W. A. READE & F. METCALF.

METHOD OF MAKING TYPE BARS.

APPLICATION FILED DEC. 15, 1916.

1,232,718.

Patented July 10, 1917.

2 SHEETS—SHEET 1.

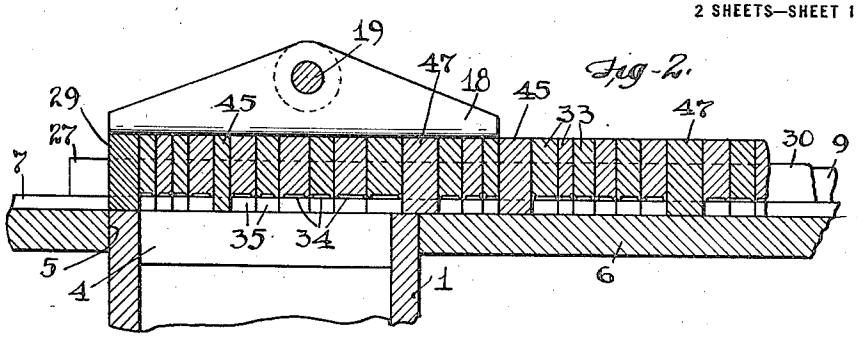


Fig. 2.

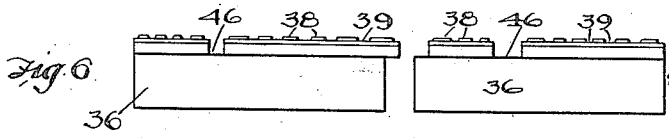


Fig. 6

Fig. 7.

