

Jan. 23, 1951

## F. C. FROLANDER

2,538,902

## TYPOGRAPHICAL DISTRIBUTING MACHINE

Filed Feb. 12, 1948

2 Sheets-Sheet 1

FIG. 1.

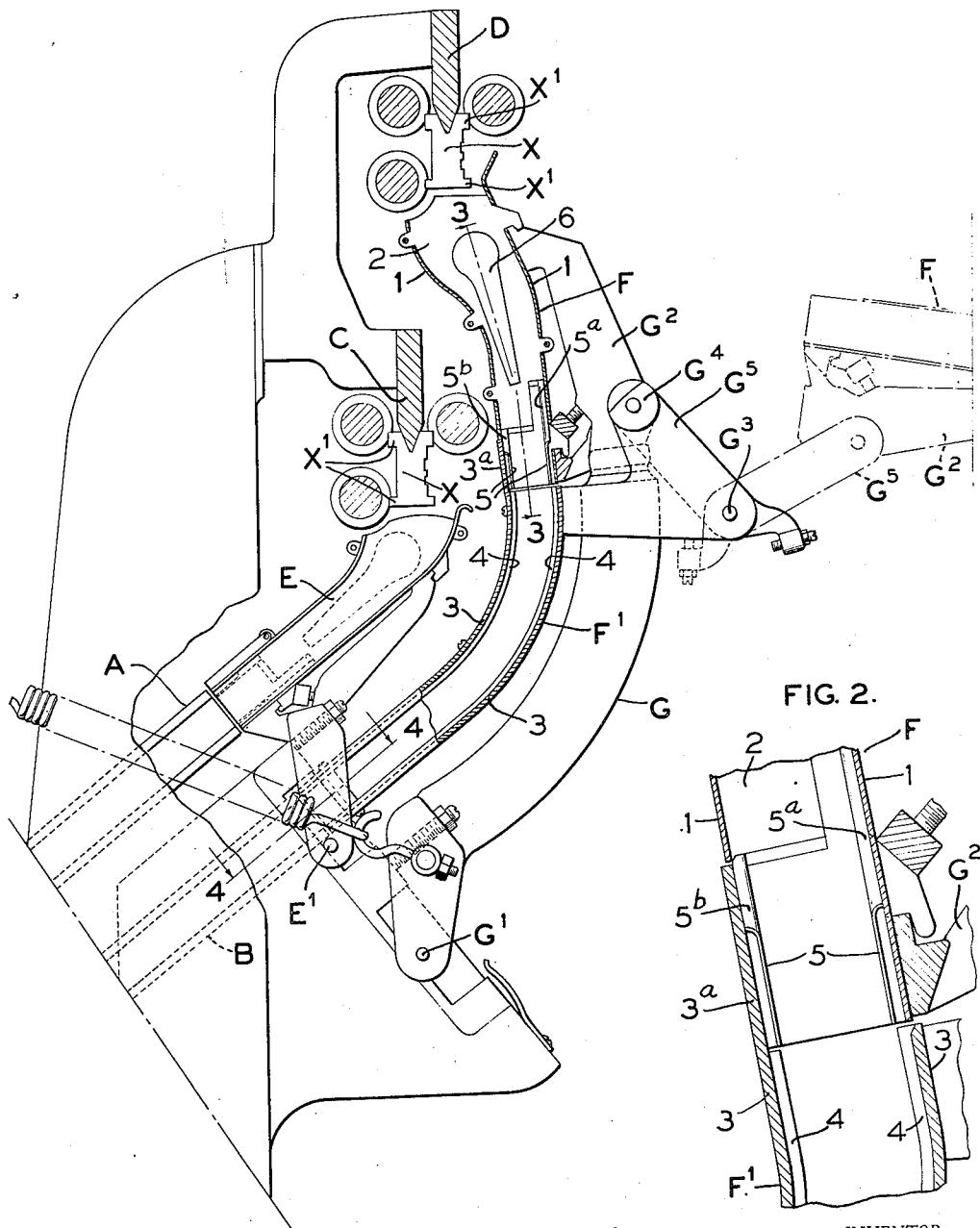
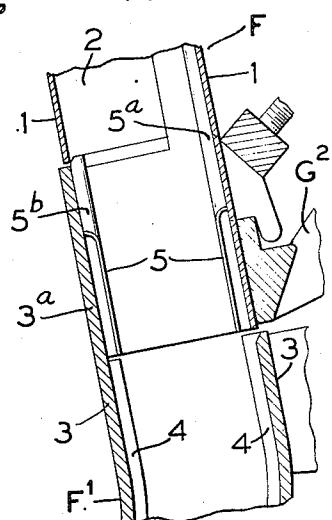


