

T. R. CASTLE.
MOLD FOR LINE CASTING MACHINES.
APPLICATION FILED FEB. 11, 1909.

1,057,036.

Patented Mar. 25, 1913.

2 SHEETS-SHEET 1.

Fig. 1.

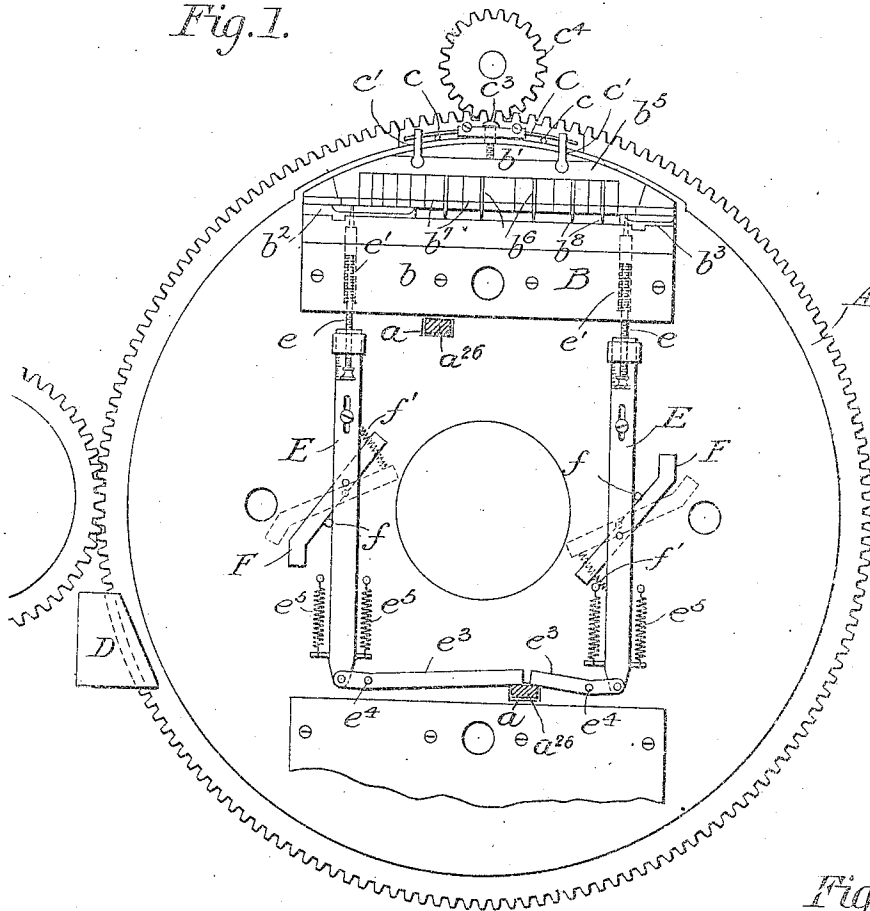


Fig. 2.

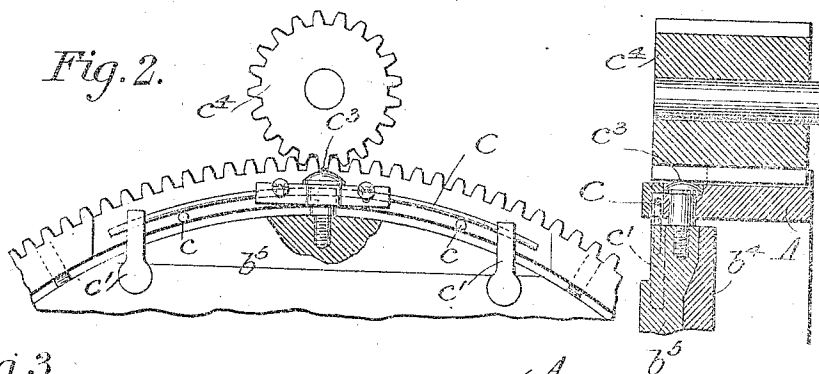
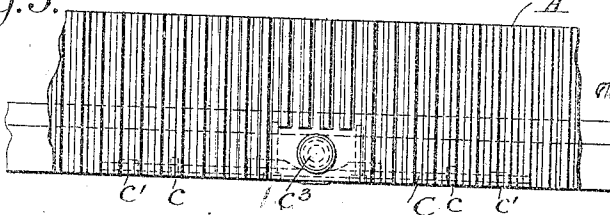


Fig. 3.

