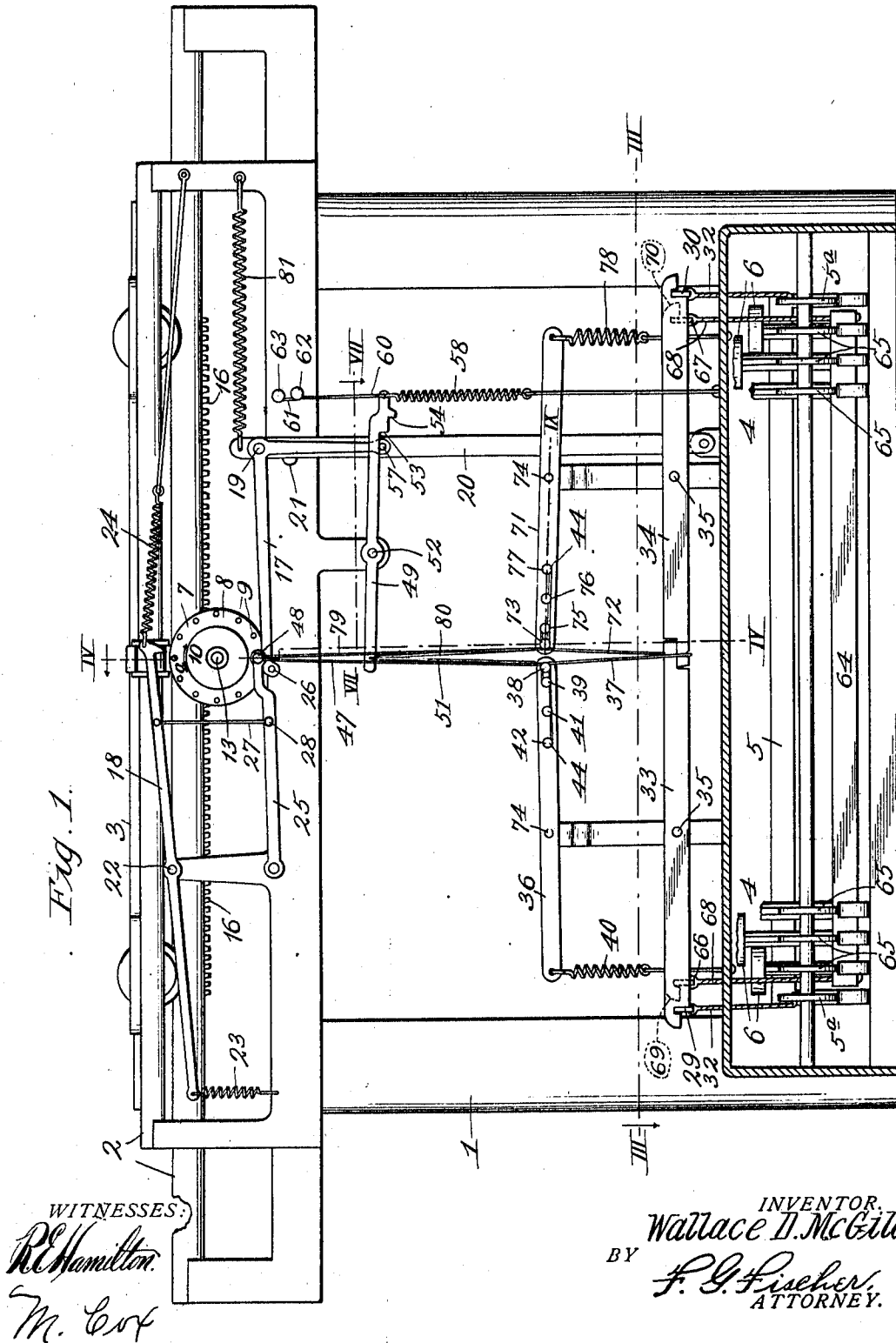


W. D. McGILL.
 CONVERTIBLE SPACING MECHANISM FOR TYPE WRITERS.
 APPLICATION FILED AUG. 3, 1908.

945,244.

