

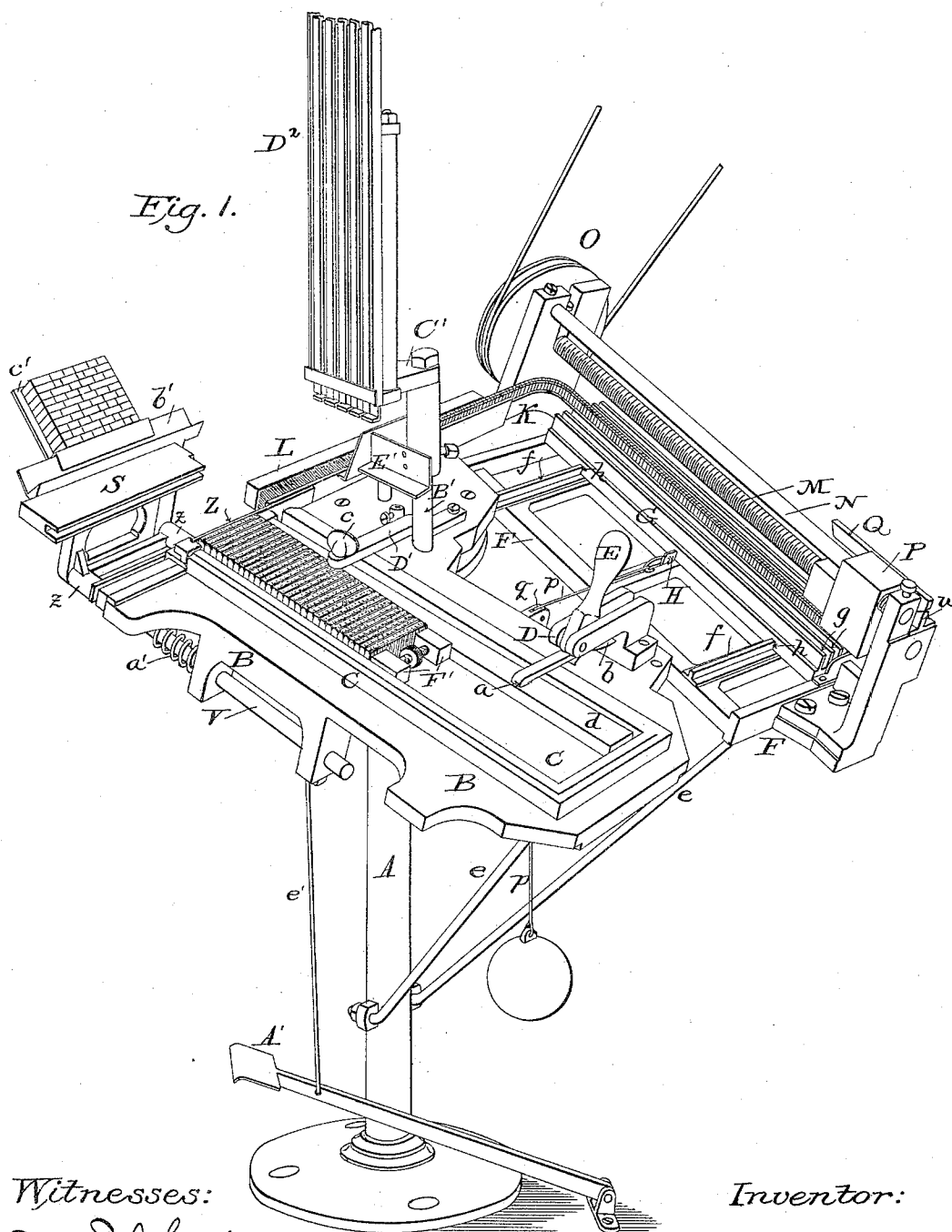
(No Model.)

4 Sheets—Sheet 1.

J. L. McMILLAN.  
TYPE JUSTIFYING MACHINE.

No. 465,877.

Patented Dec. 29, 1891.



Witnesses:  
James F. Duhamel  
Horace A. Dodge.

Inventor:  
John L. McMillan.  
by Dodge Bros.  
Atty.

