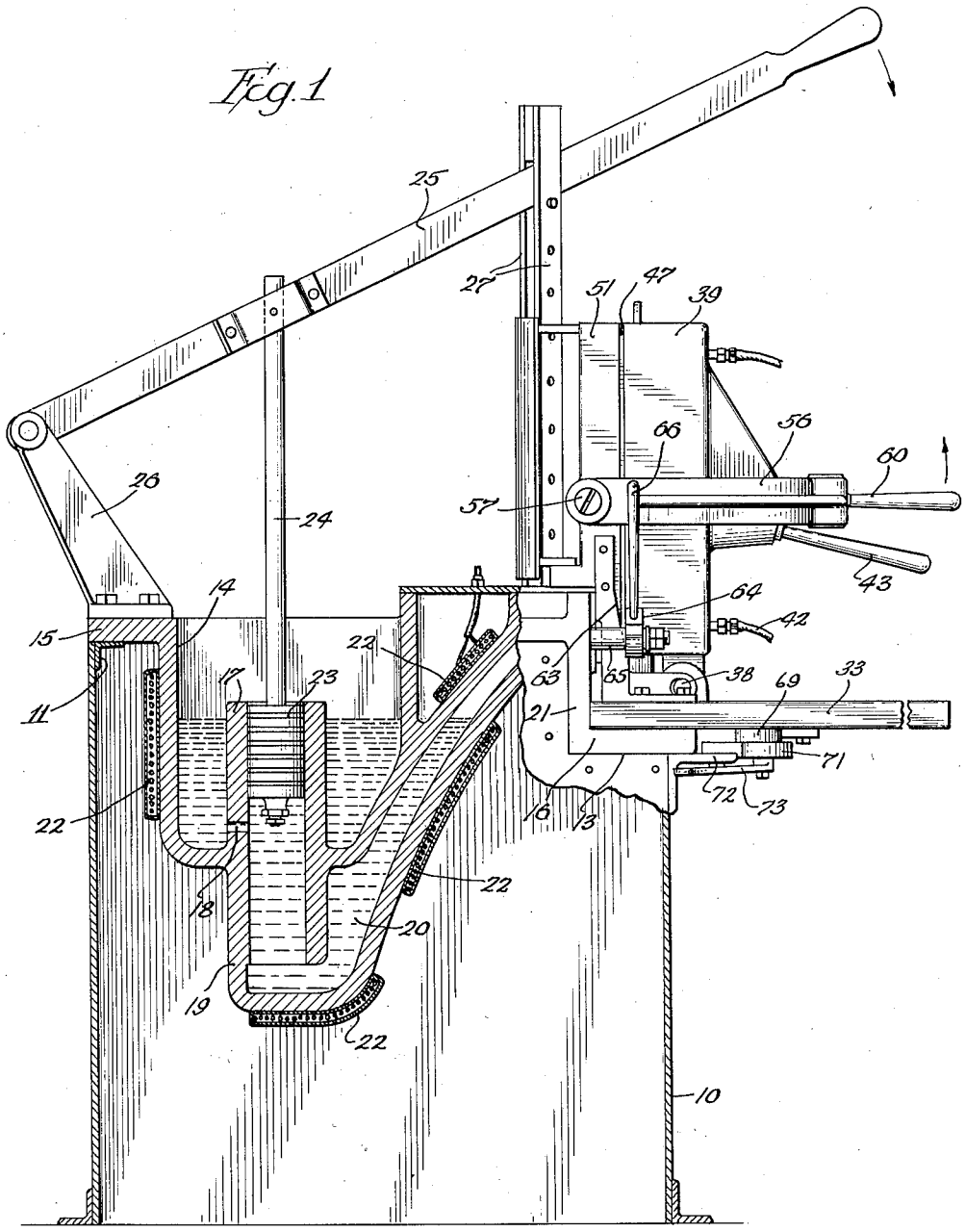
Aug. 15, 1933. E. L. WILSON 1,922,514

STEREOTYPE CASTING APPARATUS

Filed Oct. 29, 1932 4 Sheets-Sheet 1

Fig. 1



Inventor:
EDWIN L. WILSON
E. L. Wilson Atty.

