No. 645,438. Patented Mar. 13, 1900.

J. S. THOMPSON.

LINOTYPE MACHINE.

(Application filed Feb. 2, 1899.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

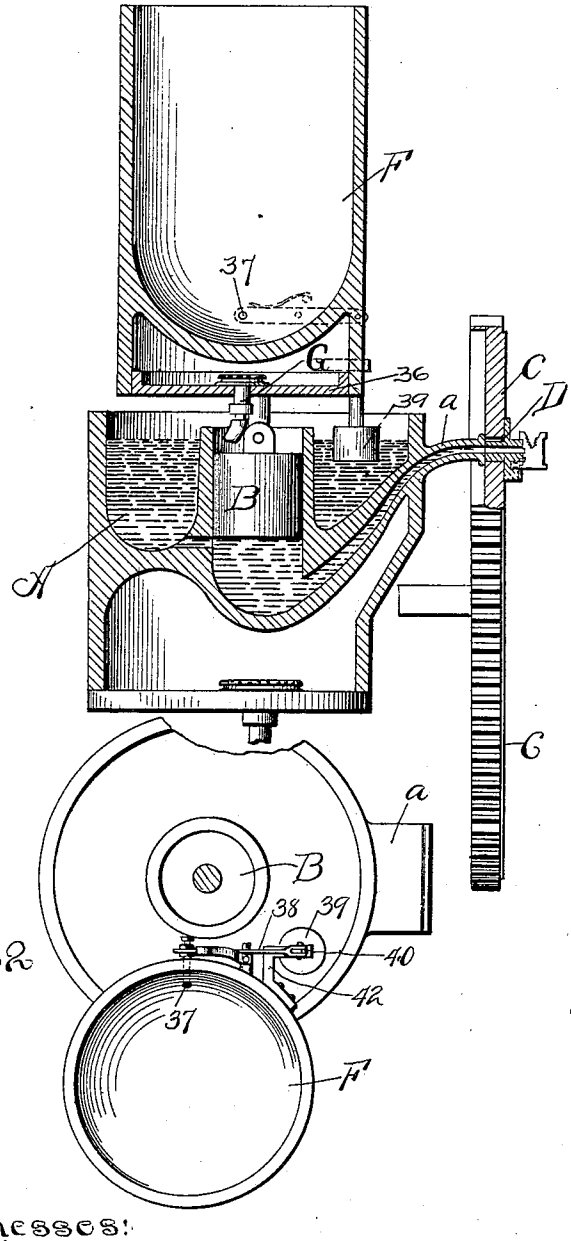


Fig. 2.

Fig. 3.

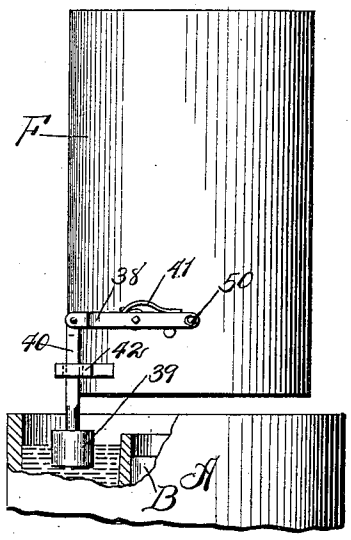
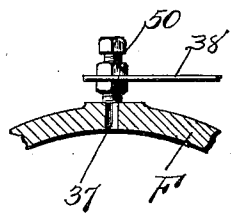


Fig. 4.



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(No Model.) 3 Sheets—Sheet 2.

Fig. 5.

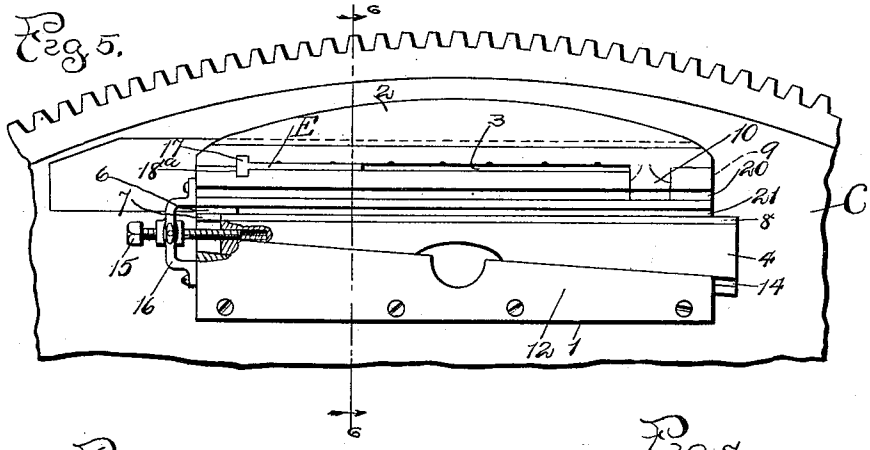


Fig. 6.

