

(No Model.)

P. T. DODGE.
TYPE JUSTIFYING MECHANISM.

No. 539,983.

Patented May 28, 1895.

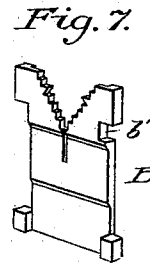
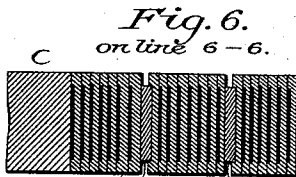
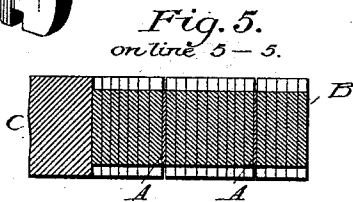
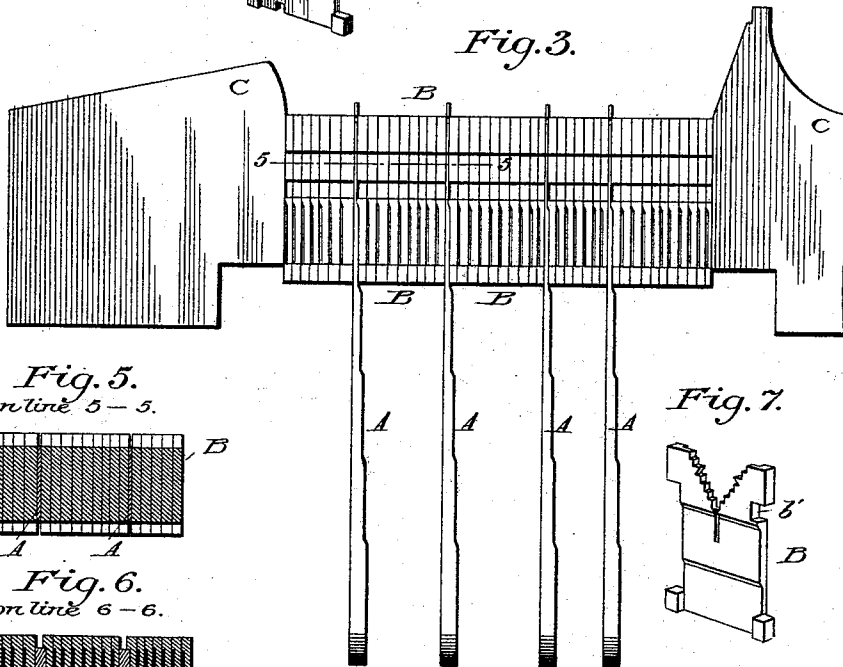
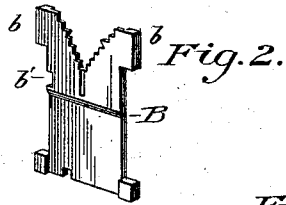
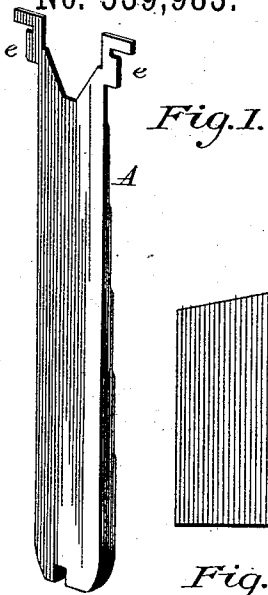
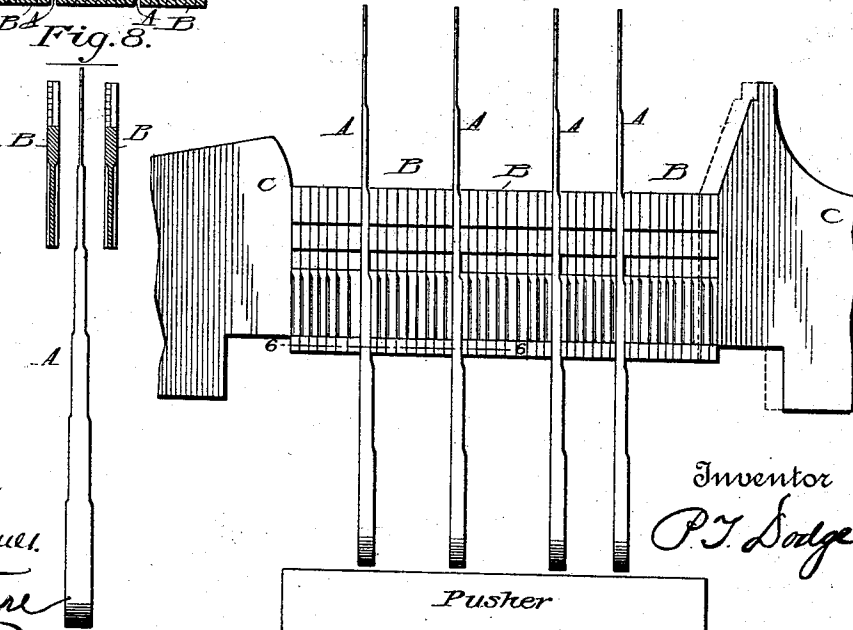


Fig. 4.



