H. BATES.

TYPEWRITING MACHINE.

APPLICATION FILED JULY 19, 1919.

1,415,138.

Patented May 9, 1922.

3 SHEETS—SHEET 1.

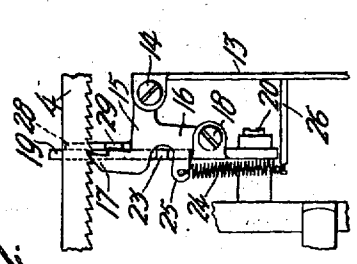


Fig.2.

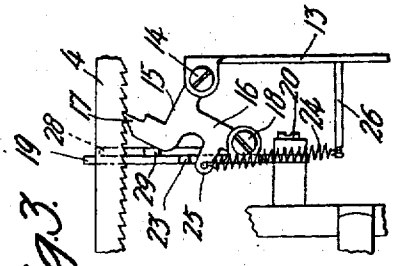


Fig.3.

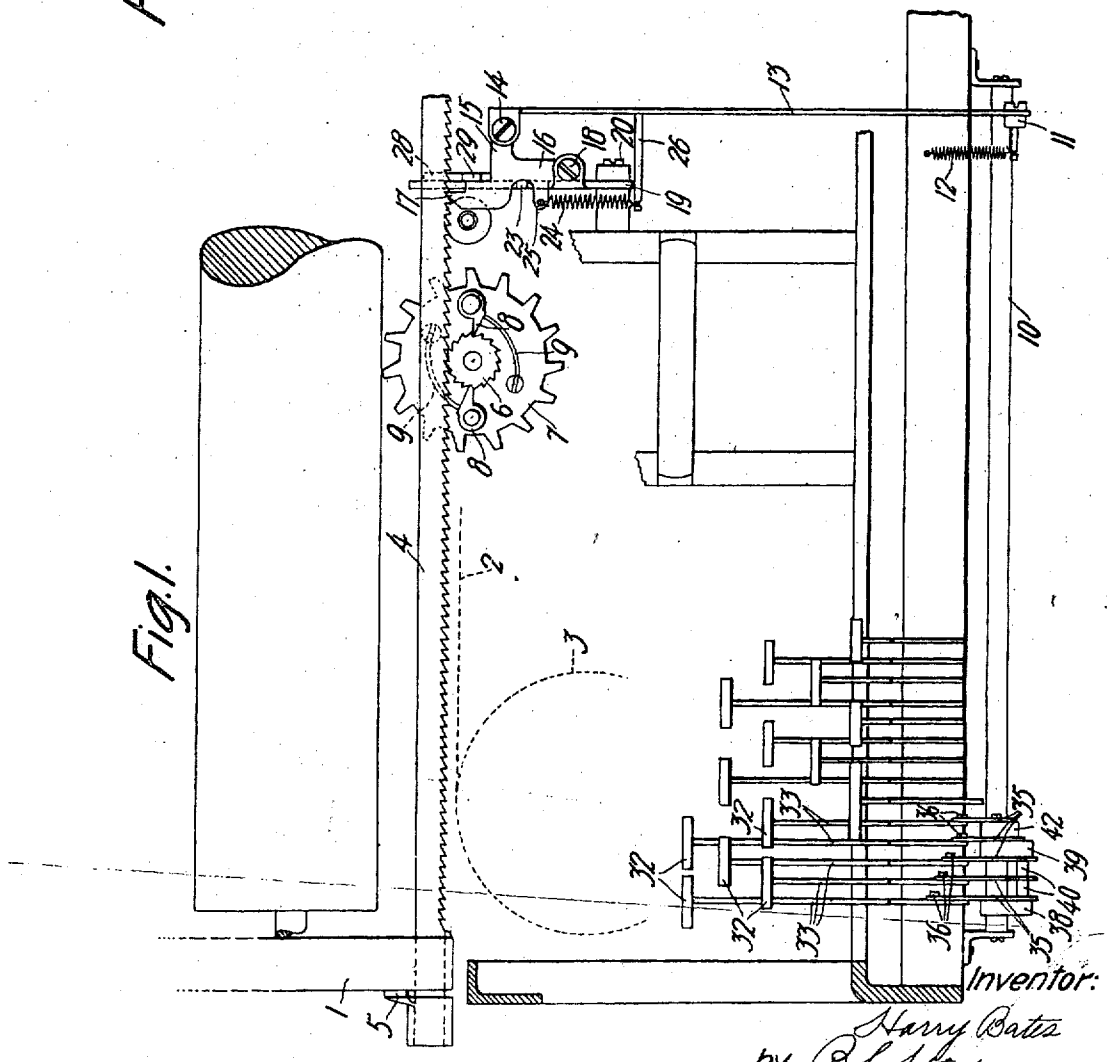


Fig.1.