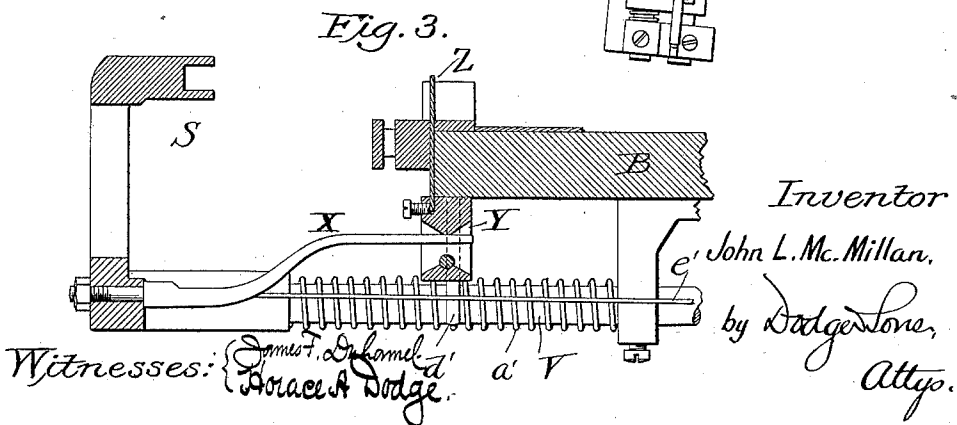
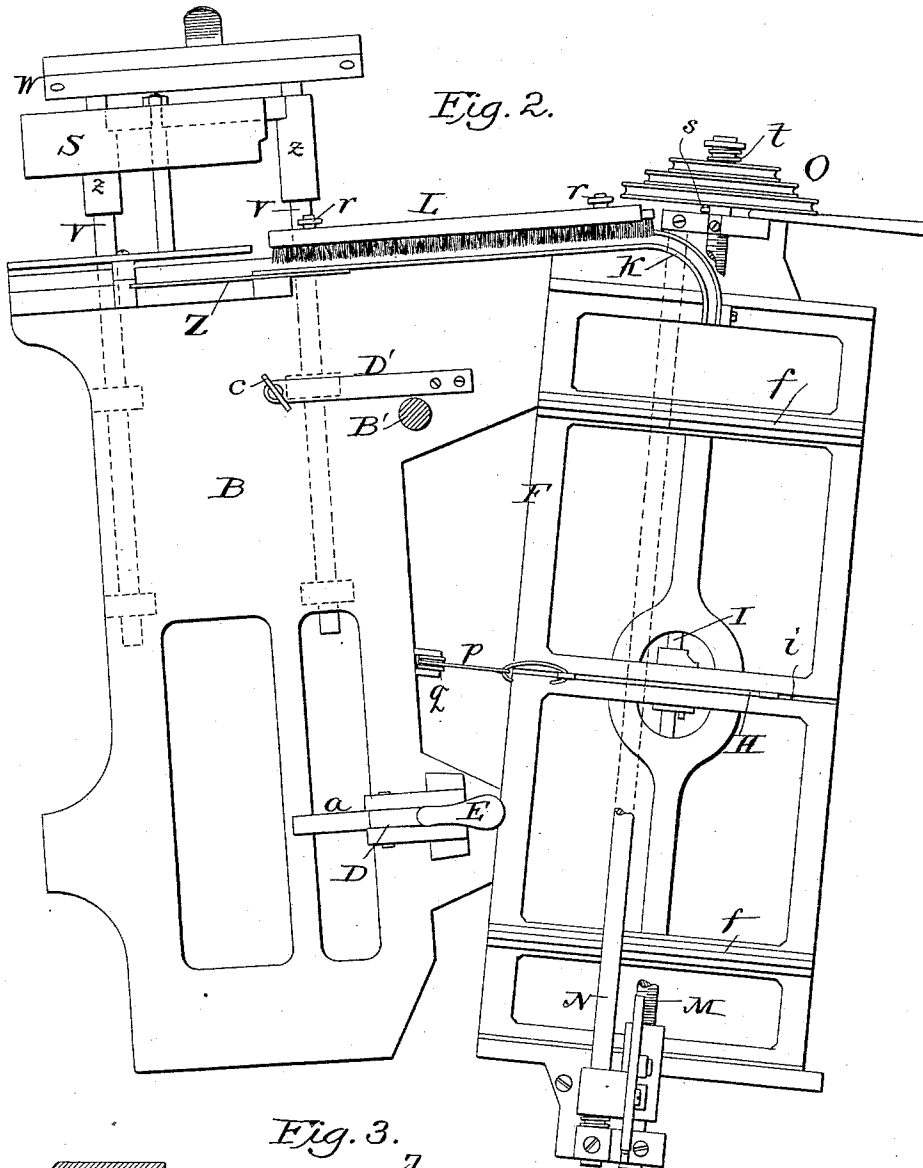
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Horace A. Dodge.

Inventor  
John L. McMillan,  
by Dodge & Sons,  
Attys.

