April 5 1932. S. E. SPERRY 1,852,985

MOLD FOR LINE CASTING MACHINES

Filed Oct. 9, 1930 3 Sheets-Sheet 1

Fig. 1.

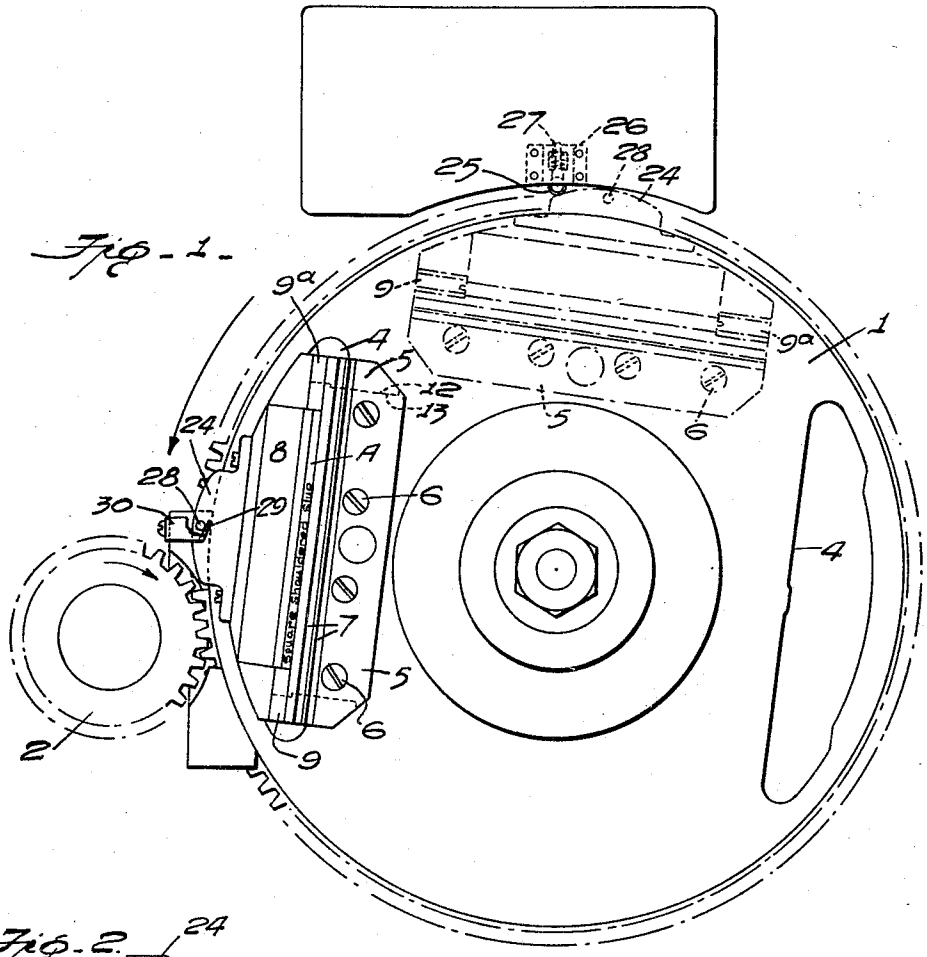


Fig. 2.

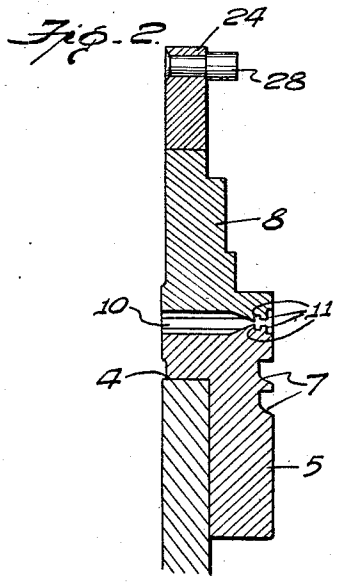


Fig. 11.

