(No Model.) 2 Sheets—Sheet 1.

O. MERGENTHALER.

TYPE MATRIX AND MECHANISM FOR DISTRIBUTING THE SAME.

No. 347,630. Patented Aug. 17, 1886.

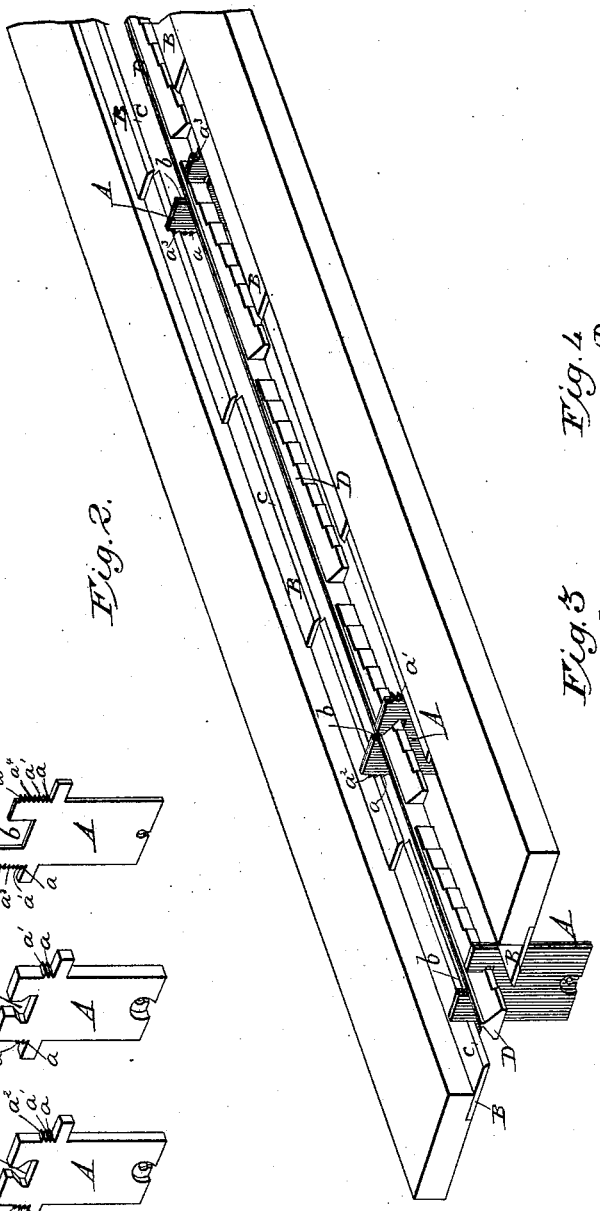

Fig. 2.