Aug. 15, 1933. E. L. WILSON 1,922,514

STEREOTYPE CASTING APPARATUS

Filed Oct. 29, 1932 4 Sheets-Sheet 2

Fig. 2

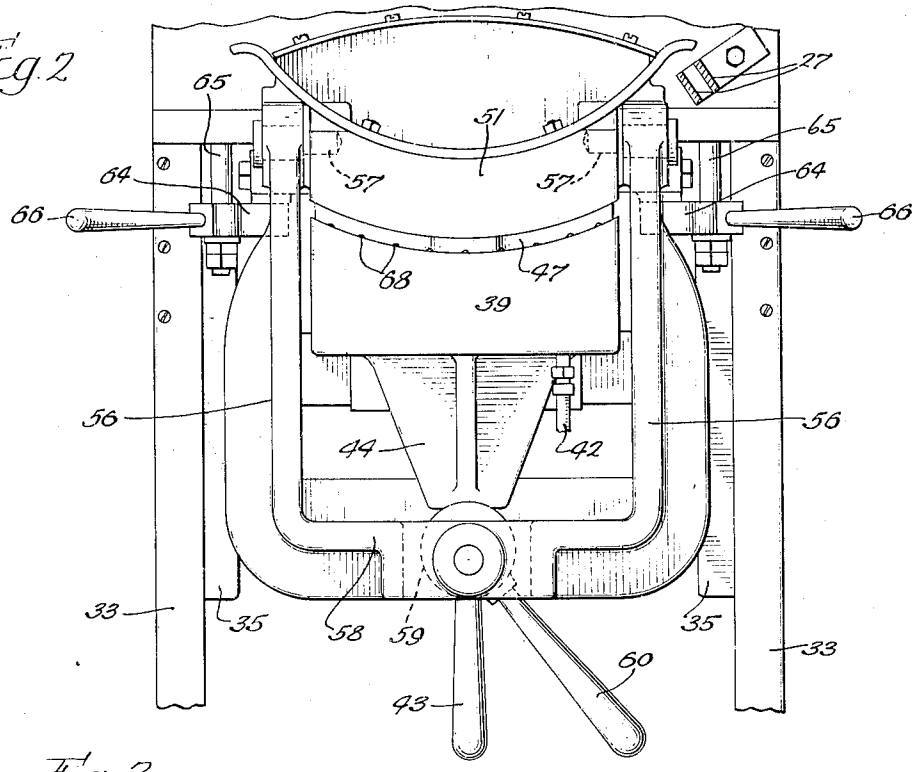
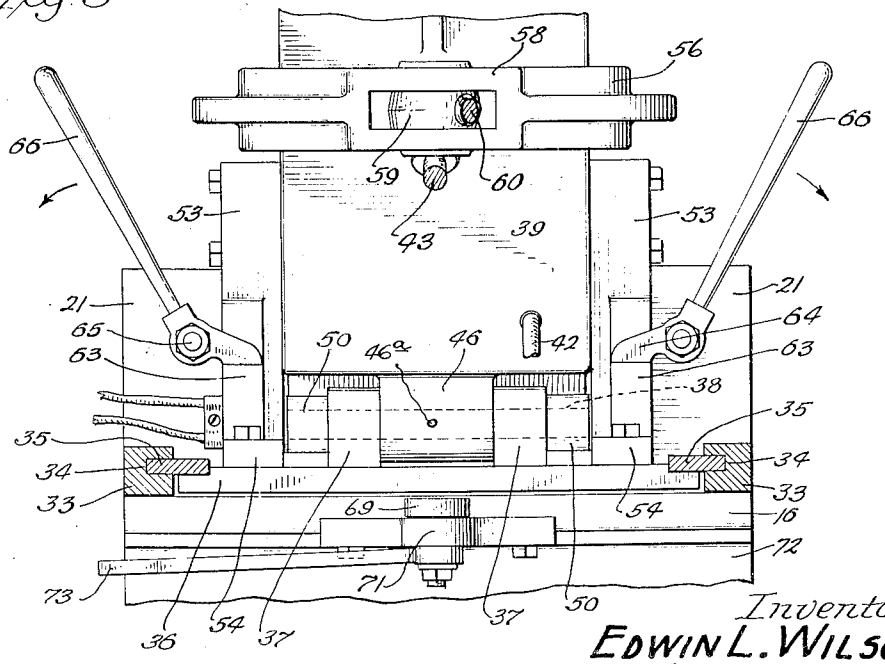


Fig. 3



Inventor:
EDWIN L. WILSON
E. N. Lindy Atty.

