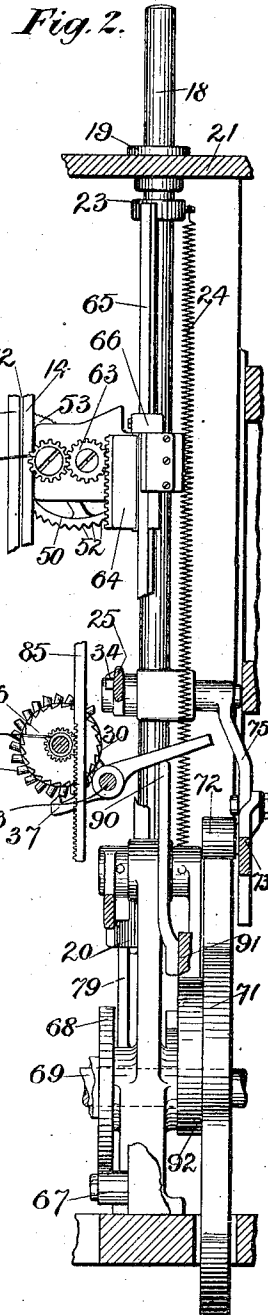
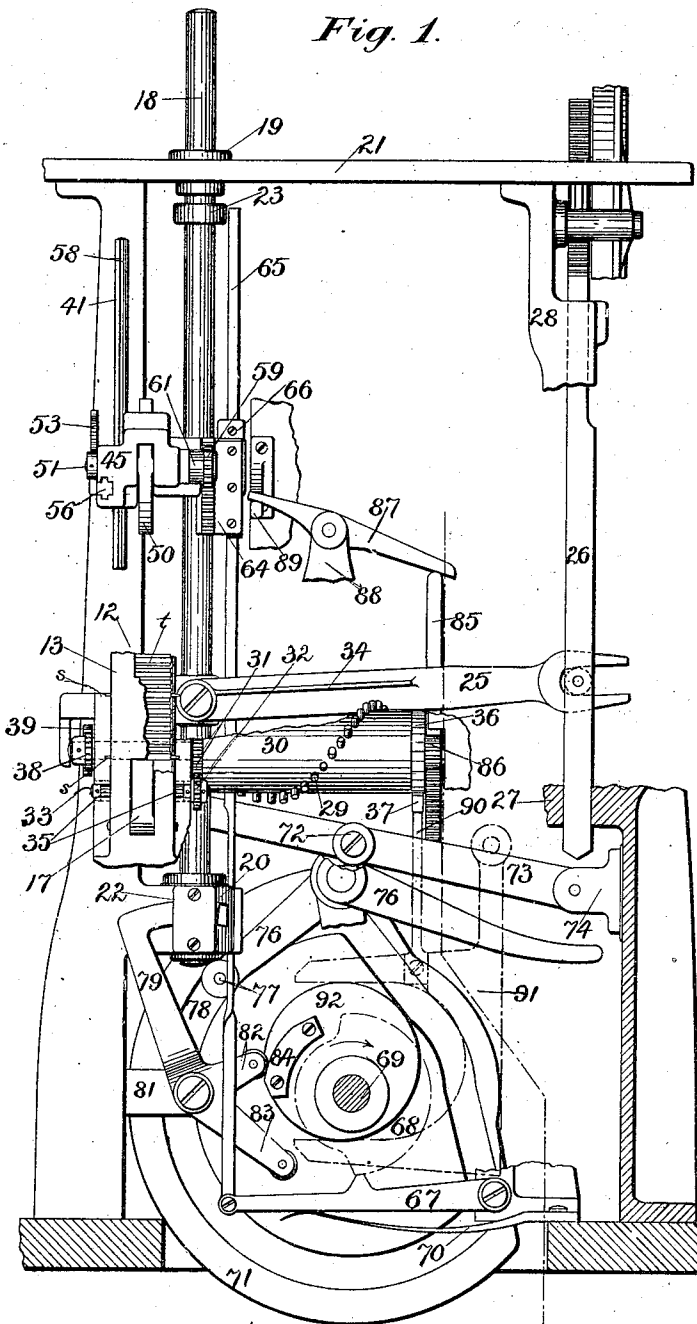


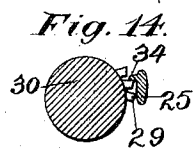
W. J. ENNISSON.
TYPE JUSTIFYING MACHINE.

APPLICATION FILED JUNE 14, 1899. RENEWED AUG. 11, 1906.

4 SHEETS—SHEET 1.



Witnesses:
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No. 844,567.

