(No Model.) 3 Sheets—Sheet 1.

W. A. HALL.

SPACING ESCAPEMENT FOR TYPE WRITING MACHINES.

No. 342,352. Patented May 25, 1886.

Fig. 1.

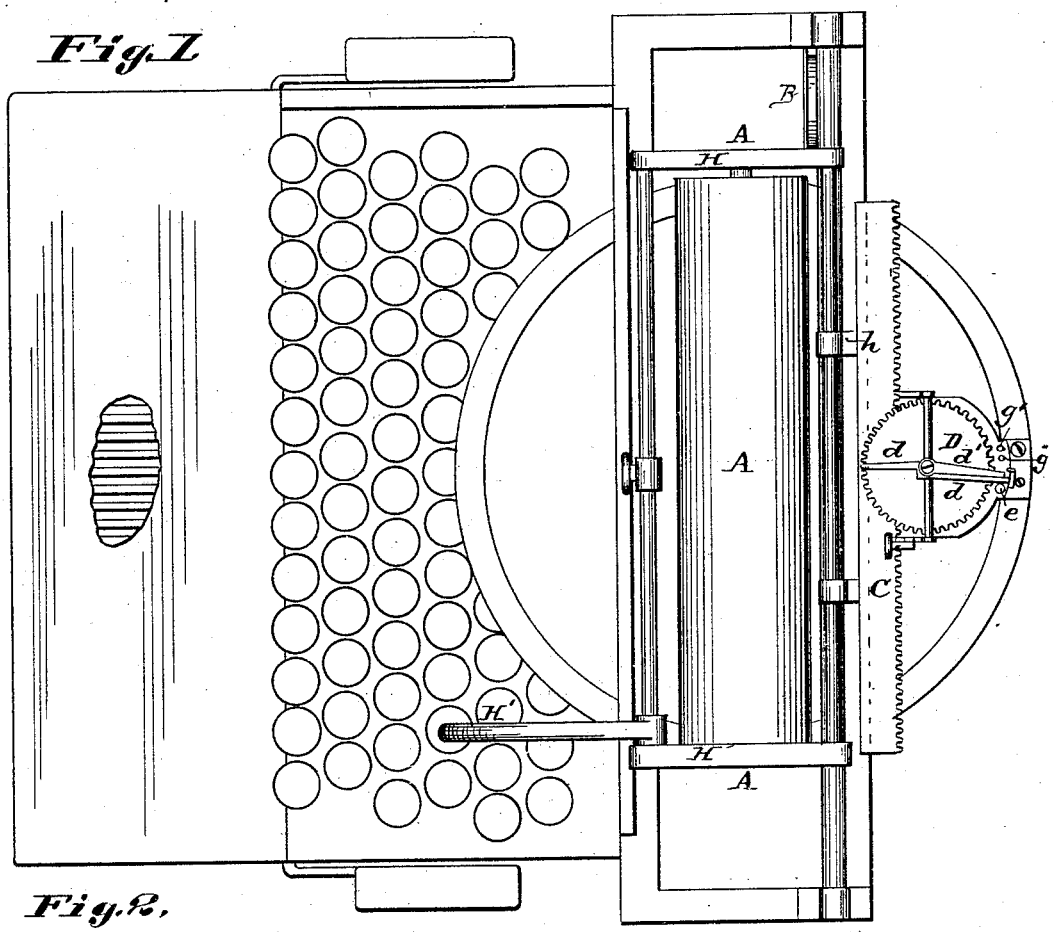


Fig. 2.

Fig. 3.

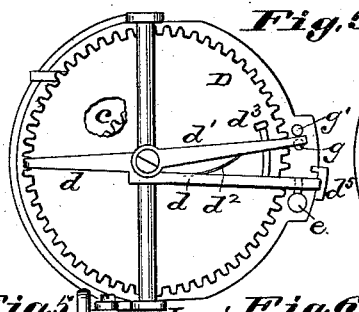


Fig. 4.

