

May 21, 1940.

G. P. KINGSBURY

2,201,140

TYPOGRAPHICAL COMPOSING AND CASTING MACHINE

Filed April 1, 1939

6 Sheets-Sheet 1

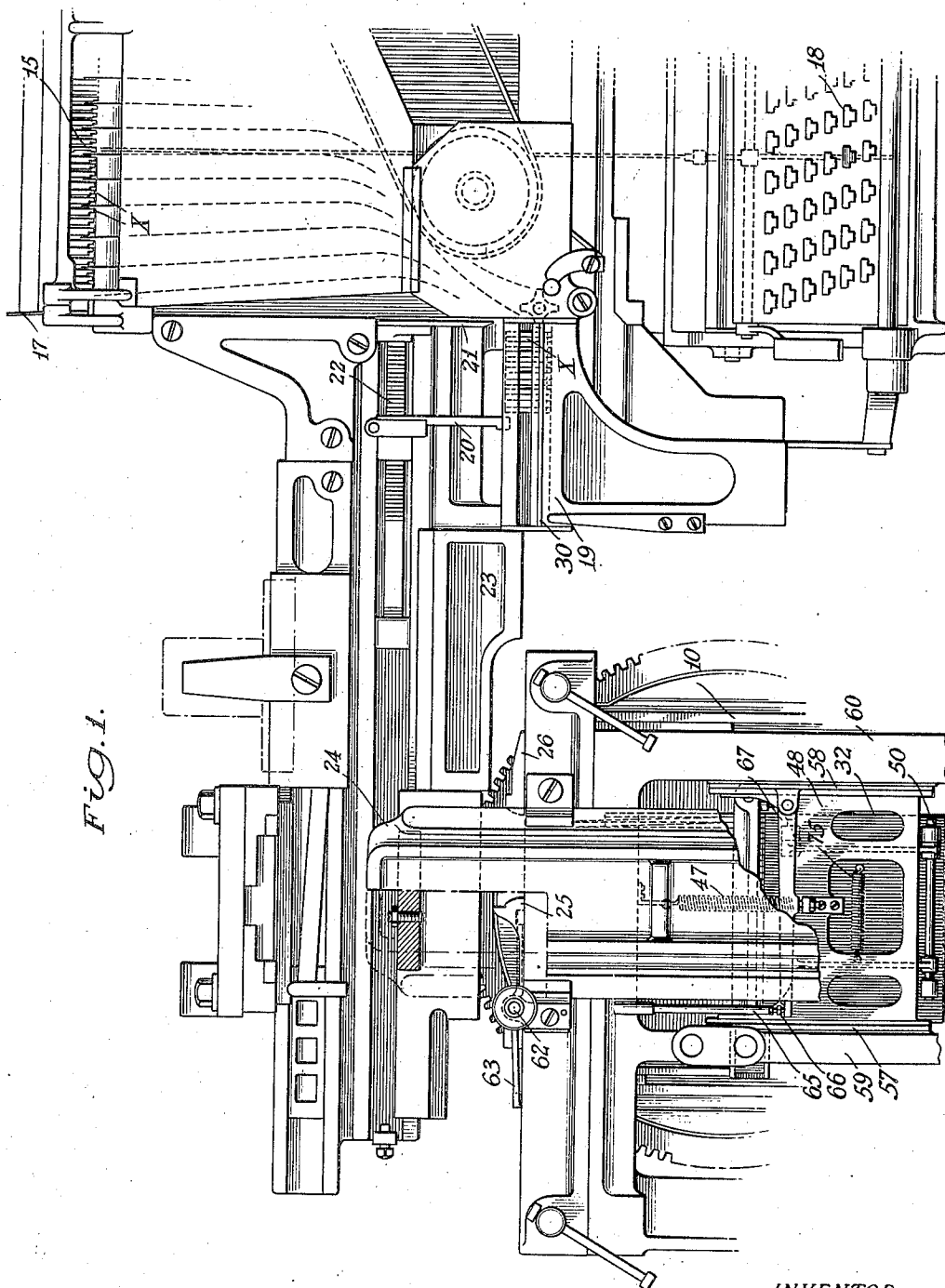


Fig. 1.

