

(No Model.)

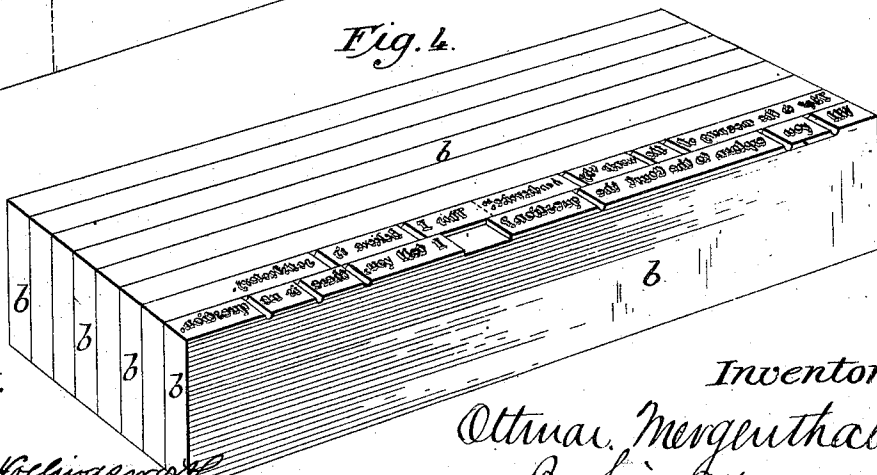
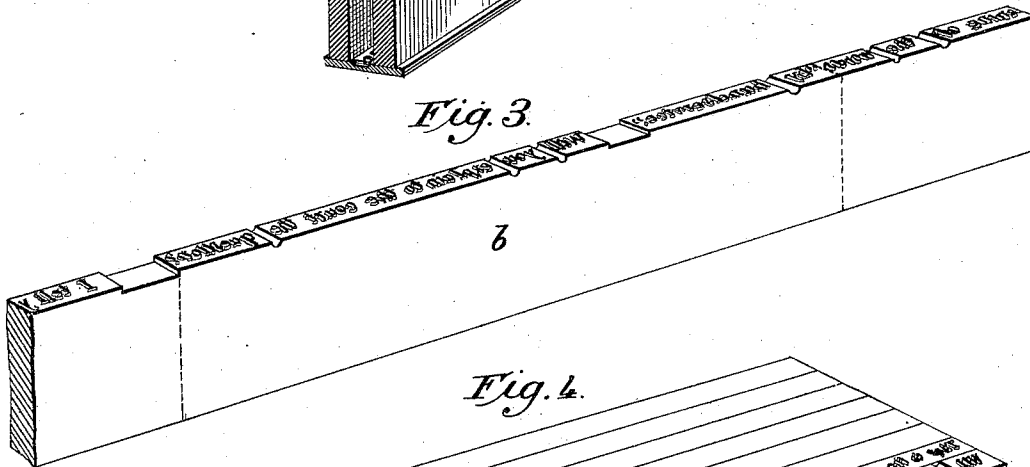
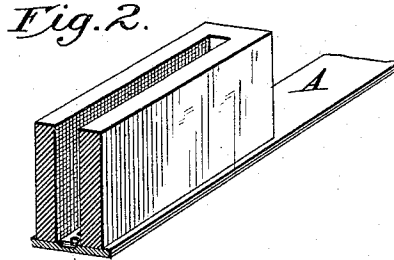
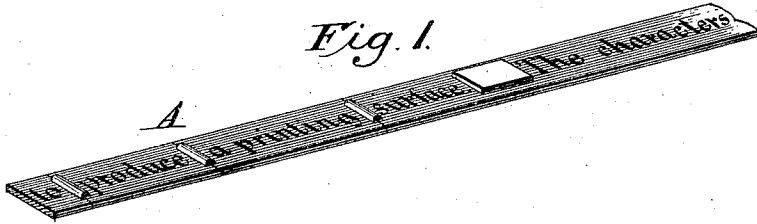
2 Sheets—Sheet 1.

O. MERGENTHALER.

METHOD OF AND MEANS FOR PRODUCING PRINTING SURFACES.

No. 311,350.

Patented Jan. 27, 1885.



Attest.

Sidney P. Hoellinger
 Harry Shipley

Inventor.