FIG. 2.



INVENTOR

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BY  
Morrison, Kennedy, Campbell ATTORNEYS

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F. C. FROLANDER

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2 Sheets-Sheet 2

FIG. 3.

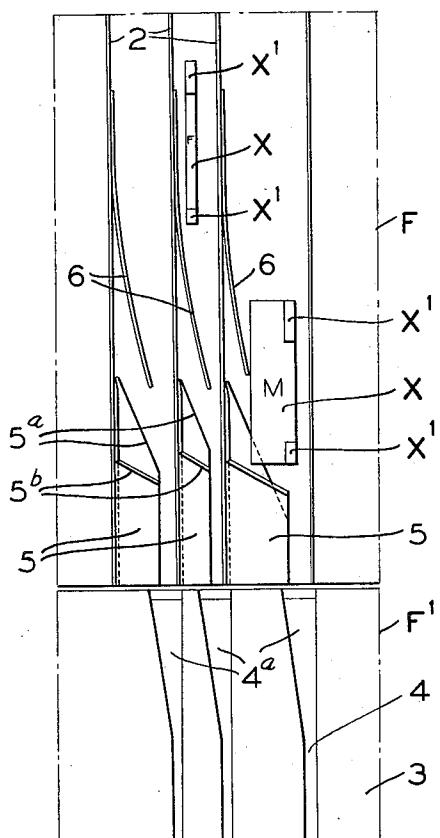


FIG. 4.

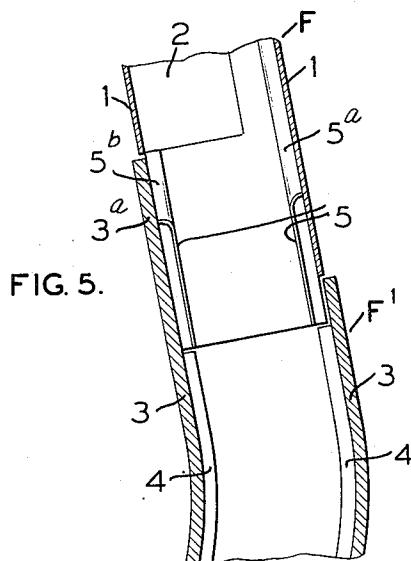
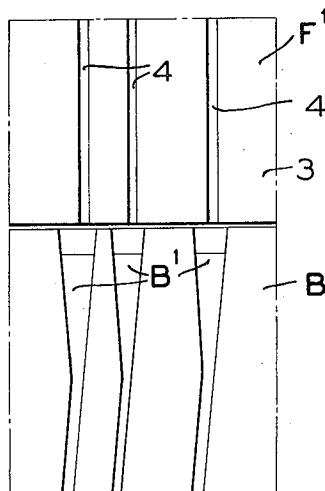


FIG. 5.

*F. C. Frolander*  
INVENTOR  
BY

*Morrison Kennedy Campbell* ATTORNEYS

## UNITED STATES PATENT OFFICE

2,538,902

## TYPOGRAPHICAL DISTRIBUTING MACHINE

Frank C. Frolander, Elizabeth, N. J., assignor to  
Mergenthaler Linotype Company, a corporation  
of New York

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10 Claims. (Cl. 199—33)

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This invention relates to typographical distributing machines of the general organization represented in U. S. Letters Patent to O. Mergenthaler, No. 436,532, wherein circulating matrices are released from a magazine in the order in which their characters are to appear in print and then composed in line, the composed line transferred to the face of a slotted mold, the mold filled with molten metal to form a type bar or slug against the matrices, and the matrices thereafter returned through distributing mechanism to the magazine from which they started.