Inventor:
Harry Bates
by B. E. Stuckney
Attorney

H. BATES.

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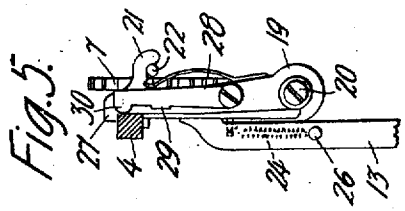


Fig. 5.

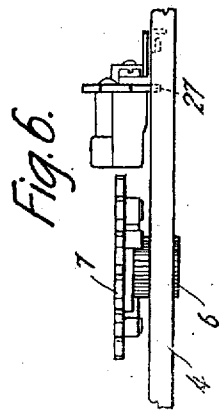


Fig. 6.

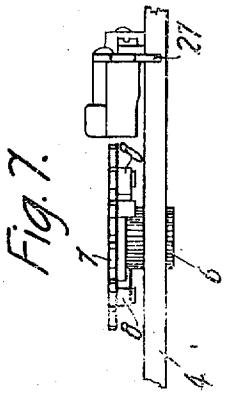


Fig. 7.

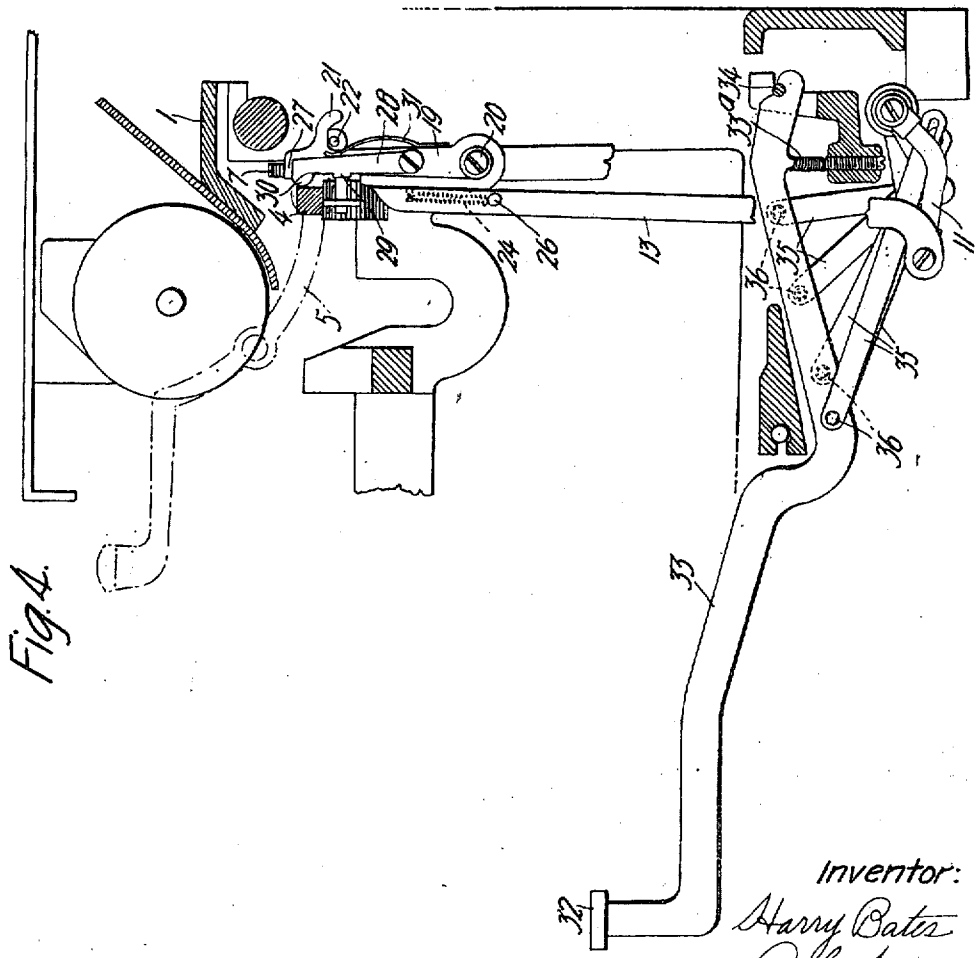


Fig. 4.