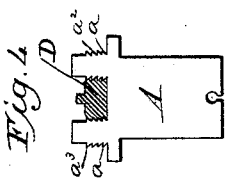

Fig. 4

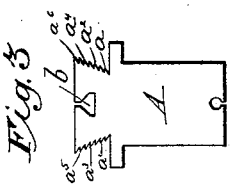

Fig. 3

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 5
on line x-x

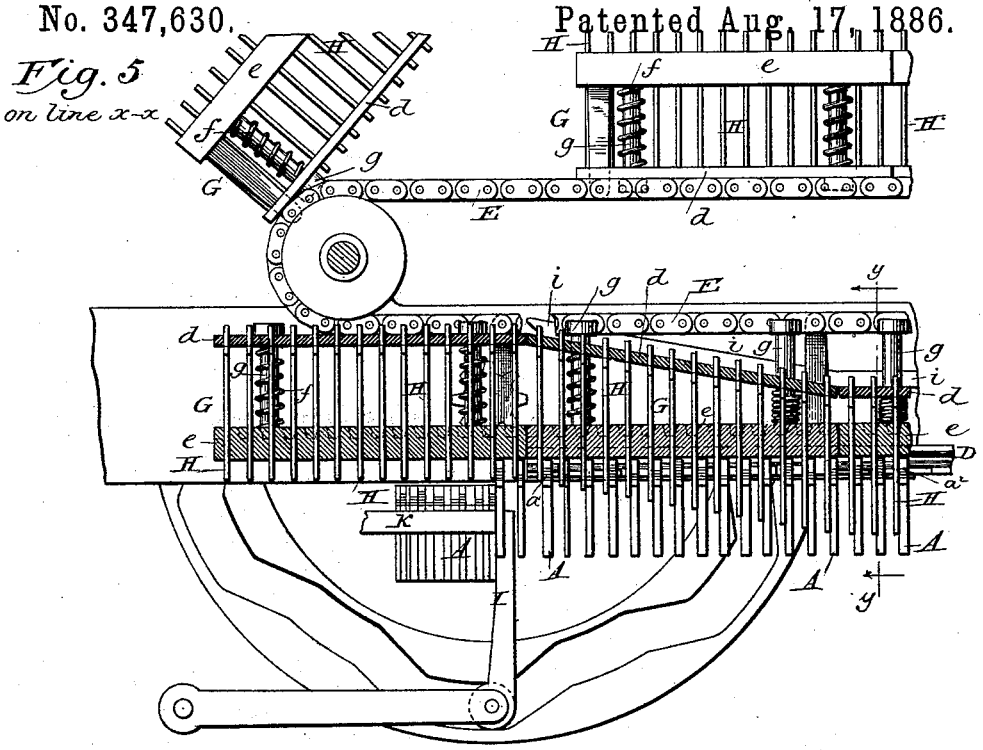


Fig. 7.

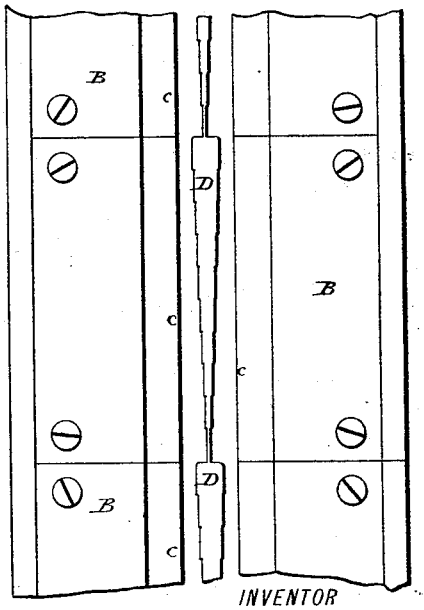
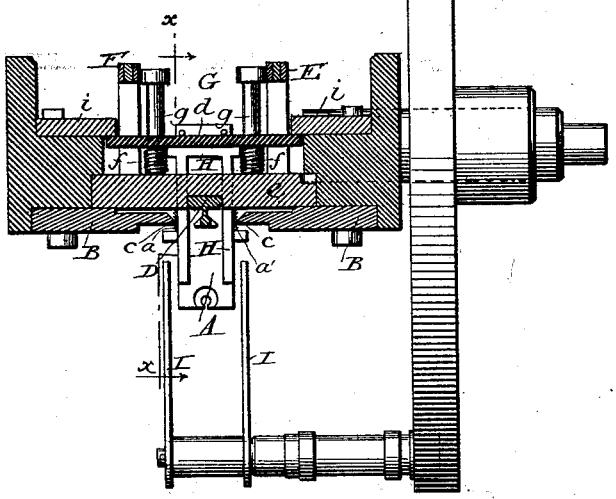


Fig. 6.
on line y-y



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UNITED STATES PATENT OFFICE.

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TYPE-MATRIX AND MECHANISM FOR DISTRIBUTING THE SAME.

SPECIFICATION forming part of Letters Patent No. 347,630, dated August 17, 1886.

Application filed June 6, 1885. Renewed March 25, 1886. Serial No. 196,587. (No model.)

To all whom it may concern:

Be it known that I, OTTMAR MERGENTHALER, of Baltimore, in the State of Maryland, have invented certain Improvements in Type-Matrices, &c., and Mechanism for Distributing the Same, of which the following is a specification.

This invention relates to improvements for distributing or assorting matrices, dies, and types, being designed more particularly for use in machines for producing type-bars of the general character represented in Letters Patent of the United States granted to me on the 12th day of May, 1885, No. 317,828, and in application for Letters Patent of the United States filed by me on the 11th day of May, 1885, No. 165,138, but also applicable in machines for producing stereotype-matrices and machines for distributing type to be used for printing in the ordinary manner.

