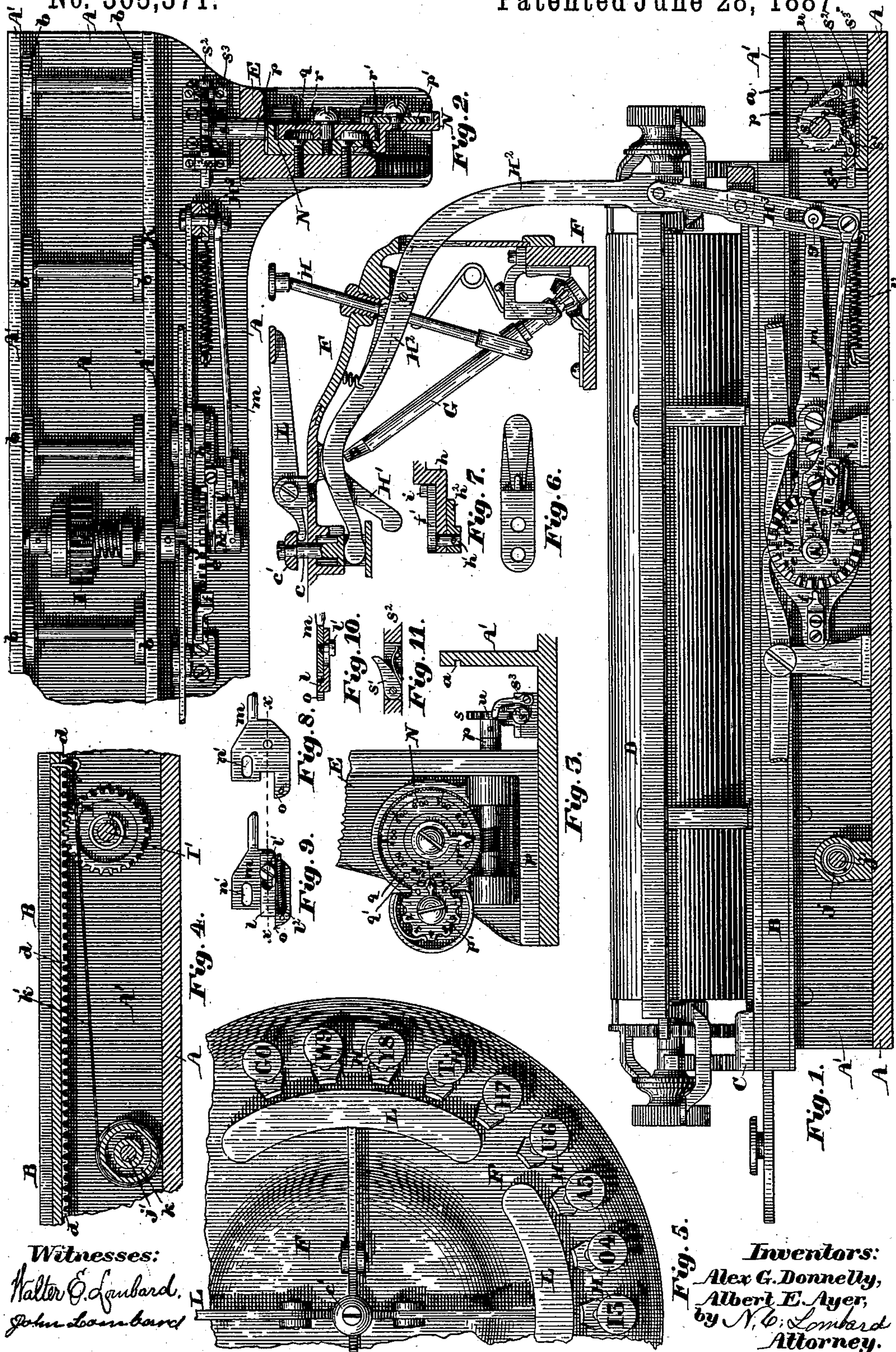


(No Model.)

A. G. DONNELLY & A. E. AYER.  
TYPE WRITING MACHINE.

No. 365,371.

Patented June 28, 1887.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 365,371, dated June 28, 1887.

Application filed April 16, 1886. Serial No. 199,056. (No model.)