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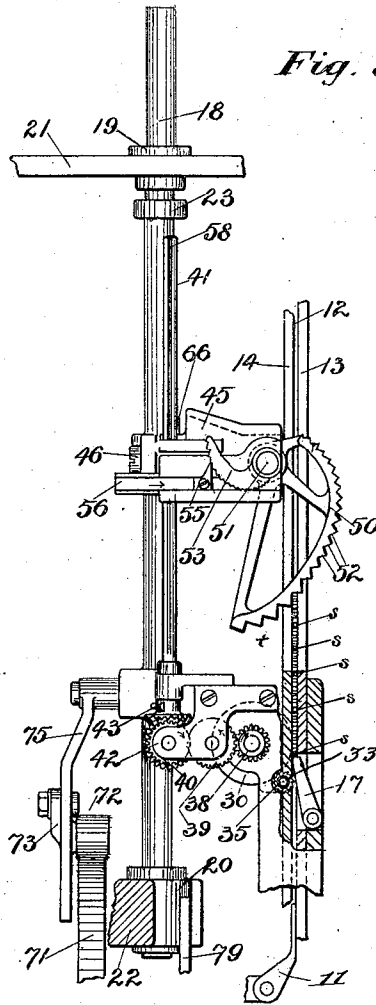
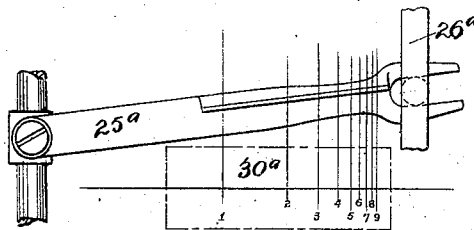


Fig. 15.



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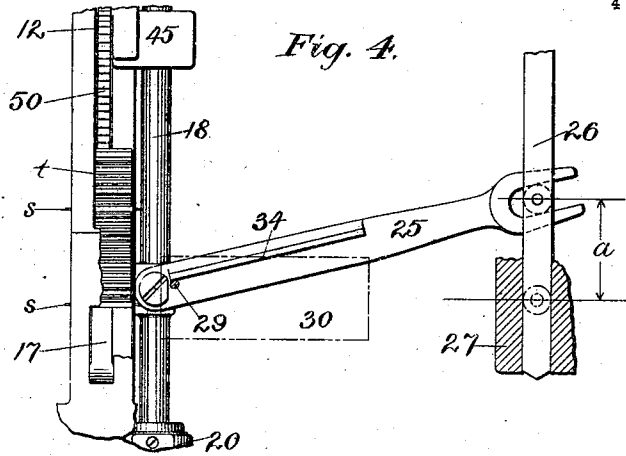


Fig. 4.

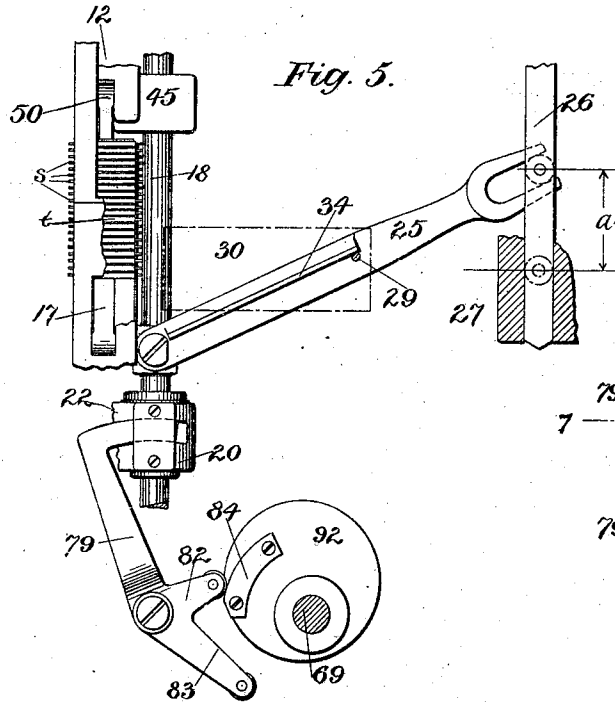
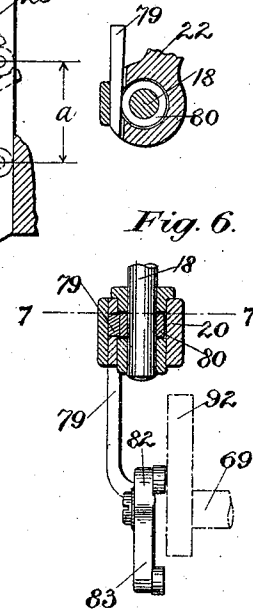


Fig. 5.

Fig. 7.

Fig. 6.



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4 SHEETS—SHEET 4.

Fig. 8.

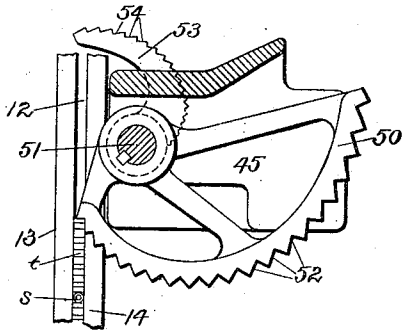


Fig. 9.

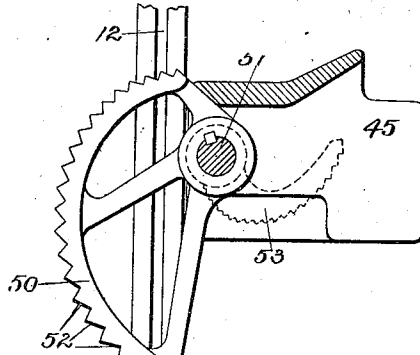


Fig. 10.

