

No. 844,559.

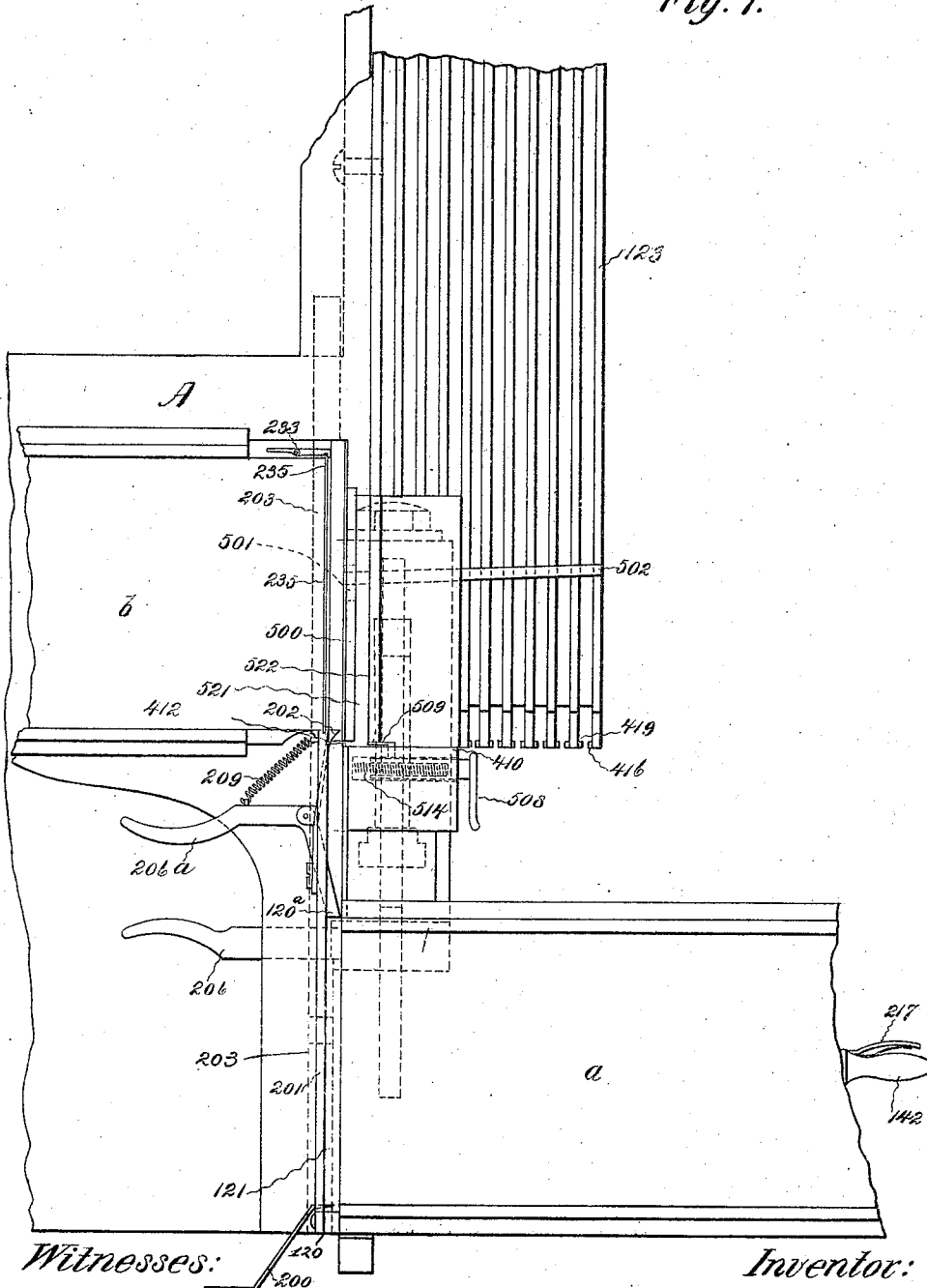
PATENTED FEB. 19, 1907.

B. M. DES JARDINS.
TYPE JUSTIFIER.

APPLICATION FILED JULY 1, 1896. RENEWED FEB. 5, 1906.

6 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
Eva S. Shelton
Edward E. Claussen

Inventor:
Benj. M. Desjardins

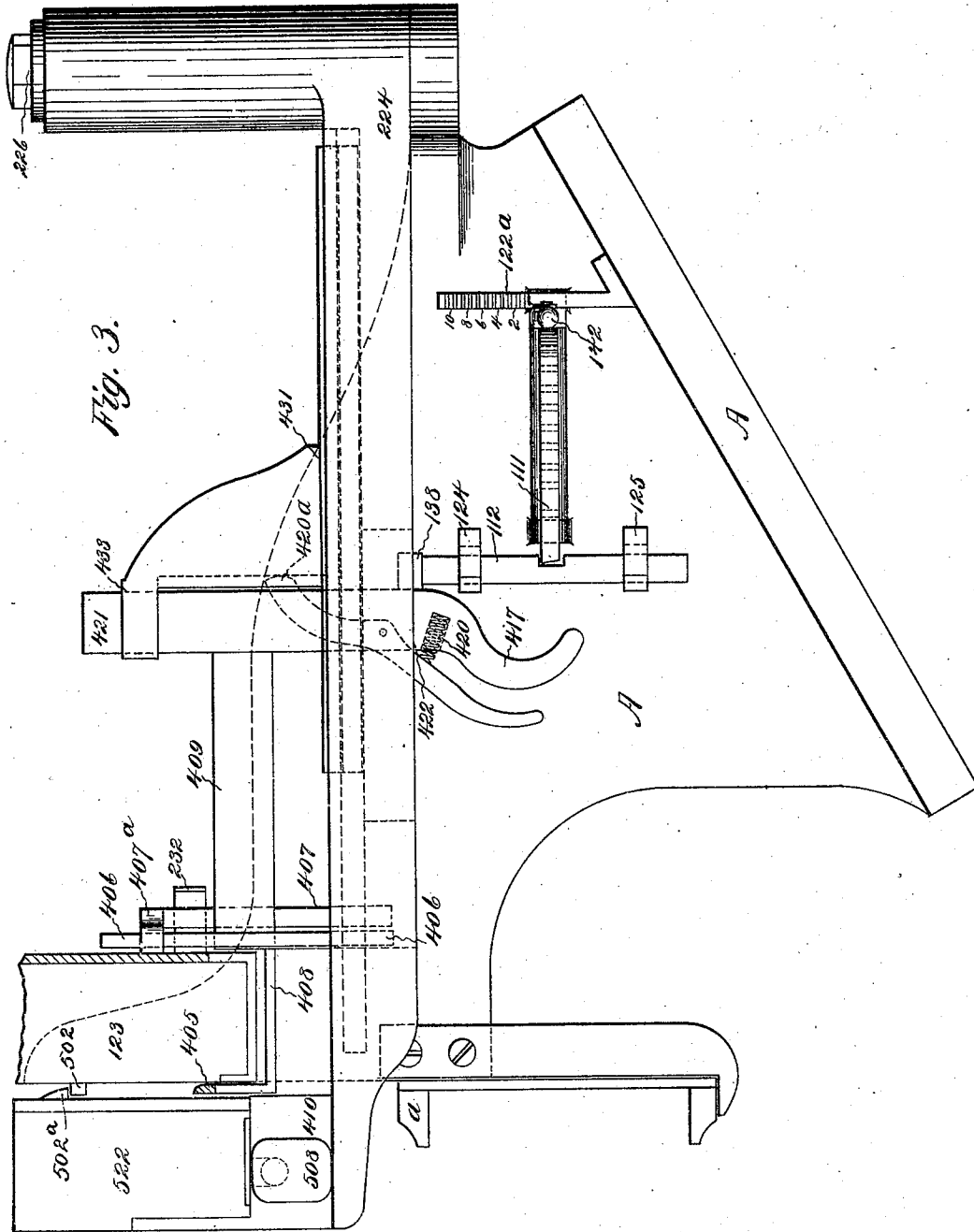
No. 844,559.