More particularly, the present improvements are directed to machines of the so-called "mixer" variety, such as disclosed in the Kennedy Patent No. 1,705,977 or the Frolander Patent No. 2,155,589 and exemplified in the commercial Linotype Models 29 and 30. These machines are equipped with two character distributors located at different levels, the lower one being connected by means of a short front magazine entrance to the upper magazine which contains matrices of one font, and the upper one being connected by means of a long rear magazine entrance to the lower magazine which contains matrices of a different font. The matrices are sorted according to font by means of an adjustable selector bridge associated with the distributor box for the upper distributor, this bridge being arranged to cooperate with notches in the lower edges of the matrices of the respective fonts in such manner that, if there is a notch in a matrix traversing the bridge and in alignment therewith, such matrix will ride low across the bridge and drop through a chute leading to the lower distributor, whereas if the matrix is devoid of a notch in line with the bridge, such matrix will ride high across the bridge and pass to the upper distributor. Both magazine entrances are pivoted at their lower ends in order to be swung rearwardly from operative position, the long rear entrance being free at all times for such swinging movement without interference with any of the parts, and the short front entrance being similarly free for such swinging movement after the rear entrance has been moved out of the way.

One of the main advantages of this type of machine is that it does away with the so-called "primary distributor" and its distributor box which are used in the older mixer models, such for example as the Linotype Model 9. But one of the disadvantages of later mixer models is the long rear magazine entrance which is required to connect the upper distributor to the lower magazine. The length of this rear magazine entrance is so great that it may accumulate, through blockage of its channels and without stopping the distributor, all of the matrices of a character,

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leaving none in the magazine for the operator's continued use and without his knowledge that the supply of matrices has been exhausted. In other words, if a matrix in any channel of the long magazine entrance should be blocked at the entrance to the magazine, succeeding matrices will pile up in the channel in end to end fashion but without reaching the distributor screws, which are depended upon in such event to arrest the operation of the distributor. Such a condition does not apply to the short front magazine entrance whose length is only about one-half of the long rear magazine entrance.

The blockage of matrices in a magazine entrance usually comes about because of the difference in width of the matrices which the machine is called upon to handle. That is to say, and as is well known, the magazine entrances of all commercial machines are provided with partitions which divide it into matrix channels and which guide the matrices by their body portions as they pass therethrough. In the case of thick matrices, the partitions function very efficiently but, in the case of extremely thin matrices, they function very inefficiently, since the thin matrices are free to assume a tilted or twisted position in the channels and cannot enter properly the magazine channels which, as is also well known, are constituted by opposed grooves which guide the matrices by their projecting ears rather than by their body portions.

To overcome the foregoing defect, whether the magazine entrances are short or long, it has been the practice to form the partitions at their lower ends with laterally projecting flanges which are intended to engage the projecting ears of the matrices and guide them in upright position into the magazine grooves. Usually, the partitions are also provided in advance of the guiding flanges with very light spring plates which are arranged to engage the matrices by their body portions and direct them to one side of the entrance channels before they reach the guiding flanges. These spring plates are made strong enough to exert the required guiding effect upon the thinnest matrix and flexible enough to be pushed aside by the thickest matrix without interrupting its passage. See, for example, the Kennedy Patent 1,648,051 and the Hilpman Patent 2,079,209, which latter discloses the latest or most improved arrangement.