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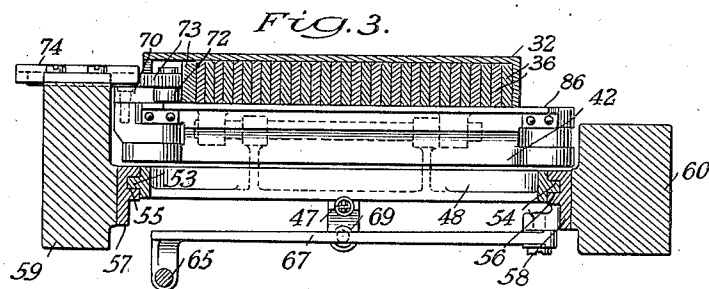
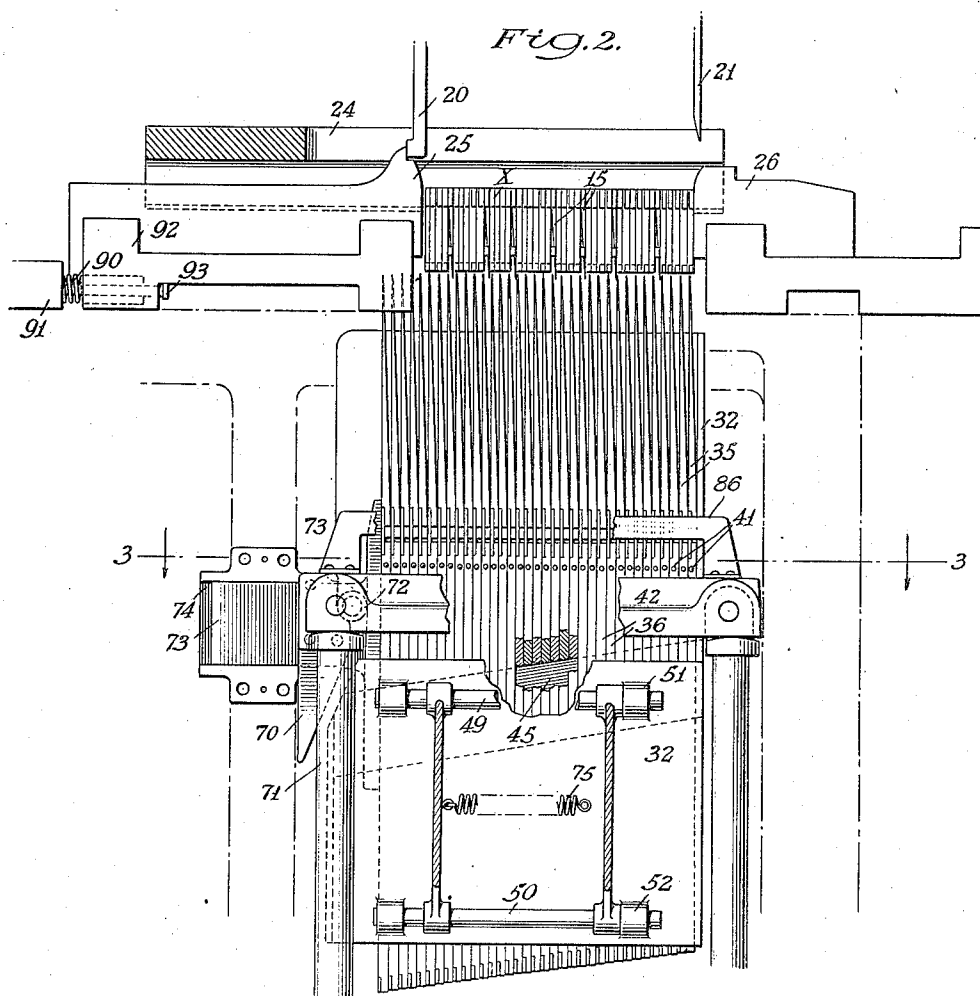
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TYPOGRAPHICAL COMPOSING AND CASTING MACHINE

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6 Sheets-Sheet 2



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TYPOGRAPHICAL COMPOSING AND CASTING MACHINE

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Fig. 4.

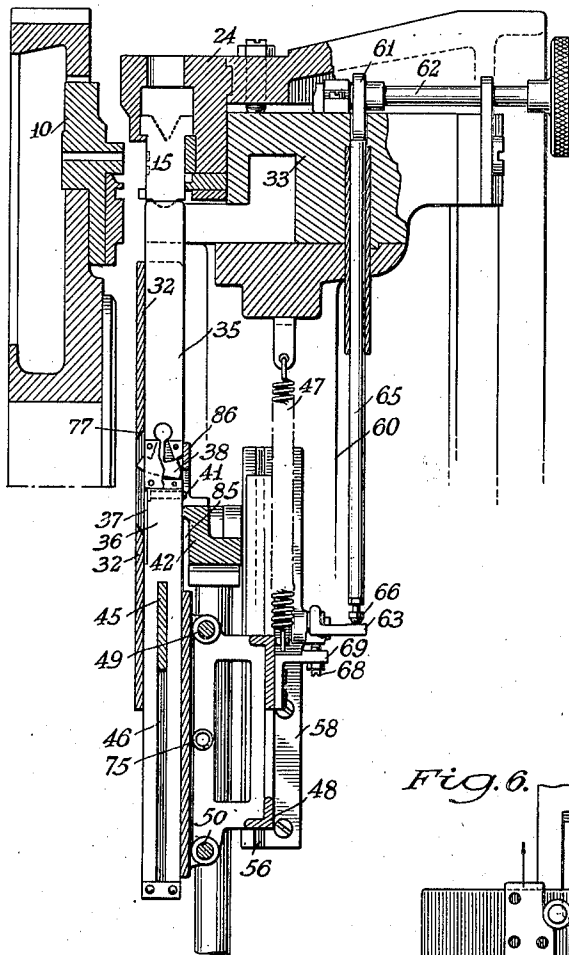


Fig. 5.

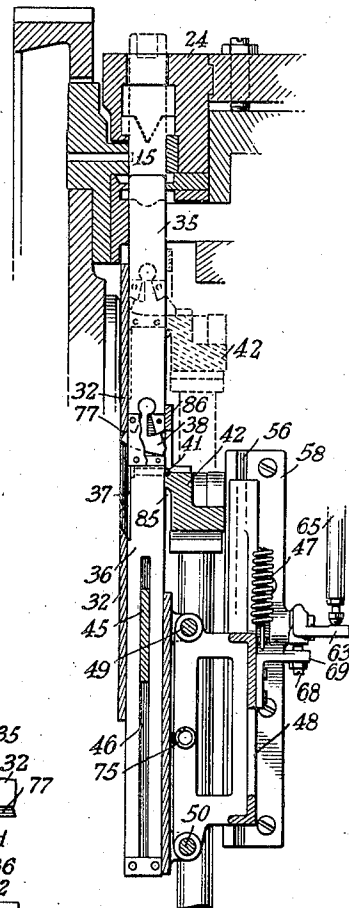
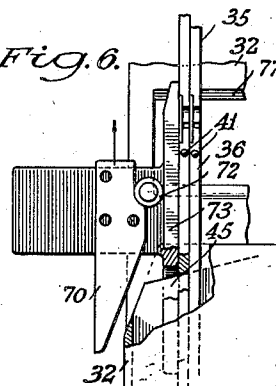


Fig. 6.