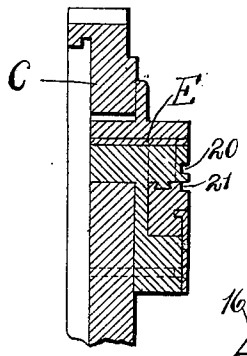


Fig. 7.

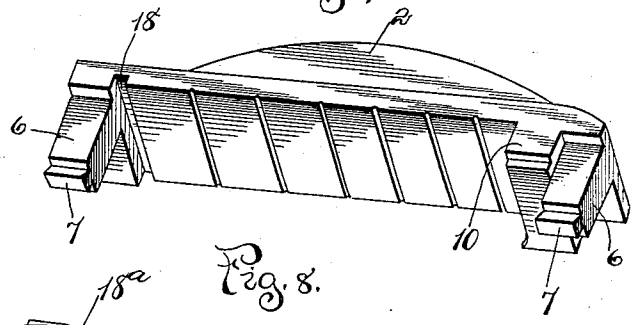


Fig. 8.

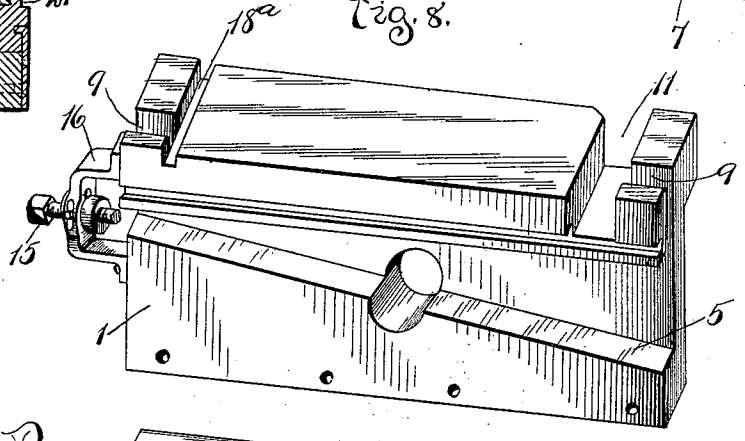


Fig. 11.

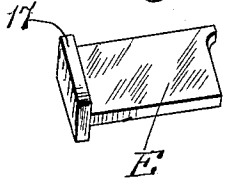


Fig. 9.

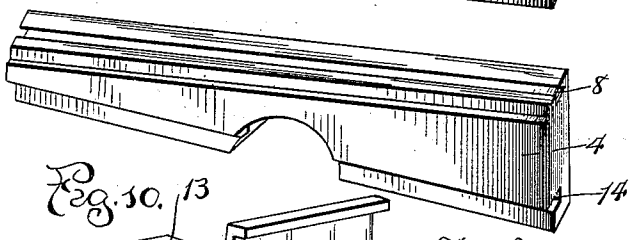
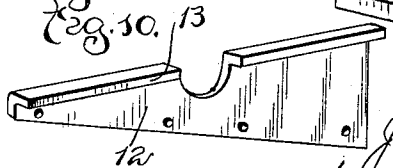


Fig. 10.



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No. 645,438. Patented Mar. 13, 1900.

J. S. THOMPSON.

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(Application filed Feb. 2, 1899.)

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Fig. 12.

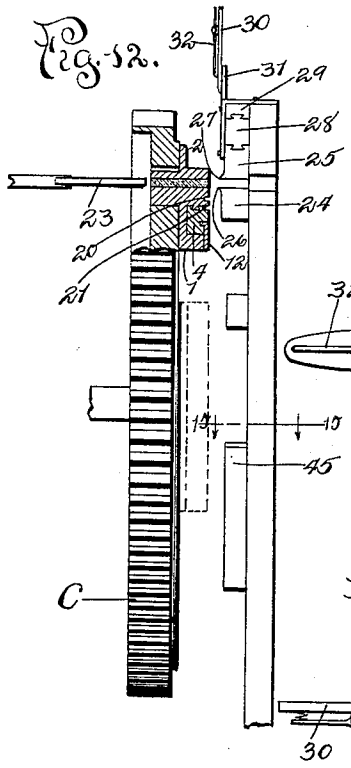


Fig. 13.