Ottmar Mergenthaler
 By his Attorney
 Philip T. Dodge

O. MERGENTHALER.

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Fig. 5

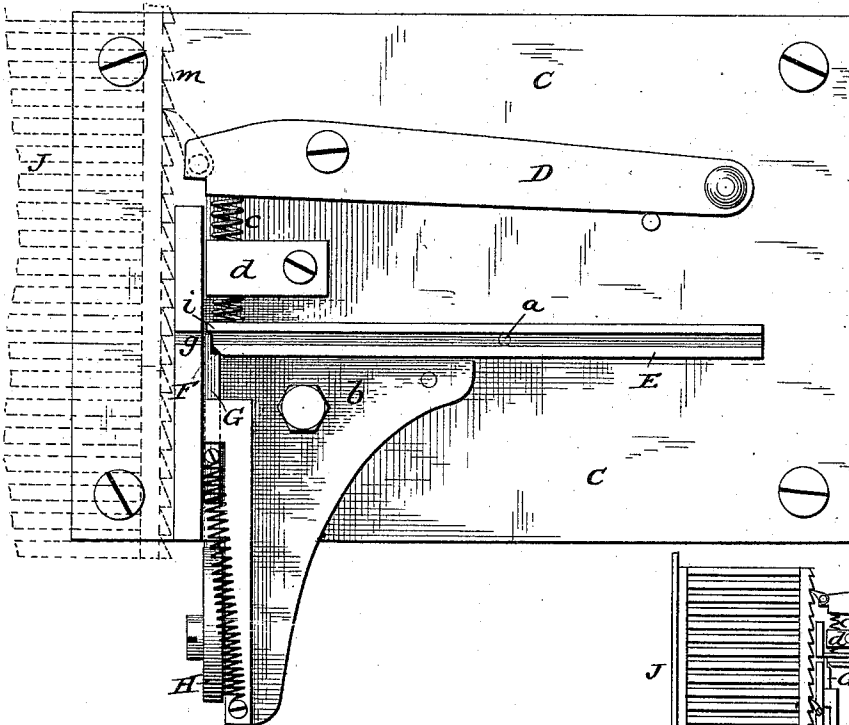


Fig. 7

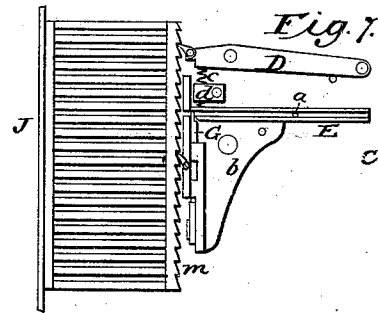


Fig. 6

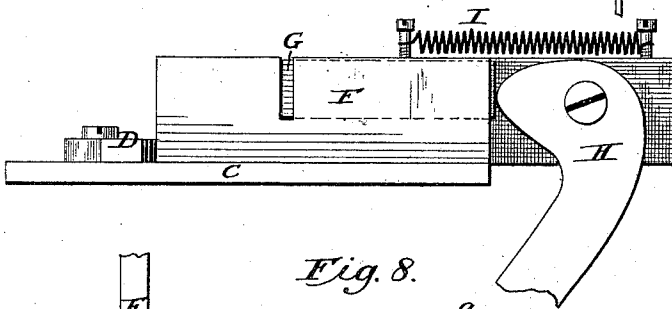


Fig. 8.

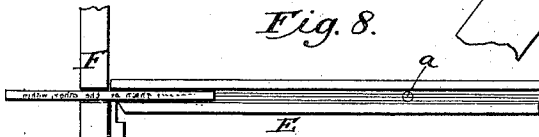
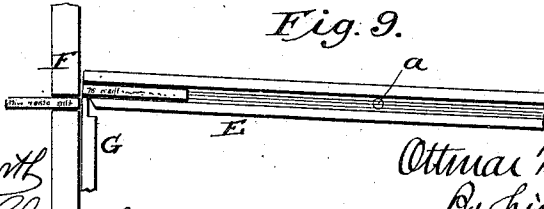


Fig. 9.



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UNITED STATES PATENT OFFICE.

OTTMAR MERGENTHALER, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE NATIONAL TYPOGRAPHIC COMPANY, OF WASHINGTON, D. C.

