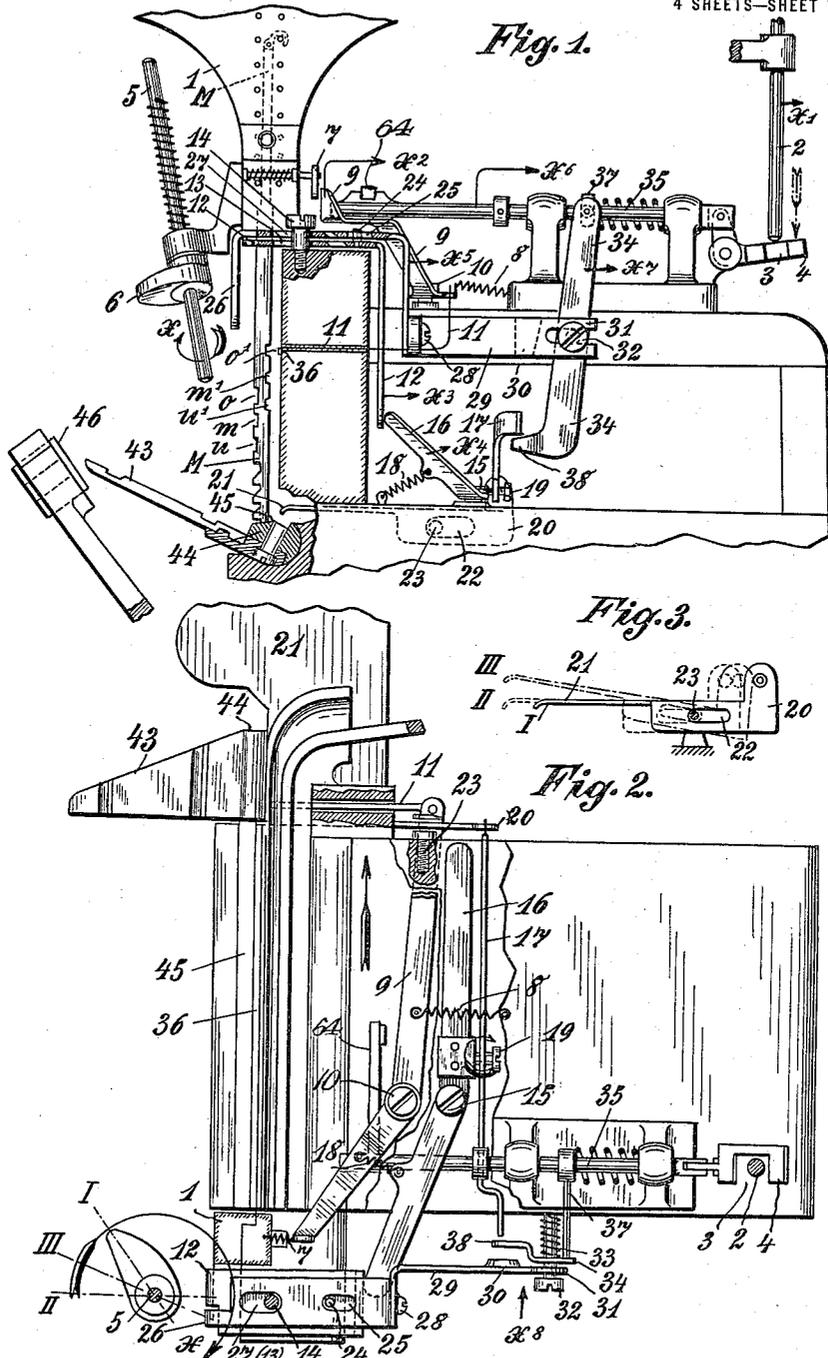


J. DORNETH.  
 MATRIX SETTING AND LINE CASTING MACHINE.  
 APPLICATION FILED JUNE 22, 1914.

1,155,137.

Patented Sept. 28, 1915.