*To all whom it may concern:*

Be it known that we, ALEX. G. DONNELLY, of the city, county, and State of New York, and ALBERT E. AYER, of Boston, in the county of Suffolk and State of Massachusetts, have invented, jointly, certain new and useful Improvements in Type - Writing Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

Our invention relates to type-writing machines, and especially to the mechanism for imparting to the paper-carrying roll or bed an intermittent step-by-step motion in the direction of the length of said roll, and to an arrangement of mechanism for registering the number of words written; and it consists in certain novel features of construction, arrangement, and combination of parts, which will be best understood by reference to the description of the drawings, and to the claims to be hereinafter given.

Figure 1 of the drawings is a front elevation of the paper-roll, its carriages, and the mechanism for feeding the carriages endwise, with the bed and a portion of the casing of the head in section. Fig. 2 is a plan of a portion of the bed with the carriage-feeding mechanism and the registering mechanism mounted thereon, and showing one of the head supporting brackets and the casing or frame of the registering device cut in section. Fig. 3 is a vertical transverse section through a portion of the bed, and showing the registering apparatus in elevation. Fig. 4 is a vertical longitudinal section through a portion of the bed, the pinion-shaft, the spring-actuated drum, and the lower carriage. Fig. 5 is a plan of a portion of the head with the type-keys and space-keys in their proper relation to each other. Fig. 6 is a rear elevation of one of the escapement-dogs and its supporting stand. Fig. 7 is a plan of the same dog and its shaft, with the stand in which said shaft is mounted and the arm upon its front end cut in section. Fig. 8 is an elevation of the plate which carries the yielding stop for limiting the downward movement of the escapement-dog when it is desired to move the paper-roll only one letter-space. Fig. 9 is a similar elevation of the same plate with said stop and its spring mounted thereon.

Fig. 10 is a section on line *xx* of Fig. 9, and Fig. 11 is a vertical longitudinal section of a portion of the pawl-carrying bar for operating the registering mechanism, with the pawl shown in elevation.

Our present invention is an improvement upon the machine described in an application of Alex. G. Donnelly, filed January 25, 1886, and numbered 189,563, and has for its object a reduction in the number of blows to be struck by the operator in printing or writing a given sentence, to the extent of one blow for each word, whereby a saving of about one-seventh of the time required to do a given job is made, as compared with the machines now in use; and a further object is to register the number of words written.

The general construction of the machine is the same as shown and described in the application above referred to, except as will hereinafter be pointed out, and therefore it has been thought unnecessary to make complete drawings of the machine, but to refer to said application for any information as to the complete machine beyond what is shown in the drawings accompanying and forming a part of this application.

In the drawings, A is the bed of the machine, provided with the two upwardly-projecting ribs, A' A'.

B is the lower carriage, resting upon the trucks *b b* and guided by the grooves *a*. C is the upper carriage; D, the paper-carrying roll.

E represents a portion of one of the goose-neck-like stands for supporting the casing F of the head of the machine.

G represents one of the type-bars; H, one of the type-bar-operating keys.

H' is one of a series of radiating levers, one end of each of which is connected to the stem of a key, H, and its other end in position to act upon the central spindle, *c*, to move it upward when said key is depressed; and H<sup>2</sup> is a lever pivoted to the casing F of the head of the machine, and engaging at its inner end with the spindle *c* and at its outer end with the lever H<sup>3</sup>, all the foregoing parts being constructed, arranged, and operating substantially as described in said prior application.

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The carriage B is provided upon its under side with a rack, *d*, the teeth of which engage with the teeth of the gear-wheel I, mounted upon and operated by the shaft I', all constructed and operating substantially as described in said prior application.

Upon the front end of the shaft I' is firmly secured the disk or escapement-wheel J, having formed upon its front face a series of radiating grooves or notches, *e*, with which the escapement-dogs *f* and *f'* alternately engage as the bar K is moved to and fro horizontally by the action of the lever H<sup>3</sup> thereon, to which said bar K is pivoted at *g*, its opposite end being supported and guided in its movements by the shaft I', which passes through a slot in the wider part of said bar. The dog *f* is firmly bolted to the bar K, and has its inner end shaped and arranged to enter and fill a groove, *e*, in the escapement-wheel J when the bar K is moved to the right. The bar K also has firmly bolted thereto, upon the opposite side of the escapement-wheel J from the dog *f*, the stand *h*, in the inner end of which is mounted the short horizontal shaft *h'*, carrying at its inner end the dog *f'*, and upon its outer or front end the arm *h*<sup>2</sup>, as shown in Figs. 1, 2, 6, and 7.