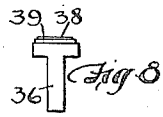


Fig. 8

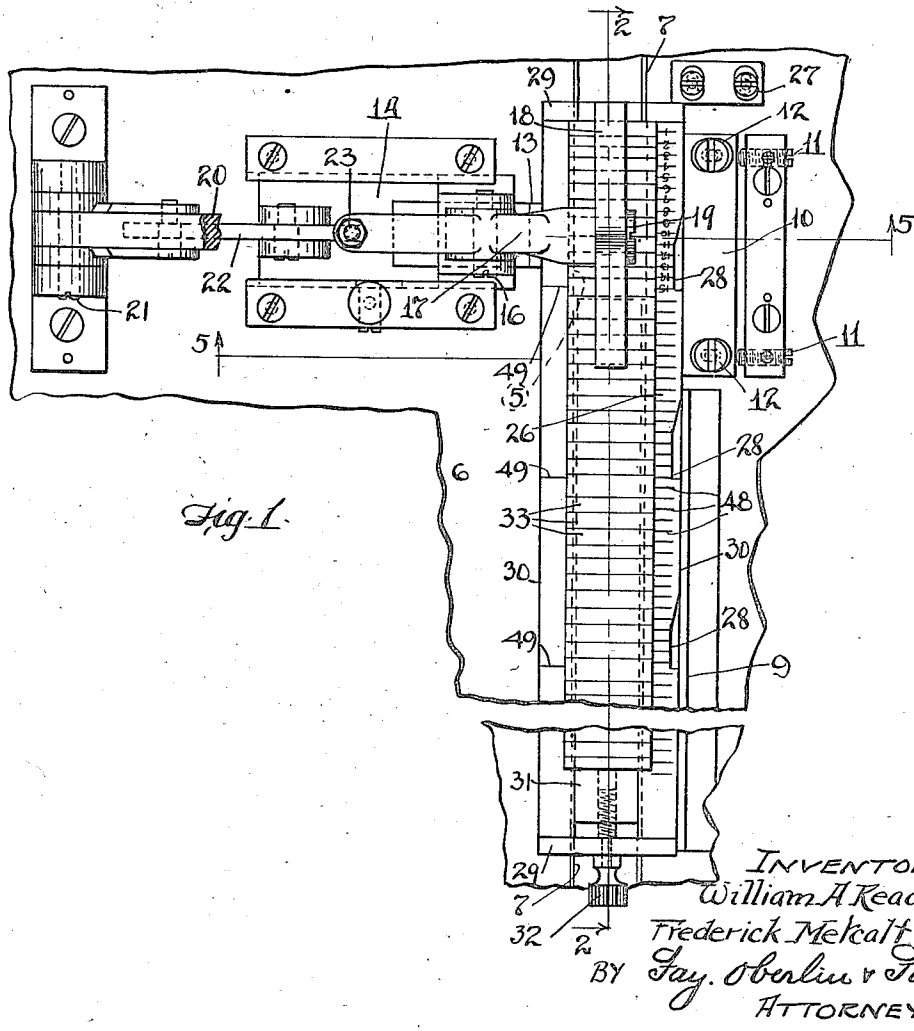


Fig. 1.

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2 SHEETS—SHEET 2.

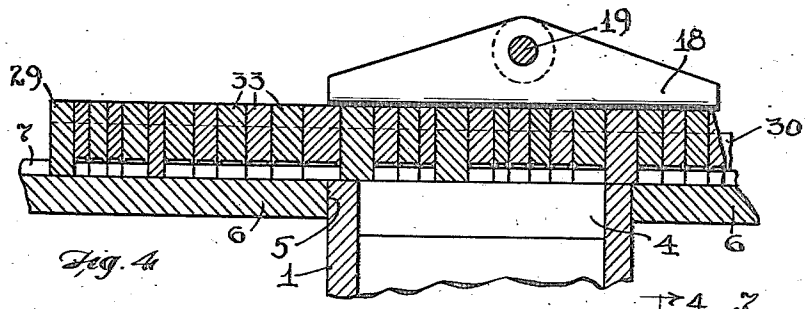


Fig. 4

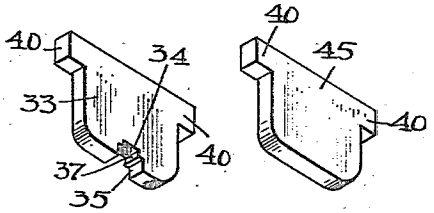


Fig. 9 Fig. 10

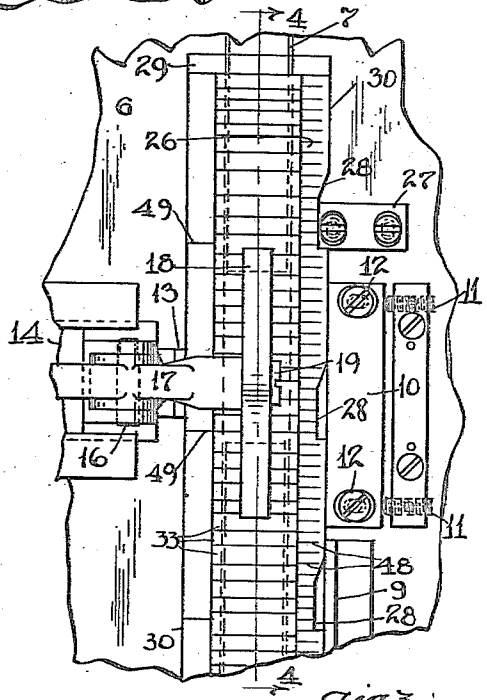


Fig. 3.

