

Sept. 11, 1934.

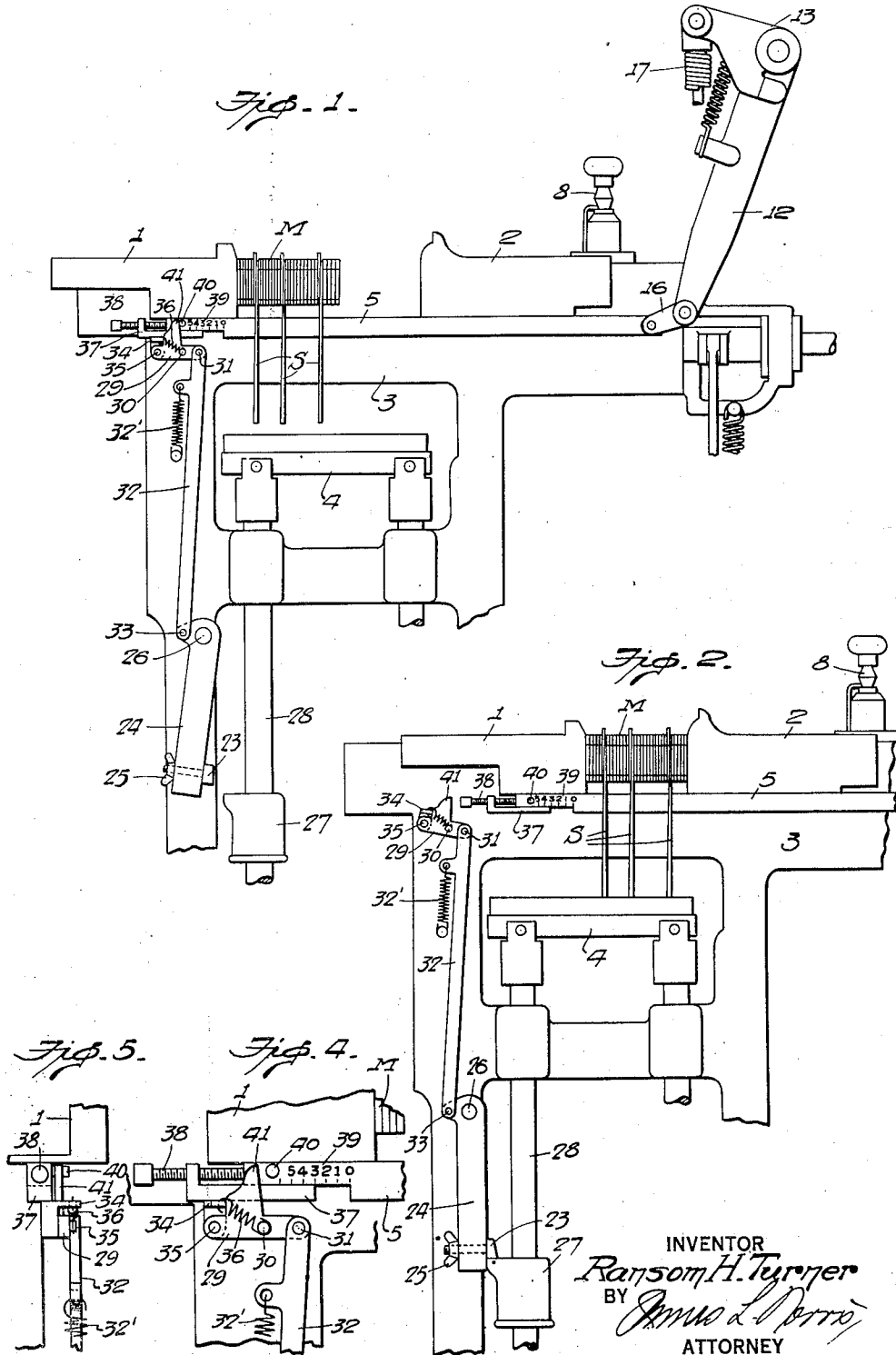
R. H. TURNER

1,973,586

TYPOGRAPHICAL MACHINE

Filed Aug. 25, 1933

2 Sheets-Sheet 1



Sept. 11, 1934.