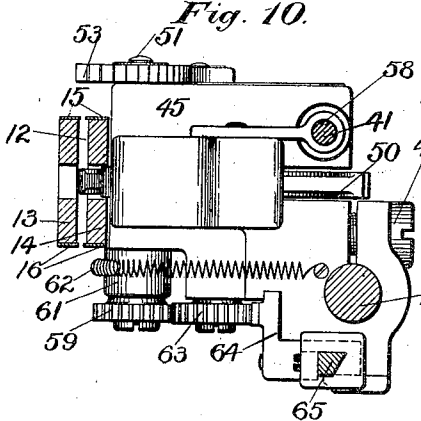


Fig. 12.

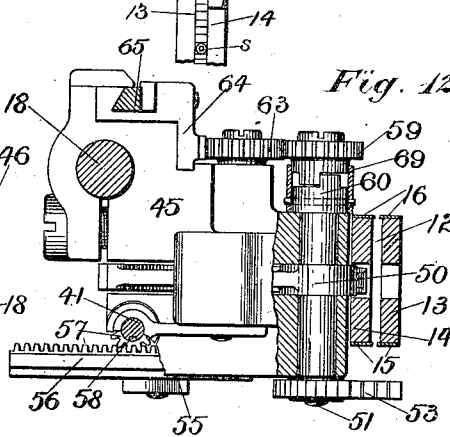


Fig. 11.

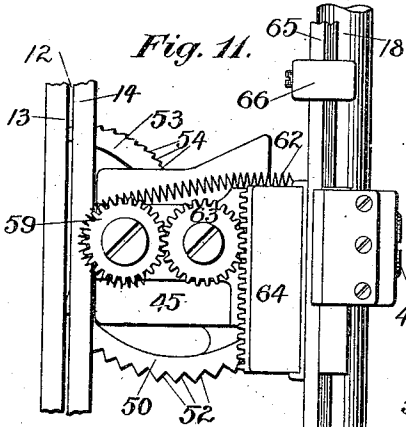
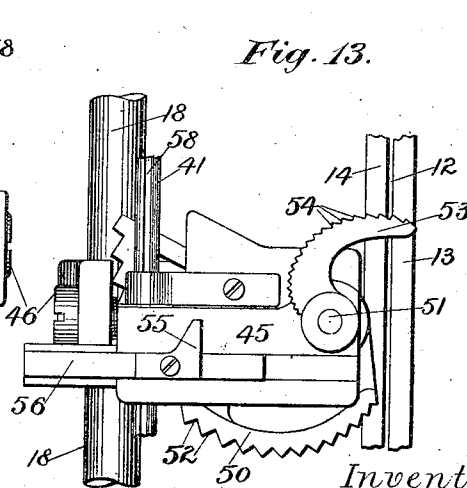


Fig. 13.



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UNITED STATES PATENT OFFICE.

WALTER JAY ENNISON, OF HARTFORD, CONNECTICUT, ASSIGNOR TO
THORNE TYPE SETTING MACHINE COMPANY, A CORPORATION OF
NEW JERSEY.

TYPE-JUSTIFYING MACHINE.

No. 844,567.

Specification of Letters Patent.

Patented Feb. 19, 1907.

Application filed June 14, 1899. Renewed August 11, 1906. Serial No. 330,147.

To all whom it may concern:

Be it known that I, WALTER JAY ENNISON, a citizen of the United States of America, and a resident of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Type-Justifying Machines, of which the following is a specification.

This invention is an apparatus for use in connection with machines for automatically justifying composed lines of type, so as to bring the successive lines to uniform length, and thus enable them to be locked up in columns of the desired width.

The apparatus comprises means for measuring an assembled line of type to ascertain its shortage, for dividing the shortage in accordance with the number of word-spaces in the line, and for setting a gage in accordance with the required thickness of the justifying-spaces as thus determined, whether those spaces are cut from space-timber or cast from molten metal or selected from magazines of ready-made or foundry spacers or "spaces," as they are commonly termed.

This invention also comprises means whereby the several devices of the apparatus are automatically set to their respective positions for the measurement of each succeeding line in accordance with the number of word-spaces contained therein, these word-spaces being temporarily occupied by separators, which are inserted by the operator during the composition of the line, preferably by means of the usual space-key of the keyboard. The ends of these separators project beyond the channel or typeway, so as to engage with the aforesaid setting devices as the line is moved into this apparatus from the stick or channel in which it is composed.