The invention consists in a series of matrices or dies provided with suspending-shoulders differing in number on the matrices representing the respective characters; also, in matrices or dies provided with suspending-shoulders graduated as above mentioned, and with secondary shoulders or notches differing in width on the different matrices; also, in a track or rail to suspend the matrices while being advanced thereover, said rail being divided transversely into longitudinal sections adapted to engage successively the different shoulders of each matrix, so that each matrix will be sustained by and carried over as many sections as it has shoulders and then released; also, in a supplemental track or rail parallel with the first and divided opposite each section of the main rail into several shoulders or sections corresponding in width with the secondary shoulders or notches in the respective matrices, so that after a matrix is released by the main rail it will be sustained by the secondary rail until carried to the exact point required, the main rail serving to divide the series of matrices into groups and determine certain limits within which the matrices of each group must fall, while the secondary rails subdivide the groups into single characters and determine the precise point at which each shall be deposited.

My invention further consists in various details relating to the parts above named, to carrying devices of peculiar construction for moving the matrices over the rails, and to other features, which will be hereinafter described in detail, and specified in the claims.

Referring to the accompanying drawings, Figure 1 represents in perspective a number of matrices, such as are employed in my present system. Fig. 2 is a perspective view in the nature of a diagram, illustrating the general construction and operation of my distributer. Figs. 3 and 4 are views of the matrices in modified forms, the latter figure also showing the rail. Fig. 5 is a longitudinal vertical section through one end of the distributing mechanism complete on the line *x x* of Fig. 6. Fig. 6 is a vertical cross-section on the line *y y* of Fig. 5. Fig. 7 is a bottom plan view of the distributing-rails.

In proceeding to embody my invention I first provide a series of matrices, types, or dies, A, of the male or female order, according to the purposes for which they are designed. Each matrix will bear a single character or two or more characters, which are to appear always in company. There may be any suitable number of matrices bearing the same character. All matrices which have the same character will be duplicates of each other in every particular; but matrices which represent different characters will differ in the particulars hereinafter specified. Each matrix is formed with one or more pairs of supporting-shoulders, *a a'*, &c. These shoulders are formed at opposite edges of the matrix, one above another. Each matrix is also provided in the upper end with a notch or recess, *b*, to engage the secondary sustaining-rail. The width of the notch *b* differs in matrices representing different characters. The entire series is constructed in such manner that a matrix bearing any one character will differ from a matrix bearing any other character, either in the number of its shoulders *a* or in the width of its notch *b*, or in both particulars, this arrangement being adopted in order that the distributing-rails, hereinafter described, may distinguish clearly between the different matrices.

Having provided the matrices, I next provide the main distributing-rails B, the general

character of which is most plainly represented in Fig. 2. These rails stand parallel with each other, their inner edges separated a suitable distance to admit of the matrices being carried in an upright position between them. At the inner edge each rail has a lip, *c*, extending from one end to the other, and designed to engage the shoulders *a a'*, &c., of the matrices and hold them in suspension. It will be observed that the lip *c* is divided transverely into a number of sections placed at successively higher levels toward the rear end of the rails. The first section is designed to engage the lower shoulders, *a*, of the matrices, while the next section is sufficiently higher to engage the second shoulder, *a'*, the third section still higher to engage the shoulders *a''*, and so on successively throughout the system. Under this construction it will be seen that if a matrix having a single pair of shoulders is suspended thereby between the lips *c* of the first section of the rail and moved forward it will remain suspended until it reaches the end on that section, whereupon it will pass from the lips and be permitted to fall. If, however, a matrix having two pairs of shoulders be inserted, the second pair, *a'*, will, in the course of its advance between the rails, engage the lips of the second section, and thus continue to sustain the matrix after the first shoulders have passed beyond the lips of the first section. A similar action occurs in the case of matrices having three or more pairs of shoulders, the successive shoulders engaging the successive sections of the rail and being suspended thereby until finally the uppermost pair of shoulders passes beyond that section of the rails which engages therewith, whereupon the matrix is released. Thus it is that each matrix is carried over as many sections of the rail as it has pairs of shoulders.