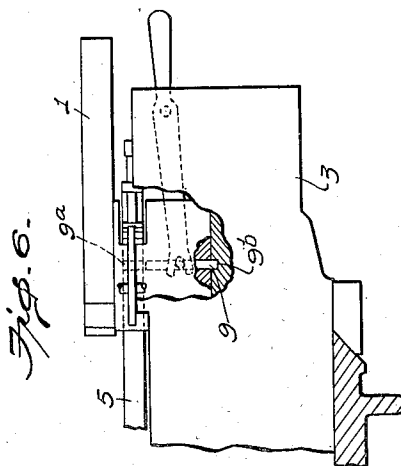
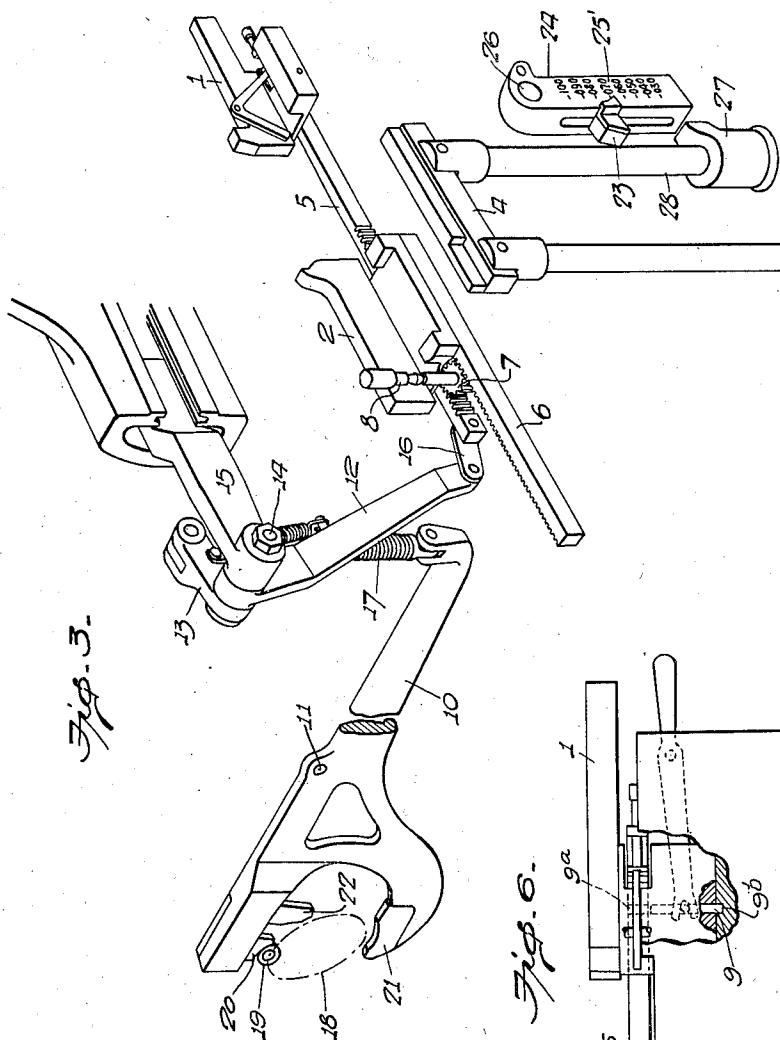
R. H. TURNER

1,973,586

TYPOGRAPHICAL MACHINE

Filed Aug. 25, 1933

2 Sheets-Sheet 2



INVENTOR  
*Ransom H. Turner*  
BY *Emilio L. D'Amico*  
ATTORNEY

## UNITED STATES PATENT OFFICE

1,973,586

## TYPOGRAPHICAL MACHINE

Ransom H. Turner, Little Neck, N. Y., assignor to  
Intertype Corporation, Brooklyn, N. Y., a cor-  
poration of New York

Application August 25, 1933, Serial No. 686,785  
In Germany March 2, 1933

13 Claims. (Cl. 199—50)

The present invention relates to improvements in typographical machines of the well-known class wherein matrices are composed into lines and slugs cast therefrom, and the invention relates more particularly to machines of this class having means for moving one or both of the vise jaws to confine lines of matrices or lines of matrices containing expansible spacebands at either end or centrally of the length of a slug casting mold, such operations being known as quadding or centering.