For short magazine entrances the matrix guiding flanges and spring plates above alluded to have proved to be highly successful but, for long magazine entrances, they leave much to be desired. The explanation seems to be that, in the use of long magazine entrances, the matrices have such a long distance to travel that they

have greater opportunity to assume a tilted or twisted position in the entrance channels before they come under the influence of the spring plates and the guiding flanges. Not only that, the width of the entrance channels in recent years has been considerably increased to accommodate extremely thick matrices, with the result that the spring plates offer too great a resistance to the free passage of thicker matrices. In other words, the danger of blockage of the entrance channels may be due to an extremely thin matrix which, because of its tilted or twisted position, fails to straighten up under the influence of the spring plates or the guiding flanges, or it may be due to an extremely thick matrix which fails to get past the spring plates.

The present invention contemplates the continued use of the spring plates and guiding flanges in the magazine entrances of the Linotype mixer Models 29 and 30 but aims, first, to minimize the danger of blockage of matrices within the channels of the long magazine entrance and, next, to bring about a quick stoppage of the distributor whenever blockage does occur. To these ends, specifically, the long magazine entrance is divided into sections, an upper one whose channels are constituted by partitions as before, and a lower one whose channels are constituted by opposed grooves, like the channels of the magazine itself; and moreover, the upper entrance section is provided at its lower end with the aforementioned matrix guiding flanges and spring plates, just as if it were a full length entrance. While the actual length of the upper entrance section might vary, it preferably is made of substantially the same length as that of the short front magazine entrance which by experience has proved to be almost free of blockage under normal conditions. As a result of this arrangement, it has been found that the matrix guiding flanges and spring plates will act just as efficiently in the long magazine entrance as they do in the short magazine entrance, the conditions being pretty much alike. In other words, the thin matrices in passing through the long magazine entrance will have little or no opportunity to twist or turn out of upright position before they come under the guiding influence of the spring plates which then direct them into proper engaging relation to the laterally projecting flanges. Once the matrices are under the control of the flanges, they of course are guided accurately and smoothly into the grooves of the corresponding channel of the lower entrance section. As for the thicker matrices, they too will have a better opportunity to pass the spring plates without being held up because of the braking resistance exerted thereon, and, indeed, the spring plates can be made more flexible than before because of the less tendency of the thinner matrices to assume a tilted or twisted position before they reach the guiding flanges. However, should a matrix become blocked at the lower end of the upper entrance section, due to the failure of the spring plates and guiding flanges to perform their intended function, only a relatively few matrices will be allowed to pile up in the blocked channel before the operation of the distributor is arrested. Consequently, there will be no danger of the supply of matrices of a particular character becoming exhausted before the operator is informed, by the stoppage of the distributor, that a blockage has occurred somewhere in the magazine entrance. To facilitate the clearing of this blockage, if and when it occurs, the upper entrance

section is arranged to be swung rearwardly from its operative position, that is to say, out of receiving relation to the distributor and out of delivering relation to the lower entrance section. The lower entrance section—in fact both entrance sections as a unit—may also be moved from operative position to facilitate the clearing of any blockage which might occur in the lower entrance section or at the upper end of a corresponding magazine.

Referring to the drawings:

Fig. 1 is a vertical section taken through the distributing mechanism of a mixer machine, such as the Linotype Model 29 or 30;

Fig. 2 is an enlarged view of the meeting end portions of the two sections comprising the long rear magazine entrance section in Fig. 1;

Fig. 3 is an enlarged section taken on the line 3—3 of Fig. 1;

Fig. 4 is an enlarged section taken on the line 4—4 of Fig. 1; and

Fig. 5 is a view similar to Fig. 2 but showing, in modified form, the meeting end portions of the two entrance sections.

The matrices are of usual form, comprising body portions X which vary in width according to character, and projecting ears X<sup>1</sup> which (though actually differing slightly in thickness) are of substantially uniform thickness on all matrices, thick or thin.

The matrices are stored according to font in an upper magazine A and a lower magazine B, which are grooved as usual to guide the matrices by their projecting ears (see Fig. 1, which shows flared mouth grooves B<sup>1</sup> in the bottom side plate of the lower magazine B).

Cooperating with the two magazines are two character distributors (each comprising as usual a toothed distributor bar to release the matrices at different points according to character and a distinct set of conveying screws for propelling the matrices along the bar), a lower one C for the upper magazine A, and an upper one D for the lower magazine B.