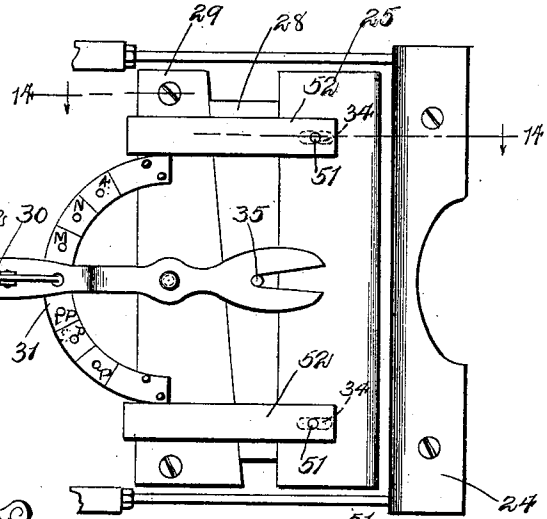


Fig. 14.

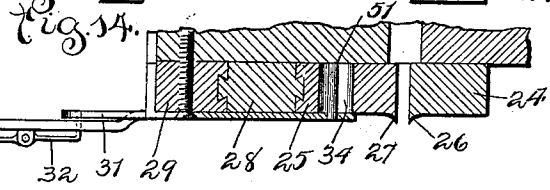


Fig. 15.

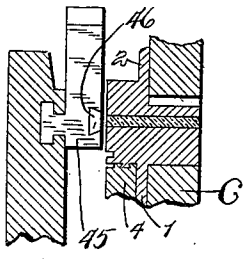


Fig. 16.

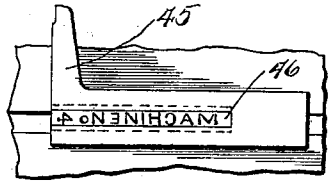


Fig. 17.

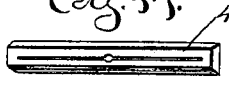
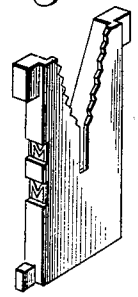


Fig. 18.



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UNITED STATES PATENT OFFICE.

JOHN S. THOMPSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE MERGENTHALER LINOTYPE COMPANY, OF NEW YORK.

LINOTYPE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 645,438, dated March 13, 1900.

Application filed February 2, 1899. Serial No. 704,268. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. THOMPSON, a citizen of the United States of America, and a resident of Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Linotype-Machines, of which the following is a specification.

My invention relates to machines for automatically casting types or type-bars. In certain of these machines single types or characters are cast, while in others entire lines or linotypes are so made. It is to this latter class of machines that my invention relates in particular, although certain features of it are equally applicable to the former class.

In the linotype-machines the slug is cast by forcing molten metal through a cell or slot of a suitable mold and against a series of matrices which bear intaglio characters and which have been previously assembled opposite the slot or cell of the mold.

My invention has reference to an improvement in the construction of the mold whereby it may be adjusted to the formation of linotypes varying in thickness or in length, or both; also, to the combination of a main and a secondary melting-pot with automatic connections between them, as hereinafter described; also, to improved construction of the matrix-clamping jaw whereby it is adapted to carry a matrix or pattern-plate adapted to form a corresponding design in relief on the linotype in the absence of the ordinary matrices; also, to means for adjusting the knife whereby outgoing slugs or linotypes are trimmed to the exact thickness required.