In order to successfully perform these operations, the vise jaw or jaws must not only be moved to close against the matrix line and to locate the jaw or jaws properly in front of the mold prior to the casting operation and to open after the casting operation, but means must be provided for controlling the movable jaw or jaws during justification whereby the justifying action may take place properly, the line will be relieved of the confining action of the jaws during justification and while alignment of the matrices takes place, and the jaws will hold the line tightly during the casting operation, an example of quadding and centering mechanism of this kind being shown and described in the prior applications of Samuel E. Sperry, Serial No. 562,390, filed November 9, 1931, and Serial No. 612,349, filed May 19, 1932.

For good printing it is desirable that the spacing between words in the successive lines be uniform. While succeeding lines of full column width cannot be produced with the same spacing between the words because in succeeding lines there will be a different number of expansible spacebands which are the means of creating the spacing between words, lines of less than column width that are quadded or centered might be produced with equal spacing between the words by using space matrices instead of expansible spacebands. The use of space matrices, however, is not always convenient and it requires selection of the desired thickness of space matrices to suit the varying conditions of the composition. Accordingly it would be advantageous to use the ordinary expansible spacebands by providing means whereby they would be capable of producing any desired amount of spacing between words in all lines where this is possible.

One of the objects of the invention is to provide means whereby any desired spacing between the words or characters in quadded or centered lines can be produced and whereby this can be accomplished by using the usual expansible spacebands, and in doing this to provide means for pre-

determining the spacing to an exact degree, notwithstanding that the lines may contain different numbers of spacebands.

Another object of the invention is to provide simplified and improved mechanism for moving and controlling the vise jaws so that clamping action of the jaws against the line will take place automatically and at the proper time to harmonize with the justification or expansion of spacebands in the lines, and so that, at the same time, justification of lines of full column width will not be disturbed, and lines that do not contain expansible spacebands can also be cast.

To these and other ends, the invention consists in certain improvements and combinations and arrangements of parts all as will be hereinafter more fully described, the features of novelty being pointed out more particularly in the claims at the end of the specification.

In the accompanying drawings:

Figure 1 is a rear elevation of the vise of a typographical machine, showing the relationship of the vise jaws immediately after a line of matrices has been introduced between them and before the spacing controlling means has been brought into operation;

Figure 2 is a view similar to Figure 1 but showing the line of matrices moved by the right hand jaw toward the left hand jaw and the spacing controlling means in operative position;

Figure 3 is a perspective view of parts of the machine as viewed from the front thereof, showing the vise jaw moving and controlling means in position at the commencement of the vise jaw moving operation;

Figure 4 is a detail view, on an enlarged scale, of the setting means for the spacing controlling means as viewed from the rear in the machine;

Figure 5 is a side elevation of the parts shown in Figure 4; and

Figure 6 is a top plan, partly in section, of a portion of the vise frame, showing means for detachably connecting the right hand jaw to its rack bar.

Similar parts are designated by the same reference characters in the several figures.

In the preferred embodiment of the invention shown in the present instance, 1 and 2 designate, respectively, the right hand and left hand jaws of the vise as commonly employed in machines of this class for presenting the lines of matrices in front of a mold for the casting of type bars or slugs therefrom, these jaws being both guided to move toward and from one another in a vise frame 3, and 4 designates the justifying mecha-

nism which, in machines of this class, is actuated by springs controlled by cams and serves to push upwardly and thereby expand wedge-like spacebands contained in the matrix line to justify it, as well-known to those skilled in the art.