4 SHEETS—SHEET I.



Witnesses:  
 L. I. Mallard  
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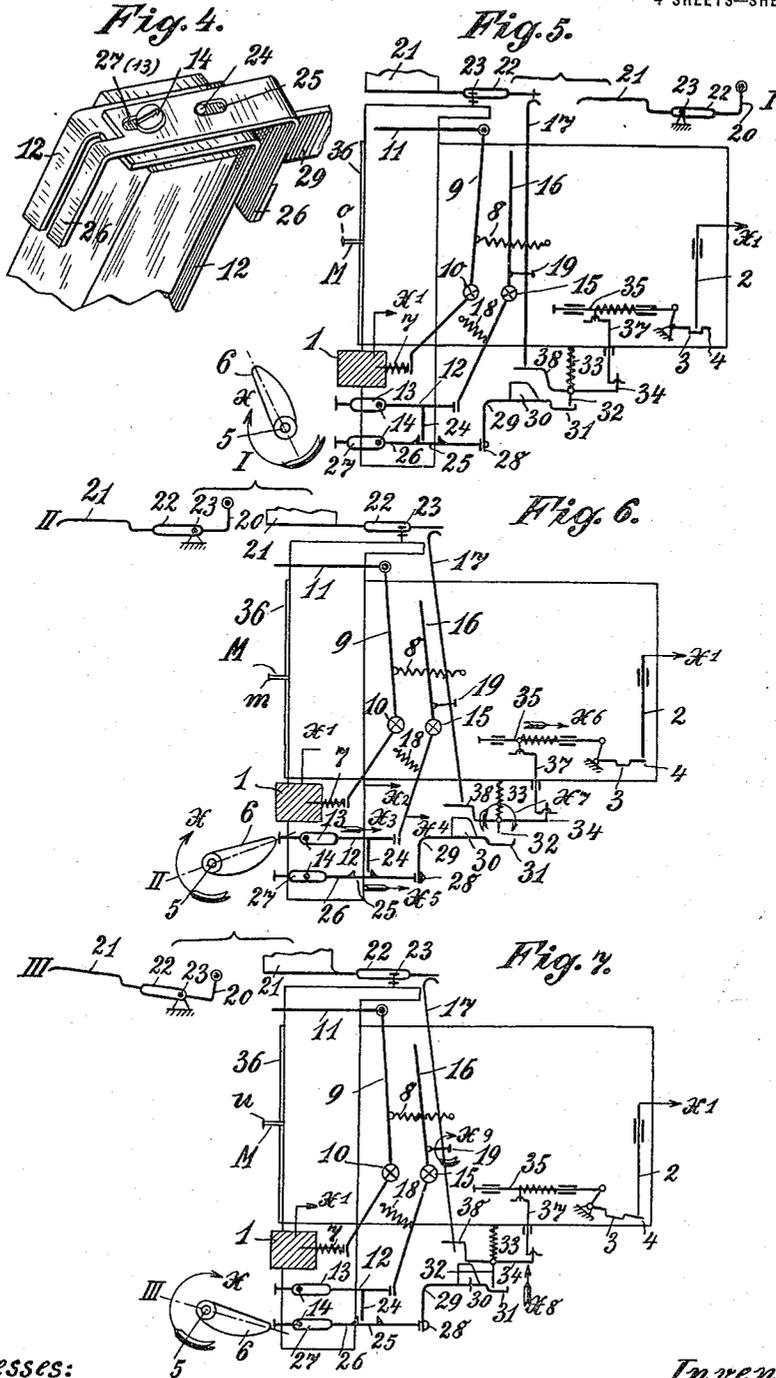
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4 SHEETS—SHEET 2.