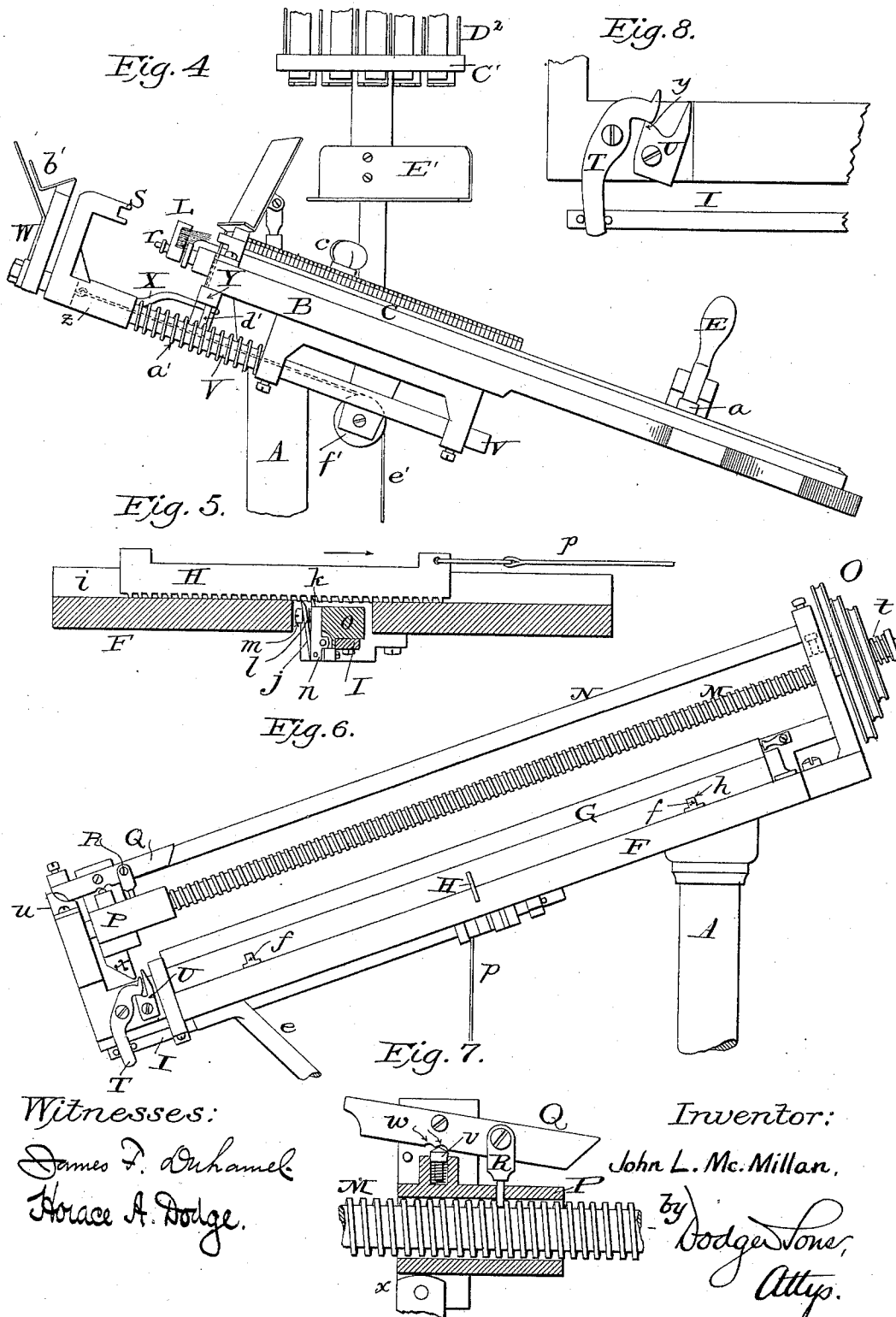
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4 Sheets—Sheet 3.

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Horace A. Dodge.

Inventor:

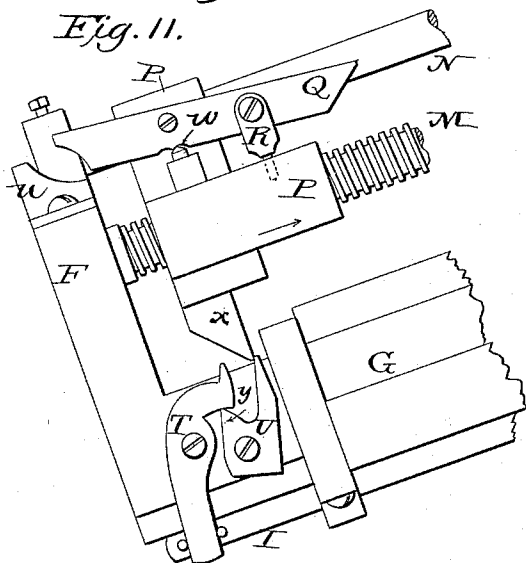
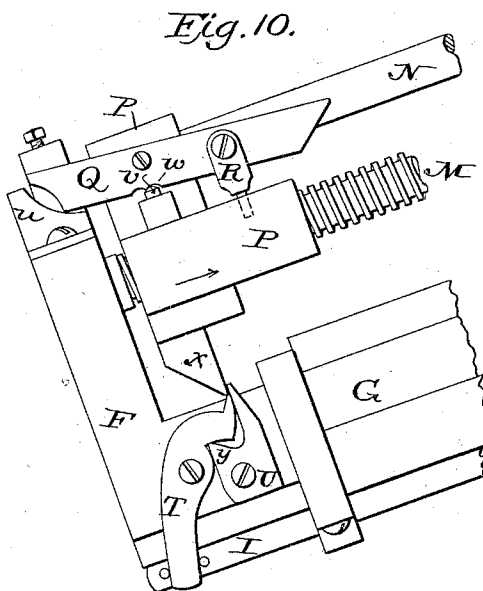
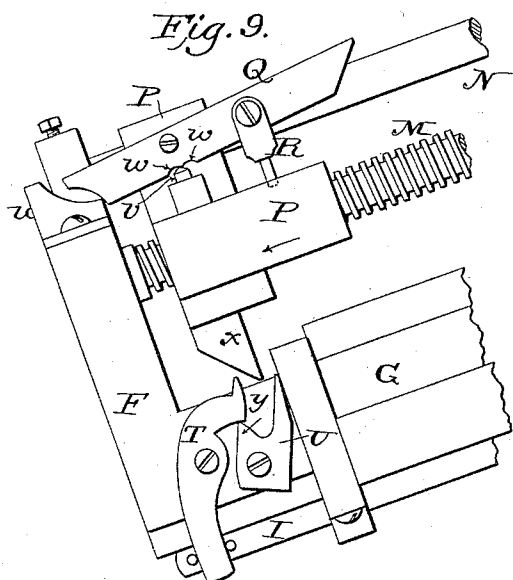
John L. McMillan,

by  
Dodge & Sons,  
Attys.

4 Sheets—Sheet 4.

No. 465,877.

Patented Dec. 29, 1891.



James F. Duhamel  
Horace A. Dodge.

*John L. McMillan,*

by Dodger Lane  
Atty.

# UNITED STATES PATENT OFFICE.

JOHN L. McMILLAN, OF ILION, NEW YORK.

## TYPE-JUSTIFYING MACHINE.

SPECIFICATION forming part of Letters Patent No. 465,877, dated December 29, 1891.

Application filed February 27, 1891. Serial No. 383,102. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN L. McMILLAN, a citizen of the United States, residing at Ilion, in the county of Herkimer and State of New York, have invented certain new and useful Improvements in Type-Justifying Machines, of which the following is a specification.

My invention relates to mechanism or apparatus for use in justifying printing matter or making up printing-forms.

The apparatus is designed more particularly for use in connection with that class of type-setting machines which set the type in a single line, and it is designed to facilitate the division or cutting up of the line of type set by the machine into sections of uniform length, or, in other words, into lines of a length equal to the width or length of the printing-form desired.

In the drawings, Figure 1 is a perspective view of the complete apparatus; Fig. 2, a top plan view with portions broken away or omitted to show the bed or support upon which the type-carrying plate or line-galley is mounted and moves; Fig. 3, a sectional view illustrating the construction of the bunter or device by which the matter is pushed forward after the addition of a line; Fig. 4, a side elevation of the form-galley, bunter, and attendant parts; Fig. 5, a view illustrating the line spacing or feeding mechanism by which the travel of the line-galley or type-holder is effected and determined; Fig. 6, a rear side or face view showing the mechanism by which the type are discharged from the channels or grooves of the line-galley; Fig. 7, a detailed view showing the construction of the mechanism by which the follower or ejector is placed in and thrown out of engagement with the actuating-screw; Figs. 8, 9, 10, and 11, detailed views illustrating the operation of the devices which control the line spacing or feeding devices by which the type-carrier or line-galley is caused to advance line by line.

Before proceeding to a detailed description of the construction and operation of the apparatus, I will state, for the purpose of making clearer the explanation that is to follow, that a grooved or channeled type-holder or line-galley is employed, which receiver or galley is first used in connection with a type-setting machine of any suitable construction,

the galley being so arranged as to bring one groove or channel after another into alignment with the type-containing channel or guide of the type-setting machine, so that the channels or grooves of the receiver or line-galley become successively filled with type arranged in their proper order.

The present apparatus is designed to move the lines of type from the channels or grooves successively and to advance them at a proper rate of travel to an operator or attendant, by whom the line is divided into suitable lengths, as nearly as may be, to form the lines of the printing-form, the attendant also spacing and justifying the matter as he cuts off the sections from the main line and placing the requisite leads between the different lines of type.

Referring again to the drawings, A indicates a rotary standard or pedestal, which will be made with a broad base, which will give steadiness and facilitate attachment to the floor. Secured upon the upper end of the pedestal, advisably at an inclination of from twenty to thirty degrees, more or less, is a bed or table B, upon which is clamped the form-galley C by means of suitable clamping devices D D', which latter may be of any suitable construction capable of readily clamping the galley or the galley and its furniture in position.