Patented Jan. 4, 1910.

4 SHEETS—SHEET 1.

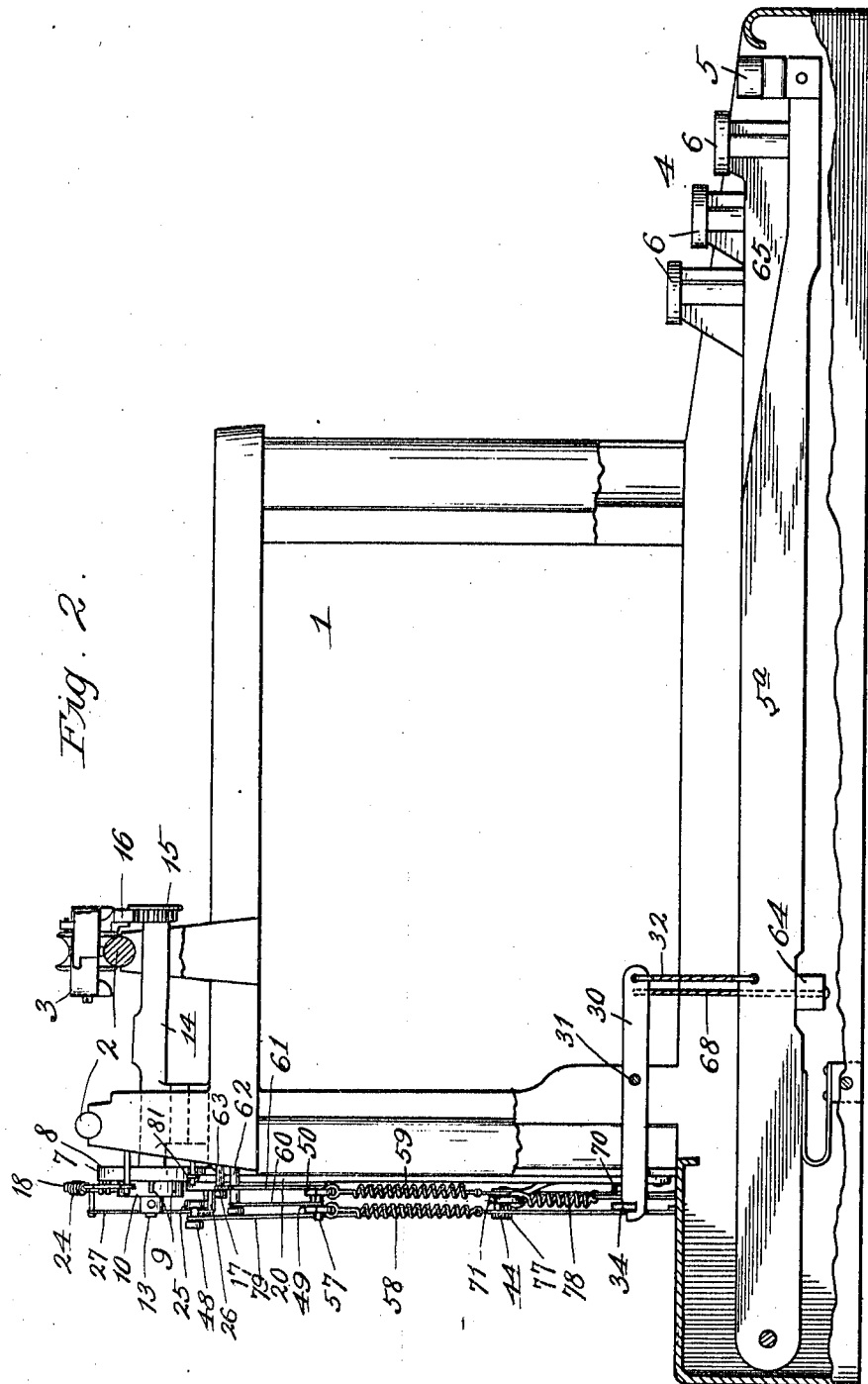


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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

Fig. 3.