Where there is but a small variety of matrices to be distributed, the parts above described will be sufficient for the purpose; but where there are many different characters to be distributed in a short distance it is necessary to provide an additional means for assorting and distributing the individual matrices to the precise points required. For this purpose I make use of the stationary central rail, D, which lies midway between the rails B, in position to enter the notch *b* in the upper end of the matrices as they are advanced between the rails. This secondary rail is of a triangular or dovetail form in cross-section, and is subdivided into lengths corresponding with the length of the rail-sections *c*, each section being divided into stops or shoulders of successively-diminishing width toward the rear end. In other words, the secondary rail consists of a number of lengths or sections, which may be duplicates of each other, each section diminishing in width, step by step, from its front to its rear end. I commonly divide each of these sections into ten steps; but any other appropriate number may be selected. The notches *b* in the respective matrices are graduated in width, so that each matrix embracing the rail D will be sustained thereby until the matrix reaches the appropriate stop or shoulder of the rail, whereupon the matrix is free to drop, provided its side shoulders are also released. The width of the notch *b* and the number of shoulders *a* on the respective matrices bear such relation to each other and to the supporting-rails B that a matrix representing a given character can drop at one point only in the length of the rails.

In order that a matrix may be discharged it is necessary not only that it shall be in position to drop from the rail D, but also that its outside shoulders shall be at the same time released. The release of the matrix by either the lips *c* or the rail D alone is insufficient to effect its discharge. It may be released by the lips *c* and still be suspended by the rail D, or released by the rail D and suspended by the lips *c*. To illustrate, a matrix having two side shoulders and a notch, *b*, of medium width will be sustained by the lips *c* of the first two sections of the rail, and after the disengagement of the side shoulders from the lips *c* the matrix will continue to be sustained by the rail D until it is moved forward to the particular stop or shoulder in the next section of the rail D, which is sufficiently narrow to pass through the notch *b* of the matrix, whereupon the matrix will fall. A matrix having a like number of shoulders, but a narrower notch, would be carried still farther forward by the secondary rail before being discharged.

The object of employing two distinct supporting-rails lies in the fact that it permits wide variations between the matrices which most nearly approach each other in size, so that the apparatus is enabled to work with certainty and without danger of misplacing the matrices.

While I have represented the matrices with vertical walls of a uniform width between their successive pairs of shoulders, it is manifest that they may be made of different widths, as represented in Fig. 3, in which case the successive sections of the lip *c* will be separated distances corresponding with the successive shoulders.

The rails B may have the supporting-lips formed thereon or applied thereto in any suitable manner. The lips may be formed by plates secured or otherwise attached to the supporting-rail, or the rails may have lips planed or otherwise formed directly thereon.

While it is preferred to construct the rail D with steps in the form represented in Fig. 2, it is to be understood that it may be formed with longitudinal sustaining steps or shoulders on its sides, as represented in Fig. 4, in which case the matrix will have the notches *b* made with corresponding shoulders, as seen in the same figure. When thus constructed, these internal shoulders of the notch will differ in number on matrices representing dif-

ferent characters, so as to effect their release at different points. The arrangement and action of these internal shoulders is practically identical with that of the outside shoulders, *a*.

While it is preferred to have the sustaining-rails and shoulders bear the relative positions represented in the drawings, it will be manifest to the skilled mechanic that their positions may be varied without in the least affecting the principle of operation.

For the purpose of advancing the matrices between the distributing-rails, conveying mechanism of any appropriate character may be employed; but I recommend for the purpose the automatic devices represented in the drawings, consisting, essentially, of an endless chain or belt, E, arranged to travel horizontally above the distributing-rails, and carrying a series of blocks, G, armed with adjustable forks or fingers to act between the matrices and push them forward. Each of the blocks G consists of two plates, *d* and *e*, urged apart by intermediate springs, *f*, and connected by screws *g*, which serve to limit their separation, and also as guides to maintain their relative positions.

The carrying fingers or forks H are of a U form, in order that they may straddle the secondary rail, D. They are attached at suitable distances apart to the plate *d*, and extend loosely through the plate *e*. When the parts are relieved from pressure the springs act to lift the plate *d* and draw the forks backward through the plate *e*, so that they project but a slight distance beyond its face; but as the blocks are carried forward in an operative position above the distributing-rails the edges of the plates *d* ride beneath and are depressed by stationary rails or shoulders *i*, which force them downward so as to thrust the forks H downward between the rails and between the matrices. The shoulders *i* continue horizontally above the distributing-rails, so as to retain the forks in their depressed positions until they have finished their action. As each of the carrier-blocks descends to an operative position at the front end of the distributer-rails, and before its forks are depressed, it passes above a vertically-reciprocating finger, I, by means of which the matrices are lifted one at a time from stationary supporting-rails K, so as to be carried by the forks between the distributing-rails. The construction and arrangement of the stationary rails and the lifting-fingers may be identical with those described in my application filed on the 11th day of May, 1885, and before alluded to, to which reference may be made for a detailed description thereof. The advantage of using this lifting or placing device for inserting the matrices one at a time lies in the fact that the matrices are thereby separated from each other and introduced between the succeeding forks, so that there is no danger of their clinging to each other in such manner as to prevent a proper distribution.

