(No Model.)

J. PLACE.

MATRIX AND EXPANDING SPACER FOR LINOTYPE MACHINES.

No. 540,002. Patented May 28, 1895.

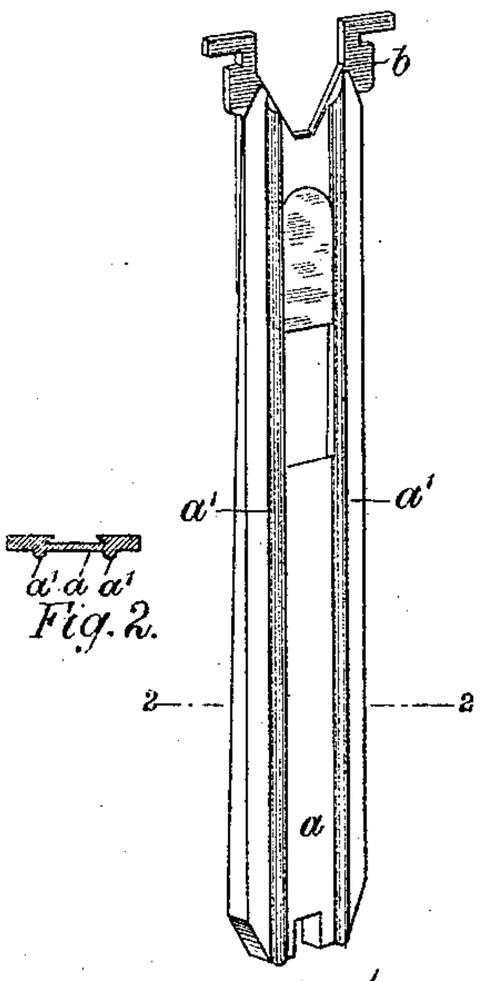

Fig. 1.

Fig. 2.

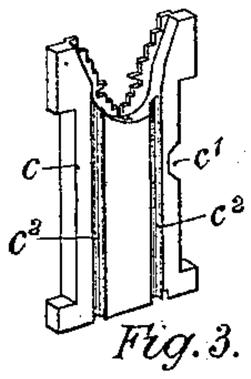

Fig. 3.

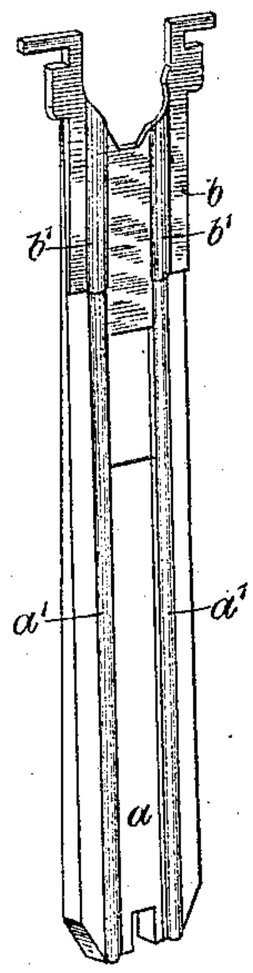

Fig. 7.

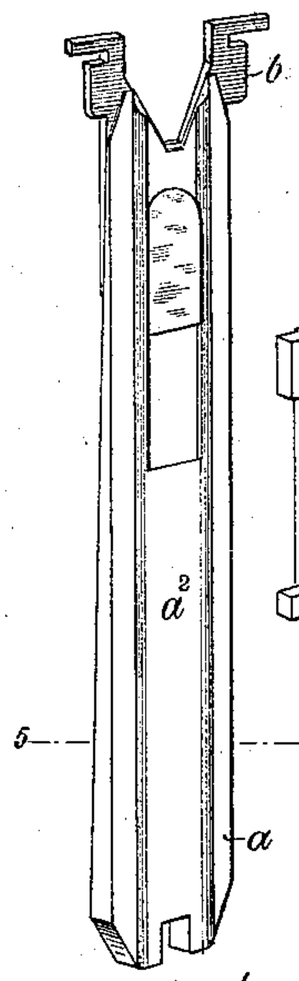

Fig. 4.

