

Sept. 1, 1936.

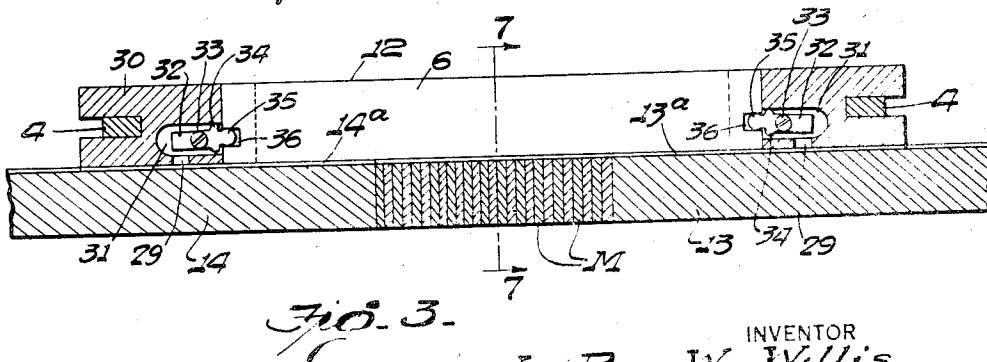
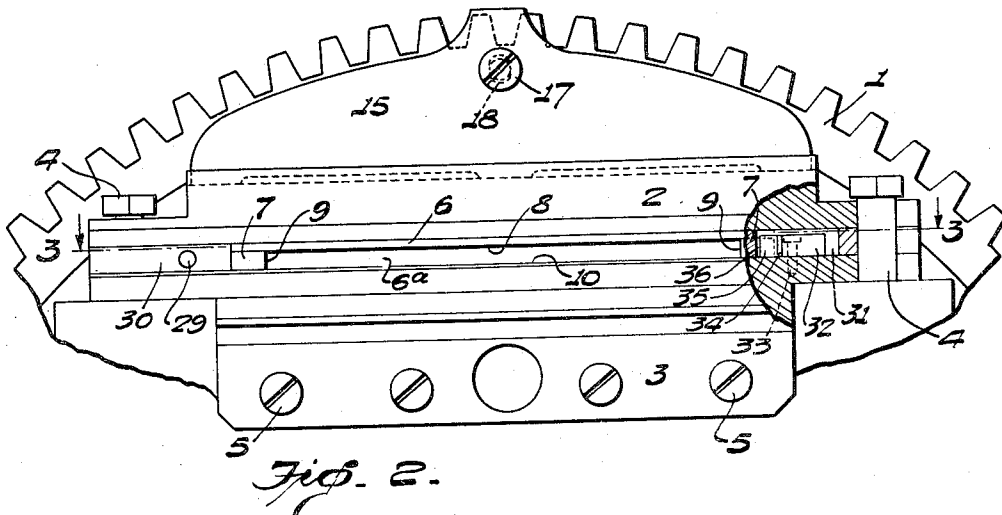
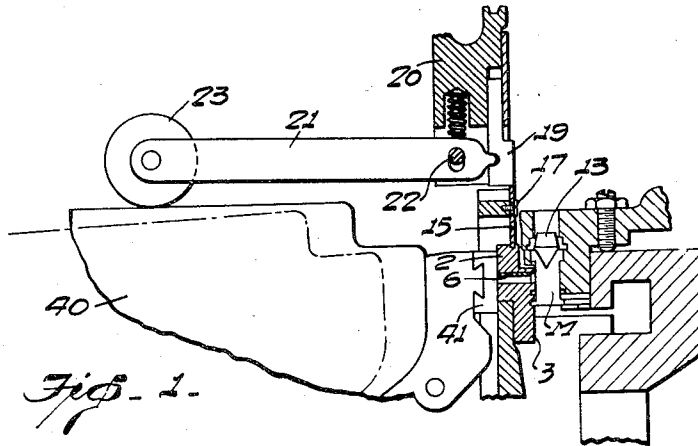
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2,053,232