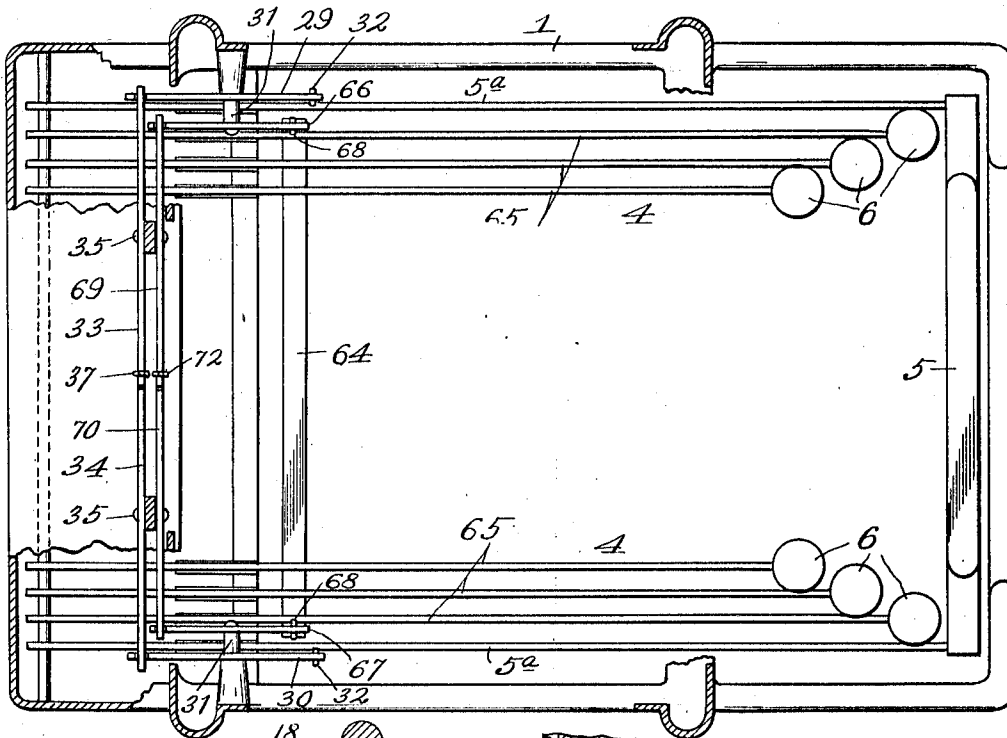


Fig. 5.

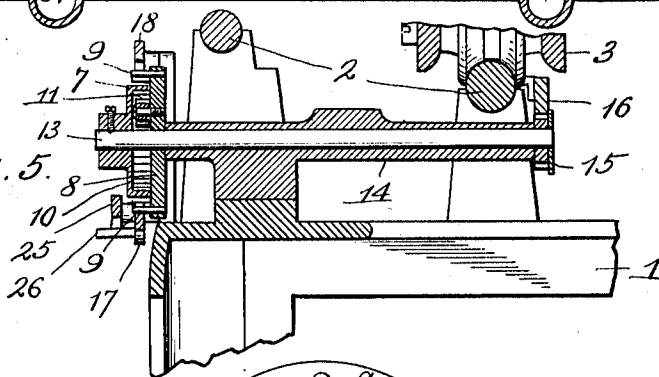
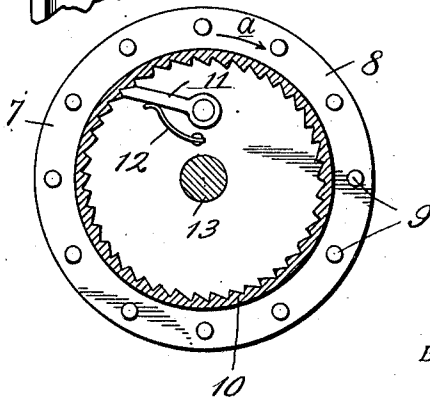


Fig. 6.



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4 SHEETS—SHEET 4.

Fig. 4.