Witnesses
J. F. Barnes.
L. E. Morrison



Inventor
Thomas Richard Castle
By
G. T. Dodge
Attorney.

T. R. CASTLE.
MOLD FOR LINE CASTING MACHINES.
APPLICATION FILED FEB. 11, 1909.

1,057,036.

Patented Mar. 25, 1913.

2 SHEETS-SHEET 2.

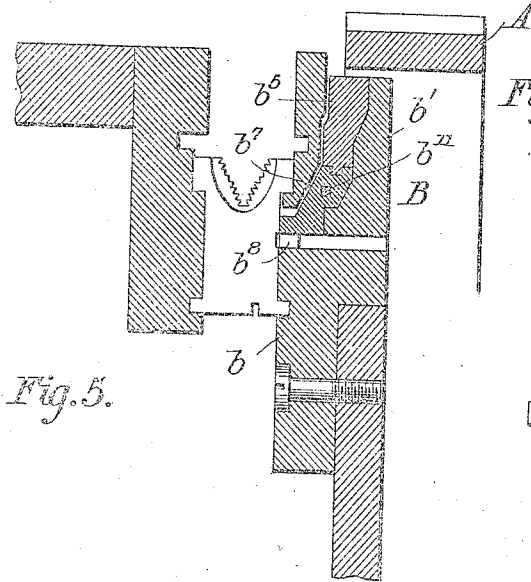


Fig. 9.

Fig. 10.

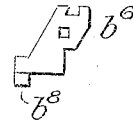


Fig. 11.

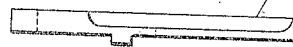


Fig. 12.

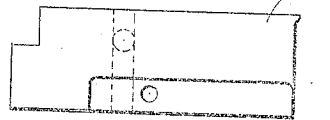


Fig. 6.

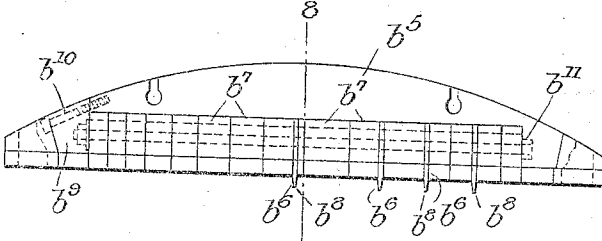


Fig. 8.

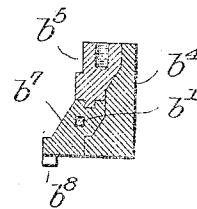
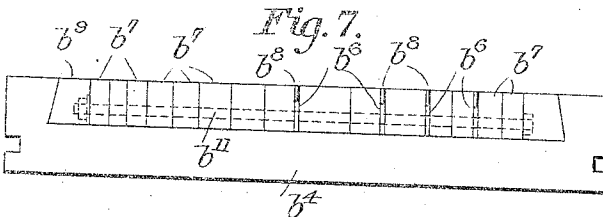


Fig. 7.



Witnesses

P. F. Barnes.
L. E. Morrison.

8

Inventor

Thomas Richard Castle

By P. F. Dodge

Attorney

UNITED STATES PATENT OFFICE.

THOMAS RICHARD CASTLE, OF LONDON, ENGLAND, ASSIGNOR TO MERGENTHALER
LINO TYPE COMPANY, A CORPORATION OF NEW YORK.

MOLD FOR LINE-CASTING MACHINES.

1,057,036.

Specification of Letters Patent.

Patented Mar. 25, 1913.

Application filed February 11, 1909. Serial No. 477,424.

To all whom it may concern:

Be it known that I, THOMAS RICHARD CASTLE, of 12 Cormont road, Myatt's Field, Brixton, London, England, have invented
5 a new and useful Improvement in Molds for Line-Casting Machines, of which the following is a specification.

My invention has reference to line casting machines of the general organization represented in Letters Patent of the United States No. 436,532, to Mergenthaler, wherein circulating matrices are assembled or composed in lines by means of finger keys, and the composed line presented to a channeled
10 mold, into which mold molten metal is delivered, under pressure, to produce slugs on which type characters are formed by the matrices at the front. The slugs when assembled constitute a type form or surface
15 from which to print.

When numerical tables or similar matter containing vertical column rules are to be printed it has been known to provide all of a series of slugs with shallow grooves, slots
25 or notches in their upper or printing faces, the several grooves being in line, and brass printing rules being subsequently seated therein. Such grooves and rules are shown for instance in United States Letters Patent
30 to Rogers No. 791,165.