In Fig. 1 I have represented two forms of clamping devices, that shown at D being a pivoted bar or lever *a*, which is normally lifted by a light spring *b*, but is forced down by a cam-lever E to give the necessary pressure upon the galley or its furniture. The clamp shown at D' consists, simply, of an overhanging bar provided at its outer end with a thumb-screw *c*. In practice I find it convenient to employ these two forms of clamping device, the cam-lever because of its greater facility of manipulation and the thumb-screw because of the lack of space at the point at which it is used to accommodate the cam-lever. In said figure I have represented the clamps as bearing directly upon a rule or side-stick *d*, which in turn rests upon the bottom of the galley C, so that by properly adjusting the galley and the stick before securing the clamps the clamps may be made to hold both the furniture or side-stick and the

galley in position and the whole in proper relation to the bunter, which advances the form as it is made up.

F indicates a second bed or table, advisably of skeleton form, joined to the bed or table B and braced like said table B by a rod *e* running from its lower end downward to and through a lug or ear cast upon the pedestal A and secured in place by a nut 10 screwed upon it in rear of the lug, as indicated in Fig. 1, it being, however, apparent that any other suitable form of bracing may be adopted. The bed F is provided with ribs or ways *f*.

15 G indicates the line-galley or type-holder, provided on its upper face with a series of longitudinal grooves *g* to contain the lines of type, and having on its lower face transverse grooves *h* to receive the ribs or ways *f*, upon 20 which the line-galley rests, and by which it is guided in its movements across the bed or support F.

At or about its mid-length the bed or platform F is provided with a transverse groove 25 or channel *i*, in which is arranged a sliding bar H, which is cut away on its upper side a distance exactly equal to the width of the line-galley or type-receiver G, so that when said type-receiver is placed in position upon 30 the ways or ribs *f* the upwardly-extending ends of the bar H shall bear respectively against the front and rear edges of the line-galley G, fitting the same closely and avoiding independent movement of the two parts. 35 The lower edge of the bar H is notched or formed with teeth, as shown in Fig. 5, with which engage alternately spacing-dogs *j* *k*, the former being a yielding dog and the latter a fixed one, similar to those employed for letter-spacing in type-writing machines. The dog *j* is 40 pivoted at its lower end, and its upper end is normally thrown forward and out of alignment with the dog *k* by means of a light spring *l*, the distance to which it is thus thrown being determined by a stop-screw *m*. The dogs 45 are carried by a block *n*, which is pivotally attached to a larger block *o*, which is secured to and carried by a rod or bar I. By reciprocating the bar I the dogs *j* and *k* are brought 50 alternately into engagement with the teeth or rack of the bar H, which bar is urged forward in the direction indicated by the arrow in Fig. 5 by a cord and weight, spring, or equivalent means. From this it follows that when 55 the fixed dog *k* passes out of engagement with a tooth of the rack the yielding dog *j* simultaneously passes into engagement with the next succeeding tooth, and as the dog *k* fully withdraws from engagement with its 60 tooth of the rack the slide H, advancing under the influence of the weight or spring and overcoming the resistance of the light spring *l*, carries the yielding dog *j* into alignment with the fixed dog *k*. When, however, the bar 65 I is moved backward or in a reverse direction, the yielding dog *j*, as soon as it rides clear of the tooth with which it is in engagement,

will again swing forward, while the fixed dog takes its place, preventing farther advance of the slide H until the movement of the bar 70 I is again reversed and the bar H is permitted to advance a distance equal to the movement of the yielding dog *j*. This mechanism and its operation are well known in themselves and are not specifically claimed, 75 though they are believed to be new and are claimed in the combination herein set forth.

In the drawings I have shown a flexible band *p* as connected to the forward or inner end of the sliding bar H, passing thence over 80 pulley *q*, and finally downward, its lower end being provided with a weight J, which is made sufficiently heavy to draw forward the line-galley or type-receiver G, and to overcome the resistance of the light spring *l*, so 85 that as the spacing-dogs *j* and *k* are actuated the type-receiver or line-galley G shall be advanced one line at a time.

At one end of the frame F, and in such position as to register exactly with one of the 90 channels or grooves *g* of the line-galley or type-holder, is a channeled bar or guide K, which is bent or curved and carried along the upper end of the bed or table B, as shown in Figs. 1 and 2. 95

That portion of the channel or guide K beyond the bend or curve has its rear or upper wall formed by a brush L, the bristles of which project inward toward and bear against the 100 type which pass through said channel, the light friction thus given serving to press the type into close contact with each other and prevent their turning or shifting out of place.