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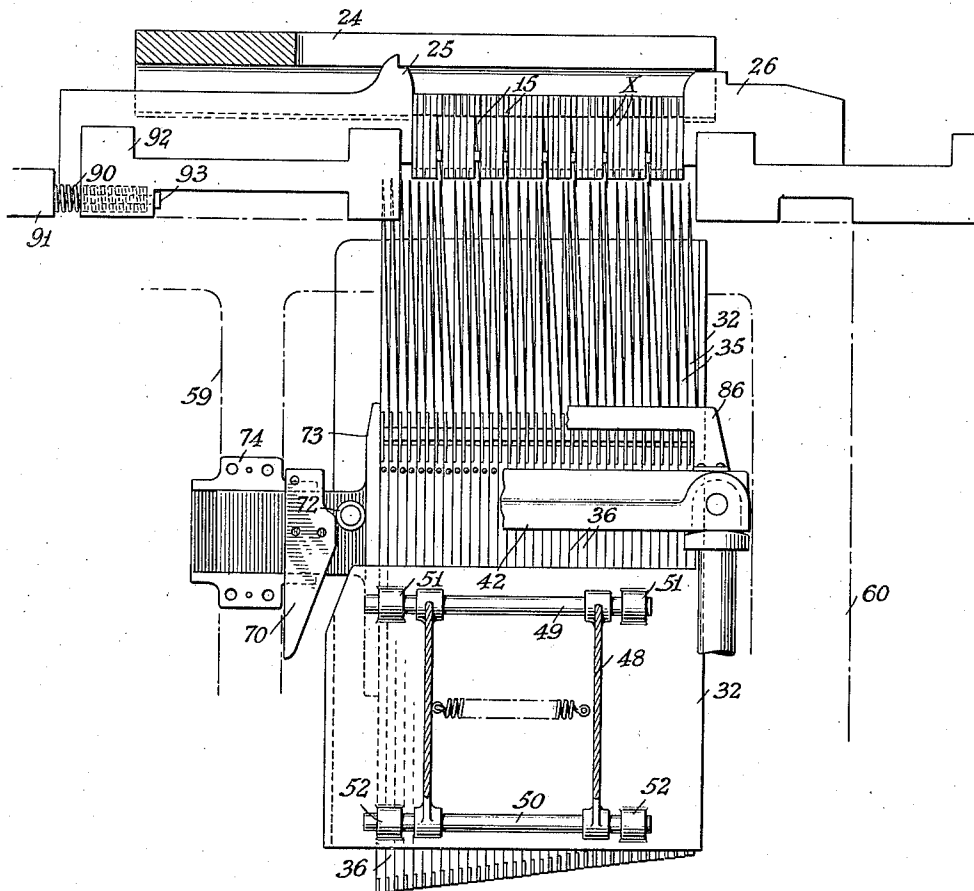
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TYPOGRAPHICAL COMPOSING AND CASTING MACHINE

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Fig. 7.



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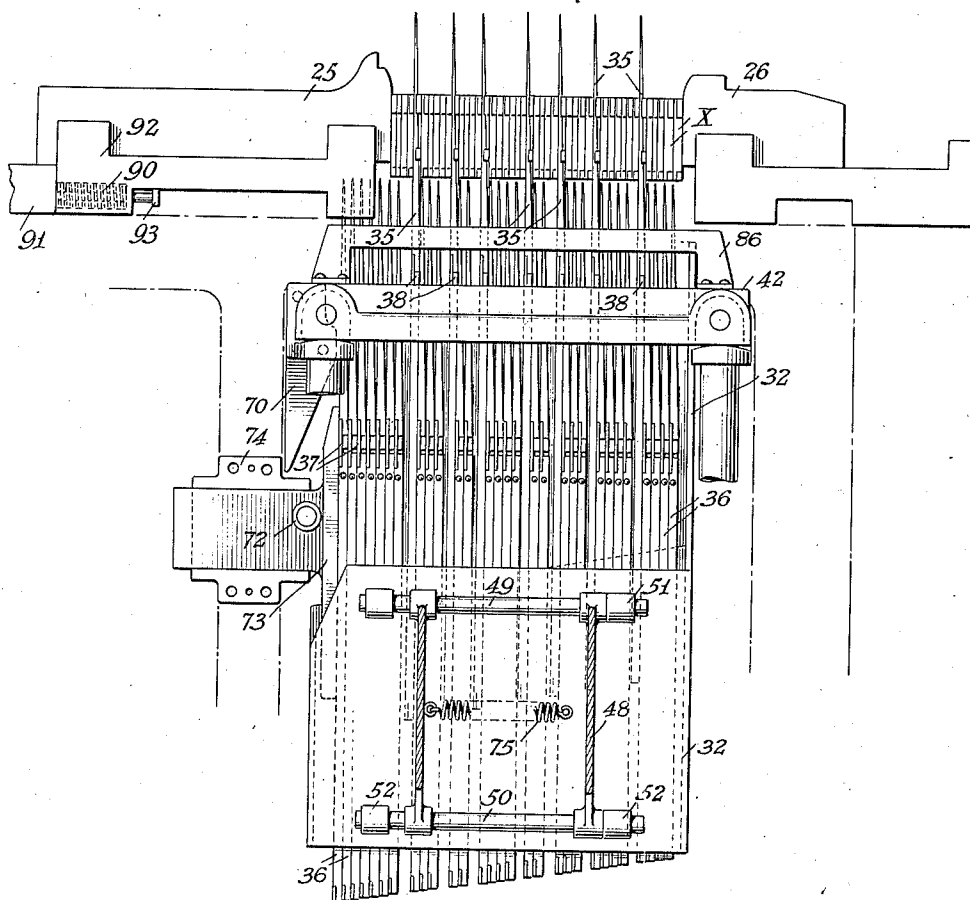
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TYPOGRAPHICAL COMPOSING AND CASTING MACHINE

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Fig. 8.



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TYPOGRAPHICAL COMPOSING AND CASTING MACHINE

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Fig. 9.