A short front magazine entrance E leads from the lower distributor C to the upper magazine A, this entrance being of the usual partitioned construction and pivoted at E<sup>1</sup> in the machine frame so as to be movable from and to operative position. In Fig. 1, the partitions of the entrance E, as indicated by the dotted line showing, are equipped with the customary matrix guiding flanges and spring plates which are relied upon to guide the matrices accurately from the channels of the entrance into the grooved channels of the magazine A.

A long rear magazine entrance leads from the upper distributor D to the lower magazine B. Heretofore this entrance, like the short front entrance E, has been of the usual partitioned construction and equipped at its lower end, or immediately adjacent the magazine B, with the customary matrix guiding flanges and spring plates. However, in the present instance, and according to this invention, the entrance is divided into two sections, an upper partitioned section F and a lower grooved section F<sup>1</sup>. Thus, the upper section F comprises a pair of side plates 1 and intermediate partitions 2, which latter divide the entrance into channels, one for each character, and which guide the matrices by their body portions. The lower section F<sup>1</sup>, on the other hand, like the magazine B, comprises side plates 3 and opposed grooves 4 which guide the matrices by their projecting ears and which connect the cor-

responding channels of the section F and magazine B. Like the magazine grooves B<sup>1</sup>, the entrance grooves 4 are flared at their upper or receiving ends, as at 4<sup>a</sup>, to facilitate the entrance of the matrices from the upper section F into the lower section F<sup>1</sup>.

As shown, the partitions 2 of the upper entrance section F are provided at their lower ends each with a pair of laterally projecting flanges 5 arranged to engage and guide the matrices by their projecting ears X<sup>1</sup> just before they enter the grooved channels 4 of the lower section F<sup>1</sup>. The lower flanges of each pair are formed with long cam surfaces 5<sup>a</sup>, while the upper flanges of each pair are formed with shorter cam surfaces 5<sup>b</sup>. The partitions 2 are also provided each with a spring plate 6 arranged to engage the side faces of the matrices prior to the engagement of their projecting ears X<sup>1</sup> with the cam surfaces 5<sup>a</sup>. As clearly shown in Fig. 3, the spring plates 6 extend across the entrance channels with their free ends sufficiently close to the opposing partitions to engage the thinnest matrix which passes through the channels. It may also be noted that the spring plates 6 are of tapered form in the direction of their length and so disposed as to engage the side faces of the matrices nearer their upper edges than at their lower edges. In short, the matrix guiding flanges 5 and the spring plates 6 are substantially as shown and described in the Hilpman Patent No. 2,079,209 and function in the same manner, except for the fact that in the present instance they are employed to guide the matrices properly from a partitioned magazine entrance section into a grooved magazine entrance section rather than directly into a magazine.

According to the foregoing arrangement, as the matrices drop from the distributor D into the upper end of the entrance section F, they are obliged to encounter the spring plates 6 before they fully enter the entrance section, it being noted that the spring plates are arranged near the upper end of the entrance section or at a distance therefrom less than the length of a matrix. As a result, the spring plates act to break the fall of the matrices as they enter the entrance section and ease the projecting ears X<sup>1</sup> into engagement with the long cam surfaces 5<sup>a</sup> of the lower guiding flanges, thereby obviating the damaging effect which might otherwise result from the matrix ears striking sharply on the cam surfaces. As the matrices continue their travel through the entrance channels, they are located positively by the long cam surfaces 5<sup>a</sup> in the proper sidewise position for the engagement of their projecting ears X<sup>1</sup> with the straight edge portions of both flanges 5 at the lower end of the entrance section. The spring plates 6 are not resistant enough by themselves to guide the matrices into their proper sidewise position, but in cooperation with the long cam surfaces 5<sup>a</sup>, the spring plates, by engaging the side faces of the matrices near their upper edges, are stiff enough to maintain the latter in an upright position during their sidewise movement to prevent them from tilting or twisting within the entrance channels and to guide them into engagement with the flanges 5 in an upright position. This action of the spring plates will be the same irrespective of the thickness of the passing matrices, although it will be understood that the plates will yield different distances according to the thickness of the matrices acted upon. Once the matrices come under the control of the guiding