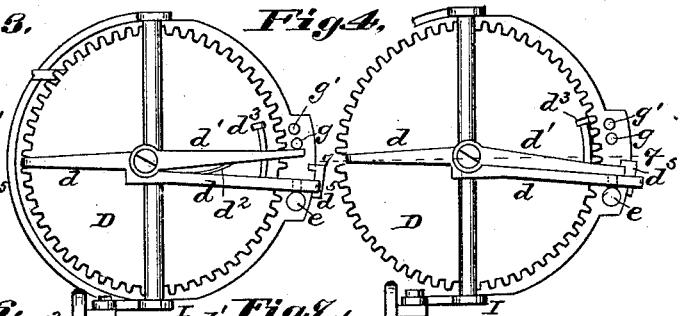


Fig. 5.

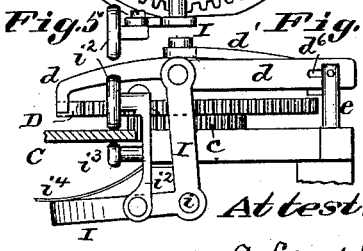


Fig. 6.

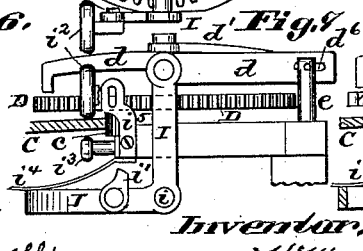
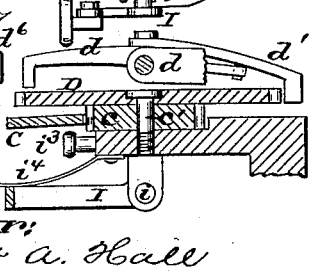


Fig. 7.



Attest.

A. Campbell.

A. F. Noble

Inventor:

Wm. A. Hall

per Robert Burns

attorney.

(No Model.) 3 Sheets—Sheet 2.

W. A. HALL.

SPACING ESCAPEMENT FOR TYPE WRITING MACHINES.

No. 342,352. Patented May 25, 1886.

Fig. 8.

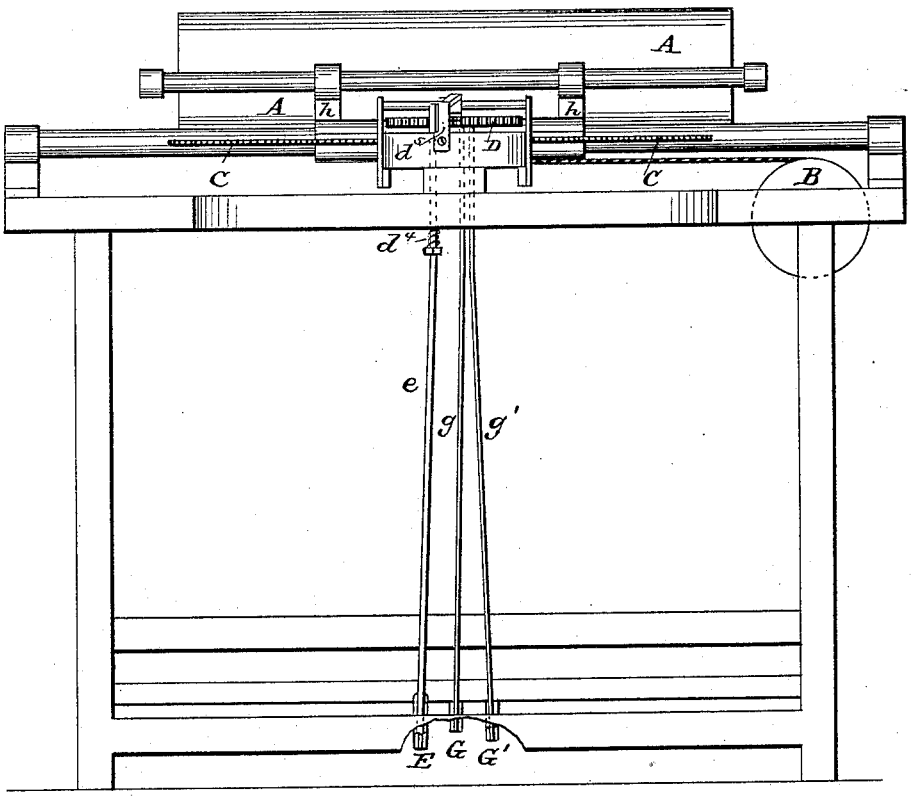


Fig. 9.