Aug. 15, 1933. E. L. WILSON 1,922,514

STEREOTYPE CASTING APPARATUS

Filed Oct. 29, 1932 4 Sheets-Sheet 3

Fig. 4

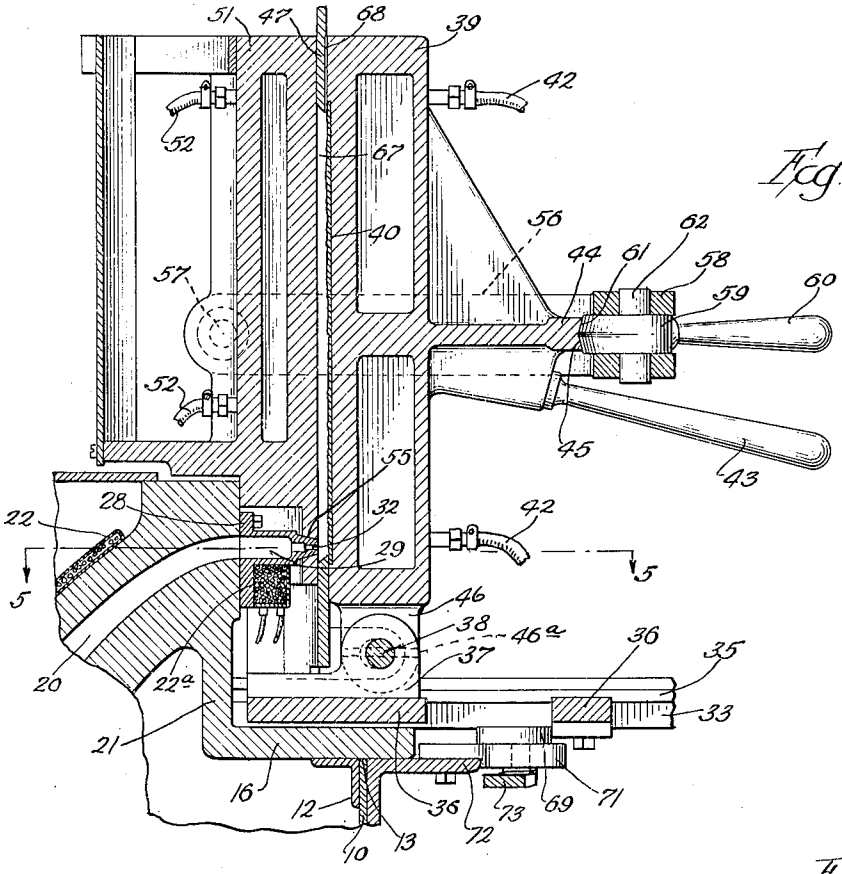
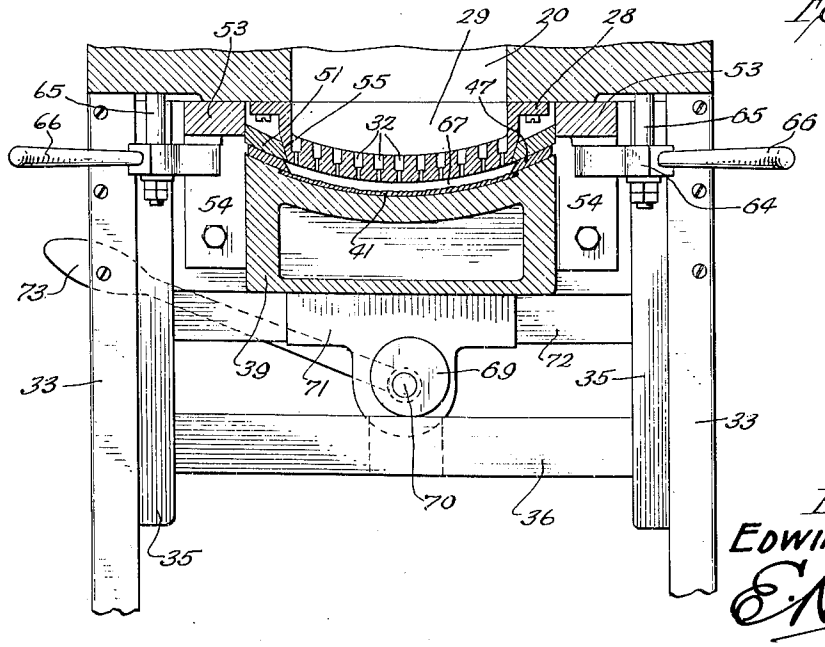


Fig. 5



Inventor:
EDWIN L. WILSON
E. V. Rumely
Atty.