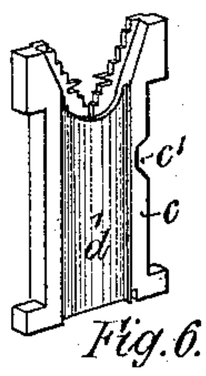

Fig. 6.

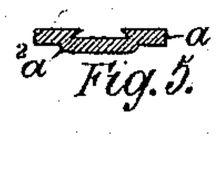

Fig. 5.

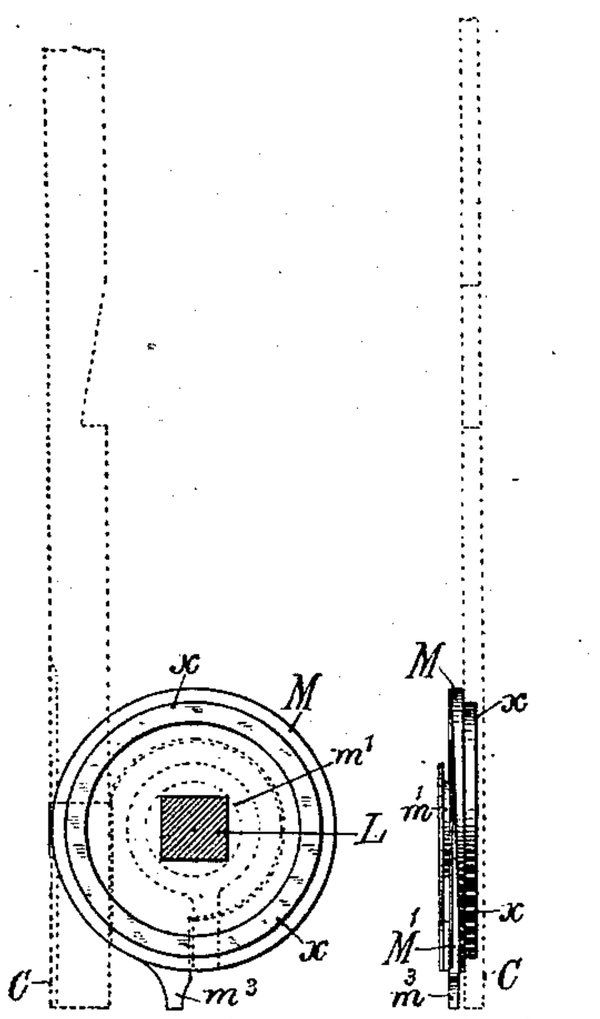

Fig. 8.

Fig. 9.

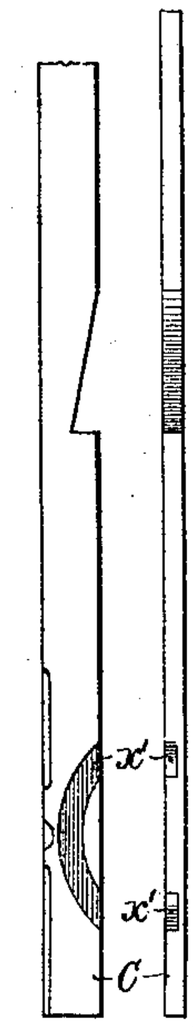

Fig. 10.

Fig. 11.