LINE CASTING MACHINE

Filed Feb. 24, 1936

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

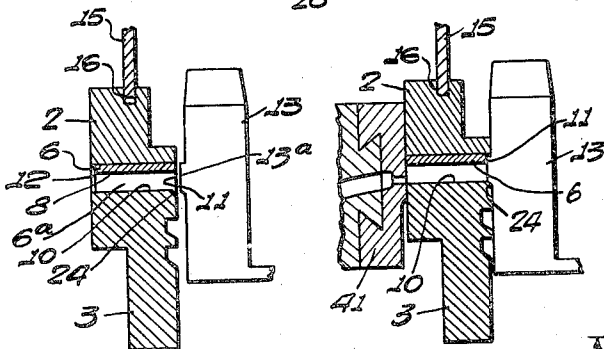
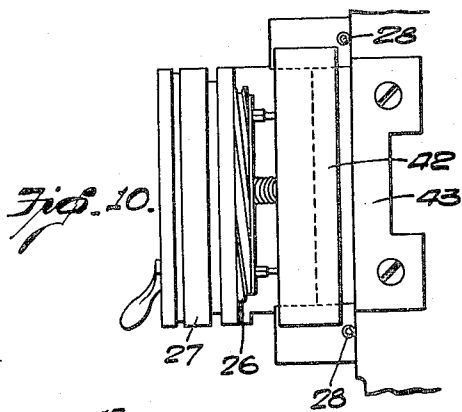


Fig. 5.

Fig. 6.

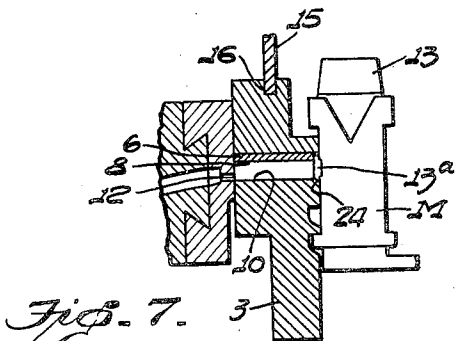


Fig. 7.

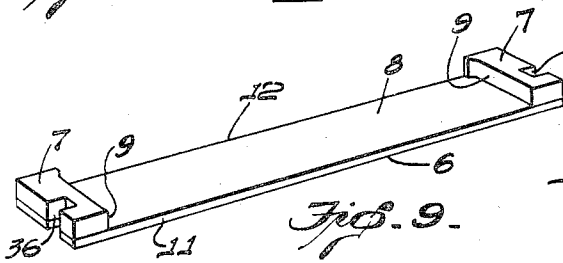
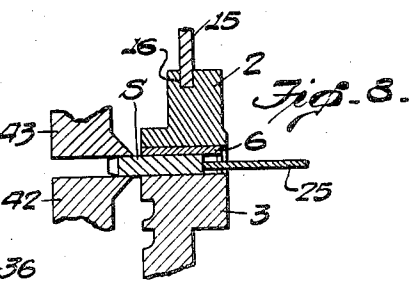
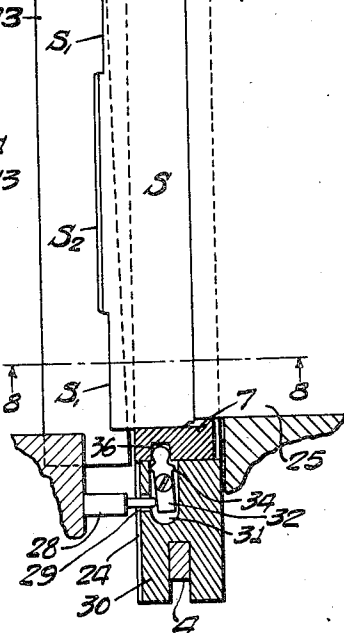
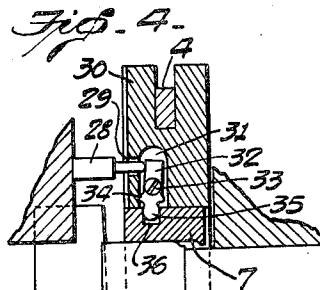


Fig. 9.