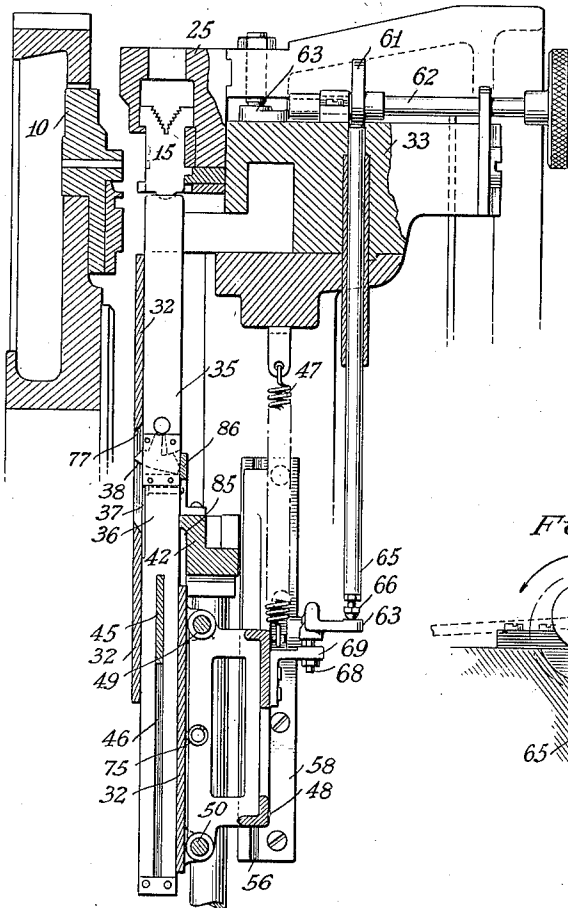


Fig. 14.

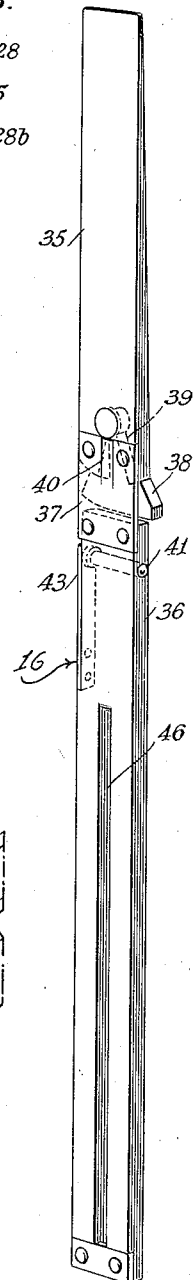


Fig. 13.

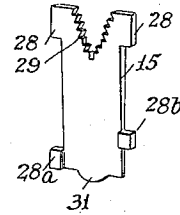


Fig. 10.

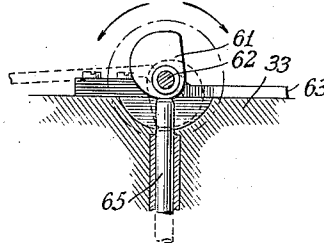


Fig. 12.

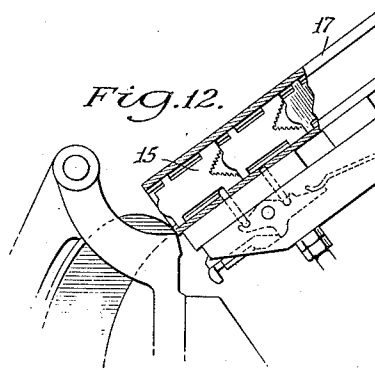
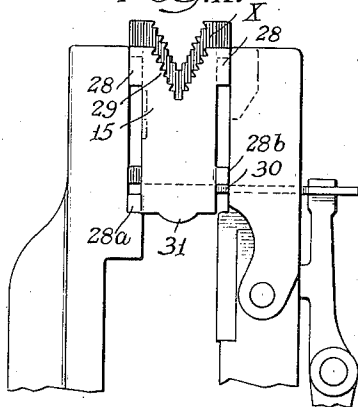


Fig. 11.



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2,201,140

TYPOGRAPHICAL COMPOSING AND
CASTING MACHINE

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tion of New York

Application April 1, 1939, Serial No. 265,564

20 Claims. (Cl. 199—68)

This invention relates to typographical composing and casting machines of the general organization represented in U. S. Letters Patent No. 436,532, wherein circulating matrices and spacers are released from their places of storage in response to the operation of a keyboard and then composed in line in an assembler under the influence of a rapidly rotating star wheel, the assembler raised to position the composed line between a pair of depending fingers carried by a delivery slide which moves to the left through an intermediate channel to deliver the line to a transporter or so-called "first elevator," the transporter lowered to position the line between a pair of confining jaws and before the face of a slotted mold, the spacers expanded to justify the line between the vise jaws, the mold advanced against the line and then filled with molten metal to form a type bar or slug against the same, and after the casting operation, the transporter raised to an upper level where the line is shifted to the right into an upper transfer channel, whence the matrices and spacers are returned to their original places of storage.

The usual, if not universal form of spacer employed in such machines comprises a short wedge section which is supported in line with the matrices and a long pendant wedge section slidably connected thereto. As so constructed, these spacers have an overall length of approximately $4\frac{1}{4}$ inches as contrasted with the overall length of the matrices which is approximately $1\frac{1}{4}$ inches. Because of this difference in length, such spacers cannot be stored in the same magazine or handled in the same way as the matrices but instead require a separate box or storage compartment and additional mechanism to effect their release and return from and to said box or storage compartment. Furthermore, experience has taught that, due to this difference in length, a pause in the operation of the keyboard must frequently be effected after the release of a spacer from its place of storage and before the release of the next following matrix in order to secure proper assembly of the line. In addition, the difference in length between the spacers and matrices slows up the operation of the machine on account of the extra time required in raising and lowering the line the extra three inches necessary to free the lower ends of the pendant sections from obstruction as they circulate through the machine, not to mention the fact that the extra distance that the line must be so raised and lowered adversely affects the total height of the machine.