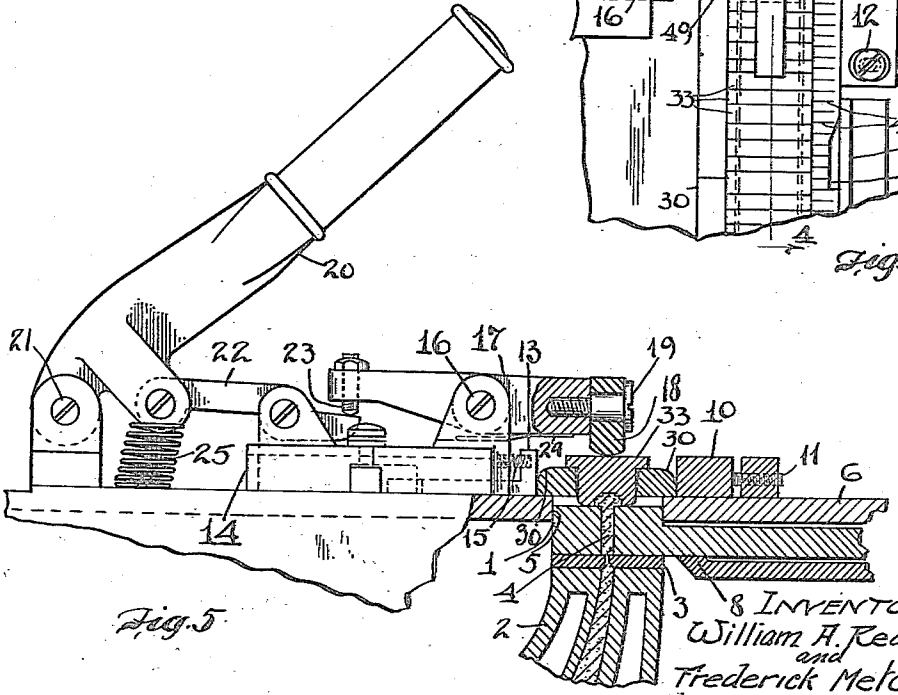


Fig. 5

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UNITED STATES PATENT OFFICE.

WILLIAM A. READE AND FREDERICK METCALF, OF CLEVELAND, OHIO, ASSIGNORS TO THE LUDLOW TYPOGRAPH COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF MAINE.

METHOD OF MAKING TYPE-BARS.

1,232,718. Specification of Letters Patent. Patented July 10, 1917.

Application filed December 15, 1916. Serial No. 137,139.

To all whom it may concern:

Be it known that we, WILLIAM A. READE and FREDERICK METCALF, citizens of the United States, and residents of Cleveland, county of Cuyahoga, State of Ohio, have jointly invented a new and useful Improvement in Methods of Making Type-Bars, of which the following is a specification, the principle of the invention being herein explained and the best mode in which we have contemplated applying that principle, so as to distinguish it from other inventions.

The present improved process or method is designed more particularly for casting slugs or type-bars having an upper enlarged portion bearing the type-characters in order to permit the casting of slugs for printing head-lines and advertisements. Heretofore linotype and similar type-bars have been practically limited to the printing of the smaller type sizes known as body type, such as are used for ordinary reading matter, and it has been necessary to maintain a stock of "sorts" of such larger or display type in order to enable the printer to set up head-lines and display work in general.

By making a slug, however, with an enlarged upper portion, thereby giving such slug either a T-shape or L-shape in cross-section, we have found that characters of the largest size used in printing work may be cast on slugs, and thus with a single font of type matrices permit any amount of this sort of work to be set up. In casting slugs of this kind, owing to the size of the characters, some difficulty is encountered where a series of slugs are to be assembled end-on in the form to make up a line of greater than column width because of the breaks occurring between successive slugs. This same difficulty of course occurs, to a noticeable degree, in setting up ordinary linotype work, where the slugs are joined end-on in the fashion just described, it being impossible by the prevailing methods and with any machines now on the market, to secure uniform spacing through the entire length of the line, since the successive slugs have to be set and justified separately.

The present improved process or method, accordingly, has as its object the casting of slugs by means of which a line of type, and particularly a line of such large type, may be set up of greater length than the normal width of the column without any breaks occurring between the terminal characters on successive slugs. To the accomplishment of these and related ends, said invention, then, consists of the steps hereinafter fully described and particularly pointed out in the claims, it being understood that the mechanism aspect of the invention forms the subject matter of a separate application filed April 12, 1915, Serial No. 20,607 out of which the present case has been required to be divided.

The annexed drawing and the following description set forth in detail certain mechanism adapted for carrying out our present improved method or process, such disclosed means constituting, however, but one of various ways in which the principle of the invention may be used.