In the accompanying drawings, Figure 1 is a vertical sectional view of so much of a linotype-machine as is necessary to illustrate my invention. Figs. 2 and 3 are respectively a plan view and a side elevation of the major portion of the same. Fig. 4 is a section of a detail of construction. Fig. 5 is an elevation of the upper portion of the mold-wheel with the mold arranged therein. Fig. 6 is a vertical section on line 6 6 in Fig. 5. Figs. 7, 8, 9, and 10 are perspective views of the different parts or pieces which compose the mold. Fig. 11 is a perspective view of the liner which is inserted in the mold. Fig. 12 is a view, partly in elevation and partly in section, of the mold or disk and a knife-block for shaving the slug as it is ejected from the mold. Fig. 13 is an elevation of the knife-block. Fig. 14 is a section taken on line 14 14 in Fig. 13. Fig. 15 is a section taken on line 15 15 in Fig. 12. Fig. 16 is a view of the movable jaw employed for determining the length of the type or printing end of the slug. Fig. 17 is a perspective view of a slide adapted to fit into the said jaw. Fig. 18 is a perspective view of one of the matrices containing two letters of different sizes.

In Fig. 1 I have shown the casting mechanism of a linotype-machine, which can be of any suitable or well-known construction. This mechanism consists of the metal pot A, plunger B, working in a cylinder formed in the middle of the melting-pot, and the rotatable mold disk or wheel C, carrying the mold D, which is so positioned therein as to come opposite the spout or outlet *a* of the metal-pot A.

My invention contemplates the use of matrices with two or more intaglio types or dies of the same letter, but of different sizes or styles of this letter, as described in Letters Patent of the United States to P. T. Dodge, Nos. 449,872 and 547,633. For example, the matrices are provided with nonpareil and minion dies of the different letters in the alphabet, punctuation-marks, &c. To illustrate, I have shown in Fig. 18 a matrix provided with a nonpareil and a minion "M." In this way it is obvious that one set of matrices will be all that is necessary for these two lines of type.

In order to arrange for the use of either one or the other or of any one of any desired number of styles of type with which the matrices are provided, the mold D is made adjustable in a way to allow a variation of the height of the slot, so that it will correspond to the desired one of the styles of lettering, and is also made so that it can engage or support the matrices in a way to allow the desired letters to come opposite the slot. In accordance with my invention the mold can be made adjustable in the way specified by any suitable or desired construction. As a simple and practical arrangement and also as a matter of further improvement I make it ad-

justable by means of the construction which I have shown in the drawings and especially in Figs. 5 to 11, inclusive. In this construction the mold comprises a lower portion or base 1, which is adapted to fit in the mold-disk C and is secured rigidly thereto, as by means of the screws shown, and an upper portion or top 2, which also fits in the mold-disk and is movable upwardly and relatively to the base 1, so that the height of the slot 3, formed by the upper surface of the base 1 and the lower surface of the top 2, will be varied in accordance with the elevation of the latter relatively to the former. The movement of the top 2 relatively to the base 1 is secured by longitudinally shifting a tapering wedge 4, which rests upon an incline 5, formed upon the base 1, and supports the legs 6 6 of the top 2. Obviously a longitudinal movement of the wedge 4 toward the left (when referring to Figs. 7, 8, and 9) will cause the top 2 to rise, while a reverse movement of the wedge will cause the same to descend. It will be observed that the tapering recess in which the sliding wedge 4 works is higher than the wedge, so as to permit the proper rise of the latter. This is best shown in Fig. 5 of the drawings.

The top 2 is prevented from separating from the wedge 4 by means of dovetail tenons 7 7, formed at the lower ends of the legs 6 6 and adapted to fit and slide in mortised groove 8, formed in the top surface of the wedge 4.

The top 2 is held against sidewise movement relatively to the base 1 by means of the legs 6 6, which work in guideways or slots 9 9, formed at the ends of the base 1. A relative sidewise movement between these two members 1 and 2 of the mold is prevented in part by the legs 6 6 and in part by a transverse lug 10, which fits and works in a transversely-arranged guide or groove 11 in the base 1. This lug 10 also acts to limit the length of the slug cast in the slot 3.

The lower portion of the wedge 4 is held so as to slide upon and against the incline 5 of the base 1 by means of a wedge-shaped plate 12, having a flange 13, which is arranged to enter a groove 14, formed in the base 1. This plate 12 is secured to the base 1 by means of screws, a simple arrangement being to employ for this purpose the screws which are used to secure the base 1 to the mold-carrier.

The sliding wedge 4 could be shifted longitudinally by any suitable mechanism. A simple arrangement is the screw 15, connected to the smaller end of the wedge and supported by and having a sliding connection with a bracket 15, attached to the base 1.