In carrying out the present invention, the vise jaws 1 and 2 are provided with rack bars 5 and 6, respectively, and a pinion 7 fixed to a shaft 8 movable vertically or axially in the vise frame 3, is shiftable into engagement with the rack bars to couple them and thereby cause the vise jaws to move simultaneously in opposite directions, for centering matrix lines with respect to the mold, or by disconnecting the rack bar 5 from the vise jaw 1, as by retracting a connecting pin 9 carried by this jaw from an aperture 9<sup>a</sup> in the rack bar 5 and engaging it in a locking aperture 9<sup>b</sup> in the vise frame, the left hand jaw 2 may be moved alone as for quadding at the left hand end of the line or by connecting the rack bar 5 to the jaw 1 by shifting the pin 9 out of the locking aperture 9<sup>b</sup> and into the aperture 9<sup>a</sup> in the rack bar 5 and shifting the pinion 7 out of engagement with the rack bars, the vise jaw 1 alone may be moved, as for quadding at the right hand end of the line, substantially as disclosed in said application Serial No. 612,349.

The vise jaw moving and controlling means, according to the present invention, comprises a lever 10 which is pivoted at 11 on a part of the stationary frame of the machine, and a lever comprising arms 12 and 13 both mounted to rock on a pivot 14 supported by a bracket 15 on a part of the stationary frame of the machine, the lower end of the lever arm 12 being operatively connected to the rack bar 5 by the link 16 and the lever arm 13 being yieldingly connected by a spring 17 to the forward end of the lever 10. The rear end of the lever 10 is forked to extend above and below the main cam shaft 18 of the machine and said cam shaft carries a roller or projection 19. The upper branch of the fork of the lever 10 has an inclined block or cam portion 20 extending inwardly therefrom in the path of the roller 19, and the lower branch of the fork of said lever has a block or cam portion 21 also in the path of the roller 19, the roller 19, during rotation of the cam shaft, first engaging the cam portion 20 and thereby rocking the lever 10 and lever arms 12 and 13 in a direction to move either one or both of the vise jaws inwardly to close against a matrix line between them, and the further rotation of the cam shaft causes the roller 19 thereon to act on the cam portion 21 to rock the lever 10 and the lever arms 12 and 13 in the opposite direction and thereby move either or both of the vise jaws outwardly or into open position. During the travel of the roller 19 from the cam portion 20 to the cam portion 21, the matrix line between the vise jaws is justified and aligned and a cast is made therefrom, after which the jaws are opened by the action of the roller 19 on the cam portion 21, as in the prior applications hereinbefore referred to. However, while a cast is being made from a matrix line, either with or without spacebands, the vise jaws must be held closed against the matrix line in order to hold the matrices therein firmly clamped together, and according to the hereinbefore mentioned applications, such is accomplished by locking pawls operative by the justifying mechanism. According to the present invention, clamping of the matrix line immediately before the casting operation takes place is effected automatically and at the proper time by the lever 10 and the lever arms 12 and

13 thus avoiding the necessity of using locking pawls and also avoiding any disturbance of the timing and proper functioning of the justifying mechanism of the machine, such being accomplished according to the present invention, by providing an inclined cam portion 22 on the forked portion of the lever 10 in the path of the roller 19 and at the proper point to be engaged and actuated by said roller to effect closing of the vise jaw or jaws against the matrix line immediately before the casting operation takes place. This cam portion 22 is spaced from the cam portion 20 which serves to initially close the vise jaw or jaws against the line, to provide an interruption in the action of the lever 10 during the period in the cycle of operation of the machine in which justification of the matrix line and alignment of the matrices therein takes place, such alignment of the matrices in machines of this class being effected by a slight rise of the usual first elevator which lowers the matrix line into position between the vise jaws, between the usual first and second justifications, thereby aligning the usual lugs on the matrices with the commonly used aligning rails on the mold.