Figure 1 of the drawings is a front view of this apparatus, showing the parts in position to measure a line of type, a portion of which is represented in the type-channel. Fig. 2 is a side view projected from the right-hand side of Fig. 1. Fig. 3 is a side view projected from the left-hand side of Fig. 1, the type-channel being partly in section, so as to show the composed line of type engaged by the measuring devices. Figs. 4 and 5 are front views of the measuring devices in the respective positions occupied by them when the measured lines contain one and twenty

spaces, respectively, showing the equal movement or indication of the gaging or indicating end of the measuring-bar, it being assumed that each of the spaces to be filled in the two lines are exactly equal, as indicated by the dimension *a*. Fig. 6 is a side view of the locking device for the measuring-slide, a portion of which is here shown in section through its longitudinal center. Fig. 7 is a plan view in section and taken along the line 7 7 of Fig. 6, showing the action of the locking-wedge. Figs. 8 to 13, inclusive, are detached views, showing in enlarged scale the construction and mode of operation of the measuring-head. Fig. 8 is a side view showing a portion of the type-channel and of a line of type engaged by that step and the stepped jaw, which is adapted to a line having twenty word-spaces, while Fig. 9 represents the opposite extreme position of the jaw engaging a line of type with the step appropriate for a line having only one word-space. Fig. 10 is a plan view, and Fig. 11 is a right-hand side view, of the measuring-head, showing its various parts in the position occupied by them when the stop-jaw is in the position shown in Fig. 8. Fig. 12 is a plan view, and Fig. 13 a left-hand side view, of the measuring-head with its devices in the position occupied by them when the stepped jaw is drawn entirely clear of the type-channel to permit the measured line of type to pass on to the devices which insert the justifying-spacers in the line. Fig. 14 is a sectional end view of the cylinder 30 and the dividing-bar 25, showing them in engaging position. Fig. 15 is a front view of a diagrammatic nature, showing a modified arrangement of the series of indexing-stops for the dividing-bar, these stops being located at one-half, one-third, one-fourth, one-fifth, &c., of the length of the dividing-bar from its point of attachment to the gage, thereby better adapting the apparatus to operate directly in conjunction with space cutting or casting devices, in which it is desirable to move the gage in an equal ratio with the ascertained and divided shortage instead of in an increased ratio thereto.

In order to show the operative parts of this machine as plainly as possible, I have herein shown only that part of the framing *F* which is most intimately associated therewith, it being understood that the framing is

to be supported upon or incorporated with the frame of the type-composing machine of which it may form a part.

The type-channel 12 is supported in a vertical position by means of the framing and consists of two plates 13 and 14, which are of a width substantially equal to the length of character-type. The edges of this channel are provided with the plates 15 and 16, which hold the character-type in place, while permitting the reduced ends of the separators *s* to project beyond the plates to an extent sufficient to enable them to engage with and operate the setting devices. The type-separators *s* are of cylindrical form, being reduced at their ends to form shoulders substantially coincident with the length of the type, so as to be retained in coincidence therewith by the edge plates 15 and 16. The composed lines of type *t* and separators *s* are, by means of an elevating-pawl, as 11, moved upwardly through the channel past the pawl 17, which closes beneath each succeeding line and supports it throughout the measuring operation.

The measuring-slide 18 is mounted in the bearings 19 and 20 in the plate 21 and the arm 22, respectively. This slide is provided with a collar 23, to which is attached a spring 24, the lower end of the spring being attached to the framing *F* and serving to draw the slide to its lowest position. The dividing-bar 25 is pivotally attached at its left-hand end to the measuring-slide 18, the opposite end of the bar being connected with the gage 26 by means of a sliding joint to allow of the variations in the position of the bar. The gage 26 is fitted to slide at its lower end in the arm 27 of the framing *F* and at its upper end in the bracket 28, attached to the plate 21. This gage is a conventional representation of a convenient means for communicating the result of the measuring and dividing operations to the associated devices for determining, either by cutting off from space-timber, by casting from molten metal, or by selection from ready-made spaces, the various widths of justifying matter required to fill out the line.

In order to support the dividing-bar 25 at suitable positions intermediate the measuring-slide and the gage, the apparatus is provided with a series of indexing-stops, which are arranged to be brought singly beneath the rib or ledge 34 of the bar at locations corresponding with or proportional to the fractional parts into which the measured shortage of each line is to be subdivided, and these subdivisions may, by suitable location of the indexing-stop, allow the gage 26 to move to an extent exactly equal to the required subdivision or to an increased extent or to a reduced extent, as may be most convenient for the forming or selection of the spacers or other justifying matter.

In this embodiment of my invention the

indexing-stops consist of a series of pins 29, arranged in a spiral relation upon the periphery of the index-cylinder 30. In the arrangement shown in Fig. 1 the index-pins are arranged at the left-hand end of the bar, so as to allow the gage 26 to move to an increased extent equaling the subdivided shortage multiplied by 18, or, in other words, the gage is, by the arrangement of the index-pins shown in Fig. 1, allowed to move to an extent equaling eighteen times the required thickness of the justifying-spacers, as is clearly apparent in Figs. 4 and 5. In the modified construction shown in Fig. 15 the index-pins are arranged so as to allow a movement of the gage, a movement extending equally the thickness of each of the justifying-spacers required, and to this end the pins are arranged at locations equaling one-half, one-third, one-fourth, one-fifth, &c., of the length of the dividing-bar from the point of its connection with the gage 26.