Heretofore it has been customary to produce the shallow grooves or slots in the slugs either by the employment, as in Patent 791,165, of special deeply slotted matrices
35 cooperating with the mold, or by sawing the slot into the slugs after they are delivered from the machine.

The object of my invention is to adapt a machine containing matrices of the ordinary
40 form to produce slugs with shallow grooves or slots in any definite positions demanded; and my invention enables a machine to produce the slugs automatically without the employment of special matrices, and with
45 out sawing.

To this end my invention contemplates a channeled slug mold provided with one or more grooving-plates, projections, fingers, tongues or lugs (as they may be called), each
50 adapted, without entirely separating the slug into short slugs, to form shallow grooves or slots at the top of the slugs, that is, in the type or printing face thereof; these

grooving parts being retractable in order to admit of the slug being ejected into the 55 galley.

There are two distinct methods possible of coring a type slug to accommodate line or printing rules, namely casting the slugs with mere grooves or slots shallower than 60 the slug depth, said slots being at the type face and in alinement along the rule space, or on the other hand actually separating the metal into short segregated slugs. It is only to the first of these my invention applies, 65 and with such, shallow line rules are employed as distinguished from full depth rules. Since, however, in the two confusion could be caused by the use of words such as divide or division core or plate, I will em- 70 ploy the terms groove and grooving-plate, to emphasize that a mere grooving or slotting, while in one sense a division (namely a division of the printing face of the slug) is not comparable to a division in the other 75 and distinct sense of separating the metal into separate segregated short slugs.

By the system adopted in the present invention, the slug is not divided into segregated short slugs, and therefore the type 80 produced has its parts properly and permanently positioned to receive the line rules, and, the slug being a single piece of metal, its manipulation is simple, as is also the insertion of the rules. 85

I prefer to mount the grooving-plates in the top or cap of the mold, as constituent parts thereof; and to combine with the cap means by which it is automatically raised after the casting operation to withdraw the 90 plates from the slots in the slug. I prefer also to employ a composite mold cap consisting in part of laterally movable grooving-plates and intermediate filling or spacing pieces by which said plates may be se- 95 cured the desired distances apart.

The invention is susceptible of embodiment in various equivalent or alternative forms, which will suggest themselves to the skilled mechanic after consideration of this 100 specification.

In the drawings I have represented my invention in the form adapted for application to all existing Mergenthaler machines; and it is to be understood that with the ex- 105 ception of the parts hereinafter specifically

described the machines may be in all respects like that represented in Patent 436,532, or like those now in commercial use.

In the drawings: Figure 1 is a front elevation of a mold wheel provided with my improved mold and the cooperating parts—the mold being in operative position. Fig. 2 is a similar view showing the mold cap and adjuncts on a larger scale. Fig. 3 is a top plan view of the mold wheel. Fig. 4 is a cross section on the line 4—4 of Fig. 2. Fig. 5 is a vertical cross section through the mold and adjacent parts. Fig. 6 is a front elevation of the mold cap. Fig. 7 is a face view of the cap looking upward against the under side. Fig. 8 is a cross section on the line 8—8 in Figs. 6 and 7. Figs. 9 and 10 are side views showing respectively one of the spacing pieces between the grooving-plates, and one of the latter. Figs. 11 and 12 are respectively an edge view and a top plan view of one of the liners for determining the length of the slug.

Referring to the drawings, A represents the customary vertical mold wheel or disk of a linotype machine, adapted to sustain and carry one or more molds. This wheel will be mounted in a vertical position, as shown in Patent 436,532, on a horizontal slide, so that it may receive an intermitting rotation and also be moved forward and backward facewise in order to carry the mold to and from the matrix line as usual. B represents the mold, secured to and carried by the mold wheel. It consists of a body portion *b*, a composite cap *b'*, hereinafter described in detail, overlying the body, and two liners *b²* and *b³*, seated between the cap and body portions to determine the length of the mold slot or cell in which the slug is cast. The cap portion instead of being made in a solid piece is composed, as shown in Figs. 6 to 10, of a rear bar or member *b⁴*, a vertically-movable member *b⁵*, a series of grooving-plates *b⁶*, and intermediate spacing pieces or fillers *b⁷*. The member *b⁵* is formed with a longitudinal dovetail rib on its under side to sustain and hold pieces *b⁷* and plates *b⁶*. The pieces *b⁷* and plates *b⁶* are each formed in their upper ends with dovetail slots to fit the rib.