Witnesses:  
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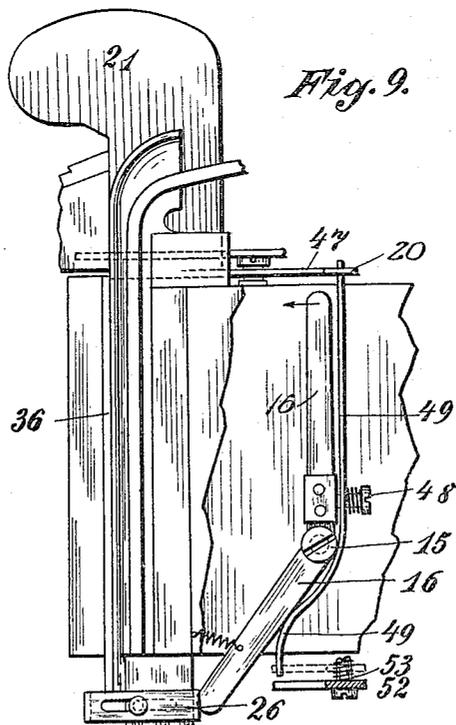
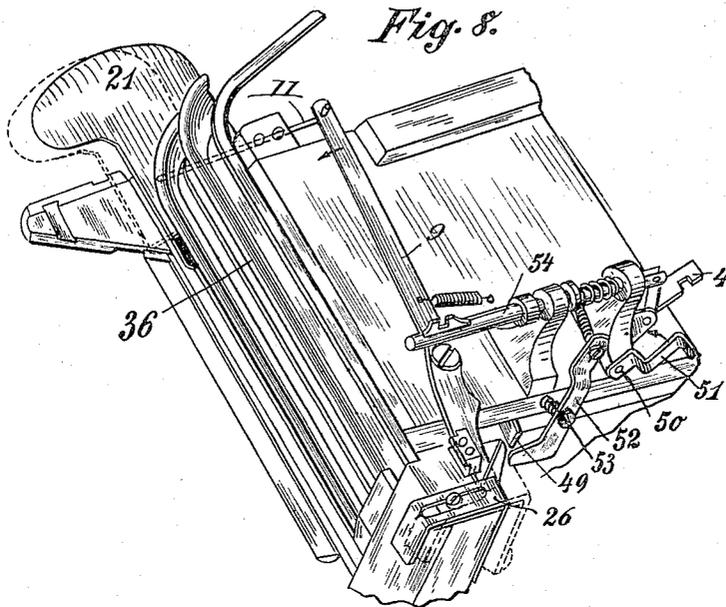
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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

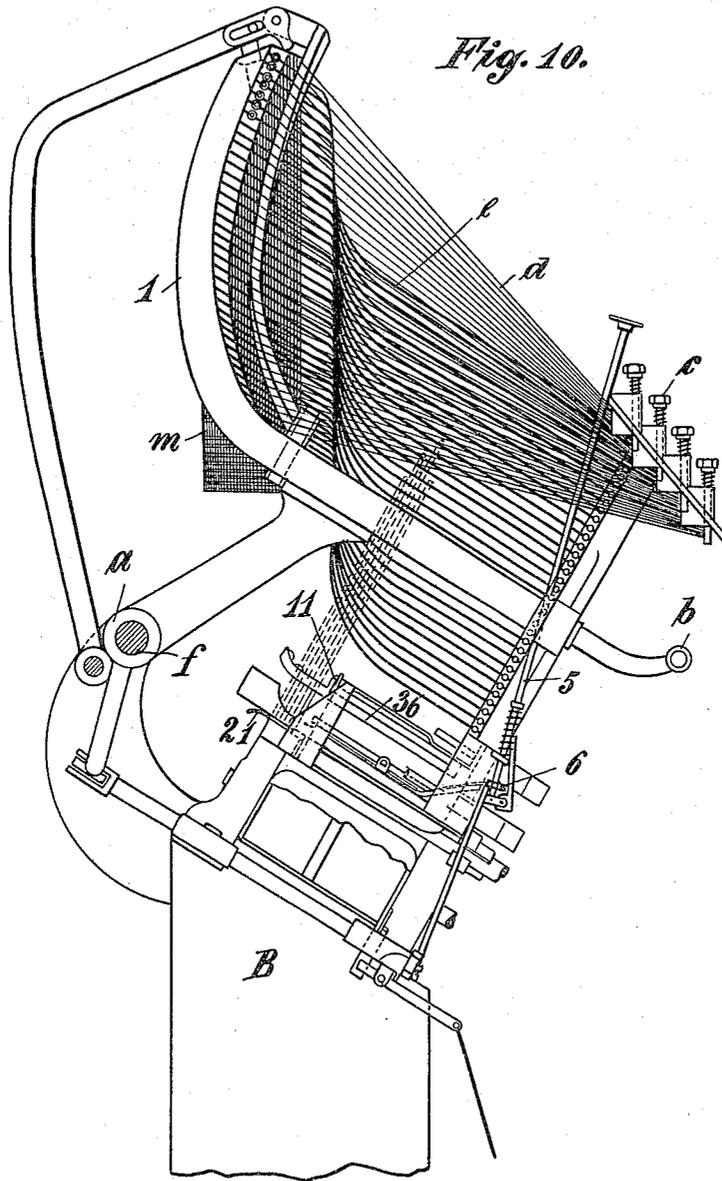


Fig. 10.