Aug. 15, 1933. E. L. WILSON 1,922,514

STEREOTYPE CASTING APPARATUS

Filed Oct. 29, 1932 4 Sheets-Sheet 4

Fig. 8

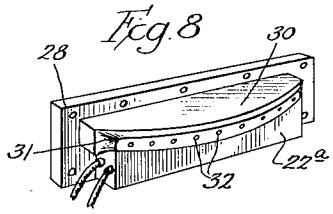


Fig. 9

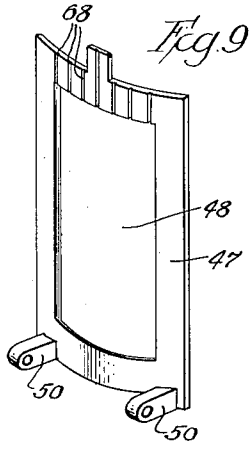
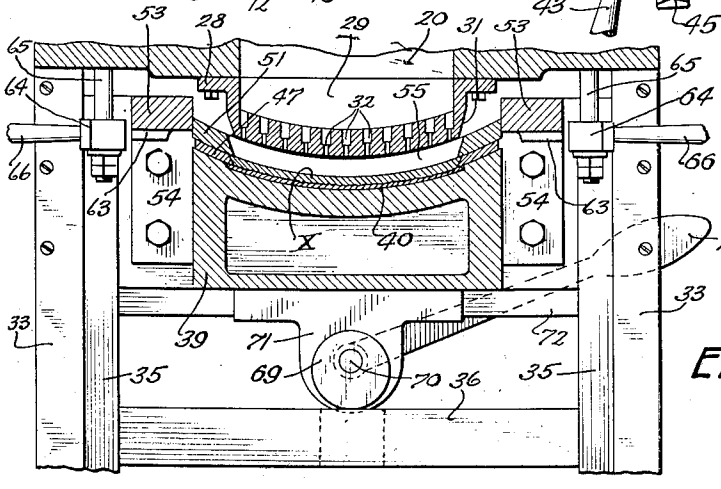


Fig. 7

Fig. 6



Inventor:
EDWIN L. WILSON
E. L. Wilson
Atty.

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UNITED STATES PATENT OFFICE

1,922,514

STEREOTYPE CASTING APPARATUS

Edwin L. Wilson, Chicago, Ill., assignor to Popular Mechanics Co., Chicago, Ill., a Corporation of Illinois

Application October 29, 1932. Serial No. 640,292

10 Claims. (Cl. 22—2)

My invention relates to stereotype casting apparatus. The primary object of my invention is to improve the construction and operation of apparatus of this character whereby stereotype plates of a more satisfactory character are secured. To this end I have provided an apparatus wherein the casting box, including the back, the bed, and the matrix frame, is disposed in a vertical plane during the metal pouring operation, and the molten stereotype metal is forced into the bottom of the box from a suitable pot which is provided with means for forcing the metal upwardly into the form or box. This causes the metal to enter and fill all the irregularities in the face of the matrix thereby securing a substantially perfect counterpart reproduction of the matrix.

The apparatus which I have devised is adapted for use in casting stereotype plates of either flat or curved shape. I have also provided a novel mouth for the discharge of the molten metal into the form, and said mouth is provided with means for keeping it properly heated during use to prevent "plugging" of its discharge orifices, and it is made in such manner that it is readily removable for the purpose of exchange or replacement whenever desired. Furthermore, I have designed and arranged the elements or members comprising the form or box so that they are effectively locked together during the period the molten metal is being forced into it, and when this is completed these parts may be readily separated for the removal of the cast stereotype plate. I have also provided and arranged a matrix frame in such manner that the thickness of the stereotype plate (usually called the "height") is determined by the thickness of said frame which is interchangeable for different "heights". This frame also provides the required bevel at the edges of the stereotype plates that are used in web presses.

The apparatus which I have devised is novel in the formation and arrangement of the parts, it is comparatively easy to operate, it is effective in performing its functions, its parts are of sturdy construction to withstand hard usage, and it is economical to manufacture so that it may be placed upon the market at a reasonable retail price.