Inventor:
Harry Bates
by B. C. Stickney
Attorney

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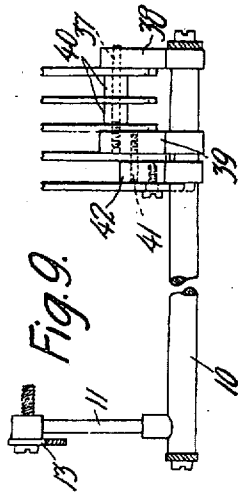


Fig. 9.

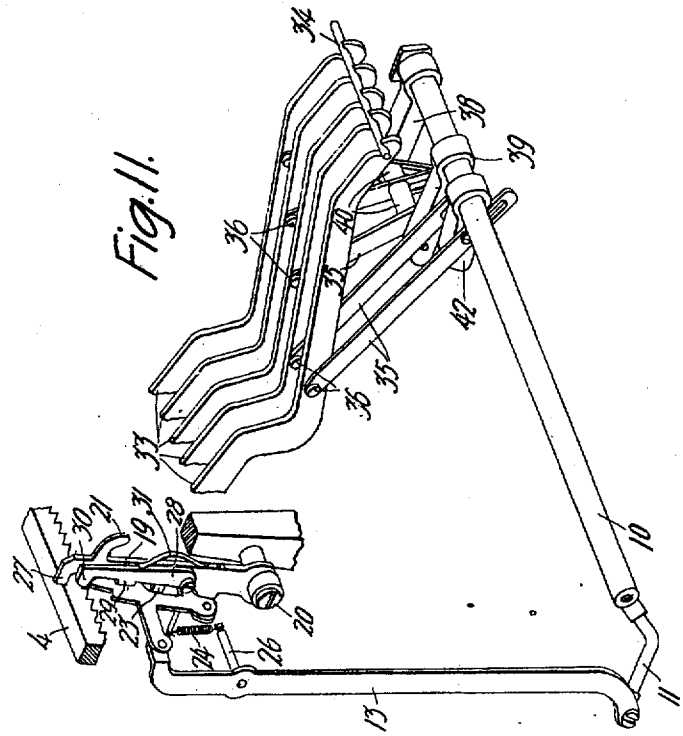


Fig. 11.

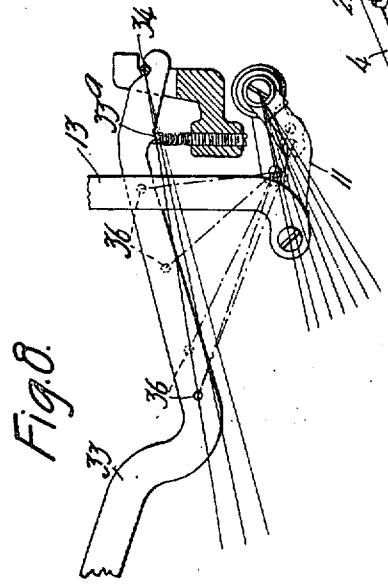


Fig. 8.

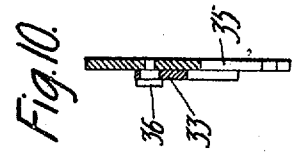


Fig. 10.

Inventor:
Harry Bates
by B. B. Stickney
Attorney.

UNITED STATES PATENT OFFICE.

HARRY BATES, OF NEW YORK, N. Y., ASSIGNOR TO UNDERWOOD TYPEWRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

TYPEWRITING MACHINE.

1,415,138. Specification of Letters Patent. Patented May 9, 1922.

Application filed July 19, 1919. Serial No. 312,074.

To all whom it may concern:

Be it known that I, HARRY BATES, a citizen of the United States, residing in New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Typewriting Machines, of which the following is a specification.