In accordance with the present invention, the foregoing and other objections are obviated by dividing the individual spacers into two separate or disconnected but complementary wedge shaped sections, one of which is made substantially equal in length to the matrices and of like form, and the other of which is made substantially longer than the matrices and of different form. A series of the shorter matrix-like sections are stored in a channeled magazine along with the matrices and they are circulated through the machine along with the matrices. On the other hand, a series of the longer sections are stored permanently at the line justifying station and, during the justifying operation, certain of these longer sections are brought into cooperative engagement with the shorter sections and forced upwardly through the line to justify the same between the line clamping jaws.

For a detailed description of the invention, reference may be made to the accompanying drawings wherein the invention has been shown in preferred form, although obviously many variations and modifications may be made therein which will be comprised within its spirit. It is to be understood, therefore, that the invention is not limited to any specific form or embodiment except insofar as such limitations are specified in the appended claims.

In the drawings:

Fig. 1 is a front elevation of a typographical machine equipped with the present invention, certain parts being broken away to show some of the details;

Fig. 2 is a front elevation of the casting portion of the machine and showing a composed line prior to justification;

Fig. 3 is a horizontal section taken along line 3—3 of Fig. 2 and looking downwardly or in the direction of the arrows;

Fig. 4 is a vertical section taken through the casting mechanism and showing the relation of the parts prior to line justification;

Fig. 5 is a view similar to Fig. 4 but showing the relation of the parts at an initial stage in the line justifying operation, the dotted lines depicting the relation of the parts at the end of the line justifying operation;

Fig. 6 is a detail front view showing the cam plate carried by the left-hand vertical rod of the justification device and its relation to the stacking mechanism;

Fig. 7 is a view similar to Fig. 2 but showing the storage box shifted slightly to the right to bring the upper ends of selected long spacer sec-

tions against the extensions on the short spacer sections in the line;

Fig. 8 is a view similar to Fig. 7 but showing the selected long spacer sections driven upwardly through the line to justify the same;

Fig. 9 is a view similar to Fig. 4 but showing the first elevator supported at the upper casting level and the storage box for the long spacer sections raised a corresponding distance;

Fig. 10 is a detail view of the cam controlling the vertical position of the spacer storage box;

Fig. 11 is a detail view showing a portion of the assembler elevator and the manner in which the short spacer sections are supported therein;

Fig. 12 is a detail view showing the manner in which the short spacer sections are stored in a channeled magazine;

Fig. 13 is a perspective view of the short spacer section; and

Fig. 14 is a perspective view of the long spacer section.

As shown in the drawings, the improved spacers comprise a series of short wedge shaped sections 15 (Fig. 13) and a series of long complementary wedge shaped sections 16 (Fig. 14). The short sections 15 are stored in a channel of a magazine 17 (Fig. 12), released therefrom in response to the operation of the usual spacer key on the keyboard 18, and then composed in line 30 with matrices X in an assembler elevator 19 (see Fig. 1). After composition, the elevator 19 is raised to position the composed line between a pair of depending fingers 20, 21 of a line delivery slide 22, which then moves to the left through an intermediate channel 23 to deliver the line to a transporter or so-called first elevator 24, which thereupon descends to position the line between a pair of vise jaws 25, 26 and before a slotted mold 19 for the line justifying and slug casting operations. After the casting operation, the short sections 15 are returned along with the matrices X to their common storage magazine 17 by means of suitable distributing mechanism.

To enable the short spacer sections 15 to be circulated through the machine with the matrices, they are provided with a pair of upper projecting ears 28 and with a pair of lower projecting ears 28^a and 28^b as well as with a distributing combination 29. It is to be noted, however, that the lower front ears 28^b of the short spacer sections 15 are located thereon at a higher level than the lower rear ears 28^a, such that the spacer sections will always be assembled at the lowermost level in the assembling elevator 19, regardless of the position of the duplex rail 30 (see Fig. 11), and hence will always occupy the lowermost position in the transporter 25 during line justification. In addition, the short sections 15, at their lower ends, are provided with downward extensions 31 which cooperate with the upper ends of selected long sections 16 during the line justifying operation in the manner subsequently to be described. The extensions 31 are desirably formed so that when the short sections 15 are stored in the magazine 17, one above another, the extension on the lower end of an upper section will enter the U-shaped notch created by the tooth combination 29 formed in the upper end of the next lower section. (see Fig. 12).

The long spacer sections 16 are stored at the line justifying and slug casting station, and during a line justifying operation selected ones are caused to cooperate with the short sections 15 in the line. To this end, the long sections 16 are stacked in a box 32 positioned in the vise frame

33 directly below the composed line when in casting position. Each long section 16 comprises a tapered or wedge shaped upper member 35 and a rectangular lower member 36 joined together by a spring plate 37 with the oppositely disposed ends thereof in spaced relation (Fig. 14). At its lower end, the tapered upper member 35 is provided with an anchor-shaped lifting dog 38 which is pivotally mounted thereon so that it may be rocked to and fro, in pendulum fashion, through the space between the oppositely disposed ends of the two members and against the frictional resistance created on the shank portion 39 thereof by a leaf spring 40 formed by bending inwardly the central portion of the connecting plate 37. Immediately below the lifting dog 38, the lower member 36 is provided with a lifting pin 41 which is slidably mounted in a fore-and-aft hole drilled through the upper end of said member. The front end of the lifting pin 41 normally protrudes a slight distance beyond the front edge of the lower member 35 and into the path traveled by the usual line justification bar 42 as the latter moves upwardly during a line justifying operation, and the rear end of the pin bears against a leaf spring 43 attached to the rear edge of the member 36. The sections 16 as a whole are supported in the box 32 by means of a cross plate 45 which extends from one side of the box to the other and through elongated slots 46 formed in the lower members 36.