While we have described the front portion of the mold cap, carrying the cores, as movable vertically, it will, of course, be understood that the entire cap may be mounted to rise and fall. The non-movable front portion *b⁴* however forms a convenient means to hold the slug down while the plates *b⁶* and movable cap portion are being lifted.

In assembling the parts the plates *b⁶* are passed endwise upon the rib in any required number corresponding to the number of slots to be cast in the slug, and between each plate *b⁶* and the next there is inserted the proper number of filling pieces *b⁷*, of such

width as to hold the plates *b⁶* at the required distances apart, these distances of course corresponding to the distances required in the print between the column rules. The grooving-plates and the spacing pieces are alike in form except that the former have downwardly projecting grooving tongues or fingers *b⁸*, Fig. 10, adapted to extend downwardly and within the mold slot or cell, and contact the upper surface of the mold body, as plainly shown in Figs. 1 to 5. This grooving projection *b⁸* forming part of grooving-plate *b⁶*, is however at the front only, as seen in Fig. 5, so that while acting as a core, it merely grooves or slots the slug, at the printing face, leaving the metal continuous at the rear.

The grooving cores *b⁸* are of a thickness corresponding to that of the column rules to be used in the form, and from front to rear they have a width less than the slug depth but equal to the depth of the rules, so that when a slug is cast in the mold, around the cores, the latter will form in the front edge, or the edge bearing the types, slots of proper size and location to receive the column rules, which are of the kind that is shallower than the slug. The slots of the successive slugs will, of course, come exactly in register with each other, so that when the slugs are assembled in the form they will present continuous vertical slots of proper width, depth and location to admit the rules. The lower ends of the grooving-plates and spacing pieces, if we ignore the cores *b⁸*, are seen to present jointly a continuous under surface, forming thereat the roof or upper surface of the mold cell or slot. By rearranging and substituting the grooving-plates and filling pieces any desired number of slots, and of any desired width, can be formed in the slug. For the purpose of confining the plates *b⁶* and pieces *b⁷* compactly together in line, the cap member *b⁴* is formed at one end with a forwardly projecting arm or shoulder, against which the filler piece at one end of the line bears; and at the opposite end the line is confined and compressed by means of a removable piece *b⁹* secured to the member *b⁴* by a screw *b¹⁰*, as shown in Fig. 6. The filling pieces and grooving-plates may also be perforated, as shown, and as an additional security held by a bolt *b¹¹* extended through the series from end to end, as shown in Figs. 6 and 8.

As usual in this class of machines, the slug formed in the mold is delivered therefrom in a forward direction by an ejector blade advancing against it in the rear. It is manifest that the ejection of the slug cannot occur while the grooving cores *b⁸* remain in the casting position; they are therefore made retractable, so that they may be lifted out and clear of the slug to admit of its ejection. To this end the front portion of the

mold cap is arranged to slide vertically. It is lifted by means of a spring C overlying two pins c in the mold wheel, and engaging at its opposite ends with two pins or links c' , connected to the mold cap. The cap is provided, as shown more particularly in Figs. 1, 2, 3 and 4, with a central stud c^3 , and when the mold approaches the horizontal or casting position this stud is acted upon and depressed by an overlying pinion c^4 , mounted on the frame and engaging the usual teeth of the mold wheel. One of the teeth of this pinion acting on the stud forces the movable portion of the cap down to the casting position and holds it in place during the casting action.

It is to be observed that the stud is independent of the lifting spring.

After the casting action the mold wheel is rotated as usual to carry the mold to the ejecting position, and during this movement the middle portion of the spring C comes in contact with the usual stationary mold guide D, which pressing the spring inward at its middle causes its outer ends to rock upward upon the pins c as fulcras, thereby raising the movable portion of the mold cap away from the body and drawing the grooving-plates out of the slug—which will be held for the time being by friction in its original position in the mold.

When the continued rotation of the disk again presents the mold in the casting position, after the ejection of the slug, the movable portion of the cap will be depressed and held as before.

The length of the mold slot and of the slug produced will be controlled as usual by replacing the left hand liner b^2 by another of different length. The thickness of the slug may be varied by replacing the two liners by others of different thickness. When this change in thickness occurs the grooving-plates must be replaced by others having the grooving core b^8 of suitable length to extend through the slug.