According to the improved vise jaw moving and controlling means as hereinbefore described, the roller 19 on the cam shaft 18 will contact with the cam portion 20 on the lever 10 immediately after a matrix line has been lowered between the vise jaws by the first elevator in the usual way, and the roller 19 acting on the cam portion 20 will actuate the lever 10 and the lever arms 12 and 13 in a direction to close one or both of the vise jaws against the matrix line between them. When the roller 19 passes the cam portion 20, the action of the lever 10 and lever arms 12 and 13 on the vise jaws is interrupted, and during this period alignment of the matrices and justification of the line take place. Immediately following completion of the second and final justification of the line and immediately before the casting operation takes place, the roller 19 comes into contact with the cam portion 22, thereby actuating the lever 10 and the lever arms 12 and 13 in a direction to move the vise jaw or jaws inwardly to tightly clamp the matrix line engaged at its opposite ends by these jaws and the latter maintain the matrix line tightly compressed or clamped until the casting operation is completed, whereupon the roller 19 passes beyond the cam portion 22, thereby relieving the clamping action on the matrix line, and the further travel of the roller 19 caused by the continued rotation of the cam shaft brings it into contact with the cam portion 21 which is opposite to the cam portions 20 and 22 and which therefore causes the lever 10 and the lever arms 12 and 13 to be moved in an opposite direction and to thereby open the vise jaws and to return them to their normal line receiving position ready for the next matrix line.

From the foregoing, it will be seen that the vise jaws are free of any closing influence acting thereon during justification of the line, and in consequence, the vise jaw or jaws will move outwardly without resistance under the expanding influence of spacebands in the line so that the justifier 4 would continue to move upwardly to an undue extent unless controlled and such would be objectionable since the spacebands in the line would be fully expanded and would produce unduly wide spacing between the words or characters in the line. The present invention provides means for controlling the extent of movement of the justifying mechanism during

its justifying action and thus controls the amount of spacing between the words or characters in the line and furthermore such controlling means, according to the present invention, is capable of being set to predetermine the amount of spacing which will be produced between the words or characters in the line, thereby enabling such spacing to be varied as desired to suit the size of the characters or the kind of print to be produced. Such justification controlling means, in the preferred embodiment shown, comprises a stop 23 which is adjustable vertically in a lever 24, the latter having a scale 25 thereon to facilitate the setting of the stop 23 thereon and the stop being fixed in different adjusted positions on the lever 24 by a clamping nut 25. The lever 24 is pivoted at 26 on the vise frame so that it may swing the stop 23 thereon into and out of the path of a collar 27 fixed on one of the rods 28 of the justifying mechanism, the stop 23 being shown in such position in Figure 2 and being shown swung out of the path of the collar 27 in Figure 1. While the stop 23 is in the path of the collar 27 on the justifying mechanism, it will arrest the ascent thereof and thereby limit the extent to which the expansible spacebands S in a matrix line M between the vise jaws are expanded, and by setting the stop 23 in different adjusted positions vertically on the lever 24, the extent of ascent of the justifying mechanism and consequently the extent of spacing between the words or characters in the matrix line may be varied, as desired.

The stop 23 is not required when matrix lines composed within a given amount less than full line measure or column width are presented between the vise jaws since such lines should be expanded to full line measure or column width as determined by the usual stops on the machine against which the jaws come to rest, but the stop 23 is required for matrix lines which are too short to be expanded to full line measure or column width, as are lines which are to be quadded or centered. The present invention provides means for automatically bringing the stop 23 into action during justification of such short lines and for retaining said stop in inactive position when lines capable of being expanded to full line measure or column width are justified. The means shown in the present instance for accomplishing this purpose comprises a lever 29 which is pivoted at 30 on the vise frame and is pivotally connected at 31 to a link 32, the latter being pivotally connected at 33 to the lever 24, a tension spring 34 being connected to the link 32 and acting to move the latter downwardly and to thereby swing the lever 24 in a direction to bring the stop 23 thereon into the path of the collar 27 as shown in Figure 2 and to rock the lever 29 into the position shown in this figure. The lever 29 has a shoe 34 pivoted thereon at 35, and this shoe is yieldingly held against a shoulder on the lever 29 by a tension spring 36. The rack bar 5 for the vise jaw 1 carries a slide 37 arranged to engage and move over the flat upper side of the shoe 34, and this slide is adjustable longitudinally of the rack bar 5 by a screw 38, a scale 39 graduated according to a suitable line measure, as for example in ems, on the rack bar 5 being preferably provided to facilitate the setting of the slide 37 at different points in the length of the rack bar 5. The rack bar 5 also carries a pin 40 which projects therefrom and is engageable with a pawl 41 on or forming part of the lever 29. In operation, the stop device for the justifying mechanism