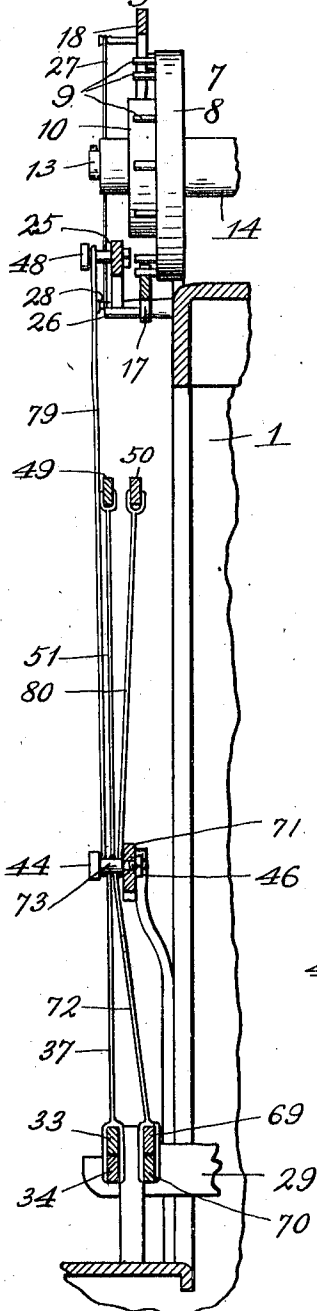


Fig. 7.

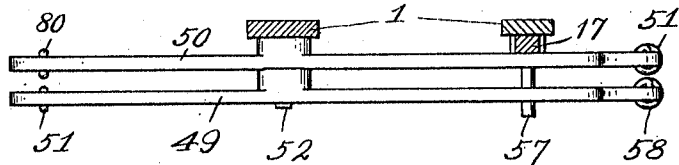


Fig. 8.

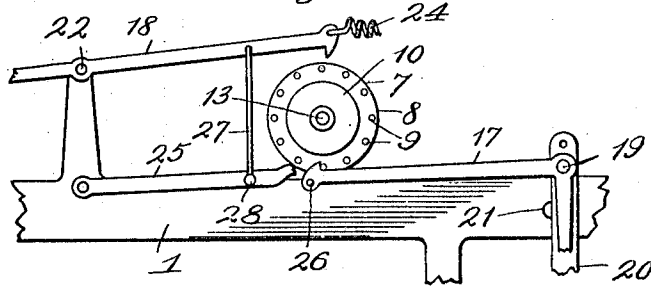


Fig. 9.

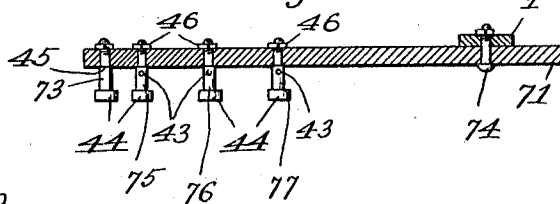
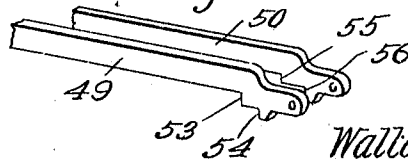


Fig. 10.



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CONVERTIBLE SPACING MECHANISM FOR TYPE-WRITERS.

945,244.

Specification of Letters Patent.

Patented Jan. 4, 1910.

Application filed August 3, 1908. Serial No. 446,766.

To all whom it may concern:

Be it known that I, WALLACE D. MCGILL, a citizen of the United States, residing at Leavenworth, in the county of Leavenworth and State of Kansas, have invented certain new and useful Improvements in Convertible Spacing Mechanism for Type-Writers, of which the following is a specification.

My invention relates to improvements in typewriter machines; and pertains more particularly to the spacing mechanism of the machine.

My principal object is to increase the speed of the machine, which I accomplish by forming the space between words by the same manipulation which prints the final characters of the words.