From the foregoing description it will be received that the mold in casting position has grooving cores in the forward end to form shallow slots, that after the casting action these cores are withdrawn to permit the ejection of the slug, and that they are again restored to their original position preparatory to the casting action. By shallow grooves or slots I mean shallower than the slug, by an amount sufficient to preserve the unity and continuity of the slug.

Owing to the fact that the spacing pieces b^7 and grooving-plates b^8 (if we neglect the grooving cores b^8) together constitute the mold roof or cap at the front, the mold at this point actually opens at the time the grooving-plates are removed from the cast slug. The plates therefore do not move into and out from the mold channel, nor have

they any relative movement with respect to the channel upper side, but they merely move into place when the channel is formed; and they withdraw with the channel roof when the mold opens, thus retracting from the slug itself and the mold lower portion.

As a precautionary, but not necessary feature, I propose to combine with the devices above described means to prevent the action of the machine in the event of the failure of the mold cap to close to its proper position. As shown in the drawings, these devices consist of two slides E guided in the mold disk, and carrying at their upper end vertically adjustable screws e , the upper ends of which pass through the liners and bear against the under side of the mold cap. They are urged constantly upward by a spiral spring e' , seated in the mold body and bearing beneath shoulders on the screws. The lower ends of the respective slides are jointed to two levers e^3 pivoted to the disk at e^4 . These slides are urged upward by springs e^5 . If the movable portion of the mold cap descends to the proper position it forces the slides downward and causes the inner ends of the levers e^3 to rise to the position shown in Fig. 1, in which position they will fail to encounter the usual automatic stop device of the machine when the disk and mold are advanced facewise to the casting position. If, however, the movable portion of the mold cap fails to descend to the proper position the slides will be urged upward and the inner ends of the levers e^3 thrown downward to such position that they will encounter and actuate the usual machine stopping device a^{26} of Patent 436,532.

In Fig. 1 hereof a^{26} is shown as a bar constituting part of a stop mechanism, it being indicated in cross-section in line with aperture a in the mold wheel. Only when the levers e^3 cover the aperture a do they act upon the bar a^{26} in the mold wheel's forward movement.

It is equally important that the machine shall be automatically stopped in the event of the movable portion of the mold cap failing to rise clear of the slug by the time the mold arrives at the ejecting position. For this purpose I pivot to each of the slides E a lever F arranged to ride against a stationary pin f and connected at one end to the slide by a spring f' .

If the movable portion of the mold cap fails to rise it will hold the slide E and the levers F in such position that the latter will actuate the automatic stop device and arrest the machine, thus preventing the forward delivery of the slugs unless the mold cap is raised to carry the cores clear of the slug.

From the description in Patent No. 436,532, page 11, lines 15 to 54, it will be understood that the device or bar or plate a^{26} is in a position where it may be acted

upon and pushed outward by the mold wheel as the latter axially advances to operating position, and that plate a^{26} through mechanical connection not necessary to be here shown, may cause the clutch mechanism to shift and stop the machine. In the present case the levers c^3 or F are the parts of the mold wheel which, when in certain positions, contact and actuate the device that releases the clutch. Thus in Fig. 1 the lever ends c^3 are not in operative position, but were they slightly lower they would come behind device a^{26} , so that the movement of the wheel toward the observer will cause c^3 to contact a^{26} and push the latter, thus stopping the machine. So after the wheel is rotated to ejecting position one lever F takes a location analogous to the illustrated location of c^3 . If the angular position of lever F be as in full lines it will be inoperative, but if in the dotted position (indicating the mold cap not to have lifted) the lever comes beneath device a^{26} , causing it as before to stop the machine. It will be seen that the device a^{26} is in duplicate, one for each lever F, and it is understood that there is a (square) opening (not seen) behind the full line position of each lever F, at the end of each lever, analogous to the openings a , a , behind the levers c^3 already described; so that when the mold wheel has shifted from the position of Fig. 1 to ejecting position; then, if the cap has been properly opened the levers F will have been shifted to dotted position, the openings will have been uncovered, and the stop-bars a^{26} (which do not move with the mold wheel) may pass into the openings, while if both levers F have not been shifted one of them will contact a stop-bar and cause the machine to stop.

Having described my invention, what I claim is:

1. A channeled mold for a line casting machine having at the front thereof one or more grooving cores adapted to form shallow grooves in the printing edge of the slugs cast therein, said cores forming part of the mold as distinguished from being formed on matrices.

