

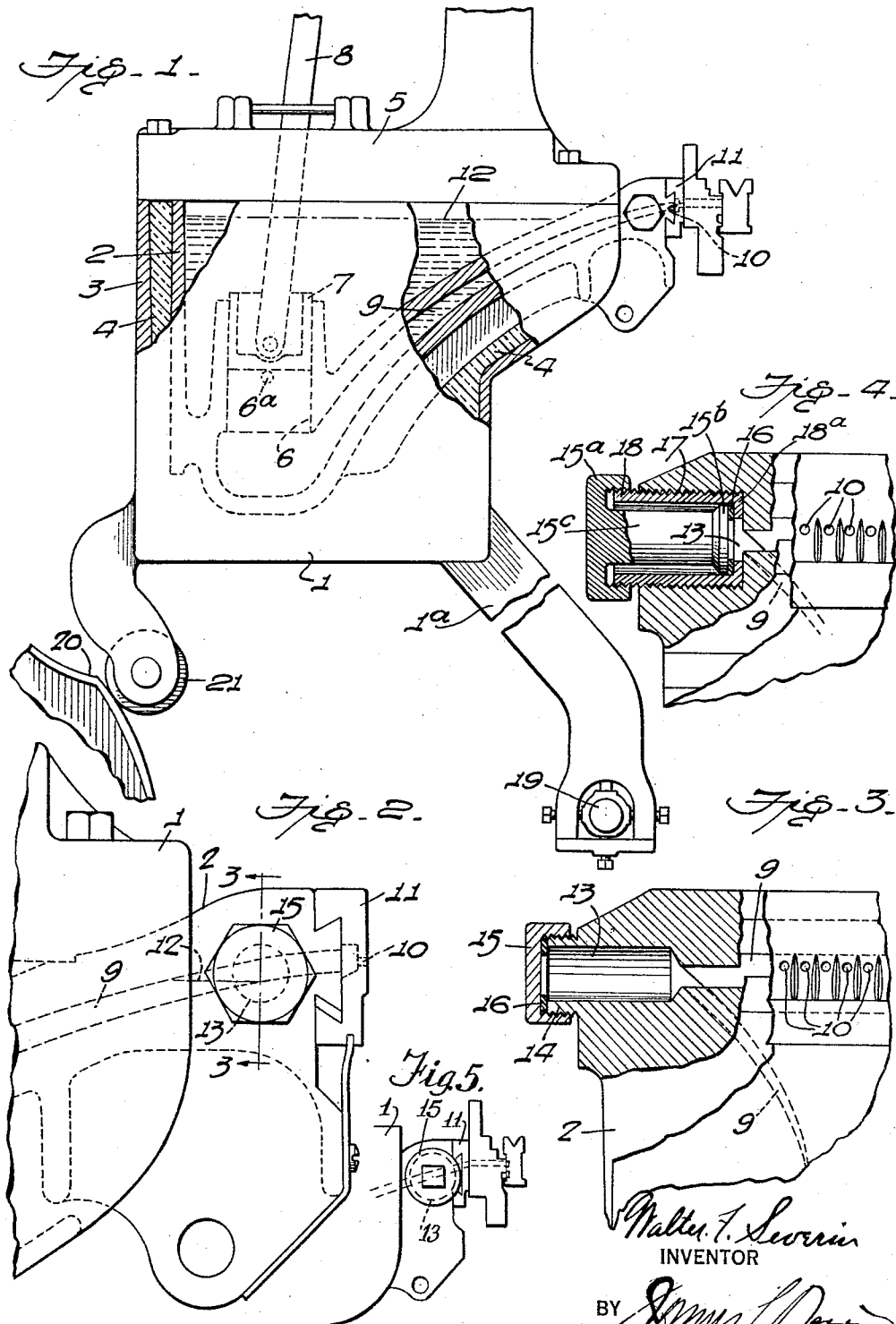
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METAL POT FOR TYPOGRAPHICAL MACHINES

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## METAL POT FOR TYPOGRAPHICAL MACHINES

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The present invention relates to improvements in typographical machines and more especially to line casting machines of the class generally shown and described in U. S. Letters Patent No. 436,532, granted Sept. 16, 1890, wherein the line of character bearing matrices is presented to one face of a mold and a metal pot is brought against the opposite face of the mold and molten metal is injected from the metal pot into the mold cavity and against the character bearing faces of the matrices to form a type bar or slug having type characters along an edge thereof.