The brush L is made adjustable by thumb-screws *r*, as shown in Fig. 1. 105

At each end of the bed or table F there is an upright post or standard, and extending from one post or standard to the other is a screw-shaft M, above which is a guide-rod N, 110 as shown in Figs. 1, 6, 9, 10, and 11.

The screw-shaft M is suitably journaled in the uprights or standards at the ends of the frame F, and is provided at one end with a pulley, preferably a cone-pulley O, by which 115 a rotary motion is transmitted to the screw-shaft from any convenient source of power. The screw-shaft is formed or provided with a projecting lug *s*, and the pulley O is formed with a socket or recess to receive or to fit over said lug. A spring *t* bears against the outer 120 face of the pulley and serves to press it inward, so as to cause an engagement of the pulley and the stud under normal conditions. When, however, it is desired to disconnect the pulley from the screw-shaft, a wedge or 125 rod is inserted between the post or standard in which the screw-shaft M is mounted and the pulley, and the latter is thereby forced outward so as to run free or clear of the lug or stud *s*, and consequently to rotate without 130 imparting motion to the screw-shaft. Any other simple and convenient form of clutching or clamping device may of course be substituted for this.

Encircling the screw-shaft M is a sleeve or block P, an upwardly-projecting portion of which is perforated to receive or to encircle the guide-rod N, which latter prevents the sleeve from rocking or turning upon or with the screw-shaft M. Pivoted to the side of the upwardly-extending portion of the block or sleeve P is a bar or lever Q, the ends of which are beveled or cut away, as shown in Figs. 1, 6, 7, 9, 10, and 11. At one side of the bar or pivot, the right-hand side as seen in said figures, there is hung from the bar or lever a block R, the lower end of which is preferably made cylindrical in form and is passed downward through an opening in the sleeve P to enter the groove or thread of the screw-shaft M, as best shown in Fig. 7.

When the block or traveler P is at the extreme left-hand or lower end of the screw-shaft M, the position it will assume by gravity, if disconnected therefrom, the lower or left-hand end of the bar or lever Q riding upon the incline *u*, is thrown upward into the position shown in Fig. 7, thereby throwing the block R downward and causing its cylindrical stem or lower end to enter into engagement with the thread of the screw-shaft M, the bar or lever being held in one or the other of its two positions by means of a conical pin *v*, which is pressed outward by a spring into one or another of two notches *w* in the lower edge of the bar or lever, the dividing point or ridge between the two notches being carried to one or the other side of the point of the conical pin *v*, as the position of the bar or lever Q is shifted. This will be readily understood by referring to Fig. 7. When the stem or point of block R is thus thrown into engagement with the thread of screw-shaft M, rotation of said shaft will cause the sleeve or traveler P to travel lengthwise of the shaft M and guide N, this travel continuing until the beveled upward or forward end of the bar or lever Q rides upon a suitable bearing at the upper end of the frame F, and is thereby lifted so as to raise the stem or lower end of block R out of engagement with the screw-thread and to carry the lever Q to the position shown in Fig. 9, where it is held by the spring-pressed pin *v*, as above explained. Being thus freed from engagement with the screw-shaft, the sleeve or traveler P, with its attendant parts, slides back by gravity to the lower end of the screw-shaft and guide-rod, or to the position shown in Fig. 10.

Projecting downward from the lower side of the sleeve or traveler P is a beveled lug *x*, and pivoted to the frame F at or near its lower end and in the line of travel of the lug *x* are two levers T and U, of the form best shown in Figs. 8, 9, 10, and 11. The levers T and U at the moment that the traveler P is descending to the lower end of the frame F occupy the position indicated in Fig. 9, the upper extremity or end of the lever T being then elevated and standing directly in the

path of the lug *x*, while the upper extremity of the lever U is thrown backward and downward, so that the lug *x* passes freely above it. As the beveled face of the lug *x* bears upon the upper end of the lever T it depresses said upper end and causes the lower end to be thrown in the direction of the arrow in Fig. 9. As shown in said figure and in Figs. 6, 8, 10, and 11, the lower end of lever T plays between two pins or lugs projecting from the side of the bar I, which, as above explained, carries the line-spacing dogs *j* and *k*. Hence it will be seen that as the lug *x* passes over and depresses the upper end of the lever T its lower end will be thrown outward and the yielding dog *j* of the spacing mechanism will be brought into line with the sliding bar H, which will thus be allowed to advance a distance equal to the play of the yielding dog *j*, or, in other words, the distance necessary to advance the line-galley or type-holder one line. In thus depressing the upper end of the lever T its overhanging upper end, bearing upon the point *y* of lever U, depresses said point and throws the nose or upper extremity of lever U upward into the position indicated in Fig. 10, or into the path of the lug *x*. The descent of the traveler or sleeve P having shifted the lever Q from the position indicated in Fig. 9 to that indicated in Fig. 11 and having thus again connected the sleeve or traveler with the screw-shaft M, the sleeve begins to move in the direction indicated in Fig. 10, the lug *x* striking the upper extremity of the lever U and throwing it down, as indicated in Fig. 11. As the lever U thus moves downward its point *y*, acting beneath the overhanging upper arm of lever T, elevates said arm, as indicated in Fig. 11, and causes the bar I to be moved lengthwise, thereby bringing the rigid dog *k* of the line-spacing mechanism into engagement with the rack or teeth of the sliding bar H, holding the line-galley against farther movement. The parts remain in the position thus indicated until the lug *x*, which traverses the grooves or channels I, completes its travel through the channel in which it then is and until the block or traveler P is released, allowed to descend, and caused by engagement of the lug *x* with the lever T to shift the dogs *j* *k* and permit the advance of the line-galley one line. The traveler or sleeve P, beginning again its upward movement, the lug *x* acts upon the block or lever U, through it upon the lever T, and thus upon the bar I, thereby bringing the rigid dog *k* again into engagement with the teeth of the sliding bar H and holding the line-galley rigidly in position during the inward travel of the sleeve or traveler P.