Other objects of the invention will hereinafter appear and in order that it may be fully understood, reference will now be made to the accompanying drawings, in which:

Figure 1 represents a broken rear elevation of a typewriter partly in section, provided with my invention. Fig. 2 represents a broken side elevation partly in section of the same. Fig. 3 is a broken horizontal section on line III—III of Fig. 1, with some of the parts removed. Fig. 4 is an enlarged irregular vertical section on line IV—IV of Fig. 1. Fig. 5 is an enlarged vertical section on the plane of line IV—IV of Fig. 1. Fig. 6 is a detail vertical section of an escapement-wheel employed in carrying out the invention. Fig. 7 is an enlarged horizontal section on line VII—VII of Fig. 1. Fig. 8 is a detail broken rear elevation of the escapement-mechanism employed in carrying out the invention. Fig. 9 is a broken horizontal section on line IX of Fig. 1, of a junction lever, two of which are used in carrying out the invention. Fig. 10 is a broken perspective of a space-governor employed in carrying out the invention.

1 designates the frame of the typewriter, which is provided with a track 2, a carriage 3 arranged to travel on said track, and a keyboard 4 consisting of a spacing-key 5 and the usual type-keys 6, a number of which latter have been removed from the sectional view Fig. 3, so that certain parts of the invention may be seen more clearly.

7 designates an escapement-wheel consisting, preferably, of a disk 8, an annular row of studs 9 arranged parallel to each other and extending rearwardly from the disk, a

ratchet-wheel 10 having internal teeth, and a detent 11 carried by the disk and held in engagement with the ratchet-wheel by a spring 12. Disk 8 is loosely mounted upon the rear end of a shaft 13 journaled in a bearing 14 and provided at its forward end with a pinion 15 which intermeshes with the usual rack-bar 16 secured to the carriage, which latter is automatically drawn to the left by the customary main spring, not shown, after the spacing-key or any of the type-keys have been operated.

Ratchet wheel 10 is secured to the rear end of shaft 13 by a set-screw so that it will turn in either direction with said shaft. For instance, when the carriage is moved to the left one step by the main spring, it will rotate the ratchet-wheel one step in the direction of arrow *a*, (Figs. 1 and 6) through the instrumentality of shaft 13, pinion 15, and rack-bar 16; and disk 8 will be turned with the ratchet-wheel through the intermediacy of detent 11, but when the carriage is drawn to the right by hand to start a new line of writing, the ratchet-wheel of course, will be rotated backward in a direction opposite to that indicated by arrow *a*, and in so doing will slip over the detent 11 and permit disk 8 to remain stationary until the carriage again moves to the left.

The rotation of the escapement-wheel in the direction of arrow *a* is controlled by a primary pawl 17 and a secondary pawl 18 which former normally engages the escapement-wheel to lock the same from rotation. Primary pawl 17, in the present instance is arranged in the form of a bell-crank lever, and pivotally mounted upon a pin 19 carried by an oscillatory-bar 20, pivotally secured at its lower end to the rear portion of frame 1. The rightward movement of bar 20 is limited by a stop 21 against which it is normally held by pawl 17 and the escapement-wheel. Before, or immediately after the primary pawl 17 is drawn down out of engagement with the escapement-wheel, the latter is engaged and locked from rotation by the secondary pawl 18, which is pivotally mounted upon a pin 22 projecting from the rear upper portion of frame 1. Pawl 18 is normally held out of engagement with the escapement-wheel by a retractile spring 23 secured to frame 1 and the pawl, see Fig. 1. Pawl 18 is also controlled by a perfecting spring 24 secured thereto and to frame 1.

Spring 24 pulls on pawl 18 and holds it in proper position to engage the adjacent stud of the escapement-wheel by taking up any lost motion which may exist between said pawl and pin 22.

25 designates a controller adapted to depress pawl 17 out of engagement with the escapement-wheel by contacting with a pin 26 projecting from the free end of said pawl. Said controller also draws pawl 18 down into engagement with the escapement-wheel through the intermediacy of a cable 27, the lower end of which is wrapped around an adjusting-screw 28 carried by the controller, so that proper adjustment may be had between the controller and the pawls.