The cylinder 30 is mounted at its ends to rotate in suitable bearings in the framing *F* and is provided at its left-hand end, as shown in Fig. 1, with a pinion 31, which meshes with the pinion 32 on the setting-shaft 33. This shaft is journaled adjacent to the type-channel 12 and is provided with the ratchets 35, located one at each side of the channel, with their teeth extending across the ends of the channel, so as to be engaged by the projecting ends of the separators *s*, by means of which the cylinder is rotated step by step, whereby each composed line operates to bring beneath the rib 34 of the dividing-bar the particular indexing stop-pin for dividing the shortage of that line into the number of word-spaces contained therein. The opposite end of the cylinder is provided with a ratchet 36, which engages with the pivotally-mounted detent 37, the rearwardly-projecting end of which is heavy enough to cause its toothed end to engage with the ratchet 36, thus serving to retain the cylinder 30 in each of the positions to which it is rotated by the separators *s*.

At its extreme left-hand end the cylinder 30 is provided with the pinion 38, which is in train with the pinions 39 and 40, which turn on studs fixed in the framing. The rotative movements of the cylinder are thus communicated through this train of pinions to the vertical setting-shaft 41 by means of the bevel-pinions 42 and 43, attached to the pinion 40 and the shaft 41, respectively. The lower end of that shaft is journaled in a suitable bracket in the framing *F*, and its upper end is journaled in and slides freely through the measuring-head 45 and the pinion 57, mounted thereon. That head is clamped to the measuring-slide by means of the screw 46 at a vertical distance above the pawl 17 suitable for measuring lines of type of the required lengths, and the head may be adjusted upon the slide so as to accommodate

lines of differing length for various classes of work.

The measuring-head 45 carries the stepped jaw 50, which is keyed to the shaft 51, journaled transversely in the measuring-head in such a position as to enable the stepped jaw to be swung laterally across the type-channel 12, as shown in Figs. 8, 9, and 10. The stepped jaw (best shown in Figs. 8 and 9) is sector-shaped and has a periphery of approximately volute form, provided with a series of steps 52, of a number equaling the maximum number of word-spaces in the lines to be justified, herein assumed to be twenty. Each of these steps is of a height equaling the thickness of the separators *s*, the function of these steps being to eliminate from the measurement of each line the aggregate measurement of the separators *s* contained therein. Thus if a line having but one word-space is to be measured the lowest step is brought into engagement with the line, as shown in Fig. 9, and for measuring a line of twenty spaces the twentieth or highest step is employed, as shown in Fig. 8.

The shaft 51 has fixed upon its left-hand end the arm 53, the lower side of which is also substantially volute in form and is provided with a series of index-notches 54, corresponding in number and in angular position with relation to the shaft 51 with the steps 52 of jaw. The rotative position of the stepped jaw 50, and consequently the step thereof to be employed in measuring a given line, is determined by the position of the stop-pawl 55, which is attached to the rack 56, fitted to slide in ways in the side of the measuring-head 45, as best shown in Figs. 12 and 13. The pinion 57 is mounted in the head 45 concentrically with the vertical setting-shaft 41, upon which the pinion slides being connected therewith by means of a spline-way 58. Thus the pawl 55 is positively connected with the index-cylinder 30, both of which are therefore contemporaneously set by the separators *s* to positions appropriate for measuring and dividing the shortage of any given line in accordance with the number of word-spaces contained therein. The opposite or left-hand end of the shaft 51 has loosely mounted upon it the pinion 59, the inner hub of which forms, in conjunction with the collar 60, pinned to the shaft 51, a clutch, by means of which the stepped jaw is positively moved out of the channel. The outside of the collar 60 is provided with a drum or shell 61, to which is attached one end of the spiral spring 62, which passes partly around the drum, as shown in Figs. 10 and 11, and is attached at its other end to the head 45, the tendency of the spring being to swing the stepped jaw across the line until it is arrested by the appropriate notch 54 of the arm 53 coming in contact with the previously-set stop-pawl 55. The hubs of the

clutch are cut away to allow the pinion to continue its rotation to the extent required for the full range of movement of the jaw 50. The pinion 59 meshes with the idle pinion 63, journaled on the head 45, and the latter pinion engages with a rack 64, (see Figs. 10, 11, and 12,) mounted on suitable ways on the head 45, so as to slide vertically with relation thereto to an extent sufficient to swing the stepped jaw 50 entirely out of the channel to the position shown in Figs. 12 and 13 from its extreme inner position. (Shown in Fig. 9.) The rack is mortised to receive the sliding rod 65, the lower end of which connects with one end of the cam-lever 67, the other end of the lever being pivotally mounted upon the framing F, and the cam-lever is pressed upwardly into contact with the cam 68 on the shaft 69 by means of the spring 70. The rod 65 is provided with the stop-collar 66, which bears against the upper end of the rack 64 when drawn down by the cam 68.