Motion may be communicated to the carrier-plates in any appropriate manner; but I prefer to provide them on the back with gear-teeth, and to operate them by means of a pinion in the same manner as in the application last referred to.

Having thus described my invention, what I claim is—

1. A character matrix or die having a plurality of suspending-shoulders, one above another, each pair separated horizontally to the same extent as those of the other pairs.

2. A character matrix or die having undercut sustaining-shoulders at opposite edges, and a central notch or recess having shouldered or undercut edges to engage a sustaining-rail, whereby it is adapted to co-operate with two distinct and independent means of suspension.

3. A series of matrices or dies bearing different letters or characters and provided with sustaining-shoulders, those which bear one character differing in the number of their shoulders from those which bear other characters, whereby the number of the shoulders is rendered available in distributing or assorting the matrices.

4. A series of matrices or dies bearing letters or characters, each having suspending-shoulders at the sides, and also a suspending notch or recess at the middle, those matrices which bear any given character differing in the number of their shoulders or the size of the notch from those which bear other characters, whereby the series is adapted for use in connection with two distinct sustaining and distributing devices.

5. A series of matrices or dies provided with sustaining-shoulders at the edges, one above another, the number of shoulders differing on the respective matrices, in combination with the sustaining-rails having successive sections with edges or lips at different heights to engage the corresponding shoulders, substantially as described and shown, whereby matrices are carried greater or less distances, according to the number of their shoulders.

6. In combination with a series of dies having sustaining-shoulders separated horizontally a uniform distance, but differing in number, on the respective dies, two parallel sustaining-rails with inner lips or edges adapted to engage and sustain said shoulders, said lips consisting of successive sections differing in height, whereby the matrices passing in from one section to another will be sustained by different shoulders.

7. A series of matrices provided with shoulders at different heights, the number of shoulders differing on matrices bearing different characters, in combination with sustaining-rails having at different points in their length lips or shoulders at different heights to engage the different shoulders in succession.

8. A series of matrices provided with sustaining-shoulders, one above another, the number of shoulders differing on different matrices,

in combination with sustaining-rails adapted, substantially as described, to engage the successive shoulders as the matrices are advanced thereover.

9. In combination with main distributing-rails having sections of different heights and a secondary central rail having sections of different widths, the series of matrices or dies having the shoulders to engage the main rails and the notches to receive the secondary rail, said notches and shoulders graduated, as described, to cause the release of the matrices at different points.

10. In combination with the distributing mechanism adapted to sustain the advancing matrices, the endless carrier provided with fingers or forks to advance the matrices, and a lifting mechanism, substantially as described, to place the matrices one at a time between the forks.

11. In combination with a series of matrices or types, rails to sustain said matrices, an endless carrier provided with fingers or forks to act upon the matrices, a vertically-reciprocating finger, and operating mechanism, substantially as described, whereby the matrices are lifted one at a time and inserted between the succeeding fingers.

12. In a distributing mechanism, a carrier consisting of an endless chain, a series of blocks carried thereby, fingers or forks arranged to rise and fall endwise on said blocks, and means, substantially as described, for raising and lowering said fingers.

13. The endless chain, the plates *d* and *e*, connected thereto by springs and guides, the fingers or forks, and the rails or cams to effect the depression of the plates.

14. In combination with the rail D to give central support to the matrices, the carrier having the divided fingers or forks to straddle said rail.

15. In a distributing mechanism, rails whereon the matrices or dies are supported, and an endless carrier provided with fingers having a vertical motion independent of the carrier, substantially as described, whereby they are adapted to be thrust downward between the rails and between the matrices.

In testimony whereof I hereunto set my hand in the presence of two attesting witnesses.

OTTMAR MERGENTHALER.

Witnesses:
JULIEN P. FRIEZ,
RICHARD R. BERGER.