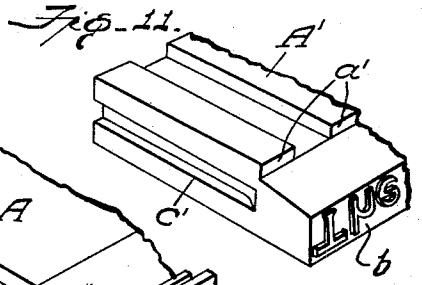
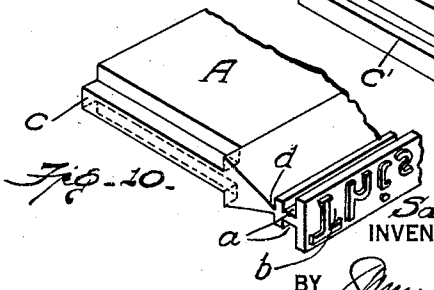


Fig. 10.



Samuel E. Sperry
INVENTOR

BY James L. Norris

ATTORNEY

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MOLD FOR LINE CASTING MACHINES

Filed Oct. 9, 1930 3 Sheets-Sheet 2

Fig. 3.

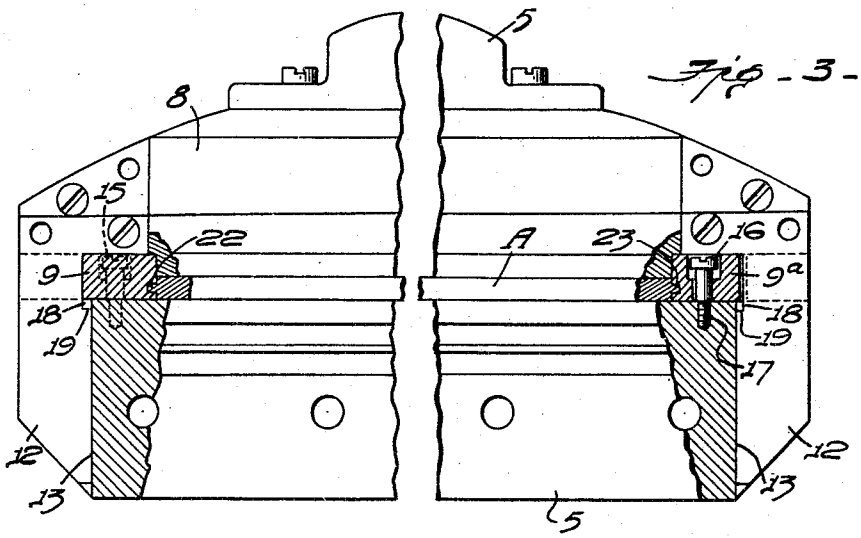


Fig. 4.

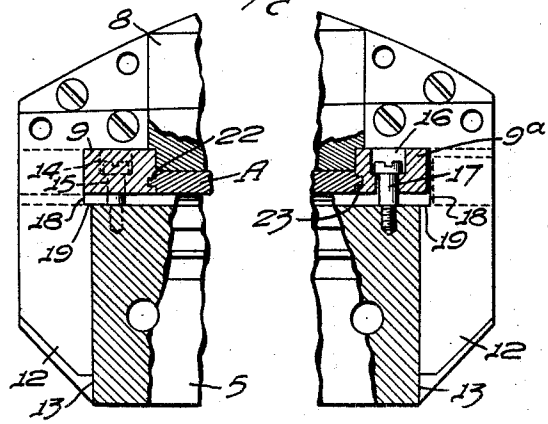


Fig. 6.

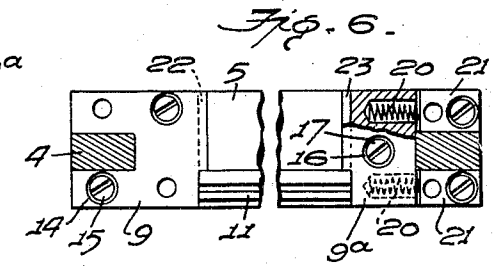
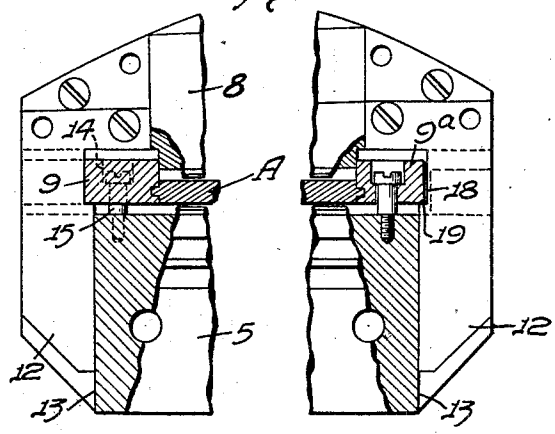


Fig. 5.