The movements of the measuring head and slide are controlled at suitable times by means of the measuring-cam 71, which is also fixed upon the shaft 69. The periphery of the cam engages with a roller or pin 72 on the cam-lever 73. One end of that lever is pivotally supported on the bracket 74, while the other end is connected, by means of the link 75, with the measuring-slide 18. The periphery of the cam 71 is so formed as to allow the measuring-slide, with its head, to be brought down by the spring 24 upon the line of type immediately after the index-cylinder and its connected stop-pawl 55 have been set by the passing separators of the line to be measured and the stepped jaw has been swung to its proper position. After the measuring-head has been thus lowered in the measuring operation to the lowest point permitted by the line then being measured it is desirable to clamp the slide in this lowest position before lowering the dividing-bar upon its index-stop, especially when the selected pin is close to the left-hand end of the lever, as shown in Fig. 4. As a means for thus locking the slide in its lowermost position the apparatus is provided with a locker 79, the end of which is wedge-shaped and projects through a mortise in the bearing 20 against the lower end of the slide 18 or against a loose collar 80 therein, as shown in section in Figs. 6 and 7. The locker 79 is pivotally mounted upon a bracket 81 of the framing F and is controlled in its movements by two integral arms 82 and 83, which project into the pathway of a cam-piece 84, fastened to the side of the cam, which is fixed upon and rotates with the shaft 69. When the strip engages with the arm 83, it moves the locker to its locking position, where it remains during the dividing and gage-setting operations, after which the cam-strip by engaging with the arm 82 withdraws the locker,

and thereby permits the measuring-slide to be elevated by its cam 71. The gage 26 is then lowered so as to bring the dividing-bar 25 into contact with the index-stop brought beneath it in the setting operation by means of a bend or bell-cranked lever 76, one end of which extends beneath the gage 26, while the other end is provided with a pin or roller 77, which enters the cam-path 78 in the side of the measuring-cam 71. The contour of this cam-path is so formed with relation to that of the peripheral surface of the cam 71 as to lower the gage immediately after the measuring-slide 18 has been lowered, and these two cam contours cooperate to raise the dividing-bar 25 to the position shown in Fig. 1 at the conclusion of the measuring and dividing operations, so as to allow the cylinder to be reset for the succeeding line.

The index-cylinder 30 and its connected stop-pawl 55 for the stepped jaw may be returned to their zero positions at the conclusion of each measuring operation by means of a rack 85, fitted to slide vertically in the framing F and meshing with the pinion 86, attached to the cylinder, as best shown in Fig. 2. The upper end of the rack may be employed by the operators as a means for manually returning the parts to their zero positions, or it may be provided with an arm 87, pivoted to a bracket 88 on the framing F, the opposite end of the arm projecting into the path of movement of a lug or projection 89 and extending from a slide at some other moving part of the machine with which this apparatus may be connected. Before the cylinder can be thus returned, however, it must be freed from its detent 37, the rearward end of which is lifted at the proper time by means of the arm 90, extending from the slide 91, that slide being operated by means of the cam 92.

The operation of this machine upon a line containing four word-spaces will now be described. It is assumed that during the intervals in the operation the various parts rest in the positions shown in Figs. 1 and 2, excepting that the line of type (shown in Fig. 1) is still below the channel-pawl 17. As the line of type is brought up through the channel from the point at which it is composed to its resting position upon the pawl 17 the projecting ends of the separators engage successively with the teeth of the ratchet 35, so as to move the index-cylinder and its connected stop-pawl 55 to the required positions, whereby the pawl will arrest the swinging movement of the stop-jaw, so as to hold its fourth stop in the channel in engaging relation to the line, thereby eliminating from the measurement of the line the aggregate thickness of the four word-separators therein. The setting operation also operates upon the cylinder to bring beneath the dividing-bar 25

the fourth index-pin from the left-hand end of the lever, thereby insuring that the shortage found in the line shall be divided into four subdivisions in its transmission to the gage 26. The cam 68 then allows the connecting-rod 65 to be raised by its spring 70, so as to lift the collar 66 from the rack 64, thereby permitting the spring 62 to move the stop-jaw 50 across the line until its swinging movement is arrested by the stop-pawl 55. By the operation of the measuring-cam the measuring-slide and its head are then lowered until the fourth step 52 of the stepped jaw rests upon the line, as shown in Fig. 3. The cam-strip piece 84 then operates upon the locker 79 to lock the measuring-slide in place, and the cam-path 78 operates to allow the gage 26 to lower until the rib 34 of the dividing-bar rests upon the fourth pin of the index-stop. The gage may rest in this position during the casting, cutting off, or selection of the justifying-spaces, or the gage movement may be utilized merely to set the space casting, cutting, or selecting devices. At the conclusion of the operation both the gage and the measuring slide are elevated to their respective positions, (shown in Fig. 1,) the stepped jaw is withdrawn from the channel to the positions shown in Figs. 12 and 13 by the operation of the cam 68, the line of type is moved on through the channel to the position in which the final spacers are inserted, and the respective parts are reset for the succeeding operation.

The cam-shaft 69 is given a single rotation for each line operated on. That rotation may be imparted manually, or when the apparatus is used in connection with a composing-machine the shaft may be driven therefrom by suitable single-rotation devices.

The construction and mode of operation of the modified arrangement (shown in Fig. 15) are substantially like those already described excepting that the pins constituting the indexing-stops for the dividing-bar 25^a are arranged at one-half, one-third, one-fourth, one-fifth, one-sixth, &c., of the operative length of the bar from its point of connection with the gage 25^a, so that the movements of the latter are exactly equal to the subdivided shortage of the line instead of being multiplied eighteen times, as in the other figures of the drawings. The longitudinal location of each pin of the series upon the cylinder 30^a is indicated by a vertical line designated in the drawings by the numerals representing the number of spaces of the lines for which they are respectively adapted.