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2,053,232

LINE CASTING MACHINE

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Application February 24, 1936, Serial No. 65,495

20 Claims. (Cl. 199—57)

The present invention relates to improvements in typographical machines, and more especially to line casting machines of the class disclosed in Letters Patent No. 436,532, granted September 16, 1890, wherein matrices are assembled in lines and the lines clamped by vise jaws in front of a mold, after which molten metal is injected into the mold to cast a type bar or slug against the character bearing edges of the matrices.

The present invention relates more particularly to improvements respecting the cooperative relationship between the matrix line clamping vise jaws and the molds of machines of the class referred to, whereby the entire surface along the top edges of blank slugs, or such portion or portions of the printing edges of the slugs as may exist beyond the type characters cast on said edges from the character bearing matrices will always be cast automatically to a predetermined low-quad height, that is, a desired height which is less than the full depth of the mold in which the slugs are cast.

The primary object of the invention is to enable the production of such low-quad surfaces on slugs when cast in molds of standard depth such as are ordinarily employed in casting slugs with their type characters at the usual standard height (.918") as used in printing. To do this, it is obvious that at least for the extent of the mold corresponding to the location of such low surfaces, the depth of the mold must be reduced, as by projecting into the casting cavity along the front thereof, suitable filling means such as ribs or tongues of the required size. Several forms of filling means have been proposed for this purpose, such as low-quad matrices which may comprise part of the matrix lines held between the vise jaws and which, instead of having formative characters in their casting edges, have tongues to project into the front of the mold cavity. Matrix quad blocks intended for insertion between the vise jaws and having longitudinal ribs, and vise jaws provided with such ribs for entering the front of the mold cavity have also been proposed.

The present invention provides a novel mold which is so constructed and operative as to facilitate the reception of such low-quad forming ribs or tongues, or their equivalents when the mold is advanced in the usual manner to its casting position, it avoiding the difficulties heretofore experienced in attempting to enter between fixed or rigid walls of a mold cavity ribs or tongues of the exact size of such cavity, due to the practical difficulties of maintaining the respective parts in per-

fect alignment, for reasons that will be well understood by those familiar with machines of this class. Accordingly, the present invention provides a reciprocable member within the casting cavity of the mold, a portion of such member forming part of the walls of the casting cavity and the front edge thereof being of a dimension greater than the vertical height of the ribs or tongues so that it may cooperate facewise with the ribs or tongues and form a metal-tight closure at the depth to which the ribs or tongues project into the mold and along such portion at the front thereof as may be occupied by the ribs or tongues while casting a slug.

The reciprocable member thus provided preferably constitutes or takes the place of the usual mold liners or spacing pieces which determine the height and length of the casting cavity, and such member also constitutes at least one of the longitudinal walls of the mold cavity, and such an arrangement is shown in the accompanying drawings and will be hereinafter described in detail. It is to be understood, however, that other constructions and arrangements may be employed to accomplish the objects of the present invention, as will be apparent to those skilled in the art, and that such are intended to be included within the scope of the annexed claims.

To these and other ends the invention consists in certain improvements and combinations and arrangements of parts, all as will be hereinafter more fully described, the features of novelty being pointed out more particularly in the claims at the end of this specification.

In the accompanying drawings:

Fig. 1 is a vertical section through a portion of a line casting machine embodying the present invention;

Fig. 2 is a front elevation, on an enlarged scale and partly in section, of an improved mold according to the present invention;

Fig. 3 is a horizontal section taken on the line 3—3 in Fig. 2, this view also showing the vise jaws in cooperative relation with the mold and a matrix line centered thereby in front of the mold;

Fig. 4 is a vertical section taken through the slug ejecting and trimming means of the machine, this view showing the mold in section and in slug ejecting position, and a slug cast therein from a centered matrix line as shown in Fig. 3;

Fig. 5 is an enlarged vertical section through the mold shown in Fig. 1, showing the mold partly advanced toward the cooperative vise jaw;

Fig. 6 is a view similar to Fig. 5 but showing

the mold and also the mouthpiece of the metal pot advanced into casting relations with one another and with the vise jaws;

Fig. 7 is a vertical section taken on the line 7-7 in Fig. 3, showing the mold and mouthpiece of the metal pot advanced into casting relation with one another and with the vise jaws and a matrix line;

Fig. 8 is a section taken on the line 8-8 in Fig. 4;

Fig. 9 is a detail perspective view of the reciprocatory member for the casting cavity of the mold, according to the present invention; and

Fig. 10 is a rear elevation of the slug trimming knives.