I prefer to carry out my invention and to accomplish the numerous objects thereof in substantially the manner hereinafter fully described and as more particularly pointed out in the claims. Reference is now made to the accompanying drawings that form a part of this specification, in which drawings:—

Figure 1 is a vertical side elevation of my improved stereotype casting apparatus, a portion thereof being shown in vertical section to disclose the construction and arrangement of the pot or reservoir for the molten stereotype metal and the members of the "box" or "form" being shown in their locked positions for the casting operation.

Figure 2 is a top plan of the portion of the apparatus at the right-hand side of Figure 1 with the pot or reservoir omitted.

Figure 3 is a front elevation of the apparatus with upper and lower portions broken off.

Figure 4 is a central vertical section taken through the upper portion of the apparatus and showing the parts in position for casting a stereotype plate.

Figure 5 is a transverse horizontal section taken on line 5—5 of Figure 4.

Figure 6 is a section similar to Figure 5 showing the "box" or "form" structure unclamped and moved a small distance away from the mouth.

Figure 7 is a central vertical section similar to Figure 4 showing the "box" or "form" opened preparatory to removal of a finished stereotype plate.

Figure 8 is a perspective of the discharge mouth detached from the apparatus.

Figure 9 is a perspective showing the matrix retainer or frame detached from the apparatus.

A typical or preferred form of my invention is disclosed herein, the drawings illustrating an apparatus for casting stereotype plates of curved shape. It will be understood, however, that this disclosure is merely for the purpose of convenience and the structure is just as well adapted for casting flat plates. In these drawings the same reference characters are employed to designate similar or like parts wherever they appear throughout the several views.

The support for the apparatus preferably consists of a rectangularly shaped standard made up of vertically disposed sheet metal wall plates 10 the lower edges of which rest upon the floor or other support, and the upper horizontal edges of which are reinforced by angle metal strips 11 and 12. It will be noted the front portion of the standard, that is the portion nearest the operator, is cut away to provide a ledge 13 for mounting certain parts of the apparatus and the angle-strip 12 is secured to the top edge of this ledge as shown in Figures 4 and 7.

The pot for the molten casting metal consists

of a reservoir or fount 14 having a laterally flanged or lipped upper edge 15 that rests on the reinforced upper edges of the standard (Fig. 1), and the forward portion of the pot structure is provided with depending shelf 16 that is fitted on and is secured to the cut-out ledge 13 above mentioned.

There is a cylindrical shaped well 17 arising in the central portion of the reservoir, which well has a lateral port 18 communicating with the interior of the reservoir below the level of the metal, and there is a continuation 19 of this well that extends outside and below the reservoir a suitable distance as shown in Figure 1. At its lower end the well is open so that it enters or communicates with an obliquely disposed passage 20 extending upwardly to and through a vertical depending flange 21 that connects with the shelf 16 with the edge of the pot. All the parts last above-mentioned are preferably formed in an integrally cast unit. For the purpose of melting the stereotype metal, as well as for maintaining it in a molten state during the operation of the apparatus, suitable electrical heating units 22 are mounted on several portions of the reservoir and the passage at about the locations shown in Figure 1.

At the upper end of the passage 20 there is a discharge mouth, which will be later described in detail, and the molten metal is forced from the reservoir through the passage 20 and is discharged through said mouth by a pump structure that consists of a reciprocable plunger or piston 23 that moves longitudinally in the well up and down past the lateral port 18. The plunger or piston has an upwardly disposed rod 24 that projects out of the reservoir and has its upper end pivotally connected to an intermediate portion of an actuating lever 25. The end of this lever nearest the operator provided with a hand grip or handle, and at its opposite end it is fulcrumed upon the upper end of a pivot-bracket 26, while a portion of said lever intermediate the handle and the plunger rod passes between a pair of upstanding guide-bars 27.

For the purpose of clearing other portions of the apparatus, which are mounted directly in front of the reservoir or fount, the operating lever 25 is preferably disposed obliquely across the reservoir so that the handle portion is within easy reach of operator's right hand and out of contact with the other parts of the apparatus. When the plunger or piston 23 is being raised above the port 18 the molten metal will be drawn into the well through said port thus filling the well below the plunger. Upon moving the plunger downwardly after passing below the port the molten metal is forced out of the well into the passage 20 from which it is discharged through the mouth and upwardly into stereotype box or form.