In said annexed drawings:—

Figure 1 is a plan view of a typograph machine embodying our present improvements; Fig. 2 is a cross-section of the same taken on the line 2—2, Fig. 1; Fig. 3 is a broken plan view corresponding to Fig. 1, but showing the parts in a different operative position; Fig. 4 is a sectional view of the same corresponding to the section of Fig. 2; Fig. 5 is a front elevational view with parts broken away and shown in section, of the aforesaid mechanism; Figs. 6 and 7 are side elevations of two slugs or type-bars cast with the mechanism as arranged in Figs. 2 and 4, respectively; Fig. 8 is an end elevation of such a slug; Fig. 9 is a perspective view of a matrix bar with a character-impression; and Fig. 10 is a similar view of a blank matrix bar.

The casting mechanism proper forms no part of the present invention, the general features thereof being the same as those shown and described in the co-pending application of Edwin S. Carman, filed February 26, 1910, Serial No. 546,108. The parts of present interest comprise a mold 1 supported so as to be capable of vertical movement downward from the casting position shown in Fig. 5 to a position which will permit of the ejection of the slug. Co-operative with such mold in the latter's casting position is a casting pot, of which only the nozzle 2 is shown, such pot being supported so as to permit the nozzle to be moved entirely out of the path of movement of the mold just described, and including suitable means (not shown) where-

by the molten metal may be forced into the casting slot 4 in the mold when the latter is in proper position, as will be readily understood. The end of the nozzle is provided with a squirt-plate 3 of the usual construction, which comes into direct contact with the under side of the mold, the slot in the latter being of such form and dimensions as to serve as a mold for a slug body of the desired length and width.

In its casting position the mold registers with, or rather lies in, an opening 5 in the horizontally extending top 6 of the general machine frame, so as to be substantially flush with the upper surface of such top, or rather with the surface of a trough-like depression 7 extending transversely across the same from the front to the rear as shown in Fig. 1. Associated with the mold, so as to be carried therewith in its vertical movement, is a trimming knife or blade 8 in the form of a slide, such slidable trimmer being retracted in the casting position of the mold, as shown in Fig. 5, and being capable of being thereupon advanced across the casting slot in such mold, after the nozzle of the casting pot has been withdrawn.

The extent and form of the table top 6 are more or less a matter of indifference, such top primarily forming a support for the matrix holder, pending the placing of the same over the mold, and the withdrawal of the latter therefrom when the slug has been cast. Preferably, however, said top is relatively extensive and closed, instead of being merely an open framework such as might otherwise suffice, in order better to protect the operator and the parts of the machine supported on the top, from the heat and gases arising from the casting pot. Disposed alongside the trough or depression 7 in the top, designed to receive the matrix holders, as already set forth, is a guide 9 that extends substantially to the opening 5 wherewith the mold registers in its casting position. Adjacent one side of such opening is a stop block 10 adjustably fixed to the table by means of set-screws 11 and clamp-screws 12, as will be readily understood; while adjacent the opposite side of the opening is a presser foot 13, movably held in the forward end of a slide 14, a compression spring 15 being interposed between such foot and slide so as to afford a resilient backing for the former. Oscillatorily mounted upon said slide about a transverse pivot 16 is a lever 17, the forward end of which projects over the opening 5 in the table and carries a bar 18 alined with such opening, said bar being pivotally secured to the front end of said lever by a pin 19 so as to be adapted to press uniformly on the backs of the assembled matrices in the holder, as will be presently explained. To further assist in securing uniform contact with said matrices, the under side of this clamp-bar is rounded off transversely as shown in Fig. 5.