flanges 5, they will be guided accurately and smoothly by their projecting ears X<sup>1</sup> into the grooves 4 of the lower entrance section F<sup>1</sup>, and the latter section will of course conduct the matrices the remaining distance and deliver them into the grooved channels B<sup>1</sup> of the magazine B. In this way, notwithstanding the great length of the rear magazine entrance, and notwithstanding the rather circuitous path the matrices have to travel from the upper distributor D to the lower magazine B, the danger of blockage of the entrance channels is greatly minimized but, as before pointed out, if such a blockage occurs it will take place at the lower end of the upper entrance section and hence will bring about a quick stoppage of the distributor D, since only a few matrices will be allowed to accumulate in the blocked channel before they reach the lower distributor screw and through it, in the usual way, effect the throwout of the distributor clutch.

The two entrance sections F and F<sup>1</sup> are mounted in a swinging frame G which is pivoted at G<sup>1</sup> to the fixed machine frame so as to be movable from and to operative position at will, all in the usual way. However, the frame G, in the present instance, is provided with a supplemental swinging section G<sup>2</sup> which carries the upper magazine section F. This section G<sup>2</sup> is pivoted to the frame G at G<sup>3</sup> in order to allow the upper magazine section to be swung independently from and to operative position (see the dotted line showing in Fig. 1) in clearing a blockage which occurs in the upper entrance section. When in operative position the section G<sup>2</sup> is locked in place by a bolt G<sup>4</sup> carried by a bracket G<sup>5</sup> fixed to the frame G.

To insure lateral registration between the upper magazine section F and the lower magazine section F<sup>1</sup>, the top side plate 4 of the upper section F is cut away at its lower end and the top side plate 3 of the lower section F<sup>1</sup> is extended as at 3<sup>a</sup> to provide an overlapping fit between the two entrance sections at their line of junction (see Fig. 2). As an alternative, both the top and bottom plates 4 of the upper entrance section may be cut away at their lower ends and the top and bottom plates 3 of the lower entrance section extended at their upper ends to provide for an overlapping fit at both sides of the entrance sections at their line of junction (see Fig. 5). It may be noted that the location of the pivot G<sup>3</sup> is such that, notwithstanding such overlapping of the meeting ends of the two magazine sections, the upper one is free to be moved from and to its operative position without interference.

As shown clearly in Fig. 1, both sections F and F<sup>1</sup> of the long rear magazine entrance are curved, the upper section F extending downwardly and rearwardly from the upper distributor D, and the lower section F<sup>1</sup> extending downwardly and forwardly from the upper section. This particular arrangement of the long rear magazine entrance is typical of the modern mixer machines, such as the Models 29 and 30, and is resorted to in order to give access to the parts from the rear of the machine with the required facility. In other words, and as before indicated, both magazine entrances may be swung about their respective pivotal axes E<sup>1</sup> and G<sup>1</sup> from and to operative position without disturbing any of the parts with which they are associated, the long magazine entrance, when lowered, being out of the way of the short magazine entrance, so

that the latter may be swung through the same path for access to the upper magazine A and lower distributor C. By way of contrast, it may be stated that previously the upper magazine entrance was connected to the upper distributor and the lower magazine entrance to the lower distributor (see for example the Rogers Patents Nos. 767,169 and 799,943), but such an arrangement would obviously be unsuitable in mixer machines of the kind under discussion.

Having thus described my invention, what I claim is:

1. A typographical distributing machine for handling matrices with body portions of different widths and with projecting ears of substantially uniform thickness, said machine being equipped with two vertically disposed character distributors arranged at different levels and with two magazine entrances arranged one behind the other and both mounted to be swung rearwardly from operative position when required, the front entrance being short and leading from the lower distributor to an upper inclined magazine, and the rear entrance being long and leading from the upper distributor to a lower inclined magazine, characterized by the fact that the long rear magazine entrance is made in two sections, an upper one comprising a series of partitions which divide it into channels and which guide the matrices by their body portions, and a lower one comprising a series of opposed grooves which divide it into a corresponding number of channels and which guide the matrices by their projecting ears.