The height of the mold-slot 3 is determined and maintained by liners E, Fig. 11. There are provided a number of these liners, corresponding to the number of styles of types used, the liners for each different style having the thickness which the slug of that style of type should have. There can also be provided, if desired, liners having different lengths, as well as different thicknesses, so as to provide for different lengths of lines of the different styles. These liners E are constructed with a laterally-arranged flange 17 17, which is adapted to fit into grooves 18 18ª, formed in the top 2 and the base 1.

In arranging the mold thus described for operation the top 2 is put in place above the base 1 with its legs 6 extending into and through the grooves 9, and the sliding wedge 4 is then inserted in position in its recesses, and in so doing the dovetails 7 7 are inserted in its groove 8. Then the plate 12 is placed and held firmly in position by means of screws. Then the desired liner is arranged in the slot formed between the top and the base, and, finally, the adjustable screw 15 is adjusted so as to draw and hold the wedge 4 in position to draw the top 2 firmly against the liner. In this way the desired length or height of the slot is formed. When it is desired to change the length or height of the slot, the adjusting-screw 15 is suitably unloosened, the liner then in position is removed and replaced by another one, and then the wedge is tightened as before.

It will be observed that the mold, either thus constructed or made in any other manner so as to be adjustable in a way to vary the height of the slot, can be employed to advantage in machines in which different sets of matrices having different-sized types are used; but inasmuch as I propose to use this adjustable mold particularly in connection with a set of matrices having two or more type-dies I have shown it constructed with an additional feature which particularly adapts it for that use. This feature consists in the provision of a couple of longitudinal grooves 20 21, each of which is adapted to receive the lugs formed at the lower ends of the matrices for holding the same in position. These grooves 20 and 21 are arranged the one above the other, so that when the lugs of the matrices are confined in one one set of the type-dies is presented to the mold-slot, while when the same are confined in the other groove the other set is presented to the slot. This is best shown in Fig. 1. The upper groove 20 is conveniently formed in the upper portion of the base 1. The lower groove 21 is conveniently formed by a recessed portion in the upper corner of the sliding wedge 4, and the overhanging shoulder provided by an edge portion of the upper face of the recess in the base 1 in which the wedge 4 works.

Referring to Fig. 1, it will be seen that when the lugs at the lower ends of the matrices are confined in the lower groove 21 the upper type-die is opposed to the mold-slot, and also that when these lugs are confined in the upper groove 20 the lower type-dies are presented to that slot. The larger type-die of the matrix could be either above or below the smaller one; but I prefer to place it below, as shown in the drawings and particularly in Fig. 18, in order to accord with the

principles employed in the mold. Although I have shown these matrices provided with intaglio characters, it will be understood that my invention contemplates providing them with relief characters instead, if so desired. These matrices with two type-dies can be assembled, it will be understood, by means of any suitable assembling mechanism adapted to assemble them in position to allow either one or the other of the dies to be used. As such mechanism forms no part of my present invention, I do not illustrate it here. As one mechanism for so doing, however, I refer to Letters Patent No. 615,909, granted December 13, 1898, to John R. Rogers for linotype-machine. I further provide a knife-block which is made so as to permit of its adjustment in a way to vary the space between the cutting-lips of its knives. Such an adjustable knife-block is particularly adapted for use in connection with matrices having two or more type-dies of different lengths, in that it allows the shaving or trimming of slugs of different sizes or thicknesses. It is, however, apparent that it is equally well adapted for use in connection with machines in which different sets of matrices are used to secure different styles of type, for in these machines also the varying thickness of the slugs makes it desirable to be able to correspondingly vary the distance between the cutting-lips of the knife-blocks.

In the drawings I have shown a construction of adjustable knife-block which I consider a matter of further improvement, although my invention contemplates the use of any style or construction of knife-block.