PATENTED FEB. 19, 1907.

B. M. DES JARDINS.
TYPE JUSTIFIER.

APPLICATION FILED JULY 1, 1896. RENEWED FEB. 5, 1906.

6 SHEETS—SHEET 3.



Witnesses:
Ewa S. Shelton.
Edward C. Claussen.

Inventor:
Benj. M. Desjardins

No. 844,559.

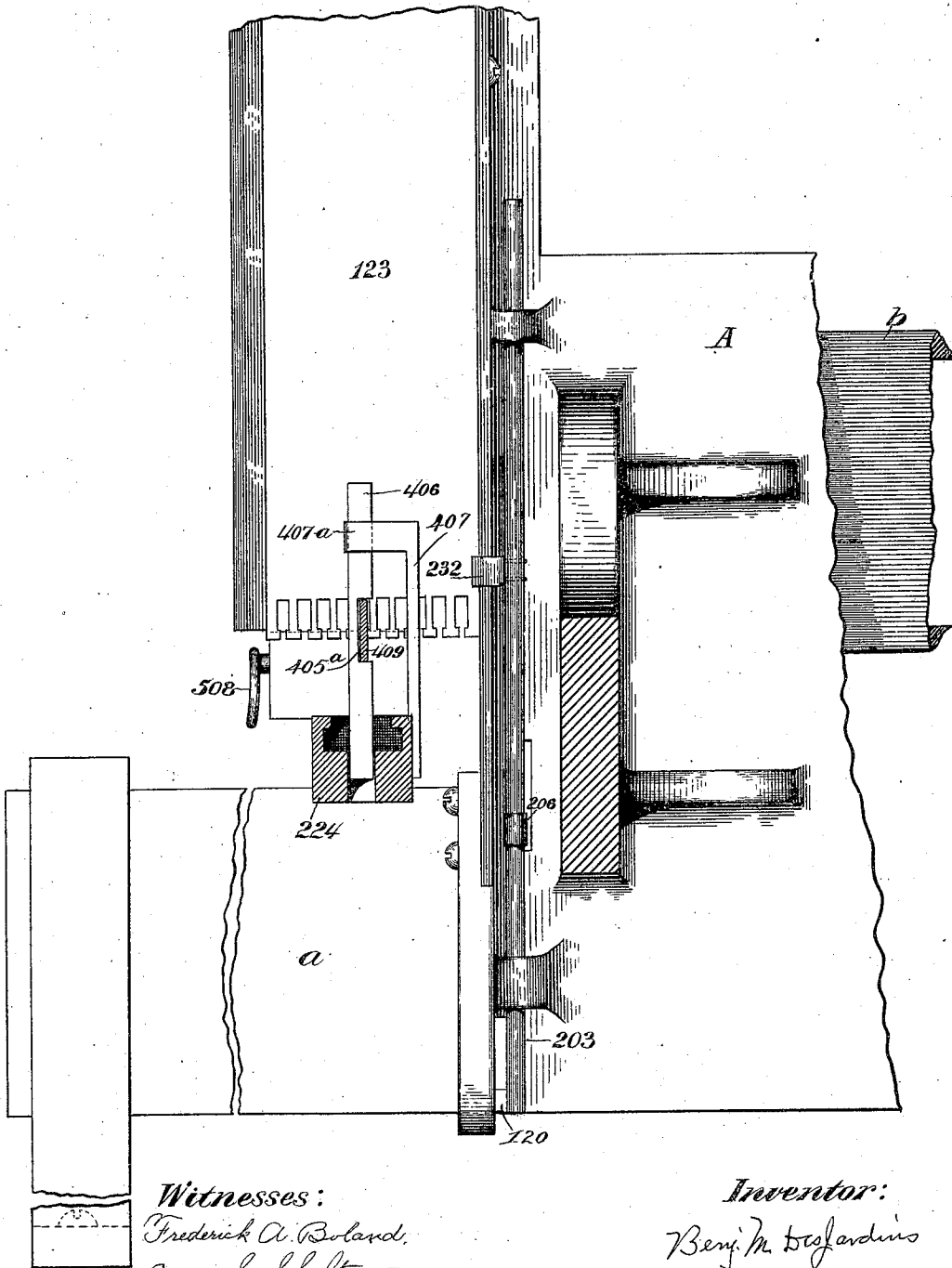
PATENTED FEB. 19, 1907.

B. M. DES JARDINS.
TYPE JUSTIFIER.

APPLICATION FILED JULY 1, 1895. RENEWED FEB. 5, 1906.

6 SHEETS—SHEET 4.

Fig. 4.



Witnesses:
Frederick A. Boland,
Eva S. Shelton.

Inventor:
Benj. M. Desjardins

No. 844,559.

PATENTED FEB. 19, 1907.

B. M. DES JARDINS.
TYPE JUSTIFIER.

APPLICATION FILED JULY 1, 1895. RENEWED FEB. 5, 1906.

6 SHEETS—SHEET 5.

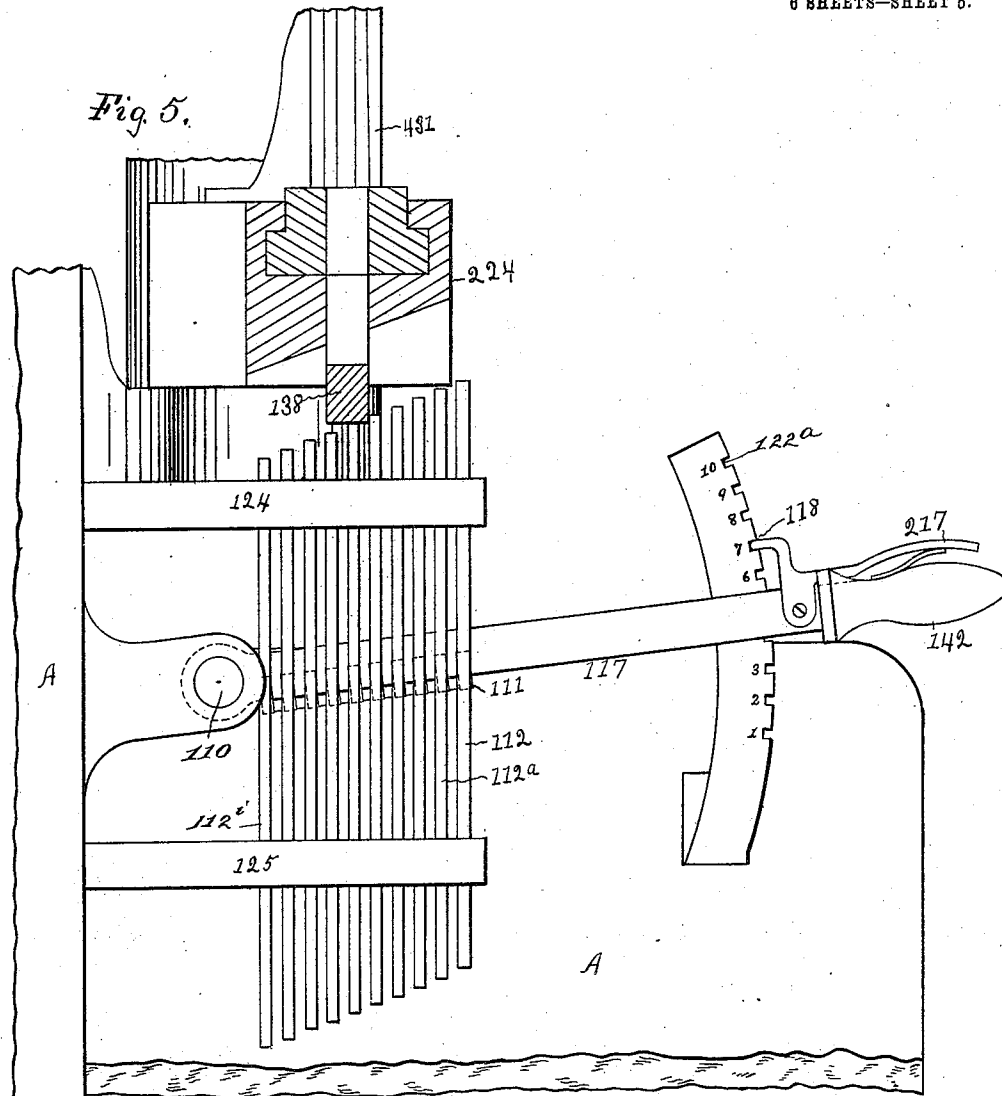
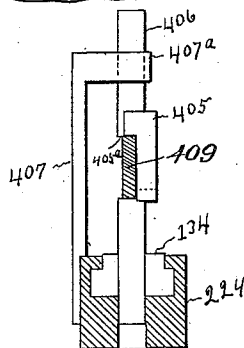