2. A typographical distributing machine for handling matrices with body portions of different widths and with projecting ears of substantially uniform thickness, said machine being equipped with two vertically disposed character distributors arranged at different levels and with two magazine entrances arranged one behind the other and both mounted to be swung rearwardly from operative position when required, the front entrance being short and leading from the lower distributor to an upper inclined magazine, and the rear entrance being long and leading from the upper distributor to a lower inclined magazine, characterized by the fact that the long rear magazine entrance is made in two sections, an upper one comprising a series of partitions which divide it into channels and which guide the matrices by their body portions, and a lower one comprising a series of opposed grooves which divide it into a corresponding number of channels and which guide the matrices by their projecting ears, and supplemental matrix guiding means arranged at the lower end of the upper partitioned section and serving to direct the matrices properly into the lower grooved section.

3. A typographical distributing machine for handling matrices with body portions of different widths and with projecting ears of substantially uniform thickness, said machine being equipped with two vertically disposed character distributors arranged at different levels and with two magazine entrances arranged one behind the other and both mounted to be swung rearwardly from operative position when required, the front entrance being short and leading from the lower distributor to an upper inclined magazine, and the rear entrance being long and leading from the upper distributor to a lower inclined magazine, characterized by the fact that the long rear magazine entrance is made in two sections, an upper one comprising a series of partitions

which divide it into channels and which guide the matrices by their body portions, and a lower one comprising a series of opposed grooves which divide it into a corresponding number of channels and which guide the matrices by their projecting ears, and laterally projecting flanges arranged at the lower end of the upper partitioned section and serving to guide the matrices by their projecting ears into the lower grooved section.

4. A typographical distributing machine for handling matrices with body portions of different widths and with projecting ears of substantially uniform thickness, said machine being equipped with two vertically disposed character distributors arranged at different levels and with two magazine entrances arranged one behind the other and both mounted to be swung rearwardly from operative position when required, the front entrance being short and leading from the lower distributor to an upper inclined magazine, and the rear entrance being long and leading from the upper distributor to a lower inclined magazine, characterized by the fact that the long rear magazine entrance is made in two sections, an upper one comprising a series of partitions which divide it into channels and which guide the matrices by their body portions, and a lower one comprising a series of opposed grooves which divide it into a corresponding number of channels and which guide the matrices by their projecting ears, laterally projecting flanges arranged at the lower end of the upper partitioned section and serving to guide the matrices by their projecting ears into the lower grooved section, and thin flexible spring plates extending across the channels of the upper section in advance of the projecting flanges and serving to guide the matrices by their body portions into proper engaging relation to said flanges.

5. A typographical distributing machine according to claim 1, wherein the upper section of the long rear magazine entrance is of substantially the same length as that of the short front magazine entrance.

6. A typographical distributing machine according to claim 1, wherein the upper section of the long rear magazine entrance is mounted for an independent swinging movement from operative position.

7. A typographical distributing machine according to claim 1, wherein the two sections of the long rear magazine entrance are both curved, with the upper partitioned section leading downwardly and rearwardly from the distributor and with the lower grooved section leading downwardly and forwardly from the upper section.

8. A typographical distributing machine according to claim 1, wherein the length of the upper section of the long rear magazine entrance is such that, in the event of a blockage occurring in one of its channels, the number of matrices which may accumulate therein will be less than the full supply of matrices bearing the particular character allotted to the blocked channel.

9. A typographical distributing machine according to claim 1, and including means for insuring lateral registration between the upper and lower sections of the long rear magazine entrance.

10. A typographical distributing machine according to claim 1, wherein the upper and lower sections of the long rear magazine entrance are formed to overlap at their line of junction.

FRANK C. FROLANDER.

No references cited.