As shown in Fig. 1, the form-galley C is so adjusted that one side of the form shall come to or about to a point in line with its end, and beyond that point the type are not guided or supported on the rear side, the space being left clear for the advance of the bunter S,

which, when the line is justified, is caused to advance and move the line up to the body of the form and to advance the entire form a distance equal to the thickness of the line and the lead, which lead is inserted by hand

in advance of the line.

The bunter is represented in Figs. 1, 2, 3, and 4, and consists of a cross head or bar provided with two tubular necks or sleeves *z*, which are mounted and slide upon guide-rods *V*, secured to the under side of the bed or table *B* in any convenient manner. The bunter is normally forced backward or upward by means of springs *a'* encircling the rods *V* and bearing at one end against the sleeves *z* and at the other end against lugs or hangers in which the guide-rods *V* are clamped or held. The upward or outward movement of the bunter *S* is limited and determined by a plate or casting *W*, connecting the upper or outer ends of the rods *V*, as shown in Figs. 1, 2, and 4, said plate *W* being formed with a trough *b* at its top, as shown in Figs. 1 and 4, and carrying the inclined plate or shelf *c'*, upon which are placed quads to be used in justifying the matter in the galley. Projecting downwardly or inwardly from the lower cross-bar of the bunter is a bent or curved arm *X*, which passes through an opening in a vertically-movable bar *Y*, provided with a cut-off slide or plate *Z*, which plays upward and downward through an opening in the bed or table *B*, just in advance of the incoming line of type. As the bunter advances the bent or curved portion of the bar *X*, coming in contact with the lower wall of the opening in the cross-bar *Y* or in contact with an anti-friction roller mounted therein, causes the slide *Z* to be thrown down out of the way of the line which has to be added to the form, the bar *Y* being guided in its rise and fall by guide stems or pins *d'*, as shown in Figs. 3 and 4. The bunter *S* is thrown forward, when required, by means of the band *e'* connected therewith passing over a pulley *f'* and connected with a treadle or foot-lever *A'*, which may be pivoted in a block made fast to the floor or otherwise sustained. It will be observed that the bunter moves backward and forward in a straight line instead of rocking upon a pivot, and that consequently it moves the type bodily instead of swinging or tripping them, as in the case of a pivoted bunter. This straight-line movement is advantageous in that it is not so likely to throw the type off their feet or out of position as the swinging movement. By depressing the treadle the bunter is caused to advance, and when pressure is removed from said treadle the springs *a'* restore the bunter to its normal position. Rising from the bed or table *B* is a post or standard *B'*, upon which is mounted or swiveled a bracket *C'*, carrying a series of slotted tubes or receivers *D*<sup>2</sup>, adapted to contain the various spaces used in justifying the matter handled by the machine. These spaces occupy a single line in the receivers or tubes and lie one upon another, the

lowermost spaces being exposed, so that it may be readily withdrawn by the fingers of the attendant or operator when required for use and as quickly replaced by another ready for the next demand. Below the space receivers or holders *D*<sup>2</sup> is a shelf *E'*, upon which are laid the leads to be used between the lines of justified matter. To prevent the too rapid descent of the form as made up, the inclination of the bed *B* is made comparatively slight, (and it may be here stated that it is not essential that there should be any inclination whatever thereto.) A friction-block or slug *F'*, preferably adjustable as to its spread, is placed between the side-stick *d* and the side of the galley *C* in advance of the form, and is caused to bear against said parts with friction sufficient to prevent the undue advance of the form. Any suitable friction device may be employed for this purpose.

It will be seen that the details of the apparatus are susceptible of more or less variation without departing from the substance or spirit of my invention. Thus the character of the pedestal or support may be varied, and instead of the single standard there may be a frame with three or more legs. The standard may be made telescopic, so as to adjust the apparatus to different heights to suit different operators, and in other ways the details may be varied.