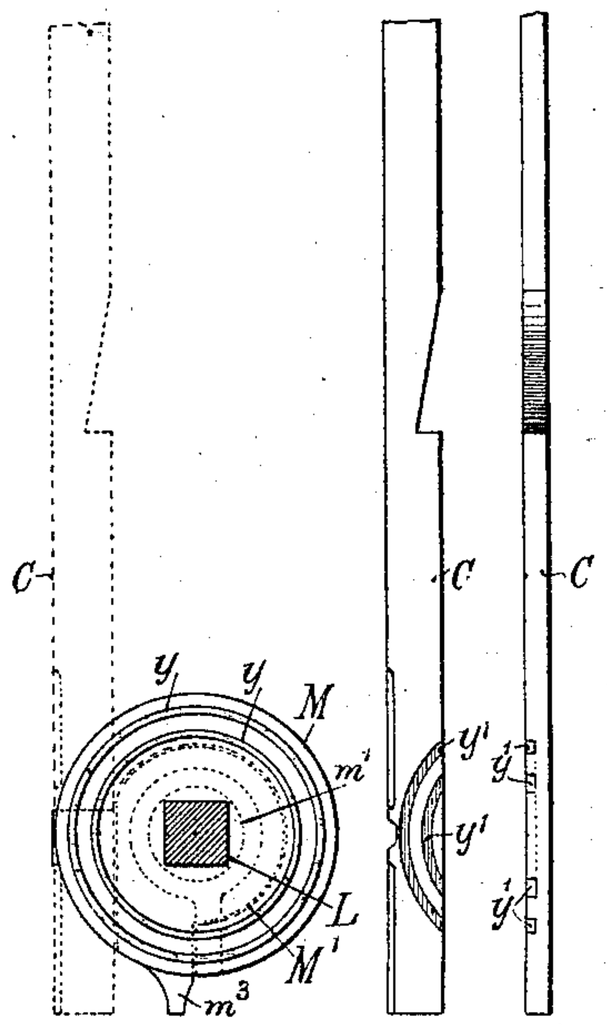

Fig. 12.

Fig. 13.

Fig. 14.

WITNESSES.

P. R. Kennedy

F. S. Elmore.

INVENTOR.

John Place

By P. J. Dodge

Atty.

UNITED STATES PATENT OFFICE.

JOHN PLACE, OF LONDON, ENGLAND, ASSIGNOR TO THE MERGENTHALER LINOTYPE COMPANY, OF NEW JERSEY.

MATRIX AND EXPANDING SPACER FOR LINOTYPE-MACHINES.

SPECIFICATION forming part of Letters Patent No. 540,002, dated May 28, 1895.

Application filed August 24, 1894. Serial No. 521,188. (No model.) Patented in England October 3, 1892, No. 17,606.

To all whom it may concern:

Be it known that I, JOHN PLACE, a subject of the Queen of the United Kingdom of Great Britain and Ireland, residing in the city of London, England, have invented certain new and useful Improvements in the Matrices and Expanding Spacers of Linotype-Machines, (for which I have obtained a patent in Great Britain and Ireland, No. 17,606, dated October 3, 1892;) and I do hereby declare that the following is a full, clear, and exact description of the invention, reference being made to the accompanying drawings, which are to be taken as part of this specification and read therewith, and one which will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to improvements in the matrices and expanding spacers of linotype machines. It is applicable to the matrices and expanding spacers of any machine for the manufacture of linotypes or printing bars, the spacers of which are adapted for expansion, *i. e.*, the increase of the distance between the outer and parallel faces of them, by the motion of one inclined inner face upon the other inner face inclined in the opposite direction. Consequently, the use of the word "linotype" in this specification must not be understood as limiting the applicability of the present invention to the machine of Mergenthaler's invention which is commonly known as the "Linotype" machine. At the same time, the nature and scope of the invention will be clearly understood from a description of the application of it to the well known "linotype" matrix and spacer.

Up to the present time, the two wedge-shaped members, the combination of which in a specific manner constitutes the "linotype" spacer, have proved so thick, even when they have been made as thin as is consistent with efficiency, that their presence has materially diminished the space available for printed matter.