The dog *f'* has formed upon the rear side of its movable end the tooth *i*, which engages with and fills a groove *e* in the escapement-wheel J as the bar K is moved to the left. The stand *h* has set in its front side near its upper edge the stop-pin *i'*, so arranged as to engage with the free end of the arm *h*<sup>2</sup>, to limit the upward movement of said arm and the dog *f'* when the dog *f* is moved out of engagement with the groove *e* in the escapement-wheel J, and said wheel is moved about its axis by the action of the spring *j* on the shaft *j'* upon the drum *k* and the cord *k'*.

When the bar K is moved to the right, the dog *f* engages with a groove in the escapement to lock it, and the dog *f'* is disengaged therefrom by the same movement; and the instant that the tooth *i* of said dog *f'* is free from the escapement-wheel the free end of said dog and the arm *h*<sup>2</sup> drop until their descent is arrested by the arm *h*<sup>2</sup> coming in contact with the stop-bar *l*, mounted, by means of the screw *l'* and a slot in said bar, upon the broad plate-like inner end of the rod *m*, the outer end of which is pivoted to the lower end of the lever H<sup>3</sup>, and its inner end has a bearing upon the screw-stud *n*, which passes through the slot *n'*, formed in said plate-like inner end, and screws into the stand *h*, as shown in Figs. 1 and 2.

The stop *l* is held in a position with its left-hand end projecting beyond the end of the upper portion of the plate-like portion of the rod *m* by the spring *l'*, and is located in such a position below the arm *h*<sup>2</sup> that the dog *f'* will drop a distance just equal to the distance between the centers of two grooves *e*, which distance must be just sufficient to permit the

carriage and paper-carrying roll to move endwise a distance equal to the desired space-feed.

It will be seen upon inspection of Fig. 1 that the rod *m* is pivoted to the lever H<sup>3</sup> at a greater distance from the fulcrum of said lever than the bar K, and as a consequence said rod *m* moves a greater distance than the bar K when said lever H<sup>3</sup> is vibrated; and it will also be observed that the lever H<sup>3</sup> is vibrated a uniform distance by every movement of a type-key, which distance is just sufficient to operate the escapement and permit a movement of the paper-carrying roll equal to the desired distance between two letters in the same word.

To insure uniformity in the letter-spacing, the stop *l* must project to the left of the end of the upper portion of the plate-like part of the rod *m* a sufficient distance to be in a position to intercept the downward movement of the arm *h*<sup>2</sup> when the lower end of the lever H<sup>3</sup> is at the extreme of its movement toward the right hand when operated by the letter-key.

It is well known that at the end of each word the paper-carrying rolls of type-writing machines must have an extra movement imparted thereto before commencing another word, in order to properly separate the words, and that this is accomplished by an extra key, which is arranged to operate the space-feed mechanism without operating a type-bar, the operating of which key occupies the same amount of time that is required to print a letter; and as the words in ordinary composition will average only about six letters in length, it follows that if the extra time employed in operating the space-key for spacing the words can be saved a gain of one-seventh of the time required to do a given job will be made. To accomplish this desirable result we so construct our escapement-wheel and dogs, and so connect the levers by which said dogs are operated with the type-bar-operating keys and the word-space keys, that said levers and escapement-dogs may be moved a greater distance by the word-space key than they can by the type-bar operating keys. This is accomplished by the peculiar construction of the escapement-wheel and dogs, and the fact that the levers H<sup>3</sup> are not connected to the spindle *c*, but act upon its lower end to lift it, and present no obstruction to a greater lift of said spindle by the action thereon of the word-space key whenever desired.

To obtain the saving above referred to it is only necessary to arrange the word-space key so that it can be struck at the same time that the type-key for printing the last letter in the word is struck. To this end we arrange a series of word-space keys or levers, *L*, around the upper end of the spindle *c*, so as to radiate therefrom with their inner ends in positions to engage with the head or collar *c'* of said spindle, and provided at their outer ends with a segmental plate or pad arranged in near proximity to the circularly-arranged series of let-



ter-keys, so that whenever either one of said letter-keys is depressed by the operator's finger one of said word space keys L may be depressed at the same instant by another finger, the consequence of which will be that the lever  $H^3$  will have its lower end moved toward the right a greater distance than when acted upon only by depressing the letter key, and the stop  $l$  will be moved to the right a sufficiently greater distance than the arm  $h^2$  to remove it from beneath said arm, and thus permit the free end of said arm to fall till it is arrested by the projecting lug  $o$  on the inner end of the rod  $m$  and the dog  $f'$  is in a position for its tooth  $i$  to engage with the second groove,  $e$ , of the wheel J, from the groove with which it was last in engagement, when said dog is again moved toward the left, and thus rendering it possible for the spring  $j'$ , acting through the drum  $k$  and cord  $k'$ , to move the carriages B and C and the paper-carrying roll D a distance toward the left equal to twice the distance it is moved when only the letter-key is operated.