The box or mold which I have devised in connection with my apparatus is in the form of two members that oppose each other and which have a matrix shaping and retaining frame between their adjacent faces. This box or mold, which will later be described in detail, is mounted in such manner that it may be bodily moved toward and from the mouth or nozzle that feeds the molten metal from the passage 20. The discharge mouth or nozzle consists of a plate 28 that is bolted or otherwise secured to the vertical face of the depending flange 21 so that it may be readily removed therefrom for exchange for a differently shaped structure. The plate 28 is provided with an elongated horizontal slot 29 that alines with the discharge end of the passage 20 and communicates therewith, and there is an outwardly projecting hollow portion 30 that surrounds the slot 29 and has a tapered outer portion 31 that is provided with a plurality of shouldered apertures or discharge ports 32 through which the molten metal will be discharged when pressure is exerted by the movement of the plunger of the plunger in the well.

A heating unit 22[a] of the electrical type, and similar to the heater units 22, is provided along the under surface of the extended portion 30 so as to maintain the discharge mouth or nozzle at the proper temperature. As shown in Figures 6, 8, etc. it will be seen the mouth or discharge nozzle is of a bowed or curved shape, but it will be understood that when flat stereotype plates are cast this mouth or nozzle will have its upper edge straight instead of arcuate.

Suitable guide bars 33 are secured to the shelf 16 and project horizontally away from the same. The facing edges of these bars are provided with guide slots 34 to receive the flanges 35 on the longitudinal side portion of a sliding frame. This frame comprises said flange bars and suitable cross members 36 that connect said flange bars. The inner cross member 36 is wider than the outer cross member and has journaling bosses 37 secured to its upper face adjacent each side of the frame, which journaling bosses 37 receive the pivot rod 38 on which the mold or casting box members are hingedly mounted.

The base member or back of the mold is a suitably shaped casting 39 that is hollow and is provided with means for centering and maintaining the matrix 41. This may be accomplished by providing the face of the member 39 with a shallow depression 40 to receive the matrix 41, or bevel pins may be provided to enter apertures in the matrix. As shown the matrix and adjacent face of the mold member are concave. Suitable connection is made through a hose 42 to permit circulation of fluid in the interior of the mold member 39. Said mold member 39 is provided with an irregularly shaped flange or fin that has a handle 43, said flange extending longitudinally on the back of said mold member and it is intersected by a transverse fin 44 having a concave depression 45 in its outer edge, the purpose of which will later appear. The mold member 39 has a pivot lug 46 at one end that is bored longitudinally to permit it to be mounted upon the pivot rod 38 so that it may be moved from a longitudinal to a vertical position as indicated in the drawings.

A lock-pin 46[a] passes transversely through the lug 46 and the pivot rod 38 so that by knocking out this pin the rod may be removed longitudinally from the lugs to release the member 39 and the matrix retainer frame.

The matrix retaining and shaping frame 47 is a comparatively thin metal concavo-convex plate having a central open portion 48, the edge of which opening being beveled as at 49 to provide the bevel on the edges of curved stereotype plates. This opening 48 is of less dimensions than the matrix sheet 41 so that when the frame 47 is placed upon the concave surface of the mold member 39 the edges of the frame around the opening will engage the edges of the matrix and assist in maintaining the latter in position, either in the depression or upon the dowel pins as above mentioned. Spaced pivot lugs 50 project laterally from the convex side of the retainer frame and they are bored in alinement with each other

to permit them to be mounted upon the pivot bar 38 in straddling fashion over the lug 46 of the mold member 39. The thickness of the matrix retaining frame determines the "height" of the cast plate, and it may be exchanged for one of greater or less thickness when other "heights" are desired. This exchange is accomplished by removing the pivot rod 38 after the lock pin has been driven out.

The counterpart mold member of the form is a heavy hollow casting 51 that has a convex face to conform with the convex faces of the matrix retainer frame 47 and the other mold member 39. This mold member 51 is rigidly mounted in an upright position upon the sliding frame and it has water connections 52 that communicate with its interior for circulating water within it.

The mold member 51 is rigidly mounted between the upright arms 53 of angle brackets 54 that are securely bolted to the wide cross member 36 of the sliding frame, and the lower edge of the upright mold member 51 is spaced above the frame a suitable distance as shown in Figure 7.

The work face or convex face of the mold member 51 is preferably smooth and near its lower edge is provided with an elongated horizontal slot 55 the edges of which taper toward the outer face of the member in the same manner as the tapered surfaces 31 of the mouth or feed piece so that the mouth piece will snugly interfit in the slot when the mold is moved toward the mouth.