In Fig. 12 is shown the mold wheel or disk C, with the mold in position opposite the adjustable knife-block. There is also shown an ejector 23, which can be of any approved design and which is understood to be automatically actuated at the proper time to eject the slug from the mold and force it between the knives of the knife-block. In front of the ejector 23 is shown my improved knife-block. This block is also shown more particularly in Figs. 13, 14, and 15. It comprises a stationary knife 24 and a movable knife 25, which are arranged opposite one another and are provided with opposing cutting lips or edges 26 and 27, respectively. Movement of the knife 25 relatively to the knife 24 is procured by a longitudinally-shiftable wedge 28, which is fitted between the knife 25 and the fixed block 29. In order to insure an accurate movement in either direction of the movable knife 25 in accordance with the backward-and-forward shift of the sliding wedge 28, I provide a positive connection between the movable knife 25, the wedge 28, and the fixed abutment 29. As a simple form of positive connection I have shown dovetailed mortise-and-tenon joints, as best illustrated in Fig. 14. The wedge 28 is shifted by means of the hand-lever 30, which is pivoted to the block 29 and engages a pin 35 on the wedge 28. It is arranged above a sector 31 and is provided with a spring-catch 32, which is adapted to engage suitable holes in the sector 31. These holes are so positioned that when the catch 32 engages them the knife-block is adjusted for the different styles of type, and the style of type for which each hole will cause the knife-block to be set is indicated near it by suitable characters or letters. Adjustment of the knife 25 is permitted by slots 34, formed in it and adapted to receive pins 51, extending through the knife 25 and secured to straps 52, which inclose the parts of the knife-block.

In Figs. 1 to 4, inclusive, I have shown an arrangement by which the melting-pot A can be automatically supplied with metal to replace that discharged to automatically cast the types or slugs. In this arrangement an auxiliary melting-pot F is arranged in position substantially above the melting-pot A. The auxiliary pot F is intended to receive a considerable quantity of unmelted metal, such as the slugs which are to be remelted, so that their metal can be used to cast other slugs, and the slugs so received by it are to be melted while within it. As an arrangement for heating this pot so as to melt the slugs I have shown a gas-burner G, arranged below it and supported in position by a bracket 36, attached to the bottom of the pot. The molten metal from this auxiliary pot F is automatically fed to the main pot A in such way as to maintain the quantity of metal in the latter substantially uniform. As a simple arrangement for this purpose I arrange in the melting-pot A a float 39, which is supported by the metal in that pot at substantially the surface thereof. This float 39 is attached to a link 40, which is pivotally connected with a swinging lever 38, which latter is pivoted to the metal-pot and is arranged so that its free end can swing up and down, so as to cover and uncover an aperture 37 in said pot F. By such arrangement when the metal in the pot A is at a proper level the float 39 is supported in position to elevate the link 40 and the connection of the lever 38 therewith, and thereby depress the free end of said lever 38, so as to cause the same to close the aperture 37; but when the metal in the pot A is lowered the float 39 descends, so as to swing the lever 38 and open the aperture 37, and thereby allow the metal to flow out of the same and into the melting-pot A. When the normal level of the metal in the pot A has been reached, the float 39 will rise and close the aperture 37, and thereby stop the further flow of molten metal into the pot A. It is desirable to make the contact of the swinging lever 38, which, it will be observed acts as a valve for the auxiliary-pot outlet 37, as tight against the auxiliary pot as possible, so as to prevent leakage from the latter. As an arrangement for securing this end I have shown in Fig. 4 the end of the lever 38 provided with an adjustable screw 50, with suitable

jam-nuts for allowing its adjustment in lever 38 and also for holding it in any adjusted position. By this arrangement the adjusting-screw 50 can be so adjusted as to make such close contact with the auxiliary pot F as to absolutely prevent leakage of the molten metal therefrom. When close contact is thus made between the swinging lever 38 and the auxiliary pot F, it will be observed that the friction between the lever 38 and the auxiliary pot F is greatly increased. To prevent objectionable results from this increased friction, I employ a spring 41, which tends to press the lever 38 downward into position to close the outlet 37. The link 40 is desirably guided by a suitable guide 42, secured to the metal-pot F. It will be observed that by this employment of an auxiliary melting-pot large quantities of metal, such as slugs, can be put into it without any particular attention or care as to their arrangement and adjustment. They can be thrown bodily into the pot in a promiscuous condition and in numbers sufficient to last the machine for some time. In this way the trouble of arranging for the automatic feed of the metal-pot of the machine is greatly reduced.