Samuel E. Sperry
INVENTOR

BY James L. Norris

ATTORNEY

April 5 1932. S. E. SPERRY 1,852,985

MOLD FOR LINE CASTING MACHINES

Filed Oct. 9, 1930 3 Sheets-Sheet 3

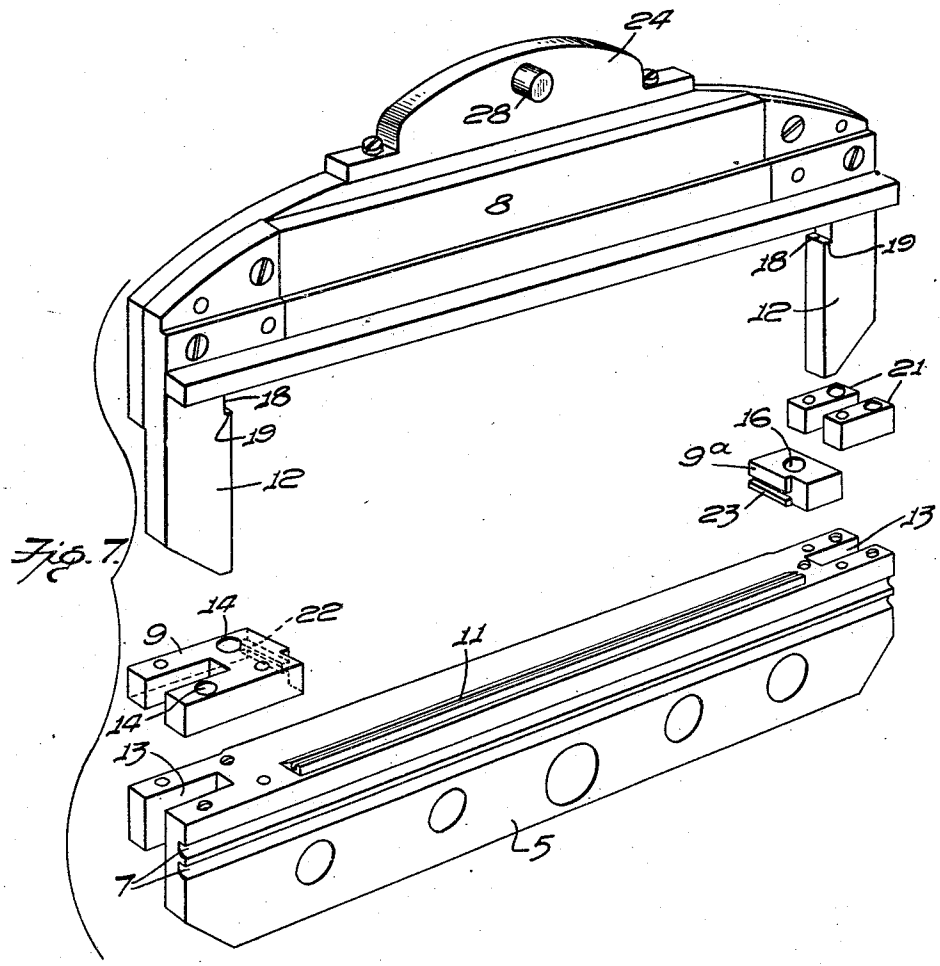


Fig. 7.

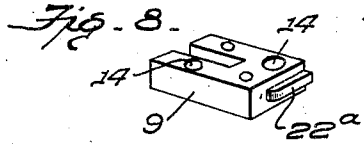


Fig. 8.

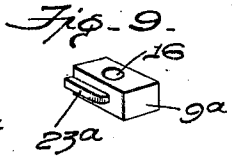


Fig. 9.

Samuel E. Sperry
INVENTOR

BY James L. Norris
ATTORNEY

Patented Apr. 5, 1932 1,852,985

UNITED STATES PATENT OFFICE

SAMUEL E. SPERRY, OF HOLLIS, NEW YORK, ASSIGNOR TO INTERTYPE CORPORATION, OF BROOKLYN, NEW YORK, A CORPORATION OF NEW YORK

MOLD FOR LINE CASTING MACHINES

Application filed October 9, 1930. Serial No. 487,585.