Similar parts are designated by the same reference characters in the several figures.

The invention is shown applied in the present instance to a line casting machine of the class hereinbefore referred to, 1 representing the usual rotatable mold disk of such machine and 2 and 3 designating the upper and lower sections of a slug casting mold, these mold sections being held in proper relative positions on the mold disk by suitable bolts 4 and screws 5. However, according to the present invention, the heads of the bolts 4 do not bear solidly upon the ends of the upper mold section 2 but are spaced slightly therefrom to permit the upper mold section to move freely to a slight extent vertically or in a direction toward and from the mold section 3, for purposes which will be hereinafter explained.

According to the present invention, the upper and lower mold sections 2 and 3 are spaced apart by a member 6 having spacing blocks 7 at its opposite ends which are equivalent to or perform the function of the usual and well known mold liners employed for determining the height of the casting cavity in the mold and for defining the opposite ends thereof and thereby determine the length of the casting cavity. The member 6 with the spacing blocks 7 connected thereto or formed integrally therewith, constitutes a unitary mold liner, which will be hereinafter referred to as the liner 6 which, when inserted between the mold sections, spaces them apart and provides a casting cavity or slot 6^a as shown in Fig. 2, this casting cavity being defined by the longitudinal face 8 of the liner 6 and the inner opposed faces 9 of the blocks 7, and by that portion of the longitudinal face 10 of the lower mold section which lies opposite to the face 8.

The liner 6 provided by the present invention is mounted to reciprocate in a direction transverse to its length and forwardly and rearwardly in the mold between the upper and lower sections thereof and is intended to cooperate along the edge thereof which lies parallel to the usual front or matrix engaging face of the mold with the opposed surfaces of low-quad ribs or tongues employed for reducing the depth of the casting cavity by entering it to the required extent and forming a front casting wall therein. In order to accommodate such low-quad ribs or tongues, the liner 6 is of less depth from its front edge 11 to its back edge 12 than the full front to rear depth of the mold by an extent equal to that to which the ribs or tongues project within or beyond the front face of the mold to reduce the depth of its casting cavity. Also, the vertical height of the liner 6 is of a greater dimension than the vertical height of the ribs or tongues with which it is intended to cooperate.

Preferably and as shown in the present instance the low-quad producing portions adapted to pro-

ject into the mold comprises ribs 13^a and 14^a which project rearwardly from the rear or casting faces of the right hand and left hand vise jaws 13 and 14 which serve as usual to clamp different length matrix lines in casting position in front of the mold, these ribs extending throughout the lengths of the respective jaws at the level of the casting cavity in the mold. The vise jaws are mounted in the usual vise frame of the machine so that either one or both of them may move longitudinally of the mold while the same occupies casting position, the vise jaws being preferably provided with any suitable or well known means for automatically quadding or centering lines on slugs by moving either jaw alone or both jaws simultaneously inwardly against the matrix line, examples of quadding and centering means suitable for this purpose being disclosed in U. S. Letters Patent No. 1,964,696, granted June 26, 1934, and No. 1,970,527, granted August 14, 1934, the vise jaws being capable of clamping the matrix lines in different positions along the front of the mold.