Witnesses
Raymond Barnes
J. S. Elmore

Inventor
P. T. Dodge

UNITED STATES PATENT OFFICE.

PHILIP T. DODGE, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO
THE MERGENTHALER LINOTYPE COMPANY, OF NEW JERSEY.

TYPE-JUSTIFYING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 539,983, dated May 28, 1895.

Application filed November 16, 1892. Serial No. 452,164. (No model.)

To all whom it may concern:

Be it known that I, PHILIP T. DODGE, of Washington, District of Columbia, have invented a new and useful Improvement in
5 Type-Justifying Mechanisms, of which the following is a specification.

My invention has reference more particularly to what are known as linotype machines, in which a series of matrices or female dies,
10 containing individual characters, are assembled, in connection with intermediate spaces, temporarily in line in front of a mold or impression mechanism, in order to produce a
15 line of type in relief on a bar or plate of type metal or other suitable material. The invention is also applicable, however, in connection with the so called matrix machines of various forms, in which male dies or punches representing individual characters are assembled
20 in line and used to impress or indent the characters in papier-maché or similar material to produce a line matrix for type.

The invention bears only on those machines in which there are individual matrices or
25 type, that is to say, matrices or type bearing only one or two characters, and arranged to travel from the magazine or holder to the point of composition, as distinguished from the long rigid matrix bar each bearing an entire alphabet, and from single character matrices which are permanently united in series
30 by strips or bands.

The object of the invention is to provide simple and reliable means by which the line
35 of matrices or dies, after being composed, may be spaced out, expanded endwise, or "justified" to the predetermined length. This justification of lines of dies has been heretofore effected by the use of intermediate
40 yielding spaces which admitted of the line being compressed endwise to the required length; by single wedge-shaped spaces forced between the matrices; by compound spaces consisting of two oppositely tapered wedges
45 moving one along the other and forming jointly an expansible space with parallel outer spaces; and also in other cases by space bars which were stepped or increased in thickness step by step, so that when forced
50 endwise through the composed line they would fill successively increasing spaces in the line.

All the methods and means of justification heretofore known are open to objections of one kind or another. The compound or two-
part wedged spaces were objectionable be- 55 cause of their expense and their extreme frailty when adapted to produce the thin spaces required in certain classes of printing. The stepped spaces were objectionable among other reasons because the number of steps
60 required in order to admit of their practical use gave them an inconvenient length. Now the main object of the present invention is to provide for justification by means of step
65 wedges or spaces adapted to be made short in length and to add at each movement only a small amount to the length of the line, so that although a line of matrices may be confined
70 between immovable jaws or clamps, it is impossible to advance the entire series of contained spaces to complete the justification of the line. With this end in view I construct my spacing devices with a series of steps or
75 shoulders, less in length than the matrices or dies with which they are to be used and construct the matrices or dies with corresponding steps, so that the spaces in position between the matrices may be advanced short
80 distances at a time, and so as to add at each movement very slightly to the length of the line without destroying the parallelism of the matrices. My matrices and space bars may be varied in detail at will, provided they
85 retain the peculiarities above named, and they may be mounted and used in connection with machines of any form now known in the art and with devices of any suitable character for composing the matrices, inserting the
90 spaces in the line and adjusting them through the line either individually or in series.

Referring to the accompanying drawings, Figure 1 is a perspective view of a space-bar constructed in accordance with my invention. Fig. 2 is a perspective view of the matrix adapted to be used in connection therewith. 95 Fig. 3 is an elevation showing an assembled or proposed line of matrices and the contained spaces located between the clamps or jaws to determine the length of the line, the parts being shown in the positions they occupy
100 previous to justification. Fig. 4 is a similar view showing the parts after justification.

Fig. 5 is a horizontal cross-section on the line 5 5 of Fig. 3. Fig. 6 is a horizontal cross-section on the line 6 6 of Fig. 4. Fig. 7 is a perspective view of a matrix with a series of steps therein. Fig. 8 is an elevation showing the matrices and spaces stepped on both sides.

Referring to the drawings, A represents one of my stepped spaces; B, one of the matrices; C C, two jaws or abutments, which previous to or during justification are fixed at a predetermined distance apart in order to determine the length of the line.

The spaces and matrices herein shown are of the same general character as those used in the well known Mergenthaler linotype machine represented in Letters Patent of the United States, issued on the 16th day of September, 1890, No. 436,532, the spaces being provided at their upper ends with shoulders *e*, by which they are suspended while traveling through the machine and while mounted in front of the mold; and the matrices being in like manner provided at their upper ends with supporting shoulders, *b*.