The upright member 51 is disposed in a position so that when the pivoted member 39 is raised from the position shown in Figure 7 to the position shown in Figure 4 the respective parts will be in intimate relation to each other with the matrix retainer plate 47 interposed between them.

When all the parts are in an upright position, as shown in Figure 4, they may be locked together prior to making the casting. This is accomplished by means of a heavy clamp yoke the parallel arms 56 whereof are mounted upon trunnions 57 disposed in horizontal positions upon the vertical side edges of the mold member 51 to pivotally hinge the clamp yoke for the desired movement. The clamp yoke is of substantially U-shape and its cross piece 58 is in such position that it will clear the flange and fin 44 on the movable or hinged mold member 39.

The cam is eccentrically pivoted on a pin 62 and when it is rotated by its handle it will seat itself in the convex groove 45 and thus clamp the mold members and matrix retainer plate firmly together. In order to allow for a slight play between the parts when being clamped the pivot lugs of the retainer plate and the mold member 39 are oval shaped or elongated as shown in Figures 4 and 7 which permits these parts to move slightly laterally towards the upright mold member 51 when the parts are being forced together by the cam. This also provides accommodation for matrix retainer frames of different thicknesses to cast stereotype plates of different "heights".

It is, of course, desirable to have the composite mold fit tightly against the discharge mouth when the casting operation is being performed and in order to do this the upright bracket arms 53 are provided with obliquely inclined or wedge-shaped faces 63 that are clearly shown in Figure 1, and there are cooperating cam lugs 64 that are mounted upon studs 65 projecting laterally from the depending wall 21 of the reservoir for the molten metal. The lugs 64 are provided with operating levers 66 by which they are manipulated and which are adapted to be lowered to their fullest extent when the mold is being locked together as will be apparent in Figure 6 of the drawings. After the parts of the mold have been locked together the operating levers 65 are raised which causes the lugs 64 to engage the wedge or inclined faces 63 and force the mold firmly into position with the tapered portion 31 of the discharge mouth in intimate fitting relation in the slot 65 of the upright mold member 51.

The thickness of the matrix retainer plate represents substantially the thickness of the stereotype plate which is cast in the apparatus as it spaces the two members 39 and 51 of the mold away from each other leaving a "form" space 67. When the parts are assembled and locked together as illustrated in Figure 4 the operating lever 25 of the pump is lowered causing the piston 23 to descend in the well 17 and after the piston passes the port 18 the metal in the lower portion 19 of the well is forced upwardly into the passage 20 and discharged through the mouth apertures 32 into the casting-space or form-space 67 where the molten metal will rise until said space 67 is entirely filled. In order to permit escape of air from the form-space suitable longitudinal slots or air grooves 68 are made in the upper portion of the matrix retainer frame 47 which grooves extend from the upper edge of the opening 48 to the upper end of the form as will be seen in Figure 4.

After the stereotype plate has been cast in the form the levers 66 are lowered which releases the cams 64 from the cam faces 63. Under ordinary conditions the form will remain in its position against the discharge mouth because of the tight fit of the mouth in the slot 55 of the upright mold member. In order to break this fit and to initially remove the entire form away from the mouth I provide a cam disk 69 that is mounted eccentrically upon a pin 70. This pin is journaled in a bracket plate 71 secured to and projecting horizontally from an angle piece 72 on the upper edge of the support as shown in Figure 4.

An operating handle 73 is arranged to be moved from one side of the apparatus to the opposite side, as seen respectively in Figures 5 and 6, which movement causes the cam disk 69 to engage the edge of the narrow cross-piece 36 of the slide frame and thus move the slide frame, together with the mold, initially away from the discharge or feed mouth.

After the initial movement of the mold away from the mouth the operator may draw the sliding frame towards him which will move the mold farther away from the discharge or feed mouth. To open the mold the operator moves the handle 60 in a direction to release the cam 59 away from the grooved edge of the fin 44 whereupon the clamp yoke 56—58 is raised to the position shown in Figure 7. The hinged portions of the mold are now ready to be lowered and they are moved downwardly by the operator grasping the handle 43. The stereotype plate which is represented by the character x may be lifted from the matrix 41 by raising the matrix retainer frame or plate 47. The beveled edge around the opening 48 of this retainer frame maintains the cast stereotype plate in the frame so that it may be readily removed by an upward movement.