In carrying the present invention into effect, one or more ridges are formed lengthwise upon the longer member of the spacer and upon either side of it. The function of these ridges is to strengthen the said member, so that the remaining surface thereof may be reduced with impunity. The strengthening ridge or ridges may be upon either side of the longer member. If they are on the outer side, the respective sides of the matrices are grouted out to make room for them. If they are on the inside, that is, on the face which slides upon the shorter member, the latter is thickened across the central portion of it, and this is grooved to receive the ridges. The grooves which receive the ribs of the spaces are of uniform or practically uniform depth from end to end, and the corresponding rib or ribs are made of uniform or practically uniform height above the side face of the spaces from one end to another. These ribs and grooves are not in themselves relied upon to effect the justification. The respective faces of the matrices are grouted out to make room for the consequent enlargement upon the outer face of the said shorter member.

In order that the invention and the means by which it is to be carried into practical effect may be thoroughly understood, I will now describe it and them in detail, referring in so doing to the accompanying figures, which are to be taken as part of this specification and read therewith.

Figure 1 is a perspective view of a linotype-spacer made according to the present invention, with a pair of strengthening-ridges upon the outer side of the longer member. Fig. 2 is a sectional plan on the line 2 2 of Fig. 1. Fig. 3 is a perspective view of a linotype-matrix made to work with the spacer illustrated in Figs. 1 and 2. Fig. 4 is a perspective view of a modified form of a linotype-spacer made according to my invention. Fig. 5 is a sectional plan on the line 5 5 of Fig. 4. Fig. 6 is a perspective view of a linotype-matrix made to work with the spacer illustrated in Figs. 4 and 5. Fig. 7 is a perspective view of a linotype-spacer, illustrating the application of the invention to the inner side of the longer member and the consequent change in the shorter member. Fig. 8 is a side elevation of a compound space with one strengthening-ridge. The relative position of the matrix-bar is indicated by the dotted lines. Fig. 9 is a front elevation corresponding with Fig. 10. Fig. 10 is a side ele-

vation of the left-hand face of as much of the matrix-bar illustrated in Figs. 8 and 9 as is affected by the present invention. Fig. 11 is a front elevation corresponding with Fig. 10. Fig. 12 is a side elevation of a compound space with two strengthening-ridges. The dotted lines indicate the relative position of the matrix-bar. Fig. 13 is a side elevation of the left-hand face of as much of the matrix-bar illustrated in Fig. 12 as is affected by the present invention. Fig. 14 is a front elevation corresponding with Fig. 13.

Referring to Figs. 1, 2, and 3, *a* is the longer, and *b*, the shorter member of the well known "linotype" spacer of Mergenthaler's invention and patented to Boult by Letters Patent No. 8,457, of 1885. In the "linotype" machine the act of expanding the spacers is always accomplished by pushing their longer members upward. There has therefore always been a minimum thickness beyond which it has not been possible to reduce these members without making them so thin that they would be bent and broken, either or both, by the push of the plate G (see Fig. 4 of the last mentioned patent) instead of being moved upward by it, so that although the thickness necessary to prevent crumpling up or fracture has (as already explained) materially diminished the amount of space in a line which has been available for matrices, that loss of space has had to be put up with so long as Mergenthaler's said invention remained unimproved. According to the present improvement, the longer member *a* has two longitudinal ridges *a'*, *a'* formed upon it. They extend from one end of it to the other, and are equidistant from the respective edges of it in order that their strengthening influence may be distributed equally throughout the member. Their maximum distance apart is limited by the width between the two formative edges of the matrix.

c is the matrix, and *c'*, its formative edge. It is between these two edges and within the side of the matrix, that room must be found, and is by the present invention provided for the ridges *a'*, *a'* by means of a pair of grooves c^2, c^2 which are cut in that side of the matrix and which will come into contact with the outer face of the longer member *a* of the spacer when the two are assembled in line. These two grooves correspond, in respect both of their cross section and distance apart, with the two ridges *a'*, *a'* so that the latter can be fully received into the former in order that the flat portions of the respective faces of both matrix and longer member may pack close together.