Fig. 6.



Witnesses:
Eva S. Shelton.
Janette S. Ellsworth

Inventor:
Benj. M. Desjardins

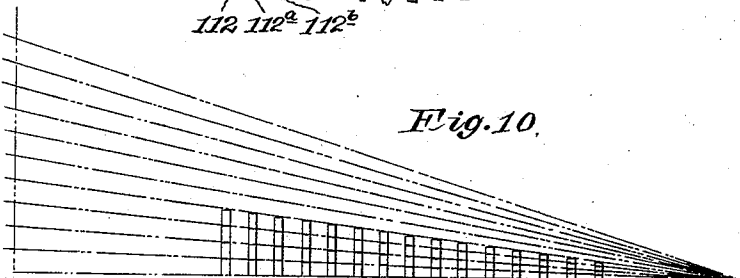
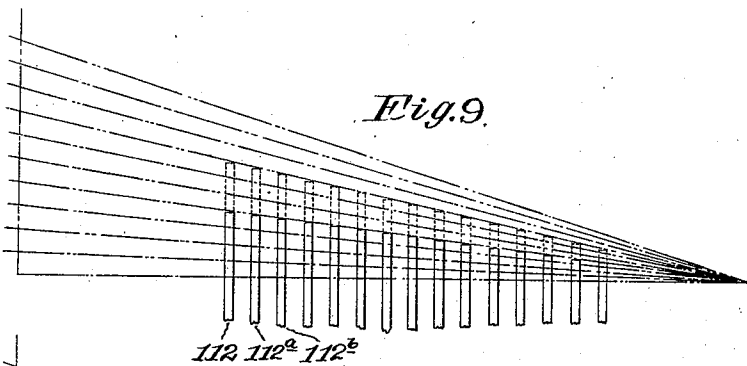
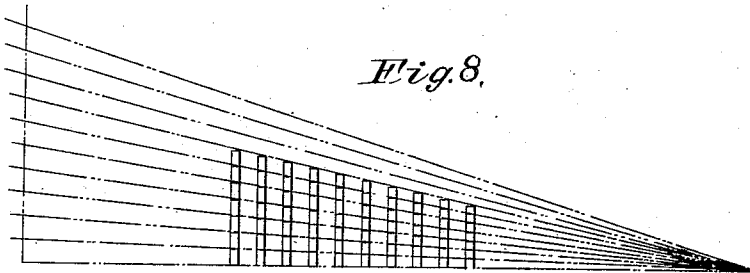
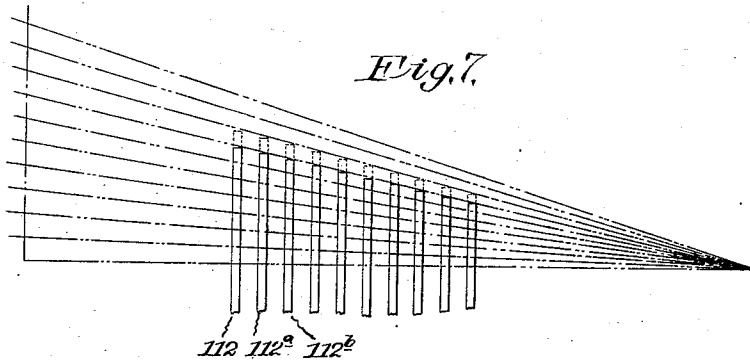
No. 844,559.

PATENTED FEB. 19, 1907.

B. M. DES JARDINS.
TYPE JUSTIFIER.

APPLICATION FILED JULY 1, 1895. RENEWED FEB. 5, 1906.

6 SHEETS—SHEET 6.



Witnesses:
Cora S. Shelton.
Edward E. Claussen.

Inventor:
Benj. M. Desjardins

UNITED STATES PATENT OFFICE.

BENJAMIN M. DES JARDINS, OF HARTFORD, CONNECTICUT, ASSIGNOR, BY
MESNE ASSIGNMENTS, TO THE UNITYPE COMPANY, A CORPORATION OF
NEW JERSEY.

TYPE-JUSTIFIER.

No. 844,559.

Specification of Letters Patent.

Patented Feb. 19, 1907.

Application filed July 1, 1895. Renewed February 5, 1906. Serial No. 299,508.

To all whom it may concern:

Be it known that I, BENJAMIN M. DES JARDINS, a citizen of the United States, residing in Hartford, in the county of Hartford and State of Connecticut, have invented a new and useful Type-Justifier, of which the following is a specification.

This invention relates particularly to type-justifying machines, and consists chiefly in novel mechanism for calculating the widths of justifying-spaces from the line shortage and number of spaces or intervals in the line and novel mechanism for applying such calculation in selecting and ejecting the justifying-spaces from a space-magazine and inserting them in the line.

The invention includes also various features of construction and combinations of parts adapted for use in type-justifying machines and other justifying mechanism.

For a full understanding of the invention a detailed description of a construction embodying the same as applied in a type-justifier of a preferred form will now be given in connection with the accompanying drawings, forming a part of this specification, and the features forming the invention will then be specifically pointed out in the claims.

Figure 1 is a front elevation of my machine; Fig. 2, a plan view of said machine; Fig. 3, a side elevation of the same; Fig. 4, a transverse vertical section taken behind the space-channels looking toward the front; Fig. 5, an enlarged detailed view showing the gage-bars and the operating-levers; Fig. 6, a front view of the adjustable guard which limits the number of spaces ejected; Fig. 7, a diagram illustrating the position of the gage-bars when raised for seven spaces; Fig. 8, a diagram illustrating the position and height of seven spaces in each of the space-channels; and Figs. 9 and 10, respectively, similar diagrams to those shown in the two preceding figures, illustrating the same elements with reference to the number four instead of seven.