The escapement-mechanism above described consisting of the escapement-wheel, the pawls, and the controller, is actuated by two independent lines of connection, one of which is controlled by the spacing-key 5 and the other by the type-keys 6. I will first proceed to describe the line of connection controlled by the spacing-key 5. 29 30 designate a pair of levers fulcrumed upon pins 31 projecting inwardly from opposite side of frame 1. Said levers are connected at their forward ends to the spacing-key levers by a pair of cables 32 and interlock at their rear ends with the outer ends of a pair of levers 33 34, respectively, fulcrumed upon pins 35 and having overlapping inner ends, as shown in Fig. 1. Levers 33 34 are adjustably connected to a junction-lever 36 by a cable 37, which extends over a junction-pin 38 and is wound upon an adjusting-screw 39, both of which are secured to the junction-lever 36. Cable 37 forms convenient means for taking up wear and adjusting the parts between the spacing-key levers and lever 36, and it is held taut by a retractile spring 40, connected to frame 1 and the outer end of lever 36 for the purpose of restoring the line to normal after the spacing-key has been operated. Lever 36, in addition to being provided with pin 38 and screw 39, is provided with adjusting-screws 41 42, for a purpose hereinafter described. Each adjusting-screw has a transverse opening 43, a knob 44, a shoulder 45 bearing against one side of lever 36, and a nut 46 bearing against the opposite side of said lever for the purpose of holding the adjusting-screw from accidentally turning. Junction-lever 36 is adjustably connected to controller 25 by a cable 47, the lower end of which extends beneath the junction-pin 38 and is wound upon the adjusting-screw 41, while its upper end is wound upon an adjusting-screw 48 projecting from the free end of the controller.

The space-governor is for the purpose of regulating the length of the steps taken by the carriage longitudinally, and it consists of a member 49 and a duplicate member 50, the former of which is controlled by the

spacing-key, and the latter by the type-keys. Member 49 is connected to junction-lever 36 by a cable 51, the lower end of which extends beneath junction-pin 38 and is wound upon the adjusting-screw 42. Members 49 50 are in the form of independent levers fulcrumed upon a pin 52, and are provided at their free ends with shoulders 53 54, and 55 56, respectively, adapted to be arranged in the path of a pin 57 projecting rearwardly from the primary pawl 17. Members 49 50 are normally held in contact with the upper surface of pin 57 by a pair of retractile springs 58 59, respectively, secured at their lower ends to frame 1. The free ends of members 49 50 may be raised to lift shoulders 53 55 out of the path of pin 57 by a pair of cables 60 61, attached, respectively, at their lower ends to members 49 50 and at their upper ends to a pair of adjusting-screws 62 63, projecting rearwardly from frame 1.

I will now proceed to describe the line of connection controlled by the type-keys, which line is substantially a duplicate of the one controlled by the spacing-key 5. 64 designates a spacing-bar extending transversely beneath the type-key levers 65, so that it may be actuated when any of said levers are depressed, but as said bar does not extend beneath the spacing-key levers 5^a, it, of course, will not be depressed by the same. Bar 64 is suspended from a pair of levers 66 67 by a pair of cables 68. Levers 66 67 are fulcrumed upon pins 31 and interlock at their rear ends with a pair of levers 69 70, which also interlock at their inner ends and are fulcrumed upon pins 35 immediately in front of levers 33 and 34, see Fig. 3. Levers 69 and 70 are connected to a junction-lever 71 by a cable 72, which extends upward over a junction-pin 73 and is wound around an adjusting-screw 75. Lever 71 is arranged opposite the junction-lever 36 and, like the latter, is fulcrumed upon a pin 74, and in addition to pin 73 and screw 75, is provided with adjusting screws 76 and 77, which are duplicates of those on lever 36. Cable 72 is held taut by a retractile spring 78, connected to frame 1 and the outer end of lever 71 for the purpose of restoring the parts to normal after a type-key has been operated. Lever 71, like lever 36, is connected to the controller 25 by a cable 79, which extends down beneath pin 73 and is wound upon adjusting-screw 77 so that it may be let out or taken up. Lever 71 is connected to the other half or member 50 of the space-governor by a cable 80 which extends down beneath the pin 73 and is wound around adjusting-screw 76.