This invention relates to mechanism for back-spacing typewriter carriages, and is illustrated as applied to the back-spacing mechanism of an Underwood typewriting machine, an example of which is found in the patent to Helmond, No. 930,962, granted August 10, 1909.

In such machines, provision is made of a back-spacing key mounted on an arm or key-lever fixed at one end to a shaft in the lower rear part of the machine. Upon depression of the back-spacing key, a second arm, mounted on the shaft, will draw down a link connected to the usual back-spacing pawl to swing a carrier for the pawl into position to cause engagement of the pawl with the usual escapement rack, and then to swing the back-space pawl about its pivot, and thereby return the rack and the typewriter carriage through one letter-space. A stop on said carrier limits the movement of the pawl in the direction of letter-feed movement, and, by other means, the movement of the pawl in the opposite or back-spacing direction is limited. Upon a return movement, the back-spacing pawl is withdrawn from the rack and returned to its normal position on the carrier.

According to the present invention, the carriage is back-spaced one letter-space or a plurality of letter-spaces by a single depression of the appropriate one of a plurality of back-spacing keys. The back-spacing is done by the usual back-spacing pawl, but, since the back-spacing movement may be for more than a single letter-space, the usual means for limiting the back-spacing movement of the pawl is omitted. The back-spacing keys are arranged at one side of the keyboard, and are carried by key-levers pivoted at the rear of the machine on the usual pivot for the character-key-levers. Provision is made of suitable connections between the shaft for actuating the back-spacing pawl and the levers, whereby an actuation of the selected key will give an appropriate movement of said pawl.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a fragmentary front view, showing the present invention applied to the Underwood typewriting machine, the parts being shown in normal positions.

Figure 2 is a fragmentary view, showing the position of the pawl after a back-spacing movement of one letter-space.

Figure 3 is a view similar to Figure 2, but showing the rack and the pawl in the positions assumed at the end of a back-spacing movement through five letter-spaces.

Figure 4 is a fragmentary side elevation, partly in section, showing the parts in normal positions.

Figure 5 is a fragmentary side elevation, showing the parts in the positions assumed when the dog has been swung into engagement with the rack.

Figure 6 is a plan view of some of the back-spacing devices in normal positions.

Figure 7 is a view similar to Figure 6, but showing the parts in the Figure 5 position.

Figure 8 is a diagrammatic side view with lines drawn from the axis of the key-lever pivot rod to indicate the amount of movement of each back-spacing key-lever to bring the back-spacing pawl into engagement with the rack and the position assumed by the back-spacing key-levers at the end of the back-spacing operations. Also lines drawn from the axis of the shaft, through which back-spacing is effected, indicate, from top to bottom, respectively, the normal position of the arm connected to the lower end of the pawl-actuating link, the position upon bringing the pawl into engagement with the rack, and the positions assumed at the end of one, two, three, four and five letter-space movements of the back-spacing pawl.

Figure 9 is a fragmentary plan view of the lower shaft with some of the parts associated therewith.

Figure 10 is a fragmentary view of the connection between a back-spacing lever and the corresponding slotted links, portions of the members being broken away to show the structure more clearly.

Figure 11 is a skeleton perspective view showing the novel structure.

The typewriter carriage 1 is urged in the direction of letter-feed by means of a strap 2 and spring drum 3, and movement in this

direction is controlled by means of the usual escapement mechanism comprising a rack 4, pivotally mounted on the carriage by means of arms 5, and the pinion 6, with which said rack is normally in engagement. Said pinion 6 has the usual one-way driving connection with the escapement wheel 7 by means of pawls 8 and springs 9, and the escapement wheel is controlled by the usual fast and loose dogs (not shown).

In order to effect back-spacing of the carriage, a rocking member shown as a shaft 10 is rocked to swing the arm 11 against the resistance of spring 12, and pull down a link 13, connected by a shouldered screw 14 to a laterally-projecting arm 15 of a back-spacing pawl 16 having a tooth 17 which is under certain conditions in engagement with rack 4. The back-spacing pawl 16 is pivoted by means of a shouldered screw 18 to a carrier 19, which is pivotally mounted on the frame of the machine by means of a shouldered screw 20. In order to limit the movement of the carrier 19, provision is made of a hook 21 thereon engaging a stud 22 on a fixed part of the frame. The back-spacing pawl is normally held in engagement with a lug 23 on carrier 19, by means of a spring 24, attached at its upper end to an offset portion 25 of the back-spacing pawl, and at its lower end to a pin 26 carried by link 13, and of sufficient length to extend to the left of screw 18, as shown in Figure 2. It will be seen that the tendency of spring 24 is to maintain the pawl in engagement with lug 23, and to hold link 13 in raised position.