Similar letters and figures of reference designate like parts in the drawings and specification.

The main framework is designated by the letter A, the galley for unjustified lines of type by *a*, and the galley for the justified column by *b*. The measuring elements are numbered 111 111^a, &c., said elements con-

sisting of a plurality of lever-arms of different lengths arranged to operate a similar number of sliding gages. The numerals employed between 400 and 500 refer to the parts that have to do with ejecting spaces from the space-channels, and the 500's refer to the intermediate space holder and transferring device.

The left end of the lower galley *a* abuts the open line-channel 121, and the left wall 201 of said channel limits the movement in that direction of a column of type in said galley. The wall 201 is fastened to the frame A at the left of the galley *a* and extends upward to the lower part of the galley *b*. Said wall is slotted lengthwise to permit the lifting point or edge of the rule 200 to pass through. The channel 121 is traversed by the limiting-stop 120^a, which designates the point to which type-lines should extend, and is provided with the handle 206^a. The stop 120^a is normally retained outside of the channel 121 and out of the path of the type-line therein by the resiliency of the spring 209, which extends between the handle 206^a and the frame A, to which said handle and stop are pivoted. The sliding rod 203 has its bearings in the frame A and is provided with the handle 206 and the gage projection 120, which extends into the channel 121 under the line when introduced into said channel to gage said line from underneath. The rod 203 with the gage 120 has sufficient longitudinal motion to adjust the latter to the length of an unjustified line. The handle 206 is integral with the rod 203 and is used to move said rod up and down. The flat spring-hook 202 is connected to the wall 201 and traverses the channel 121 to support the words of the new line opposite the open end of the galley *b* while the lower part of said line is being justified. The galley *b* is situated at the left and has its bottom edge adjacent to the bottom of the space-channels 123. The galley *b* is provided with the guard-rule 235, held in place by a groove in the bottom edge of said galley and the latch 233 at the top to prevent the justified column from falling into the channel 121. The plurality of space-channels 123 are grouped together in a series at the front of the machine, being rigidly attached to the frame A. The front and back of the channels 123 are in the shape of arcs struck from

the pivot 226 to conform with the paths of the vertical members carried by the arm 224. The bottoms of the channels 123 are slotted, thereby making the suspended walls T-shaped at their bases. The slots 416 in said channel-bottoms are adapted to permit the plunger 409 to pass through, and the shoulders 419 each side of said slots support the space-columns.

The arm 224 swings on the stud 226, extending from the frame A, and is provided with the slide 431, to which the adjustable space-plunger 409 is connected by the vertical T-blade 421. The T-blade 421 is adapted to slide up and down in the boxes 422 and 423 and has the handle 417 at its base. The plunger 409 and its mountings are provided with the latch-lever 420^a, pivoted to the blade 421. The coiled spring 420 retains the upper end of the latch-lever 420^a against the bracket of the slide 431, thereby holding the plunger 409 and its connections at whatever position they may be located by the handle 417. The vertical slide-bar 406 is mounted in the arm 224, which has the projection 407 to support the upper bearing 407^a, that serves as a guide for the top of said bar. The bar 406 has the recess 405^a in one side to receive the plunger 409, by means of which said bar is adjusted vertically. The bar 406 is also provided with the projection 408, extending forward under the space-channels 123 and then upward, terminating in the guard 405. The guard 405 is located directly in front of the space-channel 123 behind which the plunger 409 happens to be situated, and the under edge of said guard is on the same plane with or a little above the top of said plunger and of the recess 405^a. The longitudinally-adjustable rod 203 has the rearwardly-extending finger 232 projecting back of the slide-bar 406 and to the right over the plunger 409 when the arm 224 is in its position to the left adjoining the galley b.

The lever-arms 111 111^a, &c., which constitute the measuring elements, extend to the right from the sleeve 113, which is pivoted at 110 to suitable frame-brackets. The lever-arms 111, &c., are simultaneously but differentially operated by means of the lever 117, also pivoted at 110 and having the handle 142 and the spring-actuated pawl 217. The beak 118 of the pawl 217 is adapted to engage any one of the nicks 122^a when released by the operator, being designed to register with the particular nick that corresponds with the number of spaces required in a given type-line. The nicks 122^a are cut in a fixed member conveniently situated relative to the beak 118, and the distances apart of said nicks, the lengths of the arm 117, and of the arms 111 111^a, &c., are so constructed with reference to each other that whenever said beak registers with any one of said nicks

the front ends of said arms are raised out of normal position, each of them for a distance corresponding to the size of a pile containing the number of spaces represented by the engaged nick, the arms being commensurate by their difference in length with the different space sizes represented thereby. The front ends of the arms 111 111^a, &c., mesh with corresponding notches in the rear edges of the vertically-sliding bars 112 112^a, &c., said bars being adapted to reciprocate in the boxes 124 and 125, extending from the frame A. The bars 112, &c., are dependent for their position upon that of the lever-arms 111, &c., said position representing whatever number of spaces is required as determined by the operator, who counts the places for said spaces in the line and locates the pawl 217 accordingly. The blade 421, which supports and guides the plunger 409, is provided with the lug 138 to locate said plunger upon encountering one of the bars 112, &c., in a position corresponding with the amount of line shortage, as will appear more clearly hereinafter.

The value of the unit adopted in connection with this machine or the difference in thickness between neighboring space sizes may be .005 of an inch, or greater or less, provided said difference is constant according to the requirements of the construction of said machine. The smallest space in the left-hand channel 123 may be said to contain three of these units and the largest in the right-hand channel 123 twelve of said units, with the intermediate sizes in the intermediate channels each increasing by one unit.

The swinging arm 224 has the intermediate space-receiving channel 521 connected to the platform 410, located in front of the space-channels 123. The channel 521 is carried by the arm 224 and has a lateral motion or travel sufficient to locate it opposite any one of the channels 123, as the case demands. The construction and the relation of the intermediate channel 521 with reference to the lug 138, the stud 226, and the sliding bars 112 112^a, &c., are such that whenever said lug is brought into contact with one or another of said bars by the movement to the right of the arm 224 said channel becomes located in line with one of the channels 123, and by reason of the peculiar arrangement of parts the first-mentioned channel is checked in a position directly opposite the particular channel 123 that contains the size of spaces represented or indicated by the last of said bars over which said stop has passed prior to being intercepted by the bar, which is too high for it to clear. The intermediate channel 521 is provided with the left-hand movable wall 500, adapted to slide in its frame and having a shoulder 502^a at the top to bear or ride on the bar 502. The inclined bar 502 extends across the front of the chan-

nels 123, to which it is attached at the proper degree of inclination to correspond with the difference in thickness between the spaces in adjacent channels, so that said bar represents by the amount of said inclination in front of each of said channels the height of a space contained therein. The office of the bar 502 is to act as a cam whereby the wall 500 is wedged or forced upward high enough to make the opening 412 sufficiently wide to allow of the passage of whatever size of space is selected, said bar being at the proper height to intercept the rearwardly-extending shoulder on said wall. The space-pusher 509 is located in the channel 521 and connected with the thumb-piece 508, which is designed to be actuated by hand when necessary to transfer a space from said channel into the line-channel 121. The normal position of the pusher 509 is directly to the right of the bottom space or a pile that may happen to be in the channel 521, being retained at that point by the spring 514, which is incased in a pocket below the platform 410 between the closed end of said pocket and the closed end of a tubular passage in the stem of the thumb-piece 508. An opening is provided in the immovable wall 522 of the channel 521 to afford a clear passage for the pusher 509.