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# UNITED STATES PATENT OFFICE.

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MATRIX-SETTING AND LINE-CASTING MACHINE.

1,155,137.

Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed June 22, 1914. Serial No. 846,519.

*To all whom it may concern:*

Be it known that I, JULIUS DORNETH, of No. 36 Elberfelder street, Berlin, in the German Empire, workmaster, having invented certain new and useful Improvements in Matrix-Setting and Line-Casting Machines, do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates to improvements in matrix setting and line casting machines, and more particularly in machines of that class in which the matrices are formed on matrix bars which are guided on wires when being assembled and distributed.

For the purpose of obtaining mixed composition, the matrix bars have heretofore been formed each with two matrices corresponding to different fonts of type, and for setting one of the said matrices in casting position the machine is provided with an inclined rail which is shifted into the path of the matrices by shifting the matrix frame laterally into casting position. In another construction a rail is provided in the path of the matrices which is adapted to be lifted and lowered vertically. The object of the present improvements is to provide a machine by means of which the lines can be composed from two and three different fonts of type.

With this object in view my invention consists in forming each of the matrix bars with three matrices, and providing an inclined rail which is adapted to be shifted laterally and into the path of the matrix bars and to be lifted. By shifting the said rail into the paths of the matrix bars, the latter ride thereon so as to be lifted with the second matrices into casting position, and when the rail is thereafter lifted the matrices supported thereon which have once been lifted are again lifted into position with the third ones of the matrices in casting position.

For the purpose of explaining the invention two examples embodying the same have been shown in the accompanying drawings in which the same letters of reference have been used in all the views to indicate corresponding parts.

In said drawings—Figure 1, is a front view partly in section showing the assembling part of the machine and the operative

parts and gearings, Fig. 2, is a plan view of Fig. 1 with the upper plate of the assembling part shown in section so as to disclose the levers located below the same and provided for advancing and lifting the matrix lifting plate or rail, Fig. 3, is a detail view showing the lifting plate in different positions I, II, and III and seen in the direction of the arrow shown in Fig. 2, Fig. 4, is a perspective view of the two bails which are located one above the other and at the front side of the assembling part of the machine, Figs. 5 to 7 are diagrammatical views of the parts shown in Figs. 1 to 4 and illustrating the movements of the bails and levers corresponding to the three different positions I, II, and III of the lifting plate, Figs. 8 and 9, are respectively a perspective view and a plan view of a modification of the machine, and Fig. 10, is a side view showing the whole machine.

By referring to these drawings, it will be noted that 1, the matrix frame is fixed to the shaft *f*, said shaft being journaled in bearings *a* which are mounted on the frame B of the machine. The matrix frame 1 may be thrown upward from the working position represented in Fig. 1, by grasping the handle *b*. By striking one of the keys *c*, Fig. 1, the corresponding matrix bar M which is sustained at the upper end of the matrix frame 1 is released through the medium of a connecting rod or wire *d*. Thereupon, it travels along one of the guide rods or wires *e* to the assembling position in a manner well understood, this operation being continued until a line of matrices has been assembled, whereupon the same is arranged opposite the mold in proper way, and a line cast therefrom. Thereupon, by grasping the handle *b* and rocking the shaft *f* upwardly in its bearing, all of the assembled matrix bars, having been previously released for this purpose, are carried back by gravity on the guide rods or wires *e* in the well-known way, being thus automatically distributed.

Referring now more particularly to Figs. 1 to 7, each of the matrix bars M is formed at its front edge with three type matrices of different fonts, the upper type matrix being indicated by the letter *o*, the medial one by the letter *m*, and the lower one by the letter *u*. The rear edge of the matrix bar is

formed with three notches  $o'$ ,  $m'$ , and  $u'$  the relative distances of which correspond to the distances apart of the matrices  $o$ ,  $m$ , and  $u$ . By means of the said notches the matrix bars are guided on a guide rail 36 so as to be held in their proper positions.

The upper matrix  $o$  may correspond to a type of ordinary form, while the lower matrices  $m$  and  $u$  correspond to different fonts of type. For assembling the matrix bars with the medial matrices  $m$  in casting position the matrices must be lifted before getting into casting position. For this purpose I provide an inclined plate or rail 21 and mechanism described in detail in the patents of the United States Nos. 1,072,927 and 1,049,643 granted respectively September 9, 1913 and April 23, 1914. For casting the line from the lower matrices  $u$  the matrix bars  $M$  must be lifted the double amount, *i. e.* double the distance apart of two matrices. My invention relates more particularly to the mechanism provided for this purpose.