The present invention relates to improvements in molds for casting type bars or slugs, and it relates more particularly to molds for use in line casting machines of the class shown and described in U. S. Letters Patent No. 436,532 granted Sept. 16, 1890 to O. Mergenthaler, wherein lines of matrices are presented to the mold and metal is injected into the mold to cast type bars therein, after which the type bars are ejected from the mold by an ejector which engages the rear edges of the type bars and pushes them out of the mold.

The primary object of the invention is to provide a relatively simple and improved mold whereby the resistance to the ejection of the type bars therefrom is so reduced that the ejection of the type bars may be accomplished more easily than has heretofore been possible, the invention being especially applicable to molds of the kind used for casting type bars having grooves or shoulders in the side or sides thereof, such for example, as those adapted for use in printing machines having retaining grooves or slots in the drum or type holding member thereof and which form of type bars can be ejected from the mold only after separation thereof from the groove-forming projections on the casting faces of the mold, although the invention is also applicable to molds of the kind commonly used in the casting of ordinary type bars having substantially flat or smooth sides.

A further object of the invention is to provide an improved mold of this class which is capable of separating the type bar cast therein from the casting faces of the mold and of supporting and guiding the type bar during its ejection from the mold, thereby facilitating the ejection of the type bars.

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 particularly in the claims at the end of the specification.

In the accompanying drawings:—

Fig. 1 is a front elevation of the mold wheel and driving pinion of a line casting machine of well known form, the mold wheel being equipped with molds embodying the present invention;

Fig. 2 is a section taken transversely through one of the molds;

Fig. 3 is a fragmentary view of the mold on an enlarged scale and partly in section, showing the mold elements in casting relation and a type bar cast therein;

Fig. 4 is a view similar to Fig. 3 but showing the mold elements partially spread apart to separate the type bar therefrom;

Fig. 5 is a view similar to Fig. 4 but showing the mold element spread apart to a further extent to completely separate the type bar therefrom;

Fig. 6 is a section taken longitudinally through the mold in a plane parallel to the casting cavity therein, one of the liners being shown partly in section;

Fig. 7 is a collective view showing the parts or elements of the mold in perspective;

Figs. 8 and 9 are perspective views of liners of modified form;

Fig. 10 is a perspective view of a portion of a type bar of the form cast in a mold of the construction shown; and

Fig. 11 is a perspective view of a portion of a type bar of modified form and capable of ejection from a mold embodying the present invention.

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

The invention is shown in the present instance applied to a mold of the kind used in line casting machines of the class shown and described in the Mergenthaler patent referred to, 1 representing the rotatable mold wheel commonly used in such machines and 2 representing the pinion usually employed to rotate the mold wheel to bring the mold thereon in use into casting position and to then carry the mold containing the type bar cast therein to ejecting position where the type bar is removed from the mold, the means for thus rotating the mold wheel being well understood in the art so that illustration and further description thereof is deemed unnecessary.

The mold wheel is provided with recesses

or pockets 4 in which the molds are mounted, it being understood that any desired number of molds may be applied to the mold wheel and any of which may be used for the casting of the type bars.

The mold, according to the present invention, comprises a mold body 5 which is secured to the mold wheel in fixed relationship therewith by the screws 6 or other suitable means, the face of the mold body having the usual alining grooves 7 to receive the lower rear lugs or ears on the matrices of a matrix line presented to the face of the mold, a cap 8 which is mounted opposite to the mold body, and a pair of liners 9 and 9^a which are interposed between the ends of the mold cap and mold body, the thickness of these liners defining the height of the mold cavity or slot 10 in which the type bars are cast, the liners closing the ends of said cavity.

The casting faces of the mold body and mold cap as shown, are formed with ribs or projections 11 which extend toward one another or into the casting cavity and produce longitudinal grooves *a* and adjacent ribs on the sides of the type bar A (Fig. 10) adjacent to the type face *b* of the type bar, such type bar being like those shown and described for example in U. S. Letters Patents, Nos. 1,122,819 granted December 29, 1914, to G. T. Trundle, and 1,615,031 granted January 18, 1927, to J. C. Norwood et al., the type-bearing portion being broken or separated from the body portion along the thin neck *d*, although it will be understood that the casting face of one of the mold members, such as the mold cap may be so formed as to produce a type bar like the type bar A′ (Fig. 11) having an interrupted shoulder *a′* extending longitudinally along a side thereof which produces portions on the body of the type bar of greater thickness than the character bearing edge *b′*, or the casting faces of the mold body and mold cap may be substantially smooth and parallel as in molds commonly used for casting ordinary type bars.