The box 32 is normally located on the vise frame 33 in such position that when the descent of the transporter 25 is arrested at its uppermost casting level (as in Fig. 9), the upper ends of the long spacer sections 16 are below the lower ends of the matrices in the line and slightly above the level of the lower ends of the extensions 31 on the short spacer sections 15. However, the box 32 is capable of vertical adjustment against the action of a pull spring 47 so that this condition may obtain when the descent of the transporter 25 is arrested at its lowermost level (as in Fig. 4). Also, the box 32 is so arranged that it may be moved laterally to bring into cooperative engagement the upper ends of the appropriate long sections 16 and the adjacent extensions 31 on the short sections 15 in the line. Thus, the box 32 is secured to the vise frame 33 through the medium of a skeleton bracket 48 to which it is connected by a pair of upper and lower rods 49, 50, and slide bearings 51, 52; and the bracket 48, at its opposite edges, is provided with tongues 53, 54 which slide in corresponding grooves 55, 56 in bracket plates 57, 58 secured to the upright side members 59, 60 of said frame.

The vertical adjustments of the box 32 are controlled by a cam 61 (see Figs. 4, 9 and 10) fastened on the manually operated rock shaft 62 by means of which a filler piece 63 is carried into and out of operative position to arrest the descent of the transporter 25 at a higher or a lower casting level, in a manner well understood in the art. The cam 61 contacts with the upper end of a vertical rod 65 slidably mounted at its upper end in the vise frame 33. At its lower end, the rod 65 is provided with an adjusting screw 66 which rests on the left end of a cross lever 67 pivotally connected at its right end to the right-hand bracket plate 58 (Figs. 1 and 3). The central portion of the lever 67 rests on an adjusting screw 68 carried by a lug 69 attached to the central portion of the skeleton bracket 48. When the filler piece 63 is located in operative position to arrest the transporter at its upper cast-

ing level (see Fig. 9), the low portion of the cam 61 engages the upper end of the vertical rod 65, but when the rock shaft 62 is turned to remove the filler piece 63 so that the transporter 25 will descend to its lowermost level (see Fig. 4), the high part of the cam 61 engages the rod 65 and, through the above-described connections, lowers the box 32 against the action of the spring 47 a like distance to locate the upper ends of the long sections 16 in the desired cooperative relation with the extensions 31 on the short sections 15 in the line.

The endwise movement of the box 32 to bring the upper end of selected long sections 16 into engagement with the extensions 31 on the short sections 15 is effected by a cam plate 70 fastened to the upper end of the usual left-hand justification rod 71 and arranged to engage an anti-friction roller 72 carried by a stacker slide 73 mounted in horizontal bearings 74 secured to the vise frame (Fig. 7). In the normal or lowermost position of the before-mentioned justification bar 42, the low upper portion of the cam plate 70 engages the roller 72 on the stacker slide 73, as shown in Fig. 2, but as the justification bar 42 starts its upward movement, the stacker 73 is cammed to the right against the long sections 16 and 30 and moves the box 32 to the right, against the action of a pull spring 75, from the position shown in Fig. 2 to that shown in Fig. 7. As the box 32 moves to the right, the upper ends of the top members 35 of the long spacer sections 16 nearest the extensions 31 on the short spacer sections 15 are brought into contact therewith, the spring plate 37 permitting the upper ends of those top members 35 which first engage the extensions 31 adjacent thereto to yield while others which happen to have been spaced further from adjacent extensions are making such contact.

As the justification bar 42 moves upwardly, it engages the resiliently mounted lifting pins 41 and carries the long spacer sections 16 upwardly therewith. As these long spacer sections travel upwardly, the upper ends of those which were not brought into engagement with the extensions 31 on the short spacer sections 15 in the line, during the lateral movement of the box 32, engage the bottom face of the composed line and/or the bottom faces of the jaws 26, 27, and their lifting pins 41 are cammed inwardly by the rising bar 42, permitting the spacer sections to drop back to their original position of storage. The remaining or active spacer sections, however, that is to say, those whose upper ends were brought into engagement with the extensions 31 on the short spacer sections 15 in the line, are carried upwardly through the line until the frictional resistance is such that their lifting pins 41 are cammed inwardly by the upwardly moving bar. In the meantime, the lifting dogs 38 of the active spacer sections 16 are cammed forwardly from their normal inactive position by a beveled edge 77 formed on the rear wall of the box (see Fig. 5) into the path of the justification bar 42, which thereupon engages them and so forces the sections upwardly through the line to effect justification. As the active spacer sections 16 travel upwardly through the line, they are maintained in facewise alignment with the matrices by means of the lower projecting ears 28^a and 28^b on the short spacer sections 15, which, as shown in Fig. 13, are arranged to overlap the long sections 16 and guide them by engagement with their opposite edges.

In order that justification may take place progressively as heretofore, the cross plate 45 on which the long sections 16 are supported in the box 32 is inclined downwardly from right to left as best shown in Fig. 2, and the cam plate 70 is so shaped that, in rising, it gradually passes out of engagement with the roller 72 on the stacker slide 73, thus allowing the spring 75 to pull the box 32 to the left so that the necessary facewise movement of the long sections may take place during the justifying operation (see Fig. 8).

On the return movement of the justification bar 42 after casting, the long sections 16 which were forced upwardly through the line, are pulled down by means of the lifting pins 41, the front ends of which in the meantime were forced forwardly by their springs 43 into a recess 85 formed in the rear face of the bar 42. As the descent of the long sections 16 is stopped by the upper edge of the cross plate 45 and the downwardly moving justification bar 42 passes the lifting pins 41, a cross piece 86 secured thereto engages the front end of the lifting dogs 38 and cams them rearwardly to their original or inactive position (see Fig. 4). In the meantime, the cam plate 70 during its descent will have engaged the roller 72 and forced the stacker 73 to the right to re-stack the spacer sections 16 in the box 32 preparatory to the next justifying operation (Fig. 2).