The machine herein shown and described is equipped for handling ten different sizes of spaces and ten of each size for any single line of type, since there is that number of channels 123, bars 112, &c., levers 111, &c., and of nicks 122^a. It is obvious, however, that this number of respective members may be increased or decreased; but for ordinary work ten is deemed to be the proper number. The thicknesses of the spaces in the different channels 123 may be said to progress by a constant difference, termed a "unit" for convenience. This fact is illustrated by the diagrams in Figs. 8 and 10. In Fig. 8 ten piles of seven spaces each are shown resting upon a common base, with the right corners of all of said piles tangent to a radial line having the same center as said base, and the intermediate corners of said piles, composed of any number less than seven spaces, are also tangent to corresponding radials struck from the same center, all of said radials cutting a line at right angles to said base into equal parts. The bars 112, &c., correspond in position and difference in heights with the space piles in the channels 123 and the difference in thicknesses between successive sizes and with the difference in length between the levers 111, &c., and the distance apart of the nicks 122^a provides for limiting the rise and fall of said bars to heights equivalent to the numbers of spaces represented by said nicks. In short, the same radials to which piles of successive numbers of spaces are tangent traverse the tops of the bars 112, &c., when located at heights corresponding with said

piles, as shown in Fig. 7, where said bars are raised to represent the spaces in the figure below, and their position is also indicated by dotted lines if piles of eight spaces instead of seven were required. Through the medium of properly-constructed mechanism comprising certain relative members it follows that by the lateral and vertical adjustment of said members relative to any one of the gage-bars 112, &c., a similar adjustment of others of said members must take place relative to the spaces in the channels 123 to the end that a pile of spaces of a corresponding height consisting of a given number and of a corresponding size are selected. In Fig. 10 more than ten space piles of only four spaces each are shown, and a similar number of bars 112 112^a, &c., to said piles are illustrated in Fig. 9, the first ten of said bars being similar to those in Fig. 7, except they have been depressed from the seventh to the fourth space position, as indicated by dotted lines.

The following is a concrete example of the method of justifying a line of type with the devices hereinbefore described, having special reference to Figs. 2 and 5: Seven spaces are required in a given type-line the shortage of which is an unknown quantity, except as ascertained by the traverse of the same by the gage projection 120. The lever 117 is moved until the beak 118 registers with the seventh nick 122^a, and the bars 112 112^a, &c., are raised into the position shown in Fig. 5 by the lever-arms 111 111^a, &c., with the height of each above a fixed plane representing the plane of the bottom of the spaces in the channels 123, a distance equal to a pile of seven spaces corresponding in lateral location to that of the bar. The movement of the projection 120 in exact accordance with the amount of line shortage has caused the finger 232 to travel a like distance, and when the plunger 409 is elevated to meet said finger it rises for a distance also representing said shortage. While retained at the height just specified by the latch-lever 420^a the plunger 409 is swung over the bars 112, &c., until the lug 138 comes into engagement with one of said bars, and the last bar cleared by the lug 138, or the fifth in this case, represents the particular size of spaces necessary to justify the line and locates said plunger relative to the same. The amount of shortage is seven times seven units, or seven times the fifth size of spaces, or reckoning .005" as the value of a unit, $7 \times .035''$, equal to .245''. In case the smallest size of spaces is designated it will be understood that the lug 138 does not pass over any of the bars 112, &c., because the left-hand bar 112ⁱ, which said lug encounters, is the first one in its path. The result must be the same, however, as in the other instances.

Assuming that a column of loose unjustified type has been placed in the galley *a* and

pushed to the left until the first line is within
 the channel 121, the operation of my machine
 is as follows: By manipulating the handle
 142 the operator engages, with the beak 118,
 5 the particular nick 122^a that corresponds
 with the number of spaces which the line is
 to contain, he having ascertained what that
 number is by a visual inspection of said line.
 If the lever 117 was depressed, so that the
 10 pawl 217 registered with the lowest nick 122^a
 at the start and there is more than one space
 demanded, the manipulation above referred
 to of the handle 142 and said pawl raises said
 lever, the lever-arms 111 111^a, &c., and the
 15 bars 112 112^a, &c., which latter in reality
 form a series of stops when introduced into
 the path of the lug 138, as illustrated in Fig.
 5. By grasping the handles 206 and 206^a
 between his thumb and finger the operator
 20 presses them together, especially bearing
 down on said handle 206^a against the action
 of the spring 209 to swing the stop 120^a from
 its position outside of the channel 121 to its
 position inside and across the same, and then
 25 he draws the handle 206 and the bar 203 up-
 ward, with the gage projection 120 under the
 lower end of the line, raising said line until it
 is tight against the base of the stop 120^a.
 The movement of the projection 120, as
 30 described above, is equal to the amount of
 line shortage, and the finger 232 travels the
 same distance. With his left hand on the
 handle 417 he raises the blade 421 and the
 space-plunger 409 until the latter encounters
 35 the finger 232, which is connected, through
 the rod 203, with the gage projection 120 to
 indicate the length of the line shortage and
 accurately locate said plunger at a height
 40 corresponding to that of said shortage. The
 height of the plunger 409 now registers with
 that of a pile of spaces of a certain size and
 number equal to the line shortage, being the
 amount which the finger 232 was displaced
 by raising the projection 120. The V-
 45 shaped friction clamp or lever 420^a, which
 was pressed out of contact at the time the
 handle 417 was grasped, is now released and
 under the influence of the spring 420 bears
 hard against the upright or bracket of the
 50 slide 431 to hold the blade 421 and attached
 plunger 409 securely in place at the height
 just designated. The arm 224 is now swung
 to the right until the lug 138 strikes against
 the first bar or gage 112, 112^a, &c., which is
 55 too high for it to clear. This interception of
 parts locates the plunger 409 back of the
 required size of spaces or the particular size
 which when multiplied by the necessary
 number gives the amount of the shortage of
 60 the line being acted upon. The handle 417
 is next drawn forward, and the plunger 409
 coming up behind the required number of the
 designated size of spaces in their particular
 channel 123 expels them from said channel
 65 and transfers said spaces into the intermedi-

ate channel 521, the guard 405, which neces-
 sarily follows said plunger in its vertical
 movement as already described, preventing
 the spaces above the selected number from
 being disturbed by this longitudinal plunger
 70 movement. A downward pull on the handle
 417 causes the plunger 409 to be depressed in
 order to allow the spaces which lie above it in
 the channel 123, to move downward to the
 bottom of said channel without danger of dis-
 75 placement. The plunger 409 being clear of
 the channels 123, the operator moves the han-
 dle 417 to the left, carrying with it the arm
 224 and the intermediate channel 521 until
 the latter is brought against the line-channel
 80 121, and the machine is ready for the intro-
 duction of spaces into the line, the stop 120^a
 having been removed from said channel by the
 spring 209 as soon as the handle 206^a was re-
 leased. By manipulating the rule 200 the
 85 operator lifts the words from the line one at a
 time past the spring-hook 202 and into that
 part of the channel 121 which lies opposite
 the galley *b*. While the operation of lifting
 the words is going on, after the first has been
 90 raised onto the hook 202 the operator's
 right hand is placed against the thumb-piece
 508 in readiness to actuate the pusher 509.
 At the time the plunger 409 was located by
 one of the bars 112, &c., the bar 502 raised
 95 the movable wall 500 a sufficient distance to
 allow a single space of the selected size to
 pass through the opening 412, and said wall
 is retained by friction in its elevated position
 after the arm 224 has been swung to the left,
 100 and so remains until depressed by hand at
 the end of the operation of justifying the line.
 When the top of the second and each succeed-
 ing word arrives in position below the hook
 202, a pressure on the thumb-piece 508 actu-
 105 ates the pusher 509 to the left and the bot-
 tom space in the channel 521 is thrust
 through the opening 412 onto the top of said
 word, which is then raised above said hook to
 make room for the next. When the line has
 110 been completed, by a repetition of the opera-
 tions just previously described the rule 235
 is withdrawn and transferred to the right of
 the newly-justified line, which is then pressed
 to the left with the column of justified type to
 115 clear the channel 121 for the succeeding line.