From the preceding description it will be understood that the spacing-key and the type-keys have main lines extending to junction-levers 36 71, respectively, and branch lines extending, respectively, to controller 25

and the space-governor. All of said lines are independently adjustable so that the parts of each may be adjusted in proper relation to each other, and the spacing-key 5 may be converted into an ordinary single spacing-key, a double spacing auxiliary key, a compound single and double spacing-key, or a compound single and double spacing auxiliary key. The type-keys are likewise convertible so they may either act independently of the spacing-key or cooperate therewith in controlling the length of the steps taken by the carriage, but as it is more desirable to use the spacing-key than the type-keys in all but the single spacing operation, I will only enter into a detailed description of those operations in which said spacing-key is employed.

In order to convert the keys into single space keys, wires 51 80 are let out so they will not actuate the space-governor when a key is operated, hence shoulders 53 55 will remain in the path of pin 57. Then when a key is depressed controller 25 will either be drawn down by cable 47 or 79, and contacting with pin 26 will disengage pawl 17 from the escapement-wheel and at the same time draw pawl 18 into engagement with the escapement-wheel to lock the same from rotation. The instant pawl 17 is disengaged from one stud of the escapement-wheel it is drawn to the left into engagement with the succeeding stud by bar 20 which is drawn back by a retractile spring 81 until pin 57 engages shoulders 53 55 of the space-governor which limits further leftward movement of the bar and the pawl. When the depressed key is released pawl 18 is instantly disengaged from the escapement-wheel by spring 23, so that the main spring may rotate said escapement-wheel and move the carriage to the left one step when further movement is checked by bar 20 contacting with stop 21.

When it is desired to convert the spacing-key 5 into a double spacing auxiliary key the type-key half 50 of the space-governor is raised by taking up cable 61 so that only its shoulder 56 remains in the path of pin 57. Cable 47 is then let out and cable 51 is taken up so that when key 5 is fully depressed controller 25 will not be actuated but member 49 will be raised to carry shoulder 53 out of the path of pin 57. Now if a type-key be depressed to disengage pawl 17 from the escapement-wheel, before key 5 is released, said pawl will instantly be drawn to the left until it engages the second succeeding stud and pin 57 engages shoulders 54 and 56 of the space-governor, then when the type-key is released to permit pawl 18 to rise out of engagement with the escapement-wheel the carriage will move two steps to the left before being checked by bar 20 contacting with stop 21.

Spacing-key 5 is converted into a compound single and double spacing-key by raising the type-key half 50 of the space-governor so that only shoulder 56 of said half remains in the path of pin 57. Cable 51 is then partly taken up so that when the spacing-key is but partly depressed, shoulder 53 will remain in the path of pin 57 and limit the movement of the carriage to one step, and if said key be fully depressed then member 49 will be raised and permit the carriage to move two steps.

Spacing-key 5 is converted into a compound single and double spacing auxiliary key by taking up cables 51 and 80 sufficiently to enable any type-key or the spacing-key to actuate the escapement. When a type-key and the spacing-key are simultaneously depressed the space-governor will be raised to allow a double space by presenting shoulders 54 56 to pin 57, or a single space, only may be had by depressing either a type-key or the spacing-key, as either shoulder 53 or 55 will then remain in the path of pin 57. The spacing-key may also be utilized to lock the carriage while one or more type-keys are operated, by taking up cable 27 so that pawl 18 will engage the escapement-wheel decidedly before pawl 17 is disengaged therefrom. This prevents the spacing-key from being depressed sufficiently to actuate member 49 of the space-governor.

Of the above forms, the most preferable are those where the spacing-key 5 is converted into a double spacing auxiliary key, or a compound single and double spacing auxiliary key, as in either form a double space is obtained by depressing a type-key and the spacing-key. This results in a saving of considerable time during continuous writing, as it is obvious that the carriage is properly spaced longitudinally for the initial character of a word immediately after the final character of the preceding word has been printed, whereas heretofore a separate manipulation of the spacing-key was necessary to obtain the spaces between words.