Type bars obtained in this way have been used extensively in the printing art for direct printing therefrom or for the production of stereotype matrices from which stereotype plates have been cast for printing. In recent years, the printing processes employed, especially in newspaper printing, require the imposition of much heavier impression pressure upon the type bars than the pressure previously required in making stereotype matrices, and it has been found in practice that some of the type bars will break down under such increased pressures, especially when a large number of impressions are made therefrom, this tendency of the type bars to break down being due to several causes, such as lack of solidity or to a spongy texture of the type bars as a result of minute air holes due to the mixing of air with the molten metal during the casting operation. Also, in certain classes of work where the printing is done directly from the type bars, and especially when a large number of impressions are made therefrom, as in the printing of telephone or city directories or the like, the characters on the relatively soft type metal bars commonly used in line casting machines soon become worn or rounded at the edges, to which is added the tendency of the type bars themselves to gradually break down or sink so that their type faces are below the normal level known as type-high, so that after a short period of use of such type bars an uneven inking of the characters thereon from the press rollers will occur and imperfections in the impressions and smudge

in the printing produced therefrom will result.

The primary object of the present invention is to avoid such faults and imperfections now existing in machines of this class, particularly when used for casting the ordinary type metal bars, when such bars are employed for direct printing in large quantities where many thousands of impressions therefrom are required, and when such type bars are used for the production of stereotype matrices by the modern methods requiring heavier impression pressure than heretofore.

More particularly, the invention aims to provide an improvement in the metal pot for such machines, whereby it is made possible to employ a much harder type metal alloy than heretofore usable, so that the type bars cast from such metal will be inherently stronger in all respects and will therefore withstand the heavy pressures used in the modern methods of making stereotype matrices without breaking down, and more especially, the characters on such type bars will retain their full sharpness or outlines and will not have a tendency to sink or round off at the edges when many thousands of impressions are required to be made from them. Many attempts have been made to employ type foundry metal in the metal pots of line casting machines, but due to the usual construction of these pots, the walls in the outlet throat of which are relatively close together and the mouthpiece or metal ejecting plate of which is provided with a series of fine apertures, the high percentage of antimony in such alloy of type metal has resulted in very quickly clogging up the apertures in the mouthpiece and building up of metal on the upper and lower walls of the metal pot throat above the metal level therein, so that frequent removal of the mouthpiece and cleaning of the throat was found necessary. The difficulties and inconvenience of such frequent cleaning of the metal pot and its mouth piece, as usually constructed, have heretofore rendered the use of the hard alloy type metal both impractical and uneconomical for the machines of this class.

According to the present invention, means

are provided whereby the throat of the metal pot above the metal level, and if desired, the rear face of the pot mouthpiece, are made easily accessible, thus avoiding the tedious task of removing the mouthpiece for cleaning these portions and thereby preserving the required metal tight seal between the mouthpiece and the metal pot, and at the same time rendering it possible to perform the cleaning operation frequently in a quick and thorough manner.

A further object of the invention is to provide such means for rendering the upper portion of the metal pot throat accessible for cleaning and inspection and which also permits the draining off of surface sludge or dross which floats at the level of the metal in the pot throat, this being a particularly advantageous feature of the invention since, as is well known, type metal alloy of the kind now proposed for use in machines of the kind referred to, has the peculiar property of throwing off or separating a portion of its antimony constituent in form of beads which lie on the surface of the molten metal and frequently adhere to the throat of the pot above the metal level and to the back of the mouthpiece adjacent thereto, due to the slightly reduced temperature of these surfaces.