I claim as my invention—

1. In a justifying apparatus, the combination of a dividing-bar, having one end connected with means for measuring the composed line of type to ascertain its shortage, and having its opposite end connected with means for determining the width of justifying-

ing-spacers, and a stop, into contact with which the bar moves in its dividing movement and limiting said dividing movement, and arranged to engage with the bar at a distance
5 from its point of connection with the space-determining means, according with the number of spaces in the line to be justified.

2. In a justifying apparatus the combination of a dividing-bar, a movable device for
10 measuring composed lines of type and operating upon one end of the bar, a space-width-determining device operatively connected with the opposite end of the bar, and a series of stops, into contact with which the bar
15 moves in its dividing movement and limiting said dividing movement, and arranged to support the bar at locations thereof according with the number of spaces in the lines to be justified.

3. In a justifying apparatus, the combination of a dividing-bar, and a movable series of indexing-stops, into contact with which the bar moves in its measuring movement and limiting the said dividing movement,
25 and arranged to be brought singly beneath the bar at locations corresponding with or proportional to the fractional parts into which the shortage of the lines is to be subdivided.

4. In a justifying apparatus, the combination of a dividing-bar having one end connected with means for measuring a composed line of type to ascertain its shortage, and having its opposite end connected with
35 means for determining the width of justifying-spacers, a stop, and means for bringing into contact with the stop the appropriate portion of the operative length of the dividing-bar in accordance with the number of
40 spaces in the line to be justified.

5. In a justifying apparatus, the combination of a dividing-bar, a movable device for measuring the composed lines of type and operating upon one end of the bar, a space-width-determining device operatively connected with the opposite end of the bar, a series of stops, and means for bringing into contact with the respective stops the appropriate portions of the operative length of the
50 bar in accordance with the number of spaces in the lines to be justified.

6. In a justifying apparatus, the combination of a dividing-bar, a movable series of indexing-stops, and means for bringing into
55 contact with the respective stops the appropriate portions of the operative length of the bar in accordance with the number of spaces in the lines to be justified.

7. In a justifying apparatus, in combination with a dividing-bar, a rotatable stop device therefor, provided with a spirally-arranged series of indexing-stops arranged longitudinally of the bar according to the number of spaces in the line to be justified.

65 8. In a justifying apparatus, in combina-

tion with a dividing-bar, a rotatable stop device therefor, comprising a series of spirally-arranged indexing-stops, with means for rotating the stop device to bring an appropriate stop into engaging relation with the bar
70 in accordance with the number of spaces in the line to be justified.

9. In a justifying apparatus, in combination with a dividing-bar, a rotatable stop device provided with a spirally-arranged series
75 of indexing-stops, with means operable from the composed line of type for automatically bringing into engaging relation to the bar the appropriate stop for that line.

10. In a justifying apparatus, the combination of a dividing-bar, a movable device for measuring composed lines of type and operating upon one end of the bar, a space-width-determining device operatively connected with the other end of the bar, and a
85 series of stops for supporting the bar at locations thereof according with the number of spaces in the lines to be justified, and means for first moving the measuring device into contact with the type, and then moving the
90 bar into contact with its stop.

11. In a justifying apparatus, in combination with the dividing-bar thereof, an eliminating device movable with the measuring end of the bar for eliminating a predetermined
95 portion of the measurement.

12. In a justifying apparatus, in combination with the dividing-bar, a measuring-head movable therewith and provided with means for eliminating from the measurement of a
100 composed line a predetermined portion of the measurement.

13. In a justifying apparatus, in combination with the dividing-bar, a measuring-head movable therewith and provided with a
105 stepped jaw for eliminating a predetermined portion of the measurement.

14. In a justifying apparatus, in combination with the dividing-bar thereof, a jaw movable with the measuring end of the bar,
110 and provided with steps for eliminating the measurement value of the word-separators in the line.

15. In a justifying apparatus, in combination with the dividing-bar thereof, a measuring-head provided with a stepped jaw moving with the head for eliminating from the measurement of the composed line the thickness of the separators contained therein.

16. In a justifying apparatus, in combination with the dividing-bar thereof, a jaw movable with the measuring end of the bar, and provided with steps for eliminating the measurement value of the word-separators in the line, with means for moving the
125 stepped jaw against the line to be measured.

17. In a justifying apparatus, in combination with means for supporting a composed line of type and word-separators, a measuring-head mounted to move in a direction par-
130

allel with the line of type, and provided with a stepped jaw for eliminating the thickness of the separators contained in the line, with means for moving the appropriate step of the jaw against the line.

18. In a type-justifying apparatus, in combination with means for supporting a composed line of type and word-separators, a measuring-head movable in the direction of the line, and provided with a stepped jaw, means for moving the appropriate step of the jaw in the direction of the line and into engagement with the line, and means for moving the jaw out of the plane of the line of type at the conclusion of the measuring operation.

19. The combination of a type-channel, a measuring-head movable parallel therewith, and provided with a stepped measuring-jaw, with means for moving the appropriate step of the jaw into the plane of the type-channel, and for moving the said step against the line.