In order that the machine can be used without materially changing the construction for assembling lines with three different fonts of types, (which would require matrix bars of greater length by reason of a third matrix being formed thereon) the compressing bar or flag staff 45 is formed with a beveled face 45 which corresponds to the height of the matrix, so that when assembling matrices of the ordinary font the matrix bars  $M$  ride with their lower ends on the beveled face of the flagstaff.

In order that the third matrix can be set in casting position the plate 21 is adapted to be set in three different positions, as is shown in Fig. 3. In the position indicated by the numeral I the plate is in such a position, that it is out of the path of the matrices, so that it does not affect the same. In the position II the plate 21 is shifted forward and into the path of the matrices, so that the latter ride on the same and are lifted thereby a distance corresponding to the vertical distance apart of two matrices. In the position III the plate 21 is rocked upward after being shifted forward so that the matrices which have been lifted by riding on the same are again lifted the same distance.

For the purpose of explaining the principle and the operation of the new mechanism I deem it best to describe the manner in which in assembling a line the matrix bars are shifted from the position with one of the matrices in casting position into position with another matrix in casting position.

For assembling a line of ordinary matrices the machine is operated as follows: Normally the matrix frame 1, the space rod 2 mounted thereon (operated by a suitable

key primarily for releasing spaces from the space magazine, but having other functions, as described later on, and in Patent No. 1,072,927) and all the other parts of the assembling mechanism are in the positions shown in Fig. 1, and the matrices do not ride on the guide rail 36, but on the beveled face 45 of the rod 44. In this position the uppermost matrices are disposed in the line to be cast by means of the mold 46. The space rod 2 which is located above a bell crank lever 4 (the matrix frame carrying the space-rod 2 not having been shifted to the right for setting lines of mixed matrices, as hereinafter explained) does not strike the bell crank lever 4 when being depressed, so that only spacing takes place, as is known in machines of this type.

If it is desired to assemble the lines with matrices of two different sorts, the machine is thrown into gear or coupled in the usual way by pressure on the coupling rod 5. Thereby the matrix frame 1 and the space rod 2 are shifted in the direction of the arrows  $w'$  shown in Fig. 1 and to the right, as is shown in Fig. 6. Thereby a spring pressed finger 7 mounted on the frame 1 strikes the free end of a lever 9 having a rocking support on a pivot 10, so that a pin 11 secured to the said lever gets into the path of the matrices. Upon turning the rod 5 a cam 6 secured thereto engages a U-shaped bail or slide 12 and shifts the same to the right and in the direction of the arrow  $w^3$  shown in Figs. 1 and 2, until the left hand end wall of a slot 13 formed in the said bail bears on a pin 14 screwed into a relatively fixed part of the machine frame. Now the parts are in the position shown in Figs. 3 and 6. On a pivot bolt 15 a lever 16 has a rocking support and is acted upon by a spring 18. By shifting the lower bail 12 the lever 16 is moved in the direction of the arrow  $w^4$ . On a pin 19 secured to the lever 16 a lever 17 is movably mounted which is carried along when rocking the lever 16. At one of its ends the lever 17 is connected to an eye 20 formed on the plate 21, so that the said plate is shifted into operative position relatively to the matrices and into the position indicated in Fig. 3 by the numeral II, when the lever 17 is being rocked. In its movement the plate 21 is guided by means of a slot 22 and a pin 23 passed therethrough.

To the bail 12 a pin 24 is secured which engages in a slot 25 of a U-shaped bail or slide 26 located above the bail 12. The bail 26 is formed with a slot 27 corresponding to the slot 13 of the lower bail 12, and it is guided together with the bail 12 on the pin 14. When shifting the bail 12 forward and in the direction of the arrow  $w^3$ , the pin 24 carries along the bail 26 in the direction of the arrow  $w^5$ , so that an angle plate 29 se-

cured to the bail 26 by means of a screw 28 and formed with a nose 30 is likewise shifted in the direction of the arrow  $x^5$ . The angle plate 29 is formed with a bifurcated end 31 which embraces a pin 32 providing a rocking support for a lever 34 pressed outwardly on the pin 32 by a spring 33.