METHOD OF AND MEANS FOR PRODUCING PRINTING-SURFACES.

SPECIFICATION forming part of Letters Patent No. 311,350, dated January 27, 1885.

Application filed March 12, 1883. (No model.)

To all whom it may concern:

Be it known that I, OTTMAR MERGENTHALER, of Baltimore, State of Maryland, have invented certain Improvements in Methods of and Means for Producing Printing-Surfaces, of which the following is a specification.

My invention relates to that system of producing relief-plates for letter-press printing in which the matrix from which to cast the plate is formed by indenting letters or characters mechanically and successively into papier-maché or similar material in the form of a continuous line.

The aim of the invention is to facilitate the production of printing-surfaces in the form of pages or columns from the matrix-strip.

To this end the first part of the invention consists in casting from said matrix-strip long bars with a single line of characters upon their upper surfaces, and subsequently dividing these bars into shorter lengths and arranging them one against another in parallel lines.

The invention further consists in certain mechanisms, hereinafter described and claimed, for severing the bar and arranging the short lengths or line-sections in proper relation to each other.

Referring to the accompanying drawings, Figure 1 represents the matrix in line form; Fig. 2 is a cross-section illustrating one manner of applying the matrix to a mold preparatory to the casting of a printing-bar. Fig. 3 represents the printing-bar cast therefrom. Fig. 4 is a perspective view showing the short sections of the printing-bar arranged in page form. Fig. 5 is a top plan view of the mechanism for dividing the bars and a portion of the receiving device. Fig. 6 is an end elevation of the dividing mechanism. Fig. 7 is a top plan view, showing more fully the form and relationship of the dividing and receiving devices. Figs. 8 and 9 are top plan views illustrating the action of the dividing mechanism.

In proceeding to carry out my system, the letters or characters to be printed are indented or impressed successively in a narrow continuous strip, A, of papier-maché or equiva-

lent material, adapted to form a matrix for the reception of molten metal, plastic material, or other suitable material adapted to produce a printing-surface. The characters may be impressed in the strip by mechanism of any suitable construction, various machines adapted for the purpose being known in the art. I recommend a machine such as that represented in the application for Letters Patent to Ottmar Mergenthaler, filed December 16, 1878, or a machine having essentially the same mode of action.

Having produced the matrix-strip, I place the same in or beneath a suitable mold adapted to produce a bar having a body of suitable width and height for printing-surfaces. Fig. 2 illustrates one method in which this may be accomplished, the mold being made of suitable length and adapted to receive molten metal at the top while the matrix-strip is applied to its base. After properly adjusting the parts the mold is filled with type-metal or other suitable molten or plastic material adapted to assume a hardened condition, and as a result I produce a long bar, B, such as represented in Fig. 3, having in relief thereon letters or characters the counterpart of those in the matrix-strip adapted for use for printing purposes in the same manner as ordinary type.

Having thus produced a relief-bar, the next operation is to divide and arrange the same in suitable manner to produce a form or printing-surface suitable for a page or column. This is accomplished by dividing the bar, as indicated in dotted lines in Fig. 3, into short lengths or sections, each approximating as nearly as practicable the width of the required page or column. After being thus subdivided the short lengths or sections are arranged side by side, in the manner represented in Fig. 4, the result being a printing-surface presenting the same appearance and adapted for use in the same manner as an ordinary form composed of movable type.

In order to secure the proper "justification" of the lines in the form, it is occasionally necessary to again divide one or more of the short lengths or sections, in order to remove there-

from objectionable characters, or to secure the proper indentation, or regulate their length at the points of division by quads or spacing-pieces, which may be of ordinary construction.

The division of the bars may be effected by mechanism of any suitable character. I prefer, however, to make use of that represented in Figs. 5 to 9, which is constructed as follows: Upon a suitable bed-plate, C, I mount a longitudinally-grooved guide, E, mounted at or near its middle on a vertical pivot, *a*, by which it is permitted to receive a limited rotary or rocking motion in a horizontal direction. The movement of the guide in one direction is limited by means of a plate, *b*, bolted firmly to the bed-plate. The end of the guide is normally held in contact with this stop by means of a spiral spring, *c*, passing through the guide *d* on the bed-plate. Upon the bed-plate there is located a rigid anvil, F, provided with a slot, *g*, directly opposite the end of the guide E, when the latter is in its normal position, this groove being of suitable size to admit of the printing-bar passing through the same. In suitable guides upon the bed-plate I mount a horizontal sliding knife or cutter, G, the forward end of which is reduced in width and adapted to pass between the anvil F and the end of the guide E, against a shoulder or stop, *i*, on the rear side of the latter. This knife may be actuated by mechanism of any suitable character. I prefer, however, to move it by means of a cam-lever, H, and to effect its retraction by means of a spiral spring, I, applied as plainly represented in Figs. 4, 5, and 6.