To prevent looseness in the line after it is lowered between the jaws 25, 26 and before the justification bar 42 starts its upward movement, a spring 90 (see Figs. 7 and 8) is introduced between the left-hand jaw block 91 and the banking block 92 on the left-hand jaw 25. The spring 90 normally maintains the left-hand jaw 25 in a rightmost position as determined by the engagement of the head of a stud 93, about which it is positioned, with the right end face of the banking block 92, but as the line delivery slide 22 moves to the left (see Fig. 2), the long or leading finger 20 thereof engages the left-hand jaw 25 and pushes it to the left against the action of the spring 90 to its line receiving position where the block 92 banks against the jaw block 91. After the line has been delivered between the jaws 25, 26 and the line delivery slide 22 moves back to its line receiving position, the spring 90 again acts to force the left-hand jaw 25 to the right (see Fig. 7) to take up any looseness in the line which, if permitted, might enable unintended long spacer sections 16 to find their way upwardly through the line. During the line justifying operation, the left-hand jaw 25 is again forced to the left against the action of the spring 90 until the banking block 92 engages the jaw block 91, thus insuring that the line will be justified to a definite predetermined length.

Having thus described my invention, what I claim is:

1. In or for a typographical machine, a line justifying spacer comprising two separate sections, one adapted to be circulated through the machine, and the other unadapted for circulation through the machine but adapted to be stored at the justifying station for cooperation with the first mentioned section.

2. In or for a typographical machine, a line justifying spacer comprising two separate sections of different lengths, the shorter section being constructed for circulation through the machine, and the longer section unadapted for cir-

ulation through the machine but adapted for storage at the line justifying station to cooperate with the shorter section.

3. In or for a typographical machine, a line justifying spacer comprising two separate wedge shaped sections of different lengths, the shorter section being provided with upper and lower projecting ears and with a distributing combination which enable it to be circulated through the machine, and the longer section unadapted for circulation through the machine but being constructed for storage at the justifying station to cooperate with the shorter section.

4. A spacer as set forth in claim 3, characterized by the fact that the lower front ear of the shorter section is positioned at a higher level than that of the lower rear ear of said section so that said section will always be assembled in line at the lower level.

5. A spacer as set forth in claim 3, characterized by the fact that the ears on the shorter section present opposed vertical parallel shoulders to maintain the longer section in proper alignment during line justification.

6. A spacer as set forth in claim 3, characterized by the fact that the shorter section is provided at its lower end with a downward extension to cooperate with the longer section in effecting line justification.

7. In a typographical machine, the combination of a series of short wedge shaped spacer sections constructed for circulation through the machine, a series of long wedge shaped spacer sections stored at the justifying station, means for bringing certain selected long sections into cooperative engagement with the short sections in the assembled line, and means for forcing said selected long sections through the line to effect line justification.

8. In a typographical machine, the combination of a series of short wedge shaped sections constructed for circulation through the machine, a series of long wedge shaped sections stored at the justifying station with the upper ends thereof located below the bottom face of a composed line when standing at said station, means for bringing certain selected long sections into cooperative engagement with the short sections in the line, and means for forcing said selected long sections upwardly through the line to justify the same.

9. In a typographical machine, the combination of a series of short wedge shaped sections constructed for circulation through the machine, a series of long wedge shaped sections stored at the justifying station with the upper ends thereof located below the bottom face of a composed line when standing at said station, means for moving said long sections facewise to bring selected ones into cooperative engagement with the short sections in the line, and means for thereafter forcing said selected long sections upwardly through the line to justify the same.

10. In a typographical machine, the combination of a series of short wedge shaped spacer sections constructed for circulation through the machine, a series of long wedge shaped spacer sections stored at the justifying station with the upper ends thereof located below the bottom face of a composed line when standing at said station, a stacker for moving said long sections facewise to bring selected ones into cooperative engagement with the short sections in the line, and means for thereafter forcing said selected long

sections upwardly through the line to justify the same.

11. In a typographical machine, the combination of a series of short wedge shaped spacer sections constructed for circulation through the machine, a series of long wedge shaped spacer sections stored at the justifying station with the upper ends thereof located below the bottom face of a composed line when standing at said station, means responsive to the operation of the level adjusting means for shifting the position of said long spacer sections whereby the upper ends thereof will bear a definite relationship with respect to the lower face of said line regardless of the level thereof, a stacker for moving said long sections facewise to bring selected ones into cooperative engagement with the short sections in the line, and means for thereafter forcing said selected long sections upwardly through the line to justify the same.

12. In a typographical machine, the combination of a series of short wedge shaped spacer sections constructed for circulation through the machine and having downward extensions at the lower ends thereof, a series of resilient long wedge shaped spacer sections stored at the justifying station with the upper ends thereof located below the bottom face of a line standing at said station, a stacker for moving said long sections facewise to bring the upper ends of selected ones into engagement with the downward extensions on the short sections in the line, and means for forcing said selected long sections upwardly through the line to justify the same.

13. In a typographical machine, the combination of a series of short wedge shaped sections constructed for circulation through the machine and having downward extensions at the lower ends thereof, a series of long wedge shaped spacer sections stored at the justifying station with the upper ends thereof positioned below the bottom face of an assembled line when standing at said station, means for moving said long sections facewise to bring the upper ends of selected ones into engagement with the downward extensions on the short sections in the line, yielding means for taking up any looseness in the line when standing at said station, and means for forcing said selected long sections upwardly through the line to justify the same.