When the levers 9, 16, 17, and the angle plate 29 have thus been brought into the positions shown in a diagrammatical way in Fig. 6, the nose 30 of the angle plate 29 is just before the lever 34. If now the space rod 2 is depressed, it acts on the bell crank lever 4 so as to shift the connecting rod 35 to the right and in the direction of the arrow  $x^6$ . This movement of the rod 35 rocks the lever 9 by means of an arm 64 (Fig. 2), and retracts the pin 11 in order that the matrices M can ride with their medial notches  $m'$  from the lifting plate 21 onto the guide rail 36. While by moving the connecting rod 35 the lever 34 is rocked by the pin 37 in the direction of the arrow  $x^7$ , yet the depending arm 38 of the said lever does not act on the lever 17 because the arm 38 has not as yet been pushed inward by the nose 30 on slide 29, as hereinafter explained, and as will be understood from an inspection of Figs. 1, 2, and 6.

The manner of assembling lines of three different sorts of type will be best understood from Figs. 6 and 7, the operation being considered as started from the position of the parts for assembling lines from matrices of the second font (*i. e.* matrices  $m$ ). The lower bail 12, the levers 9, 16, 17, and the pin 11 and the lifting plate 21 remain in the positions shown in Fig. 6. Now the coupling rod 5 is turned in the direction of the arrow  $x$  and into the position indicated by the numeral III, so that the cam 6 secured thereto advances the upper bail 26 a slight distance, until the left hand end wall of its slot 25 bears on the pin 24, as is shown in Fig. 7. Thereby the nose 30 of the angle plate 29 presses on the lever 34 in the direction of the arrow 8 shown in Figs. 2 and 7, so that when depressing the space key its bent part 38 acts on the lever 17 in the direction of the arrow  $x^9$  and in such a way, that the lifting plate 21 is brought into the position III, as appears from Figs. 7 and 3. The pin 11 being at the same time retracted by the pressing of the space rod, as explained above, the matrices ride with their lower notches  $u'$  on the guide rail 36.

If it is desired to change the assembling operation with ordinary types or the matrices  $o$  in casting position directly to the assembling operation with the third matrices  $u$  in position for casting, the rod and the cam 6 are turned from the position I into the position III (Fig. 7), so that when passing the intermediate position II the cam 6 acts on the lower bail 12 so as to move the plate 21

and the pin 11 into the position shown in Fig. 6. If now the space rod 2 is depressed the matrix bars ride with the lower notches  $u'$  on the guide rail 36.

In the example shown in Figs. 8 and 9 the machine is set in position for assembling lines from three fonts of type by means of a special lever. To the flange 20 of the plate 21 a rod 47 is connected which is jointed to a lever 49 which is pivotally mounted at 48. The fulcrum 48 is provided on the lever 16 which has its fulcrum at 15 and which is engaged by the end of the bail or slide 26. By shifting the matrix frame the slide 26 is shifted in the usual way; thereby the lever 16 is turned within a horizontal plane, and the plate 21 is lifted into the path of the matrices.

For setting the matrix bars with the third or lowermost matrices in the casting line the matrices supported on the plate 21 are lifted a second time by rocking the said plate upward, for which purpose the lever 49 is provided which can be rocked vertically on a fulcrum 48. A lever 51 which is pivotally mounted on a pin 50 secured to the machine frame is adapted to be turned in the direction of the arrow shown in Fig. 8 by suitable means such for example as a special key provided on the key board, and when thus rocked the lever 50 engages and presses inward an arm 52 which is normally pressed outwardly in its pivot by a spring 53. Thereby the arm 52 is shifted in such a way, that it engages below the free end of the lever 49. If now the bell crank lever 4 is rocked in the known way by depressing the space rod 2 so as to pull the rod 54, the arm 52 is turned so that it lifts with its end the free end of lever 49. Thereby the rod 47 is pulled downward and the plate 21 is rocked into the position III.

For assembling lines with types of three different sorts, the operation is at first the same as in case of assembling the matrix bars with two sorts of types. But prior to depressing the space rod 2 the levers for lifting the plate 21 are coupled with the mechanism which is moved by the space rod 2, for which purpose the lever 51 is rocked from the special key so as to move the spring actuated arm 52 into the path of the lever 49. If now the space rod 2 is depressed, the plate 21 is rocked upward, whereby the matrices are lifted in such a way that the lowermost matrix gets into the line being assembled. If the special key is released, the spring 53 forces the lever 52 back again, so that when again depressing the space key the gearing for lifting the plate 21 is not actuated.