The operation of the device is as follows: The end of the bar, being inserted in the guide E, is advanced beyond the same through the slot *g* of the anvil until the required point of division is brought into line with the inner face of the anvil. The knife is then driven forward, whereby its end is caused to act upon the forward face of the printing-bar and force the same forward and effect its division in line with the inner face of the anvil, carrying the main portion of the bar, together with the swinging end of the guide, forward beyond the slot in the anvil, as represented in Fig. 9. This mode of operation secures a clean sharp division of the bar at the required point, separates the two parts from each other, and imparts to the contiguous ends smooth finished surfaces. In practice it is found that the sections of the bar thus divided are of such accuracy that they may be readily locked together, in the same manner as the surfaces of the ordinary printing-type. The sections of the bar thus produced may be removed and rearranged by hand, if desired. It is preferred, however, to combine with the supporting mechanism mechanism for receiving and retaining the sections in proper relation to each other. A simple mechanism for this purpose is that represented in Figs. 5 and 6, consisting of a frame, J,

arranged to slide transversely past the slot *g* of the anvil, and provided with a series of transverse parallel grooves lying in close proximity to each other, and each adapted to receive a line or section of the printing-bar. As a convenient means of advancing this frame intermittently, and bringing its slots in the exact position required to receive the bar, I provide the same on one side with a ratchet-bar, *m*, and pivot upon the bed-plate of the cutter a hand-lever, D, provided at one end with a pawl engaging in the ratchet-bar. This lever is acted upon by the spiral spring *c*, before mentioned, whereby it is normally held in the position represented. After each slot in the plate has been filled the lever is moved, and the plate thereby advanced to the position required to bring the next slot in position to receive the printing-bar.

In practical operations under my system I find it advisable in some cases to cast the printing-bar, in the first instance, of a length of three or more feet, while in other cases it is advisable to cast the same in a continuous length. This last-named operation may be effected by molds variously constructed, from which the bar will pass continuously to the severing mechanism above described. The molds for thus producing the continuous bar will form the subject-matter of a separate application.

In practice I find it advisable for general use to construct the bars of the same height as the movable type now employed, and of a corresponding width or thickness, to the end that they may be readily employed in existing printing-presses, and, if desired, in connection with type or quads. It is to be distinctly understood, however, that the bars may be made of a height less than that of the ordinary type, and that, if desired, they may be made in the form of thin strips or ribbons with the characters thereon, which will be mounted in or upon a suitable backing plate, sheet, or frame, to retain them in position.

Having thus described my invention, what I claim is—

1. The method of producing letter-press forms or surfaces in relief, consisting in producing a matrix in the form of a single continuous line, casting therefrom long bars, and subsequently subdividing the bars and arranging the sections side by side.

2. The herein-described method of producing relief printing-surfaces in the form of pages or columns, consisting in casting the letters or characters on continuous bars of great length, and subsequently dividing said bars into shorter lengths, and combining said lengths in parallel lines, substantially as described and shown.

3. The improved device for severing printing-bars, the same consisting of a stationary anvil, a swinging guide, and a moving knife, combined for joint operation substantially as described and shown.

4. The combination of the anvil F, the

swinging guide E, the knife G, spring c, lever H, and spring I.

5 In combination with the anvil and the cutting mechanism co-operating therewith, the sliding frame J and mechanism, substantially as described, for intermittingly advancing said frame, whereby it is brought in position to receive the successive lengths severed from the bar by the cutting mechanism.

6. The combination of the anvil, the cutter, 10 the grooved sliding frame J, and the lever and pawl for advancing said frame.

OTTMAR MERGENTHALER.

Witnesses:

JOSHUA M. MYERS,
JAS. O. CLEPHANE.