To the stand E is secured the casing or frame N of a registering mechanism consisting of the worm  $p$ , the worm-wheel  $q$ , provided with the pin  $q'$ , and the toothed wheel  $p'$ , and the stationary index-fingers  $r$  and  $r'$ , the wheel  $q$  having on its front face a scale graduated from 1 to 1,000, and the wheel  $p'$  having a similar scale graduated from 1 to 10. The worm-shaft  $p$  has secured upon its rear end the ratchet-wheel  $s$ , to which an intermittent rotary motion is imparted by the action of the pawl  $s'$ , pivoted in a slot in the bar  $s^2$ , mounted in bearings in the stand  $s^3$ , as shown in Figs. 1, 2, 3, and 11.

The bar  $s^2$  is provided at its outer end with a head or shoulder to limit its inward movement, and has fitted thereto the spring  $t$ , the tension of which serves to move said bar inward, or to keep its head or shoulder in contact with its outer bearing, as shown in Fig. 1.

The bar  $s^2$  is located in the same vertical plane as that in which the lever  $H^3$  vibrates, and the normal position of its inner end is such that the lever  $H^3$  will not strike said bar when only a letter-key is depressed; but when either of the word-space keys is depressed said bar and its pawl will be moved outward, so as to turn the ratchet-wheel  $s$  and the worm-shaft  $p$  about their axes a distance equal to one or more of the teeth on said wheel.

A stop-pawl,  $u$ , is pivoted to the stand  $s^3$ , and engages with the teeth of the wheel  $s$ , to prevent it being turned backward when the bar  $s^2$  is moved inward by the action of the spring  $t$ .

The word space keys may be arranged with their segmental pads inside the circular series of type-keys, as shown, or said segmental pads may be outside of said type-keys, if desired, without affecting the principles of our invention.

To insure the falling of the free end of the

dog  $f'$  when it is disengaged from the escapement-wheel, a spring presses upon its upper side, as shown in Fig. 2.

The lower end of the lever  $H^3$  is moved toward the escapement-wheel, when the fingers are removed from the keys, by the spring  $v$ . (Shown in Figs. 1 and 2.)

What we claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination of the escapement-wheel J, provided with the radial grooves  $e$ , the reciprocating bar K, provided with the stand  $h$ , and the dog  $f$ , firmly secured thereto upon opposite sides of said wheel, the pivoted and vibrating dog  $f'$ , arranged to engage with said wheel upon the side of its axis opposite to the dog  $f$ , the stop  $i'$ , for limiting the upward movement of the dog  $f'$  about its axis, and the stops  $l$  and  $o$ , constructed and arranged to interchangeably limit the downward movement of said dog  $f$ , according as a short or long space-feed is required.

2. The combination of the escapement-wheel J, provided with the radial grooves  $e$ , the reciprocating bar K, provided with the stand  $h$ , and the dog  $f$ , firmly secured thereto upon opposite sides of the axis of said wheel, the pivoted and vibrating dog  $f'$ , arranged to engage with said wheel upon the side of its axis opposite to the dog  $f$ , the stop  $i'$ , for limiting the upward movement of the dog  $f'$ , and the stop  $l$ , for limiting the downward movement of said dog  $f'$ , substantially as described.

3. The combination of the type-bar G, the type-key H, the lever  $H'$ , the spindle  $c$ , the word-space key L, the levers  $H^2$  and  $H^3$ , the bar K, provided with the stand  $h$ , and the dog  $f$ , firmly secured thereto, the escapement-wheel J, the vibrating dog  $f'$ , the stop-pin  $i'$ , the rod  $m$ , and the stops  $l$  and  $o$ , all arranged and adapted to operate substantially as described.

4. In a type-writing machine, the combination of a paper-carrying roll mounted upon a reciprocating carriage, a spring for moving said carriage in one direction, an escapement for stopping and releasing said carriage, a register dial and index, a ratchet and pawl for intermittently operating said register, a series of type-bar-operating keys, a word-space key, and a pivoted lever constructed and arranged substantially as set forth, to be vibrated a given distance when the type-key is depressed and a greater distance when the word-space key is depressed, and to act upon and impart motion to the register, operating only when said lever is moved its greatest distance.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, on this 9th day of March, A. D. 1886.

ALEX. G. DONNELLY.  
ALBERT E. AYER.

Witnesses:

N. C. LOMBARD,  
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