The brackets and other parts of the frame
 A that support the several operative mem-
 bers are tilted back at a suitable angle to
 safely hold for manipulation loose type lines
 120 and spaces, as will be understood by referring
 to Fig. 3. In the drawings and specifica-
 tion, however, these operative parts, which
 are inclined in practice, are shown and de-
 scribed for the sake of convenience and brevity
 125 as standing vertically.

While the mechanism shown as embodying
 the invention is adapted for handling ordi-
 nary type and the invention is especially in-
 tended for such use, it will be understood 130

that the invention is not limited to machines for justifying such ordinary type, but may be applied also in justifying type, matrices, or the like of any suitable material, and that the word "type" is used in this specification and the claims in this broad sense. It will be understood, also, that the devices for measuring the line shortage and dividing such shortage by the number of intervals in the line to determine the proper width of justifying-spaces are applicable not only in machines for justifying composed lines of type or matrices, but in line-justifying mechanism of other classes, and the term "justifying" mechanism herein is used in this broad sense to include all classes of typographic work in which lines are to be justified for printing or the production of printing-surfaces. These calculating devices in the machine illustrated and described herein are combined with a space-magazine and devices for supplying and inserting ready-made spaces; but it will be understood that the justifying-spaces, the size of which is determined by these calculating devices, may be provided otherwise than by using ready-made spaces, suitable space forming or supplying and inserting devices being combined with the calculating devices for this purpose.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a justifying mechanism, a series of relatively movable gages, corresponding to a graduated series of spaces, in combination with means for relatively adjusting said gages in accordance with the number of intervals in a line, for the purpose set forth.

2. In a justifying mechanism, a series of relatively movable gages, corresponding respectively to the individual spaces of a graduated series of spaces, and means for adjusting said gages to each represent the same number of its respective spaces.

3. In a justifying mechanism, a series of relatively movable gages, corresponding to a graduated series of spaces, combined with means for simultaneously moving all of the gages of the series distances proportional to the spaces they represent respectively.

4. In a justifying mechanism, a series of relatively movable gages, corresponding to a graduated series of spaces, combined with means for indicating the number of intervals in a line of print, and means for moving said gages simultaneously, and each an amount equal to the space it corresponds to multiplied by the number of intervals in the line.

5. In a justifying mechanism, a series of relatively movable gages, corresponding to a graduated series of spaces, combined with a lever adjustable in accordance with the number of intervals in a line, and connections between said lever and said gages, said gages being simultaneously movable in proportion to the spaces they represent, respectively.

6. In a justifying mechanism, a series of relatively movable gages, corresponding to a graduated series of spaces, combined with a series of lever-arms mounted upon a common fulcrum and engaging said gages respectively, a lever for moving said arms, and means for adjusting said lever in accordance with the number of intervals in a line.

7. In a justifying mechanism, a series of relatively movable gages, corresponding to a graduated series of spaces, in combination with a part and means for adjusting the same in proportion to the shortage of a line, and means for applying said gages to said part, for the purpose set forth.

8. In a justifying mechanism, a series of relatively movable gages, corresponding to a graduated series of spaces, and means for adjusting said gages respectively in proportion to the spaces they represent, in combination with a part movable in one direction in proportion to the line shortage, and in a second direction until intercepted by one of said gages.

9. In a justifying mechanism, a series of relatively movable gages, corresponding to a graduated series of spaces, and means for adjusting said gages to each represent a pile of its respective spaces in number equal to the number of intervals in a line, in combination with a part movable in correspondence with the shortage of a line, and means for bringing said part and said gages into coöperation to determine the size of spaces required for justification.

10. In a type-justifying mechanism, the combination with a magazine for a graduated series of spaces, of a space-ejecting plunger adjustable laterally and longitudinally of the magazine-channels, means for controlling said longitudinal adjustment in accordance with the shortage of a line, and a series of relatively movable gages corresponding to the graduated series of spaces and arranged to control the lateral adjustment of the plunger.

11. In a type-justifying mechanism, the combination with a magazine for a graduated series of spaces, of a space-ejecting plunger adjustable laterally and longitudinally of the magazine-channels, a series of relatively movable gages corresponding to a graduated series of spaces, means for moving said gages simultaneously in accordance with the number of intervals in a line, means for adjusting the space-plunger in accordance with the shortage of a line whereby it is made to register with a pile of spaces equal to said shortage, and means for bringing said space-plunger into engagement with one of said gages whereby it is caused to register with the channel containing the proper number and size of spaces for the line.

12. In a type-justifying mechanism, the combination with a magazine for a graduated

series of spaces, of a space-ejecting plunger in the rear of said magazine and adjustable laterally and longitudinally of the magazine-channels, a space-receiving channel in front of said magazine and having a movable side, and an inclined guide on said magazine adapted to raise said side in proportion to the size of spaces selected, whereby an opening is provided at the bottom of the receiving-channel through which said spaces may be ejected into the line.

13. In a type-justifying mechanism, the combination with a magazine having channels for various sizes of justifying-spaces, of a blade for ejecting spaces, and means for adjusting said blade laterally and longitudinally of the magazine to cause the same to register with the required number and size of spaces to justify a line of type.

14. In a type-justifying mechanism, the combination with a reservoir having channels for various sizes of justifying-spaces, of an ejecting-blade adjustable laterally and longitudinally of the magazine, means controlled by the number of intervals in, and the measurement of, an unjustified line for setting said blade to register with the required number and size of spaces to justify the line, and means for reciprocating the blade to eject said spaces.

15. In a type-justifying mechanism, the combination with a magazine, and means for ejecting therefrom by a single movement the justifying-spaces required to justify a line of type, of a receiver adapted to hold the spaces so ejected, and means for subsequently transferring the individual spaces successively to the line to be transferred.

16. In a type-justifying mechanism, the combination with a magazine for a graduated series of spaces, of a space-ejecting plunger in the rear of the magazine, a receiving-channel in front of said magazine, means for reciprocating the plunger to transfer a pile of spaces to said receiving-channel, and a reciprocating pusher at the bottom of said receiving-channel adapted to eject the spaces laterally and singly therefrom.

17. In a type-justifying mechanism, the combination with a magazine for a graduated series of spaces, of a space-ejecting plunger in the rear of said magazine, a vertically-movable slide on which said plunger is mounted, a laterally-movable support for said slide, and means for holding said slide in any desired vertical adjustment.

18. In a type-justifying mechanism, the combination with a magazine for a graduated series of spaces, of a space-ejecting plunger in the rear of said magazine, a vertically-movable slide on which said plunger is mounted, a support in which said slide moves, and a spring-pawl carried by the slide and engaging the support whereby the slide is held in any desired vertical adjustment.