The operation of casting is repeated by replacing the frame 47 over the matrix and raising the hinge mold member and the frame into

position against the upright or vertical mold member 51 and then locking them in place by the clamp yoke 56—58. The structure is then pushed against the mouth so that the latter enters the slot 55 and the levers 66 are raised so that the lugs will engage the wedge faces 63 and will force the slide frame and the mold into intimate contact with the tapered edges of the feed mouth so that the parts are firmly held in position.

What I claim is:—

1. A device of the kind described comprising a support, a slide reciprocably mounted thereon, an upright form member rigid on said slide, a complementary form member movably mounted on said slide, a matrix retainer frame associated with one of said form members and interposed between said members when the latter are in cooperation with each other, and means for forcing molten material into the space between said members and surrounded by said frame.

2. A device of the kind described comprising a support, an upright form member and a complementary movable form member carried by said support, a matrix retainer frame adapted to be interposed between said members when the latter are in cooperation with each other, a reservoir for molten material having a discharge mouth adjacent one of said form members, means mounting said form members and said discharge mouth for relative movement the one with respect to the other, and means for forcing the molten material through said mouth and between said form members.

3. A device of the kind described comprising a support, a reservoir for molten material thereon having a discharge passage, a discharge mouth element removably mounted at the outer end of said passage, a heating unit carried by said mouth element, pressure means for forcing the molten material through said passage to said mouth, a separable form disposed normally in a vertical position and having a feed opening opposite said mouth, and a slide movable on said support and carrying said form whereby relative movement between said form and said mouth will register the feed opening with said mouth.

4. A device of the kind described comprising a support, a separable form mounted thereon, one of said form members being upright and rigid and the other form member being hinged to be moved to and away from the rigid member, a reservoir for molten material on said support, a discharge mouth for molten metal on said reservoir adjacent the lower portion of said form, means for creating pressure on the molten material and for conveying the material to said mouth, and means mounting said form and discharge mouth for relative movement the one with respect to the other, there being a feed opening in the lower portion of said form adapted to be registered with said mouth, whereby the molten material is discharged into said form between the members thereof.

5. A device of the kind described comprising a support, a reservoir for molten material thereon, a well within said reservoir, a wall on said reservoir providing a passageway communicating with said well, means for creating pressure in said well to force the molten material through said passageway, a removable mouth member at the remote end of said passageway, a heating unit carried by said mouth member, and a separable form cooperating with said mouth to receive the molten material therefrom, one of the members of the form being hinged with respect to the other.

6. A device of the kind described comprising a support, a reservoir for molten material said reservoir providing a passageway communicating with said well, a discharge mouth at the remote end of said passageway, means for creating pressure in said well to force the molten material through said passageway to said mouth, a slide movably mounted on said support, and a separable form carried by said slide and having a feed opening adapted to register with said mouth, said form being movable with the slide towards and from said mouth.

7. A device of the kind described comprising a support, a reservoir for molten material thereon, a well within said reservoir, a wall on said reservoir providing a passageway communicating with said well, means for creating pressure in said well to force the molten material through said passageway, a mouth at the remote end of said passageway, a slide movable on said support, an upright form member rigid on said slide and having a feed opening adapted to register with said mouth, and a complementary form member hinged on said slide and adapted to cooperate with said upright member to receive the molten material between them.

8. A device of the kind described comprising a support, a reservoir for molten material thereon, a well within said reservoir, a wall on said reservoir providing a pasageway communicating with said well, means for creating pressure in said well to force the molten material through said passageway, a mouth at the remote end of said passageway, a slide movable on said support, an upright form member rigid on said slide and having a feed opening adapted to register with said mouth, a complementary form member hinged on said slide and cooperable with the upright member, and a matrix retainer frame hinged on said slide and adapted to be interposed between said members, said frame having a central opening into which the molten material is discharged from said mouth.

9. A device of the kind described comprising a support, separable form members carried thereby, an interchangeable matrix retainer frame interposed between and spacing said members for determining the thickness of the plate cast between said members, means for supplying molten material under pressure to said form members and including a discharge mouth, and means mounting said members and said mouth for relative movement with respect to each other.

10. A device of the kind described comprising a support, a slide movable thereon, separable form members carried by said slide, an interchangeable matrix retainer interposed between and spacing said form members for determining the thickness of the plate cast between said members, and means for supplying molten material under pressure to said form members and including a discharge mouth on the portion of the support adjacent said slide, said members being moved with said slide to and from said mouth.

EDWIN L. WILSON.