The mold cap 8 is movable toward and from the mold body 5, and in order to guide the mold cap in its movements, it is provided with depending arms or guide posts 12 which are rigidly secured thereto at its ends and fit slidably in slots 13 formed in the ends of the mold body. The liners 9 and 9^a are also movable toward and from the mold body, the liner 9 having recesses 14 therein to receive the heads of screws 15 which latter are shouldered and threaded into the mold body, and the liner 9^a having a recess 16 therein to receive the head of a shouldered screw 17 which latter is threaded into the mold body, the heads of the screws in these liners allowing the liners to separate or move upwardly from the mold body to a limited extent, and the liners have portions which overhang the inner walls of the slots 13 in the respective ends of the mold body and project into recesses 18 which are formed in the inner sides of the guide posts 12, the lower ends of these recesses forming shoulders 19 which are adapted to engage the under sides of the liners and to lift them from the mold body after the mold cap has separated from the mold body to a given extent. One of the liners, as the liner 9^a, is movable in a direction longitudinally of the mold in order to compensate for expansion and contraction of the mold parts due to heating thereof by the type metal, this liner containing springs 20 which are interposed between it and blocks 21 fixed to the adjacent end of the mold body, these springs acting to force this liner toward the mold cavity and thereby seal the adjacent end of the mold cavity, preventing the entrance of metal at the joints between the liners and the mold cap and body, the construction of this movable liner being similar to that shown and described in U. S. Letters Patent No. 1,684,360 granted Sept. 11, 1928, to J. C. Norwood.

The inner ends of the liners are provided with means for supporting the ends of a type bar cast in the mold cavity. As shown in Figs. 1 to 7 inclusive, the inner ends of the liners are formed with grooves 22 and 23 which extend in a forward direction, these grooves forming ribs or ledges *c* on the respective ends of the type bar A cast in the mold cavity, and when the liners are lifted or otherwise separated from the mold body, they will support the type bar, as shown for example in Fig. 4. Instead of forming the inner ends of the liners with grooves, they may be formed with inwardly projecting ribs 22^a and 23^a as shown in Figs. 8 and 9 and these ribs on the liners will then form grooves *c′* on the respective ends of the type bar, as shown in Fig. 11, so that when the liners are lifted or separated from the mold body they will support the type bar at its ends and in separated relation with the mold body. These supporting grooves or ribs on the inner ends of the liners will not only support the type bar in separated relation with the mold body but they will also guide the type bar while it is being pushed forwardly through and ejected from the mold by the ejector. These grooves or ribs extend toward the front of the mold and they may be parallel to one another, and the grooves 22 and 23 may be tapered so as to enlarge toward the front of the mold or the ribs 22^a and 23^a may be tapered so as to diminish in size toward the front of the mold and thereby relieve friction between them and the ends of the type bar during ejection thereof.

Means is provided for firmly holding the mold cap and liners in fixed relation with the mold body during the casting operation, the mold cap being shown in the present instance provided with a cam 24 which is fixed there-

on at its outer side and arranged to travel in a path which will bring it beneath a roller 25 which is mounted to reciprocate vertically in a guide 26 located above the mold wheel, the roller 25 being pressed downwardly or toward the mold wheel by a spring 27 of sufficient strength to hold the mold cap in closed position against the expansive tendency of the pressure of the molten metal injected into the mold, the outer face of the cam being convexed eccentrically of the axis of the mold wheel so that as the cam passes beneath the roller 25, which takes place as the mold moves into casting position, the latter will impose the requisite pressure on the mold cap to hold it in closed position. Means is also provided for opening the mold after the casting operation has taken place, such means comprising a pin or projection 28 fixed to and projecting forwardly from the mold cap and a cam shoe 29 which is formed on and projects rearwardly from a bracket 30 fixed to a non-rotatable part of the machine adjacent to the rim of the mold wheel so that this cam shoe will be in the path of the forwardly projecting pin 28 as the mold wheel rotates, following the casting operation, to bring the mold and the type bar therein into ejecting position, the cam shoe 29 being bevelled or inclined to the path of movement of the pin 28 so that the latter in riding over the cam shoe, will pull the mold cap outwardly or in a direction away from the mold body.