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 this specification.

In the accompanying drawing:—

Fig. 1 is a side elevation, partly in section, of a metal pot for a typographical machine, embodying the present invention;

Fig. 2 is a side elevation, on an enlarged scale, of the forward portion and mouthpiece of the metal pot;

Fig. 3 is a detail vertical section taken on the line 3—3 of Fig. 2;

Fig. 4 is a view similar to Fig. 3, showing another embodiment of the invention; and

Fig. 5 is a side elevation of the discharge end of the metal pot, showing a further embodiment of the invention.

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

The present invention is shown in the accompanying drawing applied to the metal pot of a line casting machine of the well known class shown generally in the patent hereinbefore referred to, the metal pot 1 being of the usual well known construction having a crucible 2 contained within a jacket 3 and protected against heat loss by suitable insulating material 4 interposed between the crucible and the jacket, and the top of the metal pot is closed by a cover 5, as usual. The type metal is contained within the crucible

2 and is brought to the molten state by applying heat either by an electric or gas heater in the usual or any suitable manner. A pump well 6 is formed in the lower portion of the crucible, it having a port 6<sup>a</sup> in its side wall through which the molten metal from the crucible may enter the pump well, and a piston or metal pump 7 reciprocates vertically in the pump well, it being connected to an actuating rod 8 which may be reciprocated by the usual means employed in machines of this class, it being forced downwardly when the casting operation is to take place, thereby causing the metal pump 7 to make a downward stroke and thus force molten metal beneath it in the well 6 out of the latter and into the metal pot throat 9 which, in metal pots as commonly used in machines of the class referred to, extends upwardly and forwardly, the upper forward end of the throat communicating with a series of apertures 10 formed in a mouthpiece 11 fitted to the upper forward end of the throat. As usual in typographical machines of the class referred to, the forward face of the mouthpiece 11 is brought against the rear face of a mold having a slot or cavity therein for the casting of the type bar or slug, the apertures 10 of the mouthpiece aligning with the mold cavity, and a line of matrices is presented to the opposite or forward face of the mold so that the cavity in the latter is in alignment with the type characters formed in the rear edges of the matrices, so that the molten type metal forced upwardly through the metal pot throat 9 by the descent of the metal pump 7 will be forced through the apertures 10 in the mouthpiece 11 and into the mold cavity to cast a type bar therein against the character bearing matrices. The metal pot, in machines of the class referred to, is mounted to rock or tilt forwardly into casting position against the mold and rearwardly away from the mold after the casting operation has been performed, the metal pot being usually provided with downwardly extending legs 1<sup>a</sup> pivotally supported at their lower ends on a transverse pivot or shaft 19 mounted in a relatively fixed position in the main frame of the machine, the metal pot being rocked forwardly and rearwardly about the pivot or shaft 19 as a center under control of a cam 20 on the main cam shaft of the machine which cooperates with a roller 21 on or attached to the metal pot. Such rocking of the metal pot to and from casting position and the manner of injecting the molten metal from the metal pot into the mold are the same as commonly take place in typographical machines of the class referred to, and it is therefore deemed unnecessary to describe these operations in further detail.

In practice, the level of the molten metal in the metal pot is maintained somewhat below the apertures 10 in the mouthpiece, so

that, as the metal pot is rocked or tilted forwardly to a horizontal position where its mouthpiece forms a facewise metal-tight fit against the mold, the metal will not rise so high in the throat as to prematurely flow out of the apertures 10. When the metal pot is rocked rearwardly after a cast has been made, the metal level recedes to a somewhat lower point in the throat of the pot. In the present instance, the metal pot is shown in its forward position just prior to actuation of the metal pump 7, and the metal level, designated 12, lies below the apertures 10 as described. It will be understood that the metal level in the throat is maintained at the same height as that in the reservoir or body portion of the crucible by the port 6<sup>a</sup> in the well 6, through which metal may flow from the reservoir of the crucible into the well to replace the metal discharged from the throat during each casting operation, as is usual in metal pots of this class.