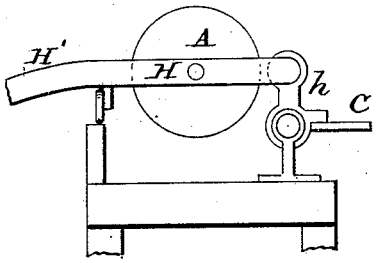
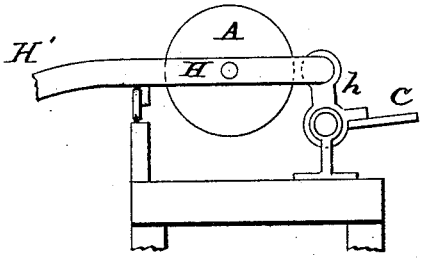


Fig. 10.



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(No Model.) 3 Sheets—Sheet 3.

W. A. HALL.

SPACING ESCAPEMENT FOR TYPE WRITING MACHINES.

No. 342,352. Patented May 25, 1886.

Fig. 11.

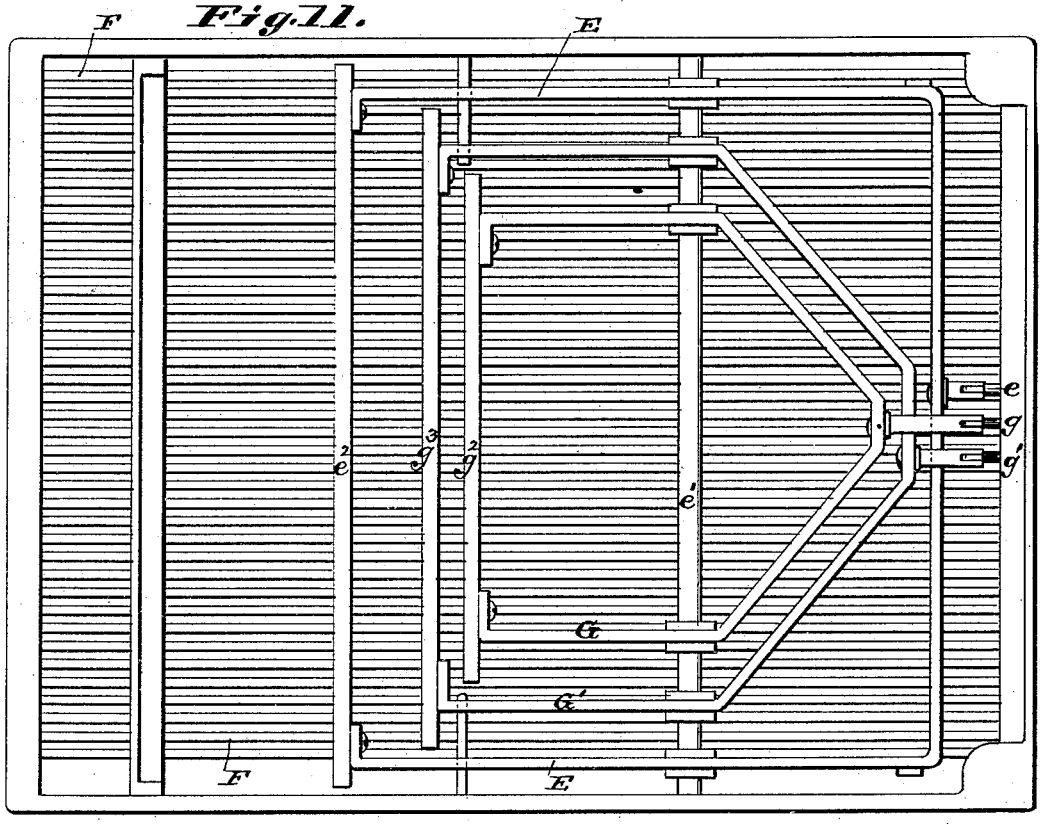


Fig. 12.

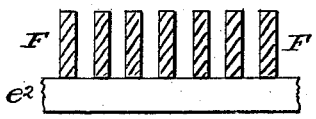


Fig. 14.

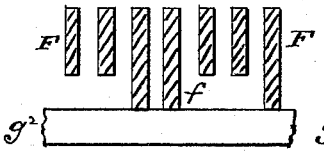


Fig. 16

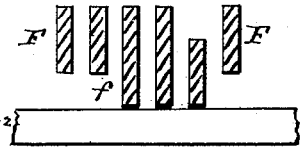


Fig. 13.