20. The combination with a type-channel, a measuring-head movable in the direction of the channel, a stepped measuring-jaw mounted on the measuring-head means for moving the appropriate step of the jaw into the plane of the type-channel, means for moving the measuring-head in the direction of the line so as to bring the said step against the line, and means for moving the stepped jaw entirely out of the plane of the channel at the conclusion of the measuring operation.

21. The combination of a type-channel, a measuring-head movable in the direction of the channel, a stepped jaw, and means for moving its appropriate step into and out of the plane of the channel, means for moving the measuring-head and jaw longitudinally of the channel to measure the shortage of the line, and a dividing-bar for dividing the measured shortage in accordance with the word-spaces contained in the measured line.

22. In a line-measuring device, in combination with one of the measuring members, an oscillating jaw provided with a volute stepped surface for engaging with the line to modify the resultant measurement.

23. In combination with measuring devices, an oscillating jaw provided with a volute stepped surface for engaging with the line, to modify the resultant measurements in accordance with the number of spaces in the line.

24. In combination with line-measuring devices, an oscillating jaw provided with a volute stepped surface for engaging with the line, each step corresponding in height to the thickness of one of the separators contained in the line, whereby the measurement of said separators is eliminated from the resultant measurement.

25. In combination with line-measuring devices, comprising a movable head, a locker

for locking the line-measuring head in the

position determined by the measuring operation.

26. In combination with means for supporting a composed line of type, a line-measuring head, means for moving the measuring-head against the line, and means for locking the head in its position against the line.

27. The combination with means for supporting a composed line of type, of a dividing-bar, means for moving one end of the bar for measuring the line, and means for rocking the bar for dividing the measurement, substantially as described.

28. The combination with means for supporting a composed line of type, of a dividing-bar, means for moving one end of the bar for measuring the line, and means for rocking the bar for dividing the measurement by the other end of the bar, substantially as described.

29. The combination with means for supporting a composed line of type, of a dividing-bar, means for moving one end of the bar for measuring the line, means for rocking the bar for dividing the measurement by the other end of the bar, and a stop for engaging the bar to limit its dividing movement in accordance with the number of spaces in the line, substantially as described.

30. The combination with means for supporting a composed line of type, of a dividing-bar, means for moving one end of the bar for measuring the line, means for rocking the bar for dividing the measurement by the other end of the bar, and a series of stops arranged to stop the bar in its dividing movement in accordance with the number of spaces in the line, substantially as described.

31. The combination with means for supporting a composed line of type, of a dividing-bar, means for moving one end of the bar for measuring the line, and means for rocking the bar on the said end as a pivot, after measuring, for dividing the measurement by the other end of the bar.

32. The combination with means for supporting a composed line of type, of a dividing-bar, means for moving one end of the bar for measuring the line, means for rocking the bar on said end as a pivot after measuring, for dividing the measurement by the other end of the bar, and a stop for engaging the bar to limit its dividing movement in accordance with the number of spaces in the line.

33. The combination with means for supporting a composed line of type, of a dividing-bar, means for moving one end of the bar for measuring the line, means for rocking the bar on said end as a pivot after measuring, for dividing the measurement by the other end of the bar, and a series of stops arranged to stop the bar in its dividing movement in accordance with the number of spaces in the line.

34. The combination of a type-containing

channel provided with shoulders adjacent to the ends of the type, whereby the character-type are preserved in alinement, a separator having a cylindrical body, substantially corresponding to the width of the character-type, and having reduced ends adapted to project through and beyond the end walls of the channel.

35. The combination of a type-containing channel provided with shoulders adjacent to the ends of the type, whereby the character-type are preserved in alinement, and separators having cylindrical bodies substantially corresponding in width with the bodies of the character-type, and having shouldered ends according with the length of the type, whereby they are retained in alinement by the channel, and having reduced cylindrical ends, projecting through and beyond the end walls of the type-channel.

36. In a justifying apparatus, a mechanism for justifying comprising an element having a straight edge and a pivotal point to which said edge is radial, in combination with means for rocking said element on its pivot, and a stop engaged by said edge to limit the rocking movement in accordance with the number of spaces in the line.

37. In a type-justifying apparatus, a pivoted dividing-bar and its pivot, in combination with type-engaging means movable in proportion to the aggregate shortage of a

line, and with a stop engaging said bar to limit its dividing movement in accordance with the number of spaces in the line. 35

38. In a justifying apparatus, a pivoted dividing-bar and its pivot, in combination with means for setting the pivot in accordance with the shortage of the line, and a stop acting to limit the dividing movement of the bar on its pivot in accordance with the number of spaces in the line. 40

39. In a justifying apparatus, a pivoted dividing-bar and its pivot, in combination with means for setting the pivot in accordance with the shortage of the line, a series of stops for said bar in its dividing movement on its pivot, and means for selecting one of said stops in accordance with the number of spaces in the line. 45

40. In a justifying apparatus, the combination with a bar, means for setting said bar in accordance with the shortage of the line to be justified, means for giving said bar a further movement to divide the shortage, and a stop limiting the dividing movement of the bar in accordance with the number of spaces in the line. 50

Signed by me at Hartford, Connecticut, this 13th day of June, 1899.

WALTER JAY ENNISSON.

Witnesses:

JENNIE NELLIE CASE,
W. H. HONISS.