Downward movement of link 13, due to the rocking of shaft 10, will act to swing the carrier 19 to its forward position, limited by engagement with the rack 4, or by means of hook 21 and stud 22, and a hook 27 at the upper end of said carrier will be brought into engagement with the top of rack 4, in order to prevent jumping of the rack during the back-spacing operation. The forward movement of the carrier 19 will bring the back-spacing pawl 16 into engagement with rack 4, and further movement of the link 13 will cause the back-spacing pawl 16 to be swung to the right against the resistance of spring 24, and back-spacing movement of the rack 4 and carriage 1 thus effected. Ordinarily, the tension of spring 24 is sufficient to prevent rocking of the back-spacing pawl 16 on its carrier 19 until the pawl is brought into engagement with the rack 4, but, to prevent any accidental movement of the pawl about its pivot, before engagement of the pawl with the rack, provision is made of a pawl-latch 28 pivotally supported on the carrier 19, so that a projection 29 thereon may pass to the right of the upper end of the pawl 16, as shown in Figure 2, and prevent movement of said pawl to the right. Upon movement, however, of the carrier 19 into its forward position, a rounded head 30 of pawl-latch 28 will engage the rear side of the rack, and during the remainder of the forward movement of the carrier, said pawl-latch will be rocked about its pivot against the action of a spring 31 to such an extent as to release the back-spacing-pawl. With the parts in the position assumed at this time, further movement of the link 13 will effect a back-spacing movement of said pawl 16.

During the return movement of shaft 10 to normal position, under the urging of spring 12, carrier 19 will be rocked to the rear to withdraw pawl 16 from engagement with the rack 4, and said pawl will be restored to its normal position on the carrier by means of spring 24 in connection with spring 12.

The mechanism so far described is the same in general as that disclosed in said patent to Helmond.

In order to prevent back lash of the escapement wheel, during the back-spacing operation, provision may be made of any suitable means such, for example, as that shown in said patent to Helmond.

In order to back-space the carriage different numbers of letter-spaces, provision is made of a plurality of back-spacing-keys 32, (five in the embodiment shown), and corresponding key-levers 33, pivoted at the rear of the machine on the usual pivot-rod 34 for the character-key-levers and normally held in raised position by means of restoring springs 33^a. It will be seen that the back-spacing-keys are arranged in the usual keyboard, and that the back-spacing-key-levers 33 are of the same general form as the character-key-levers, whereby simplicity of structure and economy of manufacture are obtained. In order to obtain connections between key-levers 33 and shaft 10 such that depression of the keys will back-space the carriage to different extents in accordance with the key depressed, (provision is made of thrust-links 35, pivoted to key-levers 33 at different distances from pivot-rod 34, by means of shouldered screws 36, the distances, from the pivot-rod 34, of the various shouldered screws 36 on the first three key-levers, from the left, being varied to determine the amount of rotation of shaft 10. At the other ends of links 35, slots are provided, and the slotted ends thus formed embrace a screw 37 mounted in arms 38 and 39 fixed on said shaft 10. The screw or rod 37 forms a bail with the arms 38 and 39. It will be obvious that the provision of suitable slots in the lower ends of links 35 enables actuation of shaft 10 by any of said keys 32 through the corresponding links independently of the remaining keys

which are maintained in their normal positions by said restoring springs 33ª. Suitable spacing blocks 40 serve to maintain the slotted ends in proper position on screw 37. On the remaining key-levers 33, links 35 are pivoted at equal distances from rod 34, greater than the distance of any of the first three links, and the slotted end of the fourth link embraces a screw 41, which bridges the gap between arm 39 and another arm 42, fixed on said shaft 10. It will be seen that screw 41 is placed nearer shaft 10 than screw 37, in order to obtain a greater movement of shaft 10, due to depression of the fourth key-lever, and that the last or fifth link 35 is secured to arm 42 at a lesser distance from shaft 10 than the fourth link, in order to obtain a still greater movement of shaft 10.