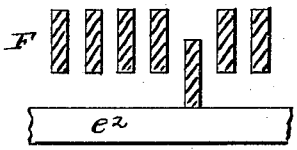


Fig. 15

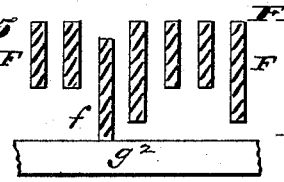


Fig. 17

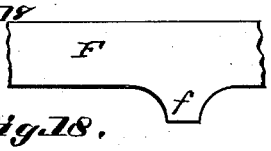
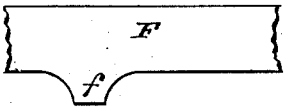


Fig. 18.



Attest:

A. Campbell.

A. F. Noble

Inventor:

Wm A. Hall

per Robert Burns

attorney.

UNITED STATES PATENT OFFICE.

WILLIAM A. HALL, OF ST. LOUIS, MISSOURI.

SPACING-ESCAPEMENT FOR TYPE-WRITING MACHINES.

SPECIFICATION forming part of Letters Patent No. 342,352, dated May 25, 1886.

Application filed December 29, 1883. Serial No. 115,975. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. HALL, a citizen of the United States, and a resident of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Spacing-Escapements for Type-Writing Machines, of which the following is a specification.

This invention relates to improvements in type-writing machines, and has for its objects, first, to provide means for automatically varying the adjustment of the paper-carriage after each impression, so that space will be given to each letter or symbol in proportion to its width; and, second, to afford means whereby the paper-carriage can be thrown out of gear and adjusted accurately to the point desired. I attain such objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a top view illustrating my improvement adapted to the ordinary caligraphic type-writer. Fig. 2 is a detail top view of my improved spacing or escapement mechanism, showing the parts in position for effecting an adjustment of two spaces. Fig. 3 is a similar view showing the parts in position for effecting an adjustment of one space. Fig. 4 is a similar view showing the operating-pawls of the spacing mechanism moved backward out of engagement to permit of the adjustment of the paper-carriage forward or backward by hand. Figs. 5 and 6 are side views of the same, showing, respectively, the escapement-lever and pawl in and out of engagement. Fig. 7 is a vertical section of same at line 7 7, Fig. 4. Fig. 8 is a rear elevation of the machine with my improvements applied. Figs. 9 and 10 are detail end views of the paper-carriage, illustrating the two positions of the same in gear to be automatically operated and out of gear to be adjusted forward and backward by hand. Fig. 11 is a bottom view of the machine, illustrating the operating-levers and cross-bars of the spacing mechanism and their arrangement in relation to the depressable key-levers. Figs. 12 and 13 are detail sections showing the cross-bar that imparts movement to the releasing-rod of the spacing mechanism, and is employed to permit of a "treble distance" movement being imparted to the paper-carriage, the two views showing the parts in a raised and depressed position, respectively. Figs. 14, 15, and 16 are similar views showing the cross-bar that imparts movement to the spacing mechanism, so as to attain a "double-distance" movement of the paper-carriage. Figs. 17 and 18 are detail side views of a portion of the depressible key-levers.

Similar letters of reference indicate like parts in the different views.

While in the accompanying drawings I have shown my improvement adapted to the well-known Remington type-writer or caligraph, yet I do not limit myself to such application, as it can be readily modified and adapted to any form of type-writer in which a progressive step-by-step movement is imparted to the paper-carriage.

Referring to the drawings, A represents the paper-carriage having a step-by-step motion across the impingement-point of the type-levers, such movement being effected in the construction shown by means of a spring-barrel, B, (see Fig. 8,) the tendency of which is to draw the carriage to the right.