19. In a type-justifying mechanism, the combination with a magazine for a graduated series of spaces, of a space-ejecting plunger adjustable laterally and longitudinally of the magazine-channels, a slide movable laterally and longitudinally of the magazine-channels by engagement with said plunger, and a guard in front of the magazine carried by said slide, said slide being unaffected by the reciprocations of the ejecting-plunger.

20. In a type-justifying mechanism, the combination with a magazine having channels for a plurality of sizes of spaces, and an ejecting-blade movable laterally of the magazine to register with any one of said channels, of a series of stops to limit the lateral movement of said plate, means for measuring the shortage of an unjustified line, and connections between said measuring means and said stops whereby the proper stop is brought into action to locate the ejecting-blade opposite the proper channel.

21. In a type-justifying mechanism, the combination with a space-magazine having its channels arranged in the arc of a circle, of a pivoted support adapted to swing across said channels in the rear of the magazine, a vertically-adjustable ejecting-blade carried on said support, and means for reciprocating said blade.

22. In a type-justifier, in combination, with means for measuring a line of type, a space-magazine having a series of space-channels, a space-plunger blade, an arm and a slide supporting said blade, the former imparting a lateral movement thereto and the latter a longitudinal movement to the same, and a channel member to receive the pile of spaces dislodged by the longitudinal movement of said blade, for the purpose set forth.

23. In a type-justifier, in combination, a space-magazine, a space-plunger blade attached to a vertically-reciprocating member supported by a slide mounted in a swinging arm whereby three distinct movements are permitted and imparted to said blade, and a channel member adapted to receive the pile of spaces dislodged by the longitudinal movement of said blade, for the purpose set forth.

24. In a type-justifier, in combination with a space-magazine, a longitudinally-movable space-plunger blade in the rear of the magazine and adapted to dislodge a selected number of spaces from any given channel in said magazine, an arm supporting said blade, and a guard in front of the magazine and adjustable with the blade, said guard being arranged to prevent said blade from dislodging more than said selected number of spaces as set forth.

25. In a type-justifying mechanism, the combination with a type-measuring channel, of a measuring-gage operating at one end of said channel, and a movable stop or abutment normally out of the path of the type in

said channel but adapted to be thrown into said path when it is desired to measure a line.

26. In a type-justifying mechanism, the combination with a type-measuring channel, a measuring-gage operating in said channel, and a handle for moving said gage, of a pivotally-mounted abutment against which the line is measured, a spring normally holding said abutment out of the channel, and a handle for throwing said abutment into the channel.

27. In a type-justifying mechanism, the combination with the type-channel, the gage for measuring a type-line therein, and the finger connected therewith, of a magazine for a graduated series of spaces, and an ejecting-plunger adjustable laterally and longitudinally of the magazine-channels, the said longitudinal adjustment being effected by bringing said plunger into engagement with said finger.

28. In a type-justifier, in combination, a series of gage-bars adjustable to represent a series of piles of successive sizes of spaces containing the same number each, a lever and a series of arms adapted to adjust said series of bars at different positions, a space-plunger arranged to be located in one direction in accordance with the amount of line shortage, and means for locating said plunger in another direction against the particular bar of said series that stands in its path, for the purpose set forth.

29. In a type-justifier, in combination, a series of simultaneously but differentially movable lever-arms, a lever adapted to operate said arms, and a pawl operating to retain said parts in their temporary positions, for the purpose set forth.

30. In a type-justifier, in combination, a series of longitudinally-movable bars so disposed as to represent space-piles of successive sizes containing the same number of spaces, gaging members for indicating the amount of line shortage, a plunger adjustable to be located in accordance with the position of said members to represent the dimension of said shortage or of a space-pile capable of filling the same, and means for bringing said plunger into conjunction with one of said bars, for the purpose set forth.

31. In a type-justifying machine, in combination, a stop and a gage projection for clamping a type-line, said gage projection arranged to be moved with said line against said stop to indicate the amount of shortage, a plunger adjustable in accordance with the position of said projection, a series of adjustable bars so disposed as to represent the different dimensions of space-piles each containing the number of spaces required by said line, and means for engaging said plunger with the particular one of said bars that

corresponds with the required size of spaces, for the purpose set forth.

32. In a type-justifier, in combination, a gage projection to bear against a short type-line and determine the amount of shortage, a finger connected to said projection and adjustable therewith, a space-plunger arranged to move against said finger, and means to bring said plunger opposite the particular size of spaces, a given number of which will be equal in dimension to the distance between their base and the top of said plunger, for the purpose set forth.

33. In a type-justifier, in combination, a gage projection to bear against an incomplete type-line and determine the amount of shortage, a plunger adjustable in accordance with the height of said projection, a series of longitudinally-movable bars representing piles of successive sizes of spaces, a lug on said plunger adapted to move transversely in relation to said bars until intercepted by one of them, thereby locating said plunger opposite the particular size of spaces a given number of which will be equal in dimension to the distance between their base and the top of the plunger, for the purpose set forth.

34. In a type-justifier, in combination with a plurality of channels arranged to receive columns of successive sizes of spaces, a space-plunger having a double movement, gaging members to traverse the line shortage and locate said plunger accordingly in one direction, means for longitudinally moving the same to the extent of expelling a pile of spaces equivalent to its height from the adjacent channel, and a guard cooperative with said plunger, in front of said channel to prevent the spaces above said pile from being displaced, for the purpose set forth.

35. In a type-justifier, in combination with a plurality of channels arranged to receive columns of successive sizes of spaces, a space-plunger having a triplicate adjustment, gaging members to traverse the line shortage and locate said plunger accordingly in one direction, a series of longitudinally-movable bars to locate said plunger in another direction behind one of said channels, and means for longitudinally moving the same in a third direction to the extent of expelling a pile of spaces from the adjacent channel, for the purpose set forth.

36. In a type-justifier, in combination with a plurality of channels arranged to receive columns of successive sizes of spaces, a space-plunger having a triplicate adjustment, gaging members to traverse the line shortage and locate said plunger accordingly in one direction, a series of longitudinally-movable bars to locate said plunger in another direction behind one of said channels, means for longitudinally moving the same in a third direction to the extent of expelling a pile of

spaces from the adjacent channel, and a guard cooperative with said plunger, in front of said channel to prevent the spaces above said pile from being displaced, for the purpose set forth.

37. In a type-justifier, in combination with a space-plunger having a lateral and a longitudinal movement relative to piles of successive sizes of spaces, a plurality of channels provided with shouldered and slotted bottoms for holding said spaces and allowing said plunger to operate through the same, for the purpose set forth.

38. In a type-justifier, in combination with an arc-shaped series of space-channels, an oscillating arm extending below said channels, a space-plunger and an intermediate space-receiving channel carried by said arm, in operative relation with the back and front of said first-mentioned channels, respectively, for the purpose set forth.

39. In a type-justifier, in combination with a plurality of space-channels, an oscillating arm supporting an intermediate space-receiving channel in front of said space-channels, means to transfer a pile of spaces from one of said first-mentioned channels into the second, and means for removing the spaces in said receiving-channel, one at a time, and introducing them into the line-channel, for the purpose set forth.

40. In a type-justifier, in combination with a plurality of space-channels, an oscillating arm supporting an intermediate space-receiving channel in front of said space-channels, means to transfer a pile of spaces from one of said first-mentioned channels into the second, a wall in said receiving-channel movable to the extent of the thickness of individual spaces contained therein, and a pusher adapted to thrust said spaces, one at a time, beneath said wall and into the line-channel, for the purpose set forth.