As previously stated, the mold sections 2 and 3 are capable of relative movement toward and from one another, and these mold sections are not clamped together tightly except during the casting operation, and the liner 6 is therefore capable of reciprocation in a forward or rearward direction in the mold except while the casting operation is taking place. Any suitable means may be employed for clamping the mold sections together during the casting operation, an example of such means being disclosed in U. S. Letters Patent No. 1,885,777, granted Nov. 1, 1932, and to which reference may be had for a more detailed illustration and description of such clamping means. Such clamping means, which is shown in the present instance, may be briefly described as comprising a clamping plate 15 the lower edge of which engages in a groove 16 in the upper edge of the upper mold section 2 and is mounted on the mold disk 1 to permit slight vertical movement thereof by a shoulder screw 17 which is secured in the mold disk and operates in a vertically elongated slot 18 in the plate 15. A plunger 19 suitably mounted to reciprocate vertically in a portion 20 of the frame of the machine is arranged to bear at its lower end on the upper edge of the plate 15, this plunger being actuated by a lever 21 which is pivoted to rock on a fixed pivot 22 supported by the frame part 20 when actuated by a roller 23 which engages the usual metal pot 40 when the latter swings forwardly and upwardly from the dotted line position to the full line position shown in Fig. 1 immediately prior to the casting operation, the plunger 19 having a notch in its rear edge engaged by a projection on the forward end of the lever 31 so that the rocking movement of the latter about its pivot will force the plunger 19 downwardly, and such downward movement of the plunger 19 causes the latter to exert a downward pressure on the plate 15 and consequently to exert a downward pressure of the mold section 2 upon the top surface of the liner 6. Upon retreat of the metal pot after the casting operation has taken place, pressure on the clamping plate 15 is removed, due to the release of the action of the metal pot on the lever 21, so that the upper mold section will then rest only freely and by its own weight on the top surface of the liner 6.

The liner 6 normally stands with its front edge 11 flush with or in the plane of the front or matrix engaging face of the mold, as shown in

Fig. 5, said liner occupying this position except when the mold is advanced in the usual manner to casting position, which brings the front face of the mold into contact with the faces of the vise jaws opposite thereto, as shown in Fig. 6, and into contact with the character bearing edges of matrices M if such be present between the vise jaws, as shown in Fig. 7. During the advance of the mold to casting position, the vertical surfaces of the projecting ribs 13^a and 14^a on the vise jaws engage the front edge of the liner 6, and such engagement of these parts causes the liner to move or slide rearwardly in the mold, the liner 6 being free at this time to so move since the upper mold section 2 then merely rests by its own weight on the top surface of the liner. When the mold is fully advanced to casting position as shown in Figs. 6 and 7, the liner 6, which as previously stated is of less depth between its front and back edges 11 and 12 than the depth of the mold by the amount to which the ribs on the vise jaws are to be projected rearwardly beyond the front face of the mold, will have its back edge 12 exactly flush with the back faces of the mold sections, and the front edge 11 of the liner will lie within or back of the front faces of the mold sections to an extent equal to that to which the ribs on the vise jaws project into the mold or back of its front face. The usual advance of the metal pot 40, which takes place subsequently to the full advance of the mold against the vise jaws, will cause the metal pot mouthpiece 41 to close the casting cavity 6^a at the back of the mold while the vertical faces of the ribs 13^a and 14^a on the vise jaws and cooperating with the vertical front edge 11 of the liner 6 will close said cavity at the front but at a reduced depth relatively to the full depth of the mold and either over the entire length of the casting cavity or over such portion or portions of its length as may be occupied by the ribs on the vise jaws when matrices are present between the jaws. While the casting of the slug in the mold by the ejection of molten metal from the metal pot into the casting cavity is taking place, the clamping plate 15, as previously explained, will retain the upper mold section 2 clamped firmly against the top surface of the liner 6.

Since the vertical height of the ribs 13^a and 14^a projecting from the vise jaws and which engage the front edge of the liner 6 is less than the total vertical height of said liner, these ribs can enter the mold freely, that is, it is not necessary that these ribs enter and fit exactly between and against the upper and lower longitudinal walls of the casting cavity but they have a frontwise engagement with the movable liner 6 over a portion of the height thereof. If the liner 6, as shown, forms only one of the longitudinal walls 8 of the casting cavity, the front edge of the other wall 10 formed by the lower mold section 3 may be bevelled, as shown at 24, and the bottom edges of the ribs 13^a and 14^a on the vise jaws correspondingly bevelled, so that necessity for exact alinement of these ribs with the opposed walls of the casting cavity in order to permit the ribs to enter the mold is rendered unnecessary, although it will be understood that these bevelled edges, cooperate, upon advance of the mold to casting position, to bring the parts into exact alinement, and that such alining operation would take place if low-quad matrices having the lower edges of their tongues bevelled to correspond and cooperate with the bevelled surface 24 were employed instead of the ribs on the vise jaws.