I claim herein as my invention:

1. In a matrix setting and line casting machine, the combination with the assembling and distributing means, of matrix bars each

having three matrices formed thereon, means for setting a bar with the second matrix of the three matrices in casting position, and means for setting a bar with the third one of the matrices in casting position, comprising the means for setting the bar with the second one of the matrices in casting position and means for shifting said bar set with the second one of the matrices in casting position from said position to the position with the third one of the matrices in casting position.

2. In a matrix setting and line casting machine, the combination with the assembling and distributing means of matrix bars each having three matrices formed thereon, means for setting the matrix bars being assembled with one of the matrices in casting position, a rail adapted to be shifted into the path of the matrix bars and when shifted to set the same with the second ones of the matrices in casting position, and means to lift said rail after being shifted with the third ones of the matrices of the matrix bars supported thereby in casting position.

3. In a matrix setting and line casting machine, the combination with the assembling and distributing means, of matrix bars each having three matrices formed thereon, means for setting the matrix bars being assembled with one of the matrices in casting position, a rail adapted to be shifted into the path of the matrix bars and when shifted to set the same with the second ones of the matrices in casting position, means to lift said rail after being shifted with the third ones of the matrices of the matrix bars supported thereby in casting position, a member which is operated following assemblage of the matrices, and means to couple said member with the lifting means so as to impart lifting movement thereto.

4. In a matrix setting and line casting machine, the combination with the assembling and distributing means, of matrix bars each having three matrices formed thereon, a shaft carrying a member for clamping the assembled matrix bars and having a reduced face providing a support for the matrix bars being assembled with one of the matrices in casting position, means for setting the same with the second ones of the matrices in casting position, and means for shifting the same from the positions with the second ones of the matrices in casting position into position with the third ones of the matrices in casting position.

5. In a matrix setting and line casting machine, the combination with the assembling and distributing means, and a coupling rod for throwing the machine into gear, of matrix bars each having three

matrices formed thereon, means for setting the matrix bars being assembled with one of the matrices in casting position, means for setting the same with the second ones of the matrices in casting position, and means controlled from said coupling rod for shifting the same from the positions with the second ones of the matrices in casting position into position with the third ones of the matrices in casting position.

6. In a matrix setting and line casting machine, the combination with the assembling and distributing means, and a coupling rod for throwing the machine into gear, of matrix bars each having three matrices formed thereon, means for setting the matrix bars being assembled with one of the matrices in casting position, means for setting the same with the second ones of the matrices in casting position, and means controlled from said coupling rod for shifting the same from the positions with the second ones of the matrices in casting position into position with the third ones of the matrices in casting position, said shifting means comprising a slide adapted to be shifted by said coupling rod.

7. In a matrix setting and line casting machine, the combination with the assembling and distributing means, of matrix bars each having three matrices formed thereon, means for setting the matrix bars being assembled with one of the matrices in casting position, a slide for setting the same with the second ones of the matrices in casting position, a slide for shifting the same from the positions with the second ones of the matrices in casting position into position with the third ones of the matrices in casting position, and a coupling rod for throwing the machine into gear and adapted when in different positions to shift said slides.

8. In a matrix setting and line casting machine, the combination with the assembling and distributing means, of a coupling rod for throwing the machine into gear, matrix bars each having three matrices formed thereon, means for setting the matrix bars being assembled with one of the matrices in casting position, means for setting the second ones of the matrices in casting position, a slide operated by said coupling rod and adapted to operate said setting means for the second ones of the matrices, and means for shifting the matrix bars from the position with the second ones of the matrices in casting position into positions with the third ones of the matrices in casting position, said means being adapted to be operated by the space-key, said means comprising a coupling part and a slide for moving said coupling part into coupling position, said slide being operated by said coupling rod, and a connection between said

slides, said connection permitting movement of the slide controlling the setting of the second matrices without moving the slide controlling the setting of the third matrices, 5 said latter slide being movable nevertheless by said coupling rod.

signed my name in the presence of two subscribing witnesses.

JULIUS DORNETH.

Witnesses:

HENRY HASPER,  
WOLDEMAR HAUPT.

In witness whereof, I have hereunto

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."