normally stands in the position shown in Figure 1, the vise jaw 1 being in its normal or line receiving position, the stop device being then in inactive position and being held in such position by the bearing of the underside of the slide 37 on the shoe 34 whereby the link 32 will be held in its raised position and the lever 24 swung into a position where the stop 23 thereon will clear the path of the collar 27 when the justifying mechanism makes its upward or justifying stroke. If a matrix line is introduced between the vise jaws which has been composed to within a given limit of full line measure or column width as determined by the setting of the slide 37 as indicated by the scale 39, such a line will be expanded to full line measure or column width by the ascent of the justifying mechanism acting on the expansible spacebands S in such line since the vise jaw 1 will then not move inwardly or toward the companion vise jaw 2 to an extent sufficient to remove the slide 37 from above the shoe 34. If, however, the vise receives a short matrix line or one composed to a length less than full line measure or column width by an amount exceeding the setting of the slide 37 as indicated by the scale 39, the rack bar 5, actuated by the lever 10 and lever arms 12 and 13 as hereinbefore described, will move sufficiently far toward the left in Figure 1 to carry the slide 37 from a position above the shoe 34 before the matrix line is closed by the movable jaw, if the device is set for quadding, or by both jaws if the device is set for centering, the device as shown in Figures 1 and 2 being for example set for quadding by the jaw 1 to which the rack bar 5 is connected. The consequent travel of the slide 37 from above the shoe 34 frees the lever 29 so that it may rock under the pull of the spring 34, and the consequent descent of the link 32 causes the lever 24 to swing about its pivot 26 in a direction to carry the stop 23 thereon into the path of the collar 27 on the justifying mechanism. Although the vise jaws are free from closing influence after they have been brought into contact with the line, the justifier 4 will rise only until the collar 27 thereon strikes the stop 23 and if spacebands are present in the line they will be driven upwardly an exact predetermined amount in accordance with the vertical setting of the stop 23 on the lever 24, as shown in Figure 2. After first justification, the justifier 4 will be lowered as usual and the spacebands S will slide downwardly, but upon the second rise of the justifier 4 for final justification, the spacebands will be again driven upwardly and will thus determine the final expanded spacing between the words or characters in the matrix line. Upon the return of the jaw 1 to normal position following the casting operation, the slide 37 will engage the shoe 34 and cause it to yield against the tension of the spring 36 until the lever 29 and the lever 24 connected thereto have been returned to their normal inactive positions, as shown in Figure 1, and when the jaw 1 reaches its fully opened or normal position, the pin 40 on the rack bar 5 will abut against the pawl 41 on the lever 29 and will thereby rock the latter sufficiently to permit the shoe 34 to swing back into position beneath the slide 37, as shown in Figure 1. Since the rack bar 5 is common to both of the jaws and may be connected to the jaw 1 by the pin 9 or to the jaw 2 by the pinion 7 or to both jaws by said pin and pinion, and the slide 37 is carried on the rack bar 5, the control of the justification means as described is accomplished for short lines whether quadded at either the

right hand or the left hand end or centered, and the end or ends of the mold not closed by the matrix line will be closed by the movable jaw or jaws. It will be understood that if matrix lines not containing spacebands are presented between the jaws, such lines will be properly clamped during the casting operation by the action of the roller 19 on the cam portion 22, without depending upon the operation of the justifying mechanism.

The adjustable slide 37 provides convenient means whereby the operator can control the range of movement of the jaw or jaws before the justification stop 23 comes into action. It is customary for the operator of machines of this class to leave a certain amount of looseness in the average lines of so-called full measure, during their composition, so as to permit expansion of the spacebands to a greater or less degree to tighten the line, lines of relatively long measure containing usually a larger number of spacebands than those in short column measure lines and the adjustable slide 37 enabling the operator to set the justification control means so that it will not come into action to limit the expansion of the spacebands unless the line has been composed to a length less than full line measure by an amount in excess of the setting of said slide.