A handled lever 20, pivotally mounted on the top 6 about an axis 21, transverse to the direction of movement of the slide 14, is connected with the latter by means of a link 22 so that said slide, with the presser foot 13, will be moved forwardly, that is to the right as shown in said Fig. 5, when said handled lever is depressed. The forward end of link 22 projects beneath the rear end of the lever 17 that carries clamp-bar 18, a set-screw 23 in such lever-end contacting with such projecting portion when the link is oscillated incidental to the depression of the hand lever, the effect of such engagement being obviously to depress the clamp-bar. A flat leaf spring 24 under the forward end of the lever 17 normally holds such clamp-bar in inoperative position, while a compression spring 25 is similarly provided to normally raise the handled lever and thus retract the slide and presser foot carried thereby.

In this condition of parts the matrix holder 26 shown in complete plan view in Fig. 1, in longitudinal vertical section in Figs. 2 and 4, and in transverse vertical section in Fig. 5, is adapted to be inserted between the fixed stop 10 and such presser foot, such holder being conveniently moved along the trough or depression 7 in the table top in engagement with the guide 9 into such desired position. The exact longitudinal location of the holder is determined by means of a stop block 27 that projects over such trough so as to engage the rear end of the holder in its initial position and one or the other of a series of notches 28 in the side of such holder in successive positions of the same, as will be presently described.

As shown in the figures last referred to, the holder in its preferred structural form comprises two end pieces 29 secured to side members 30, which latter are long enough to provide an opening somewhat larger than the aggregate length of a plurality of slugs of the kind which it is desired to cast, which in the case in hand has been assumed to be fifteen ems. Slidably secured between the side members 30 at one end of the holder is a clamp member, or block 31, that is engaged by the threaded portion of a screw 32 rotatably secured in the adjacent end piece 29 and provided with a knurled head, by rotating which said block can obviously be advanced or retracted to clamp the assembled matrices, or matrix bars 33, as they may be termed to distinguish them from the impressions 34 of the type-characters which constitute the matrices proper.

These bars are of the general form illus-

trated in Fig. 9, being in effect plates or blocks of uniform length and height, but of varying width to accommodate character-impressions of correspondingly varying width. The latter are struck or driven in the bottoms of recesses cut in what may be called the lower edges of the bars, these recesses comprising a portion 35 having a width and depth prescribed which it is desired the head of the slug 36 (Fig. 8) should have, it being understood that the depth of such head, plus the depth of the body portion of the slug, should equal the height of ordinary slugs as commercially made, so that both kinds of slugs can be used in the same form if desired. In addition to the main recess portion 35 a supplemental recess 37 is formed, where the character is of less extent than such main recess, to receive the character-impression 34, the object being to have the molded character 38 formed by the matrix on the slug, on an entablature 39 of as limited extent as possible in order to prevent smearing of the printed sheet by ink carried on the blank face of the slug.

The upper portions of the matrices project laterally in the form of ears 40 which are adapted to rest on the side pieces 30 of the holder, leaving the bodies of the matrices depend between and some distance below such side pieces, as shown in Fig. 5. In order to facilitate the insertion of the matrices in the holder, the inner faces of such side pieces are slightly beveled or flared, a close fit, however, being secured between their lower edges and the matrix bars so as to insure the correct alinement of the latter in a horizontal plane.

In so far as the foregoing features of construction are described in the co-pending application of William A. Reade, filed June 19, 1915, Serial No. 35,070, no claim is herein made to such features. In the machine of such co-pending application, however, provision is made for setting up a composite matrix adapted to cast but a single slug, whereas in the present construction of machine, by providing an elongated holder 26 equaling the aggregate length of a plurality of slugs, it is possible to set up in such holder a series of composite matrices, from which impressions can be taken, or slugs cast, one after the other, by simply moving the holder lengthwise across the top of the table and clamping it down, as will be presently described.

In setting up the individual matrix bars in the holder in order to form successive composite matrices, the spaces between words, or at the ends of lines, are formed by the use of blank matrix bars 45 of the kind illustrated in Fig. 10, which leave the cast slug with the corresponding portions 46 of its head cut away, as it were (see Figs. 6 and 7). The blank matrices used for this purpose will of course be of varying widths so as to permit of the formation of spaces in the slugs having different lengths, as shown in Figs. 2 and 4. In addition to blank matrix bars of this kind, a series of blank bars 47 are provided, all of the same width, which will preferably be two ems in the case assumed above for the purpose of illustration, one being required for use between each successive composite matrix in the holder. The latter has one of its sides 30 provided with graduations 48 in ems and has the other marked off by division lines 49 into spaces equal to the length of the slug body which is to be cast, namely, fifteen ems in the assumed instance.