In Fig. 16 I have shown a movable jaw 45, which is understood to be the movable jaw employed in linotype-machines for determining the length of the type or printing edge of the slug prior to the forcing of the molten metal against their types. This jaw is well understood to be usually subjected to a spring tending to force it into position across the mold-slot when there are no matrices in position for casting. In such position of the jaw the machine is frequently operated, and when so operated produces a blank slug. In the drawings I have shown this jaw provided with a longitudinal recess extending outwardly from its pressing-face, and have also shown a bar 46, having a fixed printing-form, such as characters upon it, confined in this recess. In this way when the jaw is moved into position opposite the mold-slot the characters on the bar 46 come into position opposite such slot, and so when the machine is operated to force metal into the mold a slug bearing the form or characters on the slide 46 is cast. This arrangement obviously permits any form, such as letters or an expression or characters employed in considerable numbers in the office in which the machine is used, to be repeatedly cast without each time operating the machine and assembling the matrices necessary to that expression. For instance, in Fig. 16 the expression on the slide 46 is "Machine No. 4." Slugs bearing these types can be cast in large quantity by the use of this slide, so as to provide the operator with a sufficient quantity of slugs bearing the number of his machine to be applied to the work done by him, as is customary in offices where linotype-machines are used.

In Fig. 17 I have shown a slide 46^a, corresponding to the slide 46, but provided instead with a form or line such as is commonly inserted at the ends of articles.

It will be seen that by my invention the expense of arrangement for the casting of slugs bearing different styles of type is greatly reduced, and at the same time machines can be operated with a less expenditure of time and labor and in a more satisfactory manner.

What I claim is—

1. A linotype-mold, comprising cap and body portions and a wedge connecting said members and arranged to effect and to positively limit their separation.

2. A linotype-mold, comprising a base portion, a top portion, and a wedge connected by sliding joints to said members, the connection to one member being in a line oblique to the mold-slot and that to the other member being parallel with said slot, and means for controlling the longitudinal adjustment of said wedge.

3. In a linotype-mold, the base portion, the adjustable cap having legs to enter the base portion, and the longitudinally-movable wedge having its upper side connected by a slot joined to said legs and its lower side connected by a sliding joint to the body of the mold.

4. In a linotype-mold, the combination of a body portion and a vertically-adjustable cap portion having a transverse rib or shoulder 10, seated in a groove in the body, whereby the vertical adjustment of the cap is permitted and the end of the mold-slot closed under the different adjustments.

5. In a linotype-machine, matrices, each having two independent characters of different heights, in combination with a mold having two alining grooves or shoulders, 20 and 21, a vertically-adjustable cap, and means for effecting the said adjustment; whereby the mold is adapted to coöperate with either of the two characters, notwithstanding their difference in size.

6. In a linotype-machine, the combination of the metal-pot, an auxiliary melting-pot, and a valve arranged to operate in front of the opening in the auxiliary pot, substantially as described and shown.

7. A metal-pot feeder comprising an independent auxiliary melting-pot made separable from the machine and attachable thereto; an independent heating device carried by said auxiliary metal-pot; a valve comprising a swinging lever arranged to work against the face of the melting-pot so as to open and close an aperture formed therein; a float arranged for introduction into the metal in the metal-pot; a link connecting the float and the lever comprising the valve; and a guide for said link.

8. In a metal-pot feeder, the combination with the auxiliary melting-pot having an opening through which the metal can flow, of a valve arranged to work back and forth in front of said outlet, so as to open and close the same, and provided with means whereby

it can be adjusted to vary the closeness of its contact with the face of the melting-pot.

9. In a metal-pot feeder, the combination with the auxiliary melting-pot having an opening through which the metal can flow, of a valve arranged to work back and forth in front of said outlet, so as to open and close the same; and a spring tending to normally hold the valve in closed position.

10. In a type-casting machine, the movable jaws for determining the length of the printing edge of the slug, provided with a removable slide bearing a fixed printing-form.

11. In a linotype-machine and in combination with a mold, a movable jaw adapted to act endwise against and confine the matrices, said jaw recessed in its front face and adapted to maintain a special or supplemental matrix in front of the mold in the absence of the ordinary matrices.

12. In an adjustable knife-block the combination of a movable knife, and a shiftable wedge having a positive connection with said knife.

13. An adjustable knife-block comprising fixed and movable knives; a shiftable wedge positively connected with the movable knife; and mechanism for shifting the wedge.

14. In a linotype-machine, the combination of a movable knife, a longitudinally-movable wedge, having a sliding connection with the movable knife, an abutment, having a similar connection with the wedge, a lever for actuating the wedge, and means for holding the same in predetermined position, whereby the knife may be positively adjusted to trim the slugs to the various thicknesses demanded.

Signed by me at Chicago, Illinois, this 28th day of January, 1899.

JOHN S. THOMPSON.

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