After the casting operation has taken place, first the metal pot and then the mold retreat and the mold disk is then rotated to bring the mold into position for ejection of the slug cast therein, in the usual and well known manner, ejection of the slug being accomplished as usual by the forward stroke of an ejector blade 25 which is then alined with the mold cavity, the ejector blade being located in rear of the mold disk and the ejector blade moving forwardly to push the slug from the mold between trimming knives 42 and 43, the mold being advanced for a second time, as usual, to bring it into slug ejecting position. Figs. 4 and 8 show the mold in slug ejecting position and advanced relatively to the trimming knives, and the slug S is shown partially ejected from the mold and entered between the trimming knives which trim the sides thereof. The slug trimming device shown in the present instance is of a well known form in which one of the knives 42 is mounted on an adjusted block which, by means of a threaded screw 26 rotatable in a correspondingly threaded housing 27, as shown in Fig. 10, may be moved toward and from the other or stationary knife 43 mounted on the frame of the machine.

Means is provided for returning the liner 6 from its casting position shown in Fig. 6 to its normal forward position as shown in Fig. 5, after the casting operation has taken place. Such means as shown in the present instance comprises a pair of pins 28 secured in the frame of the machine adjacent to the slug trimming knives and in positions to enter apertures 29 formed in auxiliary spacer members 30 between the upper and lower mold sections, these apertures being opposite to the respective pins when the mold is brought into slug ejecting and trimming position. The auxiliary spacers 30 are provided with slots 31 into which the apertures 29 lead, and these slots contain pawls 32 which are mounted to rock on pins or screws 33 secured in the lower mold section 3, the rocking movements of these pawls being limited by lugs or stops 34 on the pawls which engage the opposite walls of the slots 31. The pawls 32 are provided with rounded heads 35 which extend beyond the ends of the respective spacer members 30 and engage in notches 36 in the outer ends of the liner 6 adjacent to the spacer members 30. When the mold advances to slug ejecting position, the pins 28 on the stationary frame of the machine enter the apertures 29 and engage and rock the pawls 32 from the positions shown in Fig. 3 into the positions shown in Fig. 4, thereby causing the liner 6 to slide forwardly in the mold, the stops 34 on the front edges of the pawls limiting the forward movement of the liner at the point where its front edge 11 lies in the plane of the front face of the mold. Such positioning of the liner while the mold is in ejecting position is advantageous since the subsequent rotation of the mold disk from ejecting to casting position causes the front edge of the liner to come into contact with the front mold wiper ordinarily employed on machines of this class so that this edge of the liner will be wiped at the same time the front face of the mold is wiped, and thus remove any particles of type metal that might otherwise adhere to these surfaces.

The slug S cast in the improved mold as shown in Fig. 4 will have for example shoulders S' on its front edge beyond the type character S² thereon which are of low-quad depth, these shoulders being produced by the ribs 13^a and 14^a on the vise jaws which, during the casting operation, occupy

positions in front of the casting cavity, the vise jaws having positioned the matrices centrally of the length of the casting cavity, but it will be understood of course that one of these shoulders of low-quad depth may be produced at one or the other end of the slug beyond the type characters cast thereon if one or the other of the vise jaws is moved inwardly to quad one or the other end of the line. The low-quad casting depth depends of course upon the distance to which the ribs project from the vise jaws and enter within or back of the front face of the mold, and liners 6 of different depths may be employed to suit different requirements in this respect. The vertical height of the casting cavity may be changed by inserting liners 6 of different thicknesses between the mold sections, and ribs or tongues of different vertical height may be employed, it being necessary, however, that the vertical surfaces of the ribs or tongues engage only a portion of the height of the front edges of the liners.