The notches 28 on the side of the holder, which are arranged to engage the end stop 27, in the successive positions of such holder, will then be spaced seventeen ems apart, the first notch being also seventeen ems from the end of the holder which first abuts against such stop. In assembling the matrix bars 33 and 45 to form a line of type, it will then be a matter of indifference whether or not the last bar of the first group is exactly equal to fifteen ems, for the recess in such bar may be allowed to project beyond the end of the mold slot as shown at the right-hand end of the mold in Fig. 2, or it may stop short of the end of the mold as shown at the left of the latter in Fig. 4. In either event, between such matrix bar and the group forming the next composite matrix, one of the two-em blanks 47 is interposed as shown in said Figs. 2 and 4. The result is that when the holder is advanced from its first casting position to its second, unless a space happens to come between the first and second group of matrices, the latter will either stop short of, or extend beyond, the left end of the mold in a fashion complementary to that just described, and the upper enlarged portion of the one slug will terminate short of the end of said slug while such enlarged portion of the other slug will project a corresponding amount, as shown in the case of the juxtaposed ends of the slugs 36 in Figs. 6 and 7.

As a result of the foregoing construction it is possible to justify the line of assembled matrices at once and thus to secure uniform spacing thereof throughout the entire length of the holder 26. Furthermore, when the finished slugs are gathered together in the form they will obviously provide a continuous line of type without any unnecessary or forced spaces such as have always heretofore characterized this kind of work, even in the case of the smaller fonts of type in which the upper portion of the slug bearing the type characters is no wider than the body of the slug. It will be readily apparent, in other words, that the foregoing improved construction of typograph mecha-

nism is readily adapted for use in casting slugs for lines of greater length than the slot in the standard mold, irrespective of the face of type being used.

The general mode of operation of our improved machine has been in effect set forth incidentally to the description given of the construction of its various component parts. The length of the holder 26 used will, of course, aside from the condition of convenience in handling, depend on the total length of line which it is desired to set up with the slugs. Assuming the length of such line to be equal to six slugs, or, in other words, to six ordinary columns, an equal number of composite matrices will be formed by placing the selected matrix bars 33 and 45 in the holder with a bar or floating division piece 47 interposed adjacent each mark 49. After the holder has been thus filled, the assembled bars are clamped more or less tightly in place by means of screw 32, and the holder then positioned on the table between block 10 and presser foot 13 and with its end opposite to the one provided with such screw in engagement with end-stop 27. By depressing handled lever 20, both said presser foot and the clamp bar 18 are actuated to securely hold the first group of matrices in properly alined condition against the upper face of mold 1. By forcing the molten metal into the slot in such mold and the recesses of the matrices, a slug is formed, which is thereupon trimmed, and, after the mold has been lowered away, ejected.

Upon the mold being restored to casting position the holder, having first been released from the clamping mechanism by raising handled lever 20, is advanced until the first notch 28 engages the end-stop 27. Thereupon a second slug may be cast in just the same manner as before, the operation being repeated until the last group of assembled matrices has been reached.

As previously explained, it is necessary to give attention to the matter of justification only once in connection with the entire line, since all of the slugs otherwise fit together to form a continuous line. The difficulty heretofore encountered in setting up linotype in lines longer than the individual slugs is hence entirely overcome, it being possible to have all of the spaces in the line be, or appear to be, of uniform width. It will be understood of course that owing to varying lengths of words and widths of characters, the width of the space will vary, all this being taken into account, if the justification is to be effective and satisfactory. Much resetting is saved over the procedure where a line no longer than the slug can be cast.