Each matrix B consists of a flat plate of brass or similar material having in one edge the intaglio character or matrix proper, *b'*. The matrix instead of being made with parallel sides throughout its length as heretofore, is reduced in width step by step toward its lower end. It may be made of uniform thickness from its upper end to a point near its middle and then reduced one step and continued of the diminished thickness to the opposite end as shown in Figs. 2 and 3; or, it may be provided with two steps as represented in Fig. 7 so as to present three different thicknesses at different points in its length. It is strongly recommended that each portion or thickness present parallel vertical faces on opposite sides. The character or matrix proper is located in the edge of the thickest portion, and the bearing faces of this thickened portion are given such an area that when the matrices are assembled side by side in contact with each other between the clamping or confining jaws they will maintain parallel vertical positions and be adapted jointly with the spaces to fit against the edge of the mold after the manner of the ordinary matrices used in the Mergenthaler machine.

The space A is made of much greater length than the matrices and is provided with steps of the same length whereby the thickness of the space is reduced by easy gradations by steps from the lower to the upper end. In order to permit the operation of the spaces in series under all conditions encountered in practice, it is desirable that the steps of the matrices and spaces shall have the smallest rise allowable—that is to say, that there shall be the smallest possible increase in thickness between one step or section and the next.

When the matrices are assembled side by side in line they will bear closely against each other, as represented in Figs. 3 and 4. At the points where spaces are to occur in the print

the spacing devices A, are inserted in the line, each with its stepped face toward that of the adjoining matrix against which it will fit closely as shown, the complementary steps on the two parts permitting the upper end of the space to be made extremely thin, so that the thinnest spaces demanded by the printer may be produced by the machine. The matrix line containing the spaces and set of such length that it is impossible to introduce the matrices for another word or syllable, is placed between the two jaws or abutments C after which justification is effected by advancing the spaces endwise through the line step by step either in unison or one at a time. If the spaces are all advanced at one time through the line they will add to its length the sum of the rise of their steps. It may sometimes happen that the space remaining to be filled in the line to effect justification will be so small as to forbid the advance of all the spaces. In each case one or more of the spaces may be advanced beyond the others, that is to say, a greater distance through the line. I find, however, by actual test that if the matrices of ordinary length are constructed with a single step as shown in Fig. 2, and the space provided with from four to eight steps; it is possible under every condition encountered in practice to advance the entire series of spaces into the line the length of one step. There are in practice many reasons why it is necessary to make the matrices of the length and proportion substantially such as shown in the drawings. The employment of the steps upon the matrices and spaces admits of the matrices being made of the requisite length and of their being operated with spaces which are kept within practical limits as to length and which within their limited length contained a large number of steps, each rising but a slight distance above the next.

When the spaces are used in connection with the Mergenthaler matrix as herein shown, having projecting ears at the lower as well as the upper edge, the steps should be cut down into the matrix between the lower ears as shown in Figs. 2 and 6, leaving the ears of their original thickness and form.

While I have described the insertion of the space bars primarily with their thin ends in the line, it should be understood that they may be inserted with their thick ends in the line in the first instance, and the justification then effected by pushing the spaces backward step by step, so as to introduce successively thinner spaces on the line. This will of course necessitate the advance of one or the other of the clamping jaws to maintain the compression of the line.

While I have used in the following claims the words matrix and matrices, it is to be understood that these words are used in their generic sense, as including mainly dies or punches as well as matrices proper.

Under ordinary conditions it is sufficient to provide the spaces and matrices with steps

on one side but if desired the matrices and spaces may each be provided with steps on both sides, as represented in Fig. 8.

5 I do not claim as my invention a justifying wedge having at the middle, continuous smooth surfaces from one end to the other, with small steps at one edge, as disclosed in the application of W. S. Scudder for Letters Patent, Serial No. 865,815; nor do I claim the combination of such a space with a matrix containing a tapered groove, as described in the above mentioned application.

Having thus described my invention, what I claim is—

15 1. A rigid individual type matrix reduced in thickness from one end to the other, step by step, whereby the matrix is given a side bearing face for a justifier, less in length than the length of the matrix.

20 2. An individual type matrix consisting of a single plate of metal, reduced in thickness step by step from one end toward the other, its opposite faces being parallel except as to inclined shoulders rising from one step to the next whereby the matrix is adapted for use

with a space or justifier having steps less in length than the length of the matrix.

3. An improved matrix having its middle portion reduced in thickness, step by step, and its ears or edges of equal thickness at its two ends.

4. In combination with a series of single letter matrices stepped on their side faces, a series of correspondingly stepped spaces.

5. In combination with a single letter stepped matrix, an elongated space-bar having steps of a length less than the matrix.

6. In combination with a composed line of single letter matrices, stepped on their side faces and jaws or abutments to limit the length of the line, a series of space-bars inserted in and movable longitudinally through the line, each space having steps of a length less than the length of the matrices.

In testimony whereof I hereunto set my hand.

PHILIP T. DODGE.

Witnesses:

WARREN S. CHASE,
W. R. KENNEDY.