C is a toothed rack upon the carriage-frame, which gears with a pinion, *c*, upon a vertical shaft, *c'*, journaled on a bracket attached to the main frame of the machine. Upon this shaft *c'* is also secured the notched escapement-wheel D, as indicated in Fig. 7.

d is a rocking escapement-lever pivoted centrally over the axis of the escapement-wheel D, and carrying a hinged supplementary pawl, *d'*, capable of a limited circular movement in relation to the main pawl *d*, for the purpose hereinafter stated. This escapement-lever is rocked so as to disengage the escapement-wheel D by means of a vertically-moving rod, *e*, connected to one end of a lever, E, pivoted at *e'*, underneath the key-levers F. The other end of such lever E carries a cross-bar, e^2, common to all the key-levers F, so that a movement of any one of such key-levers will cause a movement of the rod *e* to lift the rear end of the escapement-lever *d* upward, so as to disengage the supplemental pawl *d'* from engagement with the rear side or portion of the escapement-wheel D and leave it free to move around in a circular path from the position

shown in Fig. 4 into that shown in either Figs. 2 or 3, such movement of the supplemental pawl d' being effected by means of a spring, d^2, and its movement is confined by the stop-pin d^3, as indicated in Fig. 2.

d^4 is a spring for returning the parts to their original depressed position after being raised.

The above-mentioned movement of the pawl d' is effected while it is raised out of engagement with the escapement-wheel D, (such wheel being held from rotation by the front end of the escapement-lever d engaging the front portion of said escapement-wheel,) and its movement in a circular path to engage a greater or less number of teeth of the escapement-wheel (in order to permit of a greater or less movement of the paper-carriage and compensate for varying widths of the type, letters, &c.) is automatically regulated by the following mechanism:

$g\,g'$ are vertically-moving rods, which, when raised, are brought into the path of the pawl d', to limit its circular movement, and consequently the number of teeth of the escapement-wheel that it engages, the rod g limiting its movement to one tooth, and a consequent movement of the paper-carriage to a single distance or space. Similarly the rod g' will limit its movement to two teeth of the escapement-wheel, with a consequent movement of the paper-carriage to a double distance or space, while, if both rods $g\,g'$ are allowed to remain depressed, the full movement of such pawl to its fixed stop d^3 will be permitted, with a consequent movement of the paper-carriage to a treble distance or space. Such movement is effected by the spring-drum B, which in moving the paper carriage draws the pawl d' back against the lever d or a suitable stop upon the supporting-bracket of the escapement-wheel.

In the drawings I have shown two rods, $g\,g'$, to effect the different spacings ordinarily required, yet in some cases a less or greater number of said rods may be employed without departing from the spirit of my invention. Movement is imparted to the rods $g\,g'$ by levers G G′, pivoted at e' and having cross-bars $g^2\,g^3$, common to the key-levers of the letters or symbols that require the spacing attained by the use of such rods, the arrangement, for example, being such that both rods $g\,g'$ will remain inoperative in printing the letters m w of the lower case and all other letters or punctuation-marks requiring a like treble-distance movement of the paper-carriage. The rod g' will be brought into action in printing the letters $a\,b\,c$, &c., of the lower case and such other letters or punctuation-marks requiring a like double-distance movement of the paper-carriage, and the rod g will be brought into action in printing the letters $i\,l$, &c., of the lower case and such other letters and punctuation-marks requiring a "single-distance" movement of the paper-carriage.

My preferred manner of making an operative connection between the key-levers F and the cross-bars $g^2\,g^3$ is by forming the desired key-levers with projecting teats or lugs f over the cross-bar that it is desired to operate, the remaining key-levers having such teat omitted, so that in their operation they will not affect such cross-bar. (See Figs. 14, 15, 16, 17, and 18.)

In order to permit of the adjustment by hand of the paper-carriage to any desired point I support the same upon a swinging frame, H, so as to be capable of a forward movement upon the hinge-link h, that carries the toothed rack C, a handle, H′, being provided for convenience in moving the carriage. With this construction a rocking motion is communicated to the rack C, which is in turn communicated to the escapement-lever d, to move it backward out of engagement with the escapement-wheel D, to allow of a free and easy movement of the paper-carriage backward or forward by hand, such disengagement being effected by the following means: I is a bell-crank frame pivoted at i and carrying on its vertical arm the escapement-lever $d\,d'$, its horizontal arm being connected to a vertically-moving bar i', that has bearing through a friction-roller, i^2, upon the top of the rack C, as clearly indicated in Figs. 5 and 6. From this construction it will be seen that on the paper-carriage being drawn forward such movement will impart a backward disengaging movement to the escapement-lever d, and at the same time engage the pawl d' in the holding-hook d^5 upon the supporting-bracket, to prevent any accidental movement of same during the time occupied in adjusting the paper-carriage by hand.