In carrying out the present invention, an opening, bore or passageway 13 is provided at one or both sides of the metal pot throat, at a convenient location behind the mouthpiece and substantially at the normal level of the molten metal when the pot is in its forward or casting position. Obviously, the opening or bore 13 may be of any convenient size and shape and it may be large enough to permit the removal therethrough of a matrix should such accidentally enter the metal pot, and it may be positioned at any point between the mouthpiece and the low metal level line or, if desired, more than one opening or bore may be provided. The opening or bore 13 preferably extends inwardly to intersect or communicate at its inner end with the pot throat 9. Different means may be employed for closing this opening or bore. In Fig. 3, a boss 14 is formed or provided exteriorly on the side of the pot so that it surrounds the outer end of the opening or bore 13, this boss being threaded exteriorly to receive an interiorly threaded cap 15 in which is seated a gasket 16 to form a metal tight seal for the outer end of the opening or bore 13. In the construction shown in Fig. 4, which enables the invention to be easily applied to metal pots already in service as well as to new pots, a larger bore 13 having internal threads 17 is provided, the bore being fitted with a hollow threaded nipple 18 of sufficient length to project beyond the side of the pot, and having an internal annular flange 18<sup>a</sup> at its inner end to seat against the inner end of the bore 13, the outer exteriorly threaded end of the nipple being adapted to receive a threaded cap 15<sup>a</sup> having a head 15<sup>b</sup> carried by an axial stem 15<sup>c</sup> extending inwardly from the cap and arranged to clamp the gasket 16 between it and the flange 18<sup>a</sup> and thus form a closure immediately adjacent to the throat 9, the closing of the inner end of the nipple by the head 15<sup>b</sup>

substantially at its point of communication with the throat leaving the side wall of the throat substantially smooth or without a cavity of such size as would allow a substantial volume of molten metal to flow therein and therefrom, thus avoiding disturbance of the metal in the throat during the casting operation and also preventing lodging and solidifying of metal in the discharge passageway in the nipple, since the head 15<sup>b</sup> prevents flow of the metal to the outer cooler part of the pot where it might become chilled. The cap, in either instance, is preferably of hexagon form to facilitate removal and replacement thereof. In both constructions shown, the cap-receiving threads are exteriorly of the metal discharge passageway so that these threads will not become filled or clogged with dross or metal removed therethrough, and hence difficulty in the replacement of the cap is avoided. The construction shown in Fig. 5 may be the same as that shown in Fig. 3 except that in Fig. 5 the bore 13 is large enough to permit the removal of a matrix therethrough, and a square wrench-receiving portion projects from the outer face of the cap.

While the metal pot is in horizontal or lock-up position as shown, which is the position the metal pot occupies during the casting period, the metal level, designated 12, will lie above the bottom or lowermost part of the bore 13 or the discharge passageway in the nipple, so that if the cap 15 or 15<sup>a</sup> is removed with the pot in this position, metal will immediately flow out from the throat through the bore or passageway, thus causing the removal of any dross which has accumulated in the trap formed by the lower portion of the bore 13 in Fig. 3 or from the surface of the metal in the throat in Figs. 3 and 4. In practice, it will be found desirable to remove the cap while the metal pot is tilted backwardly or out of its casting position, where it ordinarily stands when the machine is not in use, at which time the metal level in the throat will be slightly below the bore 13 or the discharge passageway in the nipple so that the metal will not escape therethrough. After the cap has been removed, the interior or upper portion of the pot throat 9 can be inspected and a suitable scraping tool can be inserted through the bore or discharge passageway to detach or loosen any dross that may be lodged on the walls of the throat or along the back of the mouthpiece 11. To drain off the dross thus loosened or the so-called antimony beads that float on the top or surface of the molten metal in the throat, it is only necessary to depress the pump piston 7 by hand, thereby causing the level of the molten metal to rise in the throat, and any floating dross or antimony beads can be skimmed off through the bore or discharge passageway.