Referring to Figs. 4, 5 and 6, the modification illustrated therein consists in the substitution of a single central ridge a^2 for the pair of ridges *a'*, *a'*, and consequently of a single central groove *d'* of a corresponding section for the pair of grooves c^2, c^2. The respective functions and relationships in respect of size and position are the same as those which have been already described with reference to Figs. 1, 2 and 3.

It is obvious that the nature of my invention does not confine me to the particular side of the spacer upon which the strengthening ridge or ridges are formed. It or they may with equal utility be formed upon the inner side of the longer member. Its or their presence there necessitates the formation of a receiving groove or grooves in the shorter member. This modification of the invention is illustrated in Fig. 7. *a* is the longer and *b* the shorter member of the spacer. *a'*, *a'* are a pair of ridges on the inner face of the long member, and *b'*, *b'* the corresponding grooves on the shorter member. The convexities of these latter enter and are received by the grooves c^2, c^2 in the matrix.

Referring to Figs. 8 to 11, it must be explained that a Rogers and Bright compound space is formed of two sections, the adjacent faces of which are respectively inclined reversely to each other. These compound spaces are fitted on a space shaft L which is shown in section in Figs. 8 and 12. M is the disk section. It has a central square opening corresponding to the square cross section of the shaft L. This disk section has a free sliding movement longitudinally on the shaft L, and can be rocked with the latter. M' is the other section of the compound space and is hereinafter spoken of as a wing section. This latter has a central circular hole which fits loosely on the circular hub m' of the disk M and has also a free rocking movement thereon. C is a matrix bar or character bar. The wing section M' has its inside face adjacent to the disk section M, inclining upward and away from the latter, while the inside face of the disk section, which is adjacent to the wing section, is inclined in the reverse direction to the inclination of the adjacent face of the said wing section, the degree of inclination being the same for each of the said inside faces. Both sections have their outside faces formed at right angles with the space shaft L. A compound space is operated in the following way: After as many spaces as the line requires have been brought into position between the several words, the sections M' being held against rotation by the engagement of the projections m^3 in a special locking groove provided for that purpose in the machine, the shaft L is rocked in the necessary direction, with the result that the disk section M is moved longitudinally away from the wing section M' thereby separating the two respective matrix bars C.

According to the present invention, the disk section M is diminished in thickness by one half or thereabout, and is reinforced by the formation upon its side of a concentric ridge *x*. *x'* is a groove cut in the adjacent side of each matrix bar and having the same radius as the ridge. In respect of position and contour, the groove *x'* is adapted to receive the

ridge x and to allow it to move within it smoothly. Referring to the modification illustrated in Figs. 12, 13 and 14, it consists in the substitution of a pair of concentric ridges y, y, as well as of a pair of concentric grooves y', y' of corresponding cross section, radius and position, for the single ridge x and groove x' of the construction illustrated in Figs. 7 to 10.

It will be observed that the essence of my invention embodied in the various forms of spacers herein shown, lies in reducing the thickness of the operative portions of the spacer, that thinner spacing in the lines may be secured, and in locally reinforcing or strengthening the members, in order to overcome the weakness which would otherwise result from the reduction in thickness.

Having thus described my invention, what I claim is—

1. In a spacing device, the combination of two separably tapered members, one member provided with one or more longitudinal strengthening ribs, adapted to fit within a corresponding groove or grooves in the other member.

2. In combination with a tapered spacing member, provided with one or more longitudinal strengthening ribs, a matrix grooved to admit said rib or ribs, substantially as described and shown.

In witness whereof I have hereunto affixed my signature, in the presence of two witnesses, this 9th day of July, 1894.

JOHN PLACE.

Witnesses:
T. F. BARNES,
CHAS. S. WOODROFFE,