It will be evident that the five back-spacing keys 32 are so connected with the back-spacing pawl 16, that actuation of any one of these keys will cause said carriage 1 to be back-spaced from one to five letter-spaces, respectively, in accordance with the number of the key from the left as shown in Figure 1.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. In a typewriting machine, the combination with a traveling carriage and means to effect letter-space movements thereof, of a series of back-space keys corresponding in number to the different line-spacing actions to be effected, key-levers actuable by said keys, a back-space device to back said carriage different amounts, and connections between said key-levers and said back-space device whereby uniform movements of said keys will drive said back-space device to effect movements of said carriage varying in extent in accordance with the keys actuated.

2. In a typewriting machine, the combination with a carriage having letter-space movements, of a series of key-levers having a common pivot, the number of said key-levers corresponding to the different back-spacing actions to be effected, a device adapted to back-space said carriage different amounts, and connecting devices, including pin-and-slot connections, whereby actuation of any of said key-levers will effect actuation of said back-space device in accordance with the key-lever depressed, the movement of said back-space device being idle with respect to the key-levers not actuated.

3. In a typewriting machine, the combination with a traveling carriage urged in one direction and an escapement mechanism to control letter-space movements thereof, of a plurality of back-space keys, key-levers carrying said keys, and key-lever-driven mechanism whereby uniform movements of the keys will back-space said carriage different numbers of steps in accordance with the values of the back-space keys depressed.

4. In a typewriting machine, the combination with a traveling carriage and an escapement mechanism therefor, including a rack connected to the carriage to travel therewith, of back-spacing means comprising a back-space pawl and means to move said pawl into engagement with said rack and to actuate said pawl and back-space said carriage, including a downwardly extending link, a shaft, an arm fixed on said shaft and connected with the lower end of said link, two arms fixed on said shaft, at positions spaced from the first-mentioned arm, a rod extending through said last-named arms forming a bail therewith, a series of back-spacing levers having a common pivot, and a series of links having slotted ends embracing said rod to enable independent actuation of said bail by said links, said links being pivoted to the corresponding levers at different distances from the common pivot, so that said pawl will back-space said carriage different numbers of letter-space distances in accordance with the back-spacing levers depressed.

5. In a typewriting machine, the combination with a traveling carriage and an escapement mechanism, including a rack connected with said carriage, to effect letter-space movements of said carriage, of back-spacing mechanism including a pawl movable into and out of engagement with said rack, means to swing said pawl to effect different back-spacing movements of said rack, including a shaft, key-levers corresponding to the different numbers of steps the carriage is to be back-spaced, and connections between said key-levers and said shaft whereby the shaft will be actuated different extents in accordance with the key-levers depressed, and each key-lever may be depressed independently of the others.

6. In a typewriting machine, the combination with a carriage and an escapement rack connected therewith, of a back-space pawl, a carrier on which said pawl is pivotally mounted so as to enable said pawl to be brought into and out of engagement with said rack, a stop on said carrier to limit the movement of said pawl in a letter-feeding direction, a link, connections between said link and said pawl, whereby the pawl may be brought into engagement with said rack and then actuated to swing said pawl to the right, a series of key-levers, and connections between said key-levers and said link whereby individual depression of said key-levers to a substantially uniform extent will actuate said link to different extents in accordance with the key-levers depressed.

7. In a typewriting machine, the combination with a carriage, of back-spacing means

therefor including a rock-shaft, and means to actuate said shaft to different extents to determine the extent of the back-spacing action, comprising arms fixed on said shaft, a rod supported by said arms, a series of back-spacing levers on a common pivot, and a series of links connecting said rod to said levers at different distances from said pivot to determine back-spacing in accordance with the lever depressed, said links having slotted portions embracing said rod to enable independent actuation of said shaft by said levers.

8. In a typewriting machine, the combination with a traveling carriage and an escapement mechanism including a rack connected with said carriage, of a back-space pawl, means to swing said pawl into engagement with said rack, and to effect different back-spacing movements thereof, including a shaft connected to said back-space pawl, a series of back-space levers on a common pivot, and links, one for each lever, each link being pivoted at one end to the respective levers at equal distances from the common pivot, and connected at the other end to pins supported by said shaft at different distances from its axis, the connections between said links and said pins being such that actuation of a back-spacing lever will cause actuation of said shaft, and actuation of any one of said back-spacing levers may be effected independently of any other.