The connection between the rod e and the escapement-lever d is by means of an elongated slot, d^6, as shown in Figs. 5 and 6, to permit of the backward disengaging movement of such lever taking place.

i^3 is an anti-friction roller or support for the rack C when it is in its normal position.

i^4 is a spring for returning the frame I to its original position.

i^5 is a slotted guide-frame for the bar i', to guide the same in its vertical movement.

I do not herein claim in a type-writing machine a letter-space ratchet pivoted so it may vibrate in the same plane with another letter-space ratchet when moving in one direction and parallel to the plane of the other when moving in the opposite direction, in combination with one or more slide-stops; nor do I claim the combination, with key-levers, space-bar, and stiff and limber letter-space ratchets, one or more vibrating stop-bars, which communicate motion to the slide-stops for altering the length of the arc of vibration of the limber space-ratchet; neither do I claim the combination, with the rack of a type-writing machine, of stiff and limber letter-space ratchets, the limber ratchet having a prolongation, a removable stop or finger, printing-keys having protuberances, and a cross-bar lying under the keys and connected to the stops; but,

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a type-writer, the combination of a paper-carriage, an escapement-wheel geared to said carriage, an escapement-lever pivoted to vibrate in a plane at right angles to the plane of rotation of the escapement-wheel, a supplemental spring-pawl parallel with the escapement-wheel and pivoted to vibrate in the same plane therewith, a fixed stop, and an intermediate movable stop for limiting the vibration of the supplemental spring-pawl, substantially as and for the purposes specified.

2. In a type-writer, the combination, with the paper-carriage A, of the escapement-wheel D, geared thereto, the rocking escapement-lever *d*, the supplemental pawl *d'*, having a circular movement at right angles to the lever *d*, one or more stop-rods, *g g'*, and means, substantially as described, for projecting said rods forward into the path of the pawl by depression of the key-levers, substantially as shown and described.

3. In a type-writer, the combination, with the escapement-wheel D, of the rocking escapement-lever *d*, pivoted above the said wheel, the supplemental pawl *d'*, having a circular movement at right angles to the lever *d*, the stop pin d^3, and one or more vertically-moving stop-rods, *g g'*, intermediate between the lever *d* and stop-pin d^3, and operating connections, substantially as described, between said rods and the key-levers, as and for the purposes set forth.

4. In a type-writer, the combination, with the key-levers, of the escapement-wheel D and its escapement-lever *d*, having a dependent rod, *e*, and cross-bar e^2, common to all the key-levers, the supplemental laterally-swinging pawl *d*, one or more vertically-moving stop rods, *g g'*, and cross-bars g^2 g^3 for said stop-rods, arranged below the key-levers, teats or lugs projecting downwardly upon the appropriate cross-bar from those levers whose type require a limited spacing, as and for the purposes set forth.

5. In a type-writer, the combination, with the paper-carriage A and rack C, of the escapement-wheel D, escapement-lever *d*, journaled in a bell-crank frame, I, and the vertically-moving bar *i'*, the parts being arranged substantially as shown, whereby, upon said carriage being pulled forward, the said lever *d* will be disengaged from the escapement-wheel D, and a forward and backward adjustment of the paper-carriage by hand permitted, as and for the purposes set forth.

6. In a type-writer, the combination of the escapement-wheel D, the escapement-lever *d*, journaled in a pivoted frame, I, the rack C, and paper-carriage A, supported in a swinging frame, H, the parts being connected together substantially as described, so that the drawing forward of the carriage will push the lever *d* out of engagement with the escapement-wheel D and permit of the forward and backward adjustment of the paper-carriage, as and for the purposes set forth.

7. The combination, in a type-writer, of the escapement-wheel D, lever *d*, pivoted frame I, and connecting-bar *i'*, with the paper-carriage A, swinging frame H, and hinge-link *h*, carrying the rack C, essentially as set forth.

8. In a type-writer, the combination of the escapement-wheel D, escapement-lever *d*, supplemental pawl *d'*, hook d^5, pivoted frame I, and connecting-bar *i'*, with the paper-carriage A, swinging frame H, and hinge link *h*, carrying the rack C, as and for the purposes set forth.

In testimony whereof witness my hand this 21st day of December, 1883, at Chicago, State of Illinois.

WM. A. HALL.

In presence of—
ROBERT BURNS,
GEO. F. DEXTER.