The present invention thus provides an opening, bore or passageway disposed be-

tween the mouth of the metal pot and the surface or level of the molten metal in the metal pot throat to afford accessibility to the interior of the throat or mouth for inspection or  
 5 for removal of dross or other objectionable matter or to drain off dross or other objectionable matter floating on the surface of the molten metal in the throat, without the necessity of removing the mouthpiece or breaking the seal between it and the metal pot.  
 10 Obviously, other equivalent means for accomplishing these results will suggest themselves to those skilled in the art and such are included within the scope of the invention as  
 15 set forth in the claims.

I claim as my invention:—

1. A metal pot for typographical machines having an upwardly extending throat for the discharge of molten metal therefrom and a  
 20 mold-engaging mouthpiece at the upper discharge end of said throat, and having an opening extending from the interior of the throat at a point adjacent to the mouthpiece to the exterior of the throat below the discharge end thereof.

2. A metal pot for typographical machines having an upwardly extending throat for the discharge of molten metal therefrom and means for maintaining the level of molten  
 30 metal therein near the upper discharge end thereof, and having a passageway extending from said throat substantially at the metal level therein to the exterior of the throat below the discharge end thereof.

3. A metal pot for typographical machines having an upwardly extending throat for the discharge of molten metal, a mold-engaging mouthpiece at the discharge end of said throat, and means for maintaining the molten  
 40 metal in the throat at a level near the upper discharge end thereof, a passageway leading from the throat in the region of the metal level therein and adjacent to the mouthpiece, to the exterior of the throat at a point substantially below the mouthpiece.

4. A metal pot for typographical machines having an upwardly extending throat for the discharge of molten metal therefrom and means for maintaining the level of molten  
 50 metal therein near the upper discharge end thereof, and having a passageway extending from said throat substantially at the metal level therein to the exterior of the throat, a portion of said passageway at the outer end thereof being below the metal level, and removable means for closing the outer end of said passageway.

5. A metal pot for typographical machines having an upwardly extending molten metal  
 60 discharge throat to contain molten metal to a level near its upper discharge end, and a trap communicating with said throat and the exterior of the metal pot substantially at the metal level therein.

6. A metal pot for typographical machines

having an upwardly extending molten metal discharge throat and a mold-engaging mouthpiece at its upper discharge end, an opening extending between the interior and exterior of the throat at the side of the mouthpiece  
 70 which is toward the throat and in substantial parallelism with the length of the mouthpiece, and means for closing said opening.

7. A metal pot for typographical machines, tiltable to and from casting position and having an upwardly and forwardly extending molten metal discharge throat to contain molten metal to a level near its upper end when the pot is in casting position, a mold-engaging mouthpiece on the upper discharge  
 80 end of the throat, a passageway extending transversely through the upper portion of a side of said throat behind the mouthpiece from substantially the level of the molten metal therein when the pot is in casting position to the exterior of the throat, and means for closing the exterior end of said passageway.

8. A metal pot for typographical machines having an upwardly extending throat for the discharge of molten metal therefrom and an opening extending from the interior of the throat at a level near the upper discharge end thereof to the exterior of the throat, and means for closing said opening toward its  
 90 inner end substantially at its junction with the interior of the throat.

9. A metal pot for typographical machines having an upwardly extending metal discharge throat and a passageway extending  
 100 from the interior of the throat at a level near the upper discharge end thereof to the exterior of the throat, and a member removably attached to the throat and having a part to seat at and close the inner end of said passageway adjacent to its point of communication with the interior of the throat.

In testimony whereof I have hereunto set my hand.

WALTER F. SEVERIN. 110

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