9. In a typewriting machine, the combination with a carriage having letter-space movements, of a series of key-levers having a common pivot, the number of said key-levers corresponding to the different back-spacing movements to be effected, a device including a back-space pawl adapted to back-space said carriage different amounts, and movement-transmitting actuating connections between said key-levers and said back-space device for moving the back-space pawl a different number of steps for a substantially uniform movement of each different key-lever, whereby actuation of any of said key-levers will impart a correspondingly different movement to said back-space pawl.

10. In a typewriting machine, the combination with a traveling carriage and escapement mechanism, including a rack connected with said carriage, of a back-space pawl, means to swing said pawl into engagement with said rack and to effect different back-spacing movements thereof, including a shaft connected to said back-space pawl, a series of back-space levers on a common pivot, links pivotally connected with said shaft at equal distances from its axis, and with certain of said levers at different distances from the common pivot, and other links pivotally connected to certain of said levers at equal distances from the common pivot, and to said shaft at unequal distances from the axis thereof, whereby said pawl will be swung to an extent in accordance with any back-space lever depressed.

11. In a typewriting machine, the combination with a traveling carriage and an escapement mechanism, including a rack connected with said carriage, of a back-spacing pawl movable into and out of engagement with said rack, key-levers corresponding to the different numbers of steps the carriage is to be back-spaced, and key-lever-actuated means for moving said pawl into engagement with said rack, and actuating said pawl to different extents in accordance with the key-levers depressed, said key-lever-actuated means including lost-motion devices, whereby actuation of any of said key-levers may be effected independently of the others.

12. In a typewriting machine, the combination with a traveling carriage and an escapement mechanism for effecting letter-space movement thereof, of a plurality of back-spacing keys, a back-space device operable by said keys to back-space said carriage different amounts, and mechanism actuated by said keys for back-spacing said carriage different numbers of steps in accordance with the back-spacing keys depressed, said mechanism including lever and link connections between said keys and said back-space device for moving said back-space device different amounts thereby to impart different extents of movement to the carriage for substantially uniform movements of the different back-spacing keys.

13. In a typewriting machine, the combination with a carriage, of back-spacing means including a rock-shaft, and means to actuate said shaft to different extents to determine the extent of the back-spacing action, comprising an arm fixed on said shaft, a series of pivoted back-spacing levers, and a series of links connecting said arm to said levers at the same distances from the axis of the rock-shaft and at different distances from the pivots of the back-spacing levers thereby to vary the extent of the back-spacing in accordance with the lever depressed, said links having a lost-motion connection to enable independent actuation of said shaft by said levers.

14. In a typewriting machine, the combination with a carriage, of back-spacing means including a rock-shaft, and means to actuate said shaft to different extents to determine the extent of the back-spacing action, comprising an arm fixed on said shaft, a series of pivoted back-spacing levers, and a series of links connecting said arm to said levers at the same distances from the axis of the rock-shaft and at different distances from the pivots of the back-spacing levers thereby to vary the extent

of the back-spacing in accordance with the lever depressed.

15. In a typewriting machine, the combination with a traveling carriage, of back-spacing means therefor including a rocking member, back-spacing keys corresponding to the number of steps the carriage is to be back-spaced, and key-actuated means including levers of different lengths for correspondingly rocking said rocking member to different extents for the different back-spacing keys depressed, thereby to determine the number of steps of the back-spacing of the carriage, said key-actuated means including lost-motion devices, whereby actuation of any of said back-spacing keys may be effected independently of the others.

16. In a typewriting machine, the combination with a traveling carriage, of back-spacing means therefor including a rocking member, back-spacing keys corresponding to the number of steps the carriage is to be back-spaced, and key-actuated means including levers of different lengths for correspondingly rocking said rocking member to different extents for the different back-spacing keys depressed, thereby to determine the number of steps of the back-spacing of the carriage.

HARRY BATES.

Witnesses:
JENNIE P. THORNE,
CATHERINE A. NEWELL.