41. In a type-justifier, in combination, an arm supporting a slide adjustable longitudinally of said arm, a blade mounted in said slide and operating at substantially right angles to the movement of the latter, a latch-lever adapted to lock said blade in position at any point of its adjustment relative to said slide, and a space-plunger rigidly attached to said blade, for the purpose set forth.

42. In a type-justifier, in combination with a plurality of space-channels, a space-plunger adjustable to the height of a pile of required spaces, a longitudinally-sliding bar operated by said plunger, a guard connected with said bar by a projection extending beneath said channels, said guard being located directly in front of said plunger and having its lower edge substantially on a line with the top thereof, and an oscillating arm supporting said plunger and bar, for the purpose set forth.

43. In a type-justifier, in combination with a plurality of channels arranged to receive columns of successive sizes of spaces, an intermediate channel adapted to receive a pile of spaces from any one of said space-channels, an inclined bar across the latter, and a movable wall in said intermediate channel adapted to be raised by said bar a distance substantially equivalent to the thickness of a space contained in the particular space-channel in front of which said intermediate channel is located, for the purpose set forth.

44. In a type-justifier, in combination with a plurality of channels arranged to receive columns of successive sizes of spaces, an intermediate channel adapted to receive a pile of spaces from any one of said space-channels, an inclined bar across the latter, a movable wall in said intermediate channel adapted to be raised by said bar a distance substantially equivalent to the thickness of a space contained in the particular space-channel in front of which said intermediate channel is located, and a pusher to remove the spaces, one by one, from said last-mentioned channel, beneath said wall, for the purpose set forth.

45. In a type-justifier, in combination, a plurality of space-channels, an inclined bar across said channels, an intermediate space-receiving channel, and a movable wall therein provided with a projection or shoulder adapted to engage said bar and raise said wall when said intermediate channel is actuated in front of said space-channels, for the purpose set forth.

46. In a justifying mechanism, a series of relatively movable projections, means for moving them with relation to each other according to the number of spaces in the line, combined with mechanism adapted to engage said projections and cause the selection of a justifying-space.

47. In a justifying mechanism, in combination, a series of relatively movable projections, space-controlling mechanism adapted to engage said projections, means for varying the position of the projections relative to each other, and for causing another variation affecting the space-controlling mechanism, and means whereby one of said variations is dependent on the number of spaces to be justified and the other upon the line's variation from the required length.

48. In a justifying mechanism, a series of relatively movable projections, a cooperating member between which and said projections there is a relative movement, means for causing one of said relative movements according to the number of spaces in the line to be justified, and the other relative movement according to the measurement of the line.

49. In a justifying mechanism, in combi-

nation, a series of relatively movable projections, a cooperating member between which and said projections there is also a relative movement, means for causing one of said relative movements according to the number of spaces in the line to be justified, and the other according to the measurement of the line, and space-controlling mechanism governed by said projections.

50. In a justifying mechanism, the combination with means for measuring a composed line of type, of a series of relatively movable space-determining gages, and means for relatively adjusting said gages in accordance with the number of intervals in a line, for the purpose set forth.

51. In a justifying mechanism, the combination with means for measuring a composed line of type, of a series of relatively movable gages, corresponding to a graduated series of spaces, and means for simultaneously moving all of the gages of the series, distances proportional to the spaces they represent.

52. In a justifying mechanism, the combination with means for measuring a composed line of type, of a series of relatively movable gages, corresponding to a graduated series of spaces, means for indicating the number of intervals in the line, and means for moving said gages simultaneously, and each an amount equal to the space it corresponds to multiplied by the number of intervals in the line.

53. In a justifying mechanism, the combination with means for measuring a composed line of type, of a series of relatively movable space-determining gages, a member and means for adjusting said member in proportion to the shortage of the measured line, and means for applying said gages to said member, for the purpose set forth.

54. In a justifying mechanism, the combination with means for measuring a composed line of type, of a series of relatively movable projections, means for moving said projections with relation to each other according to the number of spaces in the line, and mechanism adapted to engage said projections and determine a justifying-space in accordance with the measurement of the line and the relative movement of said projections.

55. In a justifying mechanism, the combination with means for measuring a composed line of type, of a series of relatively movable projections, a cooperating member between which and said projections there is a relative movement, means for causing one of said relative movements according to the number of spaces in the measured line, and the other relative movement according to the measurement of the line.

56. In a justifying mechanism, in combination, means for measuring a composed line of type, a series of relatively movable

projections, a cooperating member between which and said projections there is also a relative movement, means for causing one of said relative movements according to the number of spaces in the measured line, and the other according to the measurement of the line, and space-controlling mechanism governed by said projections.

57. In a justifying mechanism, a series of simultaneously but differentially movable lever-arms, in combination with means for moving said arms in accordance with the number of spaces in the line.

58. In a justifying mechanism, a series of simultaneously but differentially movable lever-arms, corresponding to the sizes of spaces used in the justifying mechanism, in combination with means for moving said arms in accordance with the number of spaces in the line.

59. In a justifying mechanism, a series of simultaneously but differentially movable lever-arms corresponding to the sizes of spaces used in the justifying mechanism, in combination with means for selecting one of said lever-arms in accordance with the line shortage, and means for moving said arms in accordance with the number of spaces in the line.

60. In a justifying mechanism, a series of levers having their fulera at varying distances from the ends of the levers, in combination with means for selecting and positioning one of said levers in accordance with the line shortage and number of spaces in the line for determining the width of justifying-spaces.

61. In a justifying mechanism, a series of levers having their fulera at varying distances from the ends of the levers, in combination with means controlled by said levers for determining the justifying-spaces for the line.

62. In a justifying mechanism, a series of levers having their fulera at varying distances from the ends of the levers and including a lever for each size of space used in the machine, in combination with means controlled by said levers for selecting the justifying-spaces for the line.

63. In a justifying mechanism, a series of levers having their fulera at varying distances from the ends of the levers and including a lever for each size of space used in the machine, said levers being adapted to be moved in accordance with the number of spaces in the line, in combination with means for selecting one of said levers in accordance with said movement and the shortage of the line to determine the width of justifying-spaces.

64. In a justifying mechanism, a series of simultaneously but differentially movable lever-arms, corresponding to the sizes of spaces

used in the justifying mechanism, in combination with means for selecting one of said arms and applying it to determine the width of justifying-spaces from the line shortage and number of spaces in the line.

5 65. In a justifying mechanism, a pivoted member carrying a series of engaging surfaces at varying distances from the pivot, in combination with means for selecting one of
10 said surfaces and applying it to determine the width of justifying-spaces from the line shortage and number of spaces in the line.

15 66. In a type-justifier, the combination with a space-magazine and means for ejecting spaces from the magazine-channels, devices for determining the size of justifying-spaces, and a guard controlled by said de-

vices for limiting the number of spaces ejected.

67. In a type-justifier, the combination 20 with means for measuring a line of type, a space-magazine having a series of space-channels, means for ejecting piles of spaces from said channels, a line-channel member, and an intermediate space-receiving device 25 mounted on a movable arm, and arranged to transfer a pile of spaces from any one of the channels in said magazine into operative relation with said line-channel member, for the purpose set forth.

BENJ. M. DES JARDINS.

Witnesses:

ED. E. CLAUSSEN,
EVA S. SHELTON.