The improved means provided by the present invention for moving and controlling the vise jaw or jaws is not only simple in construction but is positive and certain in its operation at the proper times to close the jaw or jaws against the ends of the matrix line, to free the jaws of any closing influence during justification of the line so that the line may spread or expand freely or without resistance from the jaws, to clamp the line tightly after justification has been completed and during the casting operation, and to move the jaw or jaws back to their normal open or full line receiving positions, and since the improved jaw moving and controlling means is actuated from the main cam shaft of the machine or independently of the justification means, the normal functioning and timing of the justification means is not disturbed.

The means provided by the present invention for predetermining and controlling the amount of spacing between the words or characters in the lines enables the amount of spacing produced by the usual expansible spacebands contained in the line to be varied to suit different kinds of print, the spacing in all of the lines being uniform for a given setting of the spacing controlling means, and by controlling the spacing by limiting the spaceband expanding stroke of the justifying means independently of the positions occupied by the vise jaw or jaws and without reacting thereon to resist the expansion of the lines, as accomplished by the particular embodiment of the invention herein shown and described, the desired control of the spacing is effected with certainty and uniformity, the justifying means making the extent of the spaceband expanding stroke according to the setting of the stop while the line is free to spread or expand without resistance from the vise jaws, and the extent of opening movement of the jaw or jaws depending on the spaceband expanding stroke of the justifying means as limited by the spacing controlling stop.

I claim as my invention:—

1. In a typographical machine having a matrix line receiving vice comprising jaws at least one of which jaws is movable toward the other jaw,

and a justifying device for expanding spacebands in the line, actuating means operative by the main cam shaft of the machine to close the movable jaw against a matrix line, relieve the movable jaw by interrupting closing action thereof and thereby leaving said line free to permit justification thereof unopposed by said jaw, and subsequently to move the movable jaw against the line to confine the latter during the casting operation.

2. In a typographical machine according to claim 1, an adjustable stop for limiting the spaceband expanding movement of the justifying device while the closing action of the movable jaw is relieved.

3. In a typographical machine according to claim 1, an adjustable stop for limiting the spaceband expanding movement of the justifying device without reaction on the vise jaws while the closing action of the movable jaw is relieved, and means for holding said stop in an inoperative position until the movable jaw has closed to a given extent, said means embodying a slide movable with the movable jaw and adjustable manually to determine the extent of closing movement of the movable jaw before said stop assumes operative position with respect to the justifying device.

4. In a typographical machine according to claim 1, a member operative by said actuating device and having means for connecting it to one or both vise jaws for movement thereby, a stop for limiting the spaceband expanding movement of the justifying device while the closing action of one or both jaws is relieved, means for holding said stop in an inoperative position until a given extent of closing movement of one or both jaws has taken place, said means embodying a slide movable with said member and adjustable to determine the extent of closing movement of the jaw or jaws before said stop assumes operative position with respect to the justifying device, and a stop carried by said member and operative to reset said limiting stop in inoperative position.

5. In a typographical machine having a matrix line receiving vise comprising jaws at least one of which is movable to close the line, and justifying means for expanding spacebands in the line, an actuating device embodying cam means operative by the main cam shaft of the machine to close the movable jaw against the line and to subsequently become inactive and thus interrupt such closing action during operation of the justifying means, said actuating device also embodying cam means operative by the main cam shaft of the machine subsequent to the interruption of said closing action and justification to move the movable jaw against the line to confine it for the casting operation, interrupt its action on said jaw after the casting operation, and thereafter reverse the action of the actuating device and thereby return said jaw to normal position.