The operation is as follows: As the mold in use on the mold wheel moves into casting position by the rotation of the mold wheel, the roller 25 acts on the cam 24 to close the mold and to hold its parts in fixed relation during the casting operation, the parts of the mold being shown in casting relation in Fig. 3, the mold cap 8 pressing upon the liners 9 and 9^a and the liners seating on the mold body 6. While the mold is in casting position and is thus held closed, a line of matrices is presented to the front of the mold and the mold moves forwardly into engagement with the matrix line and the mouth-piece of a metal pot is brought against the rear face of the mold and the metal pot operates to inject molten metal into the mold cavity after which the metal pot recedes from the mold and the mold recedes from the matrix line, the casting operation being similar to that commonly performed in machines of this class. The type bar A is cast in the cavity between the mold body and cap and between the liners, the ends of the type bar having ribs formed thereon by the grooves in the inner ends of the liner, as shown in Fig. 3. After the casting operation has been completed, the mold wheel rotates in the usual manner in the direction indicated by the arrow in Fig. 1 to carry the mold containing the type bar to ejecting position, and during this rotation of the mold wheel, the projection 28 on the mold cap rides over the cam shoe 29 whereby the mold cap is pulled outwardly or away from the mold body. The first part of the lifting or separating movement of the mold cap relative to the mold body carries the mold cap, the liners 9 and 9^a and the type bar away from the mold body until the bottoms of the recesses 14 and 16 in the upper sides of the liners engage the under sides of the heads of the screws 15 and 17 respectively as shown in Fig. 4. As the separating movement of the cap continues, the liners 9 and 9^a are held against further separation from the mold body while the mold cap continues its separating movement until the shoulders 19 on the guide posts 12 come into engagement with the overhanging portions of the liners 9 and 9^a as shown in Fig. 5, the type bar being then separated from the mold body and mold cap and being supported at its ends between the liners, the type bar when in this position being in alinement with the usual ejector of the machine so that it may be pushed forwardly out of the mold. Should the type bar adhere to the casting face of the mold body more firmly than to the casting face of the cap, then the cap will first separate from the type bar and the liners after which the shoulders 19 on the guide posts 12 will come against the overhanging portions of the liners, and as the separating motion of the mold cap continues, the liners will be separated or lifted from the mold body, causing the type bar also to be separated therefrom until the heads of the screws 15 and 17 are engaged by the bottoms of the recesses 14 and 16 in the liners, the type bar being then separated from the mold body and the mold cap and supported at its ends by the liners. Since the mold, after being opened by the cam shoe 29 passes in inverted position beneath the center of the mold wheel to reach the usual ejecting position, gravity will hold the mold cap and liners in separated relation.

Since the type bar, when ready for ejection from the mold, is supported only by the engagement of its ends in the recesses of the liners, the power required to eject the type bar is much less than heretofore required, it being only necessary to overcome the friction between the ends of the type bar and the liners. It will be understood of course that in molds having ribs or projections on its casting face or faces extending into the mold cavity to form a type bar such as that shown in Fig. 10 or one having shoulders thereon as shown in Fig. 11, the mold cap and liners will be arranged to separate from each other and the mold body to an extent sufficient to enable the type bar to clear the projections on the casting face or faces of the mold during ejection of the type bar, and it will be further understood that in applying the invention to molds of the kind commonly used in casting ordinary type bars having substantially flat or

smooth sides, a very small opening movement of the mold cap relatively to the mold body will be sufficient to separate the type bar from the casting faces of the mold cap and body and thus relieve the type bar of friction against the casting faces of the mold during ejection of the type bar therefrom.