2. A channeled mold for a line casting machine having at the front thereof one or more grooving cores adapted to form shallow grooves in the printing edge of the slugs cast therein, said cores forming part of the mold as distinguished from being formed on matrices; in combination with automatic mechanism for causing the cores to withdraw from the slugs before ejection of the latter.

3. A channeled mold for a line casting machine comprising two principal members forming a channel between them, one movable to and from the other, the movable portion provided with one or more grooving

cores extending across the channel and adapted to form shallow grooves in the printing edge of the slugs cast therein, said cores forming part of the mold as distinguished from being formed on matrices.

4. A channeled mold for a line casting machine comprising two principal members forming a channel between them, one movable to and from the other, the movable portion provided with one or more grooving cores extending across the channel and adapted to form shallow grooves in the printing edge of the slugs cast therein, said cores forming part of the mold as distinguished from being formed on matrices; in combination with automatic mechanism for causing the movable member and cores to withdraw from the slug before ejection of the latter.

5. In a line casting machine, the combination of a mold body, a relatively movable cap provided with grooving cores to form shallow grooves in the printing edge of the slugs cast therein, said grooves extending entirely through the metal and located at intermediate points in the metal, means for automatically lifting the cap and thereby withdrawing the cores from the slug after each casting action, and means for automatically restoring the cap to its original position after the ejection of the slug.

6. In a line casting machine a mold comprising members separable and closable, a part adapted to be connected to a machine stopping mechanism, and means intermediate the movable mold member and said part whereby the mold member controls the actuation of said part for effecting the stoppage of the machine when the mold is in improper adjustment.

7. In combination with the mold body, a relatively movable mold cap and means controlled by the movement of the cap for actuating a part of a machine stopping mechanism.

8. In a line casting machine a mold comprising a member movable in relation to the remainder for the purpose of closing the mold during casting, in combination with a part of a machine stopping mechanism and connections between said movable mold member and said part for actuating the latter when the mold in casting position is not properly closed.

9. In a line casting machine a mold comprising a member movable in relation to the remainder for the purpose of releasing the slug prior to ejecting, in combination with a part of a machine stopping mechanism and connections between said movable mold member and said part for actuating the latter when the mold in ejecting position is not properly opened for releasing the slug.

10. The channeled line casting mold comprising the body portion, removable liners,

and a cap provided with grooving core pieces independently adjustable laterally and adapted to form shallow grooves in the printing edge of the metal slug, without destroying its unity.

11. A line casting mold having a channel adapted to have a one-piece slug cast therein and provided with adjustable and detachable grooving core plates b' , and intermediate filling pieces b ; said plates b' having shallow groove forming projections.

12. In combination with the mold wheel the mold secured thereto and having a movable cap, the spring C, the cap depressing pinion c^4 and an external device D, not rotating with the mold wheel, to act on the spring and raise the mold cap at ejecting position.

13. In combination with the mold wheel, the mold secured thereto having a movable cap, the cap depressing pinion c^4 mounted externally to the mold wheel and in engagement with teeth on the latter, and means mounted externally to the mold wheel for effecting the raising of the mold cap at ejecting position.

14. A tabulator mechanism for linotype machines, comprising a mold member having a slug channel, one or more grooving-plates adapted to extend into the front part of the channel for producing shallow grooves at the printing edge, a movable part constantly connected with said plates, means for holding said part to retain said plates in casting position, and means for au-

tomatically moving said part to withdraw said plates from the slug before ejection.

15. A tabulator mechanism for linotype machines, comprising a mold member having a slug channel, one or more grooving-plates adapted to produce shallow grooves at the slug's printing edge, and means for automatically moving all said plates away from the slug before ejection.

16. A tabulator mechanism for linotype machines, comprising a mold member having a slug channel and a cap piece, one or more grooving-plates adapted to produce shallow grooves at the slug's printing edge, and means for automatically moving said cap piece and all said plates away from the slug before ejection.

17. In a tabulator mechanism for linotype machines, a mold comprising a base, a part supported above said base and provided with a depending dovetail member, a series of cap plates having complementary dovetail members adapted for adjustment and support on said part, and one or more grooving-plates located between said cap plates, they also having dovetail members and adapted for adjustment and support on said part.

In testimony whereof I hereunto set my hand this 22nd day of January, 1909, in the presence of two attesting witnesses.

THOMAS RICHARD CASTLE.

Witnesses:

H. D. JAMESON,

F. L. RAND.