6. In a typographical machine having a matrix line receiving vise comprising jaws at least one of which is movable to close the line, and justifying means for expanding spacebands in the line, an actuating device embodying an actuating member on the main cam shaft of the machine and cam elements successively engageable by said member and operative respectively to close the movable jaw against a line and then relieve the line of the closing action of said jaw during operation of the justifying means, to move the movable jaw against the line to clamp

it for the casting operation and to relieve the line thereafter, and finally to reverse the action of the actuating device and thereby open said movable jaw after the casting operation.

5 7. In a typographical machine having a matrix line receiving vise and justifying means operative to expand spacebands in the lines, a stop co-  
operative directly with the justifying means to  
10 limit the extent of spaceband expanding move-  
ment thereof, said stop being adjustable rela-  
tively to the justifying means to arrest its space-  
band expanding movement at one or another  
point and thereby predetermine the amount of  
15 spacing between the words or characters in the  
matrix lines.

8. In a typographical machine having a vise  
embodying jaws at least one of which is mov-  
able to close against a matrix line between the  
jaws, and justifying means operative to expand  
20 spacebands in the line, a stop movable to and  
from an active position to limit the extent of  
spaceband expanding movement of the justifying  
means, and means controlled automatically ac-  
cording to the extent of closing movement of  
25 the movable jaw for setting said stop in said  
active position.

9. In a typographical machine having a vise  
embodying jaws at least one of which is mov-  
able to close against a matrix line, and justify-  
ing means operative to expand spacebands in the  
30 line, a stop movable to and from an active po-  
sition to engage the justifying means and thereby  
limit the extent of spaceband expanding move-  
ment thereof, and means releasable by the mov-  
able jaw after it has closed beyond a predeter-  
35 mined extent to move said stop into said active  
position.

10. In a typographical machine having a vise  
embodying jaws at least one of which is movable  
40 to close against a matrix line, and justifying  
means operative to expand spacebands in the line,  
a stop movable to and from a position to limit  
the spaceband expanding movement of the just-  
ifying means, means acting to move the stop  
45 into said position, and means connected to the  
movable jaw and operative to retain said stop  
moving means against operation while said jaw  
is in its open full line position and to release said  
stop moving means for operation to move the  
50 stop into position to limit the extent of space-  
band expanding movement of the justifying

means when said jaw closes beyond a prede-  
termined extent.

11. In a typographical machine having a vise  
embodying jaws at least one of which is mov- 80  
able to close against a matrix line, and justify-  
ing means operative to expand spacebands in  
the line, a stop movable to and from a position  
to limit the spaceband expanding movement of  
the justifying means, means acting to move the 85  
stop into said position, and a slide connected to  
the movable jaw and adjustable to conform with  
different extents of closing thereof, said slide  
cooperating with the stop moving means to hold  
the stop out of said limiting position while the 90  
movable jaw is in normal full line position and to  
release said stop moving means for operation to  
move the stop into said limiting position when  
said jaw has closed beyond the extent predeter-  
mined by the setting of said slide.

12. In a typographical machine having a ma- 95  
trix line receiving vise comprising jaws at least  
one of which is movable toward the other jaw,  
and a justifying device for expanding space-  
bands in the line, an adjustable stop coopera-  
tive with the justifying device for predetermin- 100  
ing the spaceband expanding movement of the  
justifying device, and a jaw actuating device to  
move the movable jaw into closing position  
against a line to clamp the latter during the cast-  
ing operation. 105

13. In a typographical machine having a ma-  
trix line receiving vise comprising jaws at least  
one of which is movable toward the other, a jaw  
actuating device having means for operating  
it to move at least one of the jaws toward the 110  
other jaw to close against a matrix line and  
to relieve such closing action of said movable  
jaw on the line, and a justifying device operative  
while the closing action of said movable jaw on  
the line is relieved to expand spacebands in the 115  
line, a stop cooperative with the justifying de-  
vice and adjustable to predetermine and limit  
to one or another definite extent the spaceband  
expanding movement of the justifying device, the  
jaw actuating device having means for operating 120  
it subsequently to the operation of the justify-  
ing device to move the movable jaw against the  
line to clamp the line during the casting opera-  
tion.

RANSOM H. TURNER. 125

55 130

60 135

65 140

70 145

75 150