14. In a typographical machine, the combination of a series of short wedge shaped spacer sections constructed for circulation through the machine and having downward extensions at the lower ends thereof, a series of long wedge shaped spacer sections stored in a box with the upper ends thereof located below the bottom face of a line standing at the justifying station but above the level of the lower ends of said downward extensions on the short sections in the line, a vertically movable justification bar, means responsive to the initial movement of said bar for bringing the upper ends of selected long sections into engagement with said downward extensions, and means responsive to the continued movement of said bar for forcing said selected long sections upwardly through the line to justify the same.

15. In a typographical machine, the combination of a series of short wedge shaped sections constructed for circulation through the machine and having downward extensions at the lower ends thereof, a series of long wedge shaped spacer sections stored at the justification station with the upper ends thereof located below the bottom face of a line standing at said station but above

the level of the lower ends of said downward extensions, a stacker for moving said series of long sections to carry the upper ends of selected ones into engagement with the downward extensions on the short sections in the line, a vertically movable justification bar, means responsive to the initial movement of said bar for actuating said stacker, and means responsive to the continued movement of said bar for forcing said selected long sections upwardly through the line to justify the same.

16. In a typographical machine, the combination of a series of short wedge shaped spacer sections constructed for circulation through the machine and having downward extensions at the lower ends thereof, a series of long wedge shaped spacer sections stored at the justification station with the upper ends thereof located below the bottom face of a line when standing at said station but above the level of the lower ends of said downward extensions, a stacker for moving said series of long sections to carry the upper ends of selected ones into engagement with the downward extensions on the short sections in the line, a vertically movable justification bar, means responsive to the initial movement of said justification bar for actuating said stacker, and means responsive to the continued movement of said bar for forcing said selected long sections upwardly through the line to justify the same, said stacker actuating means being adapted to be rendered inoperative during the continued movement of said bar so that all of said long wedge sections may move sidewise as said selected sections are forced upwardly through the line.

17. In a typographical machine, the combination of a series of short wedge shaped spacer sections constructed for circulation through the machine and having downward extensions at the lower ends thereof, a series of long yieldingly constructed wedge shaped spacer sections stored at the line justification station with the upper ends thereof located below the bottom face of a line when standing at said station but above the level of the lower ends of said downward extensions, yielding means for taking up any looseness in the line when standing at said station, a stacker for moving said series of long sections to carry the upper ends of selected ones into engagement with the downward extensions on the short sections in the line, a vertically movable justification bar, means responsive to the initial movement of said justification bar for actuating said stacker, and means responsive to the continued movement of said bar for forcing said selected sections upwardly through the line to justify the same, said stacker actuating means being adapted to be rendered inoperative during the continued movement of said bar so that all of said long wedge sections may move sidewise as required as said selected sections are forced upwardly through the line.

18. In a typographical machine, the combination of a series of short wedge shaped spacer sections constructed for circulation through the machine and having downward extensions on the lower ends thereof, a series of long resiliently constructed wedge shaped spacer sections stored at the justification station with the upper ends thereof located below the bottom face of a line standing at said station but above the level of the lower ends of the downward extensions on the short sections in the line, yielding means for taking up any looseness in the line while standing at said station, a stacker for moving said series

of long sections sidewise to carry the upper ends of selected ones into engagement with the downward extensions on the short sections in the line, a vertically movable justification bar, means responsive to the initial upward movement of said justification bar for actuating said stacker and to the continued upward movement of said bar for rendering said stacker inoperative, spring pressed lifting pins carried by said long sections and which are first engaged by said bar during its initial upward travel and then depressed thereby, normally inoperative lifting dogs also carried by said long sections, and means responsive to further upward movement of the justification bar for shifting the dogs carried by the selected long sections into the path of said bar so that said selected sections will be forced upwardly through the line to justify the same.

19. In a typographical machine, the combination of a series of short wedge shaped spacer sections constructed for circulation through the machine and having downward extensions at the lower ends thereof, a series of long yieldingly constructed wedge shaped spacer sections stored at the justification station with the upper ends thereof located below the bottom face of a line standing at said station but above the level of the lower ends of the downward extensions on the short sections in the line, yielding means for taking up any looseness in the line while standing at said station, a stacker for moving said series of long sections facewise to carry the upper ends of selected ones into engagement with the extensions on the short sections in the line, a vertically movable justification bar, means responsive to the initial upward movement of said justification bar for actuating said stacker, spring pressed lifting pins carried by said long sections and which are first engaged by said bar during its initial upward travel and then depressed thereby, normally inoperative lifting dogs also carried by said long sections, and means responsive to further upward movement of the justification bar for shifting the dogs carried by the selected long sections into the path of said bar so that said selected sections are forced upwardly through the line to justify the same, said stacker actuating means being adapted to be rendered inoperative as said selected sections are forced upwardly through the line so that all of said sections may be moved sidewise as required during line justification.

20. In a typographical machine, the combination of a series of short wedge shaped spacer sections constructed for circulation through the machine and having downward extensions at the lower ends thereof, a series of long yieldingly constructed wedge shaped spacer sections stored at the justification station with the upper ends thereof located below the bottom face of a line standing at said station but above the level of the lower ends of the downward extensions on the short sections in the line, yielding means for taking up looseness in the line while standing at said station, a stacker for moving said series of long sections sidewise to carry the upper ends of selected ones into engagement with the downward extensions on the short sections in the line, a vertically movable justification bar, means responsive to the initial upward movement of said justification bar for actuating said stacker and to the continued upward movement of said bar for rendering said stacker inoperative, spring pressed lifting pins carried by said long sections and which are first engaged by said bar during its

initial upward travel and then depressed thereby, normally inoperative lifting dogs also carried by said long sections, means responsive to the further upward movement of the justification bar for shifting the dogs carried by the selected long sections into the path of said bar so that said selected sections will be forced upwardly through the line to justify the same, and means responsive

to the return movement of said bar for restoring said lifting dogs to their normal inoperative position, said lifting pins being adapted to be engaged by said bar during the return movement thereof to restore the long sections to their place of storage.

GEORGE P. KINGSBURY.