I claim as my invention:

1. In or for a line casting machine, a slug casting mold having a member therein one face of which defines a portion of at least one of the longitudinal walls of the casting cavity thereof, and the edges of which are adapted to form a portion of the front and back faces of the mold adjacent to said cavity, said members being reciprocable in a direction transverse to the longitudinal extent of the casting cavity and within the limits of the front and back faces of the mold.

2. In or for a line casting machine, a slug casting mold comprising opposed members relatively movable toward and from one another and an interposed member defining at least one of the longitudinal walls and the end walls of the casting cavity therein, said interposed member being of less dimension than the depth of the mold between its front and back faces and movable to and from a flush position with either of said mold faces.

3. In or for a line casting machine, a slug casting mold comprising opposed members relatively movable toward and from one another and an interposed member defining at least one of the longitudinal walls and the end walls of the casting cavity therein and spacing apart said opposed members when relatively moved toward one another, said interposed member being of less dimension than the front to back depth of the mold and movable in opposite directions to present a widened longitudinal recess communicating with either the front or the back of the casting cavity formed thereby.

4. In or for a line casting machine, a slug casting mold having a member therein of less dimension than the depth of the mold between its front and back faces and defining the ends and at least one of the longitudinal walls of the mold cavity, said member being reciprocable in opposite directions toward and from the front and back faces of the mold.

5. In or for a line casting machine, a slug casting mold having a member therein one face of which defines at least one of the longitudinal walls of the casting cavity and the longitudinal edges of which perpendicular to said face define a portion of the front and back faces of the mold adjacent to the casting cavity, and having end portions which define the ends of said cavity, said member being of less dimension than the depth of the mold between its front and back faces and being reciprocable in opposite direc-

tions to present its edges alternately in the plane of the respective corresponding mold faces.

6. In or for a line casting machine, a slug casting mold comprising opposed members relatively movable toward and from one another and an interposed member defining at least one of the longitudinal walls of the casting cavity and having end portions which define the ends of said cavity and determine the space between the opposed members when relatively moved toward one another, said interposed member, including its end portions beyond the ends of the casting cavity, being of less depth than the front to rear depth of the mold.

7. In a line casting machine, the combination of a slug casting mold having a member therein which defines the ends and at least one of the longitudinal walls of the casting cavity therein, said member being reciprocable in the direction of the depth of the mold, and elements having portions to project into the casting cavity of the mold and engageable with said member to form a metal tight joint therewith.

8. In a line casting machine, the combination of a slug casting mold having a member therein which defines the ends and at least one of the longitudinal walls of the casting cavity therein, said member being reciprocable in the direction of the depth of the mold, and elements having portions to project into the casting cavity of the mold and engageable with said member to move it rearwardly in the mold.

9. In a line casting machine, the combination of a slug casting mold having a member therein which defines the ends and at least one of the longitudinal walls of the casting cavity therein, said member being reciprocable in the direction of the depth of the mold, and elements having portions to project into the casting cavity of the mold and engageable with the forward edge of said member to form a metal tight joint therewith and to move said member rearwardly in the mold.

10. In a line casting machine, the combination of a slug casting mold comprising opposed members relatively movable toward and from one another, and an interposed member defining at least one of the longitudinal walls of the casting cavity of the mold and having end portions which define the ends of said cavity and determine the spacing between the opposed members when relatively moved toward one another, and elements having portions to project into the mold and engageable with the interposed member to move it rearwardly in the mold and to form a metal tight joint therewith.

11. In a line casting machine, the combination of a slug casting mold comprising opposed members relatively movable toward and from one another, and an interposed member defining at least one of the longitudinal walls of the casting cavity of the mold and having end portions which define the ends of said cavity and determine the spacing between the opposed members when relatively moved toward one another, elements having portions to project into the mold and engageable with the interposed member to move it rearwardly in the mold and to form a metal tight joint therewith, and means for relatively moving the opposed members relatively toward one another to clamp the end portions of the interposed member after said elements have moved the interposed member rearwardly in the mold.