The bar *H* or its toothed rack may be integral with the type-holder *G*, though I prefer the construction shown.

It is apparent that the levers *T* and *U* may be connected with each other by teeth concentric with their pivots or in any other convenient manner.

Having thus described my invention, what I claim is—

1. In a machine for justifying printing-matter, the combination of a fixed receiving-guide or line-channel and a type-holder provided with a series of grooves or channels, each adapted to contain a line of composition or printing-matter, said holder being arranged to move in relation to the receiving guide or channel so as to bring one of its receiving grooves or channels after another into alignment with said guide or line-channel, whereby the printing-matter of the several channels of the type-holder may be successively delivered to the receiving-channel.

2. In combination with a fixed receiving-guide or line-channel and with a type-holder provided with grooves or channels adapted to contain lines of printing-matter or set type, a spacing mechanism serving to permit the movement of the type-holder past the receiving-channel or guide, so as to bring one line or groove after another into alignment with the receiving channel or guide.

3. In combination with a fixed receiving-guide or line-channel, as *K*, a type-holder, as *G*, provided with a series of grooves or channels adapted to contain lines of set type, a bed or support upon which such type-holder

is mounted, means for moving the type-holder upon its support, and a spacing mechanism, substantially such as shown and described, adapted to permit a line-by-line movement of the type-holder relatively to the receiving-guide or line-channel.

4. In combination with a guide or channel, a type-holder movable relatively thereto and provided with a series of grooves or channels adapted to be brought successively into alignment with the fixed guide or channel, and an ejector adapted and arranged, substantially as described, to traverse the respective channels of the type-holder and to discharge type therefrom into the fixed guide or channel.

5. In combination with a receiving guide or channel and with a type-holder provided with a series of containing grooves or channels, a screw-shaft, and a sleeve or traveler provided with a lug or ejector-arm to traverse the channels of the type-holder and adapted to be connected with and disconnected from the screw-shaft, substantially as set forth, whereby it is enabled to discharge type from the holder into the receiving-channel.

6. In a machine for justifying printing-matter, the combination, with a channeled type-holder G, adapted to contain set type and provided with a toothed bar or rack, of a receiving-guide or line-channel, yielding dog *j* and rigid dog *k*, adapted to be thrown alternately into engagement with the rack, and means, substantially such as shown and described, for moving the holder G in the direction of the length of the toothed bar or rack.

7. In a machine for justifying printing-matter, the combination, with a suitable supporting-bed and with a receiving-guide or line-channel, of a type-holder G, provided with grooves or channels *g*, adapted to contain lines of set type, a rack-bar movable with the type-holder, a reciprocating bar I, and dogs *j* and *k*, carried by said bar, the dog *j* being adapted to yield, substantially as described, and a weight or equivalent device for moving the type-holder, substantially as set forth.

8. In combination with a type-holder, as G, provided with a toothed bar or rack, reciprocating bar I, provided with yielding dog *j* and fixed dog *k*, lever T, connected with said bar I, lever U, adapted to actuate and to be actuated by the lever T, and sleeve or traveler P, provided with nose *x*, substantially as and for the purpose set forth.

9. In combination with type-holder G, rack-bar H, and means for moving the rack-bar longitudinally, reciprocating bar I, dogs *j* and *k*, carried by said bars, levers T and U, the former connected with said bar I, screw-shaft M, and sleeve or traveler P, provided with lug *x*, substantially as and for the purpose set forth.

10. In combination with a channeled type-holder and screw-shaft M, a sleeve or traveler P, provided with ejector *x*, lever Q, and block R, carried by lever Q and provided with a stem to enter into engagement with the thread of the screw-shaft M, all substantially as set forth.

11. In combination with a type-holder and with screw-shaft M, sleeve or traveler P, lever Q, block R, carried by said lever and adapted to enter into engagement with the screw-shaft, and a stop or bearing located in the path of the lever Q and serving to lift one end and depress the other.

12. The combination, in a justifying-machine, of a screw-shaft M, a sleeve or traveler P, lever Q, provided with block R and with seats or notches *w*, a spring-pin *v*, and stops located in the path of the lever Q, whereby the ends of said lever are alternately raised.

13. In combination with table B, galley C, bunter S, movable bodily and in a right line toward and from the table, a treadle A', and band *e'*, connecting the bunter and the treadle.

14. In combination with bed or table B, bar Y, slide Z, carried by said bar, bunter S, and bent arm X, carried by the bunter and extending from an opening in the cross-bar Y, substantially as set forth.

In witness whereof I hereunto set my hand in the presence of two witnesses.

JOHN L. McMILLAN.

Witnesses:

A. D. RICHARDSON,  
F. S. HOEFLE.