Furthermore, when a wide letter comes at the end of a slug, so that it can be accommodated only by providing an overhang, the length of such overhang need not be measured in order to properly indent the next slug, but such overhang is automatically compensated for by the indentation of such following slug. Much cutting and trying is thus avoided, it being sometimes difficult to find a space, or blank matrix that will exactly complement a particular overhang.

Finally, the casting of the successive slugs is very much facilitated by the use of a long holder capable of accommodating a plurality of groups of the individual detached matrix bars, since such holder does not require to be removed and another inserted in its place for each operation of the casting mechanism, but such holder needs merely to be advanced from one position to the next across the supporting table.

In referring to the matrix bars hereinbefore, as well as in the following claims, it will be understood that we use this term to distinguish from the special division bars which form a feature of the present invention. Such matrix-bars may, accordingly, bear any of the characters found in any font, or may be simple blank bars, such as are used for spacing.

Other modes of applying the principle of our invention may be employed instead of the one explained, change being made as regards the method herein disclosed, provided the step or steps stated by any one of the following claims or the equivalent of such stated step or steps be employed.

We therefore particularly point out and distinctly claim as our invention:—

1. The method of casting slugs designed to form a line of type-characters of length greater than a single slug, which consists in assembling selected matrix-bars of various widths corresponding with the characters thereon, into alined groups of approximately the length of such single slug, interposing a division bar between successive groups, and taking a separate cast of each group.

2. The method of casting slugs designed to form a line of type-characters of length greater than a single slug which consists in assembling selected matrix-bars of various width corresponding with the characters thereon, into alined groups of approximately the length of such single slug, interposing a division bar between successive groups, and taking a cast of each group in succession, the assembled body of matrices being shifted each time a distance equal to the length of such slug plus the width of the interposed division bar.

3. The method of casting slugs designed to form a line of type-characters of length greater than a single slug, which consists in assembling selected matrix-bars of various widths corresponding with the characters thereon, into alined groups of approximately

the length of such slug, interposing a division bar between successive groups, all of said division bars being of the same width, and taking a separate cast of each group.

4. The method of casting slugs designed to form a line of type-characters of length greater than a single slug, which consists in assembling selected matrix-bars of various widths corresponding with the characters thereon, into alined groups of approximately the length of such slug, interposing a division bar between successive groups, all of said division bars being of the same width, and taking a cast of each group in succession, the assembled body of matrices being shifted each time a distance equal to the length of such slug plus the width of the interposed division bar.

5. The method of casting slugs designed to form a line of type-characters of length greater than a single slug which consists in assembling selected matrix-bars of various widths corresponding with the characters thereon into alined groups of approximately the length of such single slug, justifying such assembled matrices as a single line, interposing a division bar between successive groups, and then taking a cast of each group.

6. The method of casting slugs designed to form a line of type-characters of length greater than a single slug, which consists in assembling selected matrix-bars of various widths corresponding with the characters thereon, into alined groups of approximately the length of such single slug, interposing a division bar between successive groups, justifying such assembled matrices as a single line, and then taking a cast of each group in succession, the assembled body of matrices being shifted each time a distance equal to the length of such slug plus the width of the interposed division bar.

7. The method of casting slugs designed to form a line of type-characters of length greater than a single slug, which consists in assembling selected matrix-bars of various widths corresponding with the characters thereon, into alined groups of approximately the length of such slug, interposing a division bar between successive groups, all of said division bars being of the same width, justifying such assembled matrices as a single line, and then taking a cast of each group, the space occupied by such division bars being divided up among such casts.

8. The method of casting slugs designed to form a line of type-characters of length greater than a single slug, which consists in assembling selected matrix-bars of various widths corresponding with the characters thereon, into alined groups of approximately the length of such slug, interposing a division bar between successive groups, all of said division bars being of the same width, justifying such assembled matrices as a single line, and then taking a cast of each group in succession, the assembled body of matrices being shifted each time a distance equal to the length of such slug plus the width of the interposed division bar.

Signed by us this 14th day of December, 1916.

WILLIAM A. READE.
FREDERICK METCALF.