12. In a line casting machine, the combination of a slug casting mold comprising opposed mem-

bers relatively movable toward and from one another, and an interposed member defining at least one of the longitudinal walls of the casting cavity of the mold and having end portions which define the ends of said cavity and determine the spacing between the opposed members when relatively moved toward one another, elements having portions to project into the mold and engageable with the interposed member to move it rearwardly in the mold and to form a metal tight joint therewith, and means for restoring the interposed member to a position toward the front of the mold.

13. In a line casting machine, the combination of a slug casting mold comprising opposed members relatively movable toward and from one another, and an interposed member defining at least one of the longitudinal walls of the casting cavity of the mold and having end portions which define the ends of said cavity and determine the spacing between the opposed members when relatively moved toward one another, elements having portions to project into the mold and engageable with the interposed member to move it rearwardly in the mold and to form a metal tight joint therewith, means for relatively moving the opposed members relatively toward one another to clamp the end portions of the interposed member after said elements have moved the interposed member rearwardly in the mold, and means for restoring the interposed member to a position toward the front of the mold after the clamping of the end portions thereof has been interrupted.

14. In or for a line casting machine, a longitudinally slotted slug casting mold having a member therein which defines at least one of the longitudinal walls of the casting cavity and is of less depth than that of the mold, and elements having portions of less height than that of the mold slot but engageable with the front edge of said interposed member to form a metal tight joint therewith and operative to move said member rearwardly in the mold.

15. In or for a line casting machine, a longitudinally slotted slug casting mold having a member therein which defines at least one of the longitudinal walls of the casting cavity and is of less depth than that of the mold, and elements having portions of less height than that of the mold slot but engageable with the front edge of said interposed member to form a metal tight joint therewith and operative to move said member rearwardly in the mold, one of the front edges of the mold slot and the corresponding edges of the projections on said elements being bevelled to align said projections with said slot.

16. In or for a line casting machine, a slug casting mold having a member therein which defines at least one of the longitudinal walls of the cast-

ing cavity thereof and is reciprocable forwardly and rearwardly in the mold, and means carried by the mold and cooperative with said member for reciprocating it.

17. In a line casting machine, the combination of a slug casting mold having a member therein which defines at least one of the longitudinal walls of the slug casting cavity thereof and is reciprocable forwardly and rearwardly in the mold, elements having portions to project into the mold and engageable with said member to move it rearwardly in the mold, slug trimming means toward which the mold is movable, and means operative by the movement of the mold toward said trimming means for returning said member toward the front of the mold.

18. In a line casting machine, the combination of a slug casting mold comprising opposed members relatively movable toward and from one another, and an interposed member defining at least one of the longitudinal walls of the casting cavity and having end portions which define the ends of said cavity and determine the spacing apart of the opposed mold members, the interposed member being reciprocable forwardly and rearwardly of the mold, vise jaws for clamping matrix lines in front of the mold and toward which the mold is movable, said jaws having ribs projecting therefrom and engageable with the interposed member to move it rearwardly in the mold when the latter is moved toward said jaws, slug trimming means to receive a slug from the mold and toward which the mold is movable, and means operative by the movement of the mold toward the trimming means for returning said interposed member toward the front of the mold.

19. In or for a line casting machine, a slug casting mold having a member therein at least one face of which is adapted to form a longitudinal wall of the casting cavity and the edges of which are adapted to form portions of the front and back faces of the mold adjacent to said cavity, said member being reciprocable periodically to positions in which its front and back edges respectively lie in the plane of the corresponding faces of the mold, and means for reciprocating said member.

20. In a line casting machine, the combination of a slug casting mold comprising opposed longitudinal members of a given depth from the front to the rear faces thereof, a movable mold liner of less depth between its front and rear edges and forming a casting slot between said members, and a pair of vise jaws having longitudinal ribs projecting therefrom toward the mold, said ribs being cooperable with the liner to move it rearwardly and present its rear edge in alignment with the rear face of the mold.

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