The present invention provides a mold which may be applied to line casting machines of usual construction without change or interference with cooperating parts commonly used on such machines, and which enables the type bars or slugs cast therein to be ejected with greater ease and facility than heretofore. By mounting the mold cap and liners so that they may be spread apart relatively to each other and to the mold body, and providing the liners with grooves, ribs or equivalent means for supporting the type bar and for guiding it for ejection from the mold, the type bar cast in the mold is freed and separated from the mold body and mold cap when the latter is lifted or spread, thereby relieving the type bar of friction or other resistance to ejection from the mold body and cap, and by supporting the type bar in ejecting position within the mold cavity by the engagement of the liners with its ends, the only resistance to the ejection of the type bar is that due to the friction between its ends and the liners, which is relatively small, so the type bar may be ejected very easily.

The invention is particularly advantageous when applied to molds of the class employed for casting type bars of the well known kind, having longitudinal retaining grooves for mounting them in the grooved or slotted drum or other type holding form of a printing machine of well known construction or for casting type bars having interrupted longitudinal grooves in a side thereof or shoulders projecting from the body thereof so that portions of the bodies of the type bars have a greater thickness than that of the character bearing edge thereof, the relative spreading of the mold cap and liners relatively to each other and to the mold body freeing the interengaging portions of the type bar and the casting faces of the mold so that there will be no obstruction to the forward edgewise ejection of the type bar therefrom.

I claim as my invention:—

1. A mold for line casting machines comprising opposed members relatively movable toward and from one another, liners between said members and means for relatively moving said liners away from each of said members.

2. A mold for line casting machines comprising opposed members guided to move relatively toward and from one another and forming a casting cavity between them, and liners between said members and defining the ends of said cavity, said liners being relatively movable toward and from each of said members, and one of said members having means for moving the liners away from the other member.

3. A mold for line casting machines comprising opposed members and interposed liners forming a casting cavity, and means for moving one of said members toward and from the other member and the liners, the liners being movable toward and from said other member.

4. A mold for line casting machines comprising opposed members and interposed liners forming a casting cavity, means for moving one of said members toward and from the other member and the liners, the liners being movable toward and from said other member, and limit means permitting separation of the movable member and the liners to relatively different extents with respect to said other member.

5. A mold for line casting machines comprising opposed members relatively movable toward and from one another and forming a type bar casting cavity between them, and liners between said members and having means thereon for supporting at its end a type bar cast in said cavity and for guiding such type bar for ejection therefrom when said mold members are relatively separated.

6. A mold for line casting machines comprising opposed members forming a type bar casting cavity between them, and liners between said members and having means thereon for supporting a type bar cast in said cavity and for guiding such type bar for ejection therefrom, the liners being movable in a direction from one of said members and the other member being movable in a direction from the liners.

7. A mold for line casting machines comprising opposed members forming casting faces between them, and liners between said members and having type bar supporting portions thereon, one of said members and the liners being relatively movable toward and from each other and the other member.

8. A mold for line casting machines comprising opposed members forming a type bar casting cavity between them, and liners between said members and defining the ends of said cavity and having portions to form supports for the ends of a type bar cast in said cavity, one of said members and the liners being relatively movable toward and from each other and the other member.

9. A mold for line casting machines comprising opposed members forming a type bar casting cavity between them, and liners between said members and having portions on their inner ends to support the ends of a type bar cast in said cavity and to guide such type bar for ejection therefrom, one of said members being movable in a direction from the other member and having means for moving the liners in a direction from said other mem-

ber to separate the type bar therefrom and movable in a direction from the liners to separate it from the type bar.

10. A mold for line casting machines comprising a mold body and cap forming a cavity between them for casting a type bar therein, liners between said body and cap and closing the ends of said cavity, said liners having portions on their inner ends to support a type bar cast in said cavity and to guide it for ejection therefrom, the cap being movable toward and from the mold body and the liners being movable transversely between the cap and body.

11. A mold for line casting machines comprising a mold body and cap forming a cavity between them for casting a type bar therein, liners between said body and cap and having portions for supporting the ends of a type bar cast in said cavity and for guiding such type bar for ejection therefrom, and members on the cap for guiding it to move toward and from the body, said members having portions thereon to engage the liners and to move them away from the mold body.

12. A mold for line casting machines comprising a mold body and cap, liners between the body and cap, the liners being movable toward and from the mold body and having means for limiting their movement in a direction from the body, and the cap being movable toward and from the mold body and liners and having means to engage the liners to move them from the body and to limit the movement of the cap from the liners and mold body.

In testimony whereof I have hereunto set my hand.

SAMUEL E. SPERRY.