While I have shown and described the preferred form of my invention, I, of course, reserve the right to make such changes in the details of construction and arrangement of parts as properly fall within the spirit and scope of the invention.

Having thus described my invention, what I claim is:—

1. In a typewriting machine, the combination of a carriage, a space key and type bars, an escapement mechanism operatively connected to said carriage, one line of connections between said type-bars and said escapement, a second line of connections between said escapement and said space key, space governor mechanism, and connections between said governor and each of said lines

of connections, whereby the type and space keys may be operated to move the carriage single or double space distances.

2. In a typewriting machine, the combination of a carriage, a space key and type-keys, escapement mechanism, operatively connected to said carriage, one line of connections between said type-keys and said escapement mechanism, another line of connections between said space key and said escapement mechanism, a duplicate membered space governor, connections between one member of said governor and said space key line of connections, and another line of connections between the second member of said governor and said type key line of connections, whereby the space and type keys may be operated to move the carriage single or double space distances.

3. In a typewriting machine, the combination of a carriage, a rotary escapement member operatively connected therewith, vibratory escapement members for controlling the action of said rotary member, an adjustable space-governing member for limiting the movement of one of the vibratory members and whereby each step of the carriage is limited to either a single or a double space, a plurality of type-keys, a main line of connections whereby the vibratory members are actuated by the type-keys, and an adjustable branch line of connections leading from the main line to the space-governing member whereby the latter is actuated by the type-keys.

4. In a typewriting machine, the combination of a carriage, an escapement-wheel operatively connected therewith, vibratory escapement members for controlling the action of said escapement-wheel, a space-governing member for limiting the movement of one of the vibratory members and whereby each step of the carriage is limited to either a single or a double space, a plurality of type-keys, a main line of connections whereby the vibratory members are actuated by the type-keys, and a branch line of connections leading from the main line to the space-governing member whereby the latter is actuated by the type-keys, said main line and branch line being independently adjustable.

5. In a typewriting machine, the combination of a carriage, an escapement-wheel operatively connected therewith, vibratory escapement members for controlling the action of said escapement-wheel, an adjustable space-governing member for limiting the movement of one of the vibratory members and whereby each step of the carriage is limited to either a single or a double space, a spacing-key, a main line of connections whereby the vibratory members are actuated by the spacing-key, and an adjustable branch line of connections leading from the main

line to the space-governing member whereby the latter is actuated by the spacing-key.

6. In a typewriting machine, the combination of a carriage, a rotary escapement member operatively connected therewith, vibratory escapement members for controlling the action of said rotary member, a space-governing member for limiting the movement of one of the vibratory members and whereby each step of the carriage is limited to either a single or a double space, a spacing-key, a main line of connections whereby the vibratory members are actuated by said spacing-key, and an adjustable branch line of connections leading from the main line of connections to the space-governing member whereby the latter is actuated by the spacing-key, said main line and branch line being independently adjustable.

7. In a typewriting machine, the combination of a carriage, a rotary escapement member operatively connected therewith, vibratory escapement members for controlling the action of said rotary member, a space-governor consisting of two members for limiting the movement of the vibratory members and whereby each step of the carriage is limited to either a single or a double space, a key-board embracing type-keys and a spacing-key, mechanism operated by the type-keys for actuating the vibratory members and one member of the space-governor, and mechanism operated by the spacing-key for actuating the vibratory members and the other member of the space-governor, said mechanisms being independently-adjustable and capable of simultaneous or independent action in effecting the desired spacing of the carriage.

8. In a typewriting machine, the combination of a carriage, type keys and space key, escapement mechanism, flexible connections between said escapement mechanism and said type keys, similar connections between said escapement and said space key and a governor having connections with said escapement and said keys whereby to permit a cooperation between said escapement and said keys to regulate the movement of the carriage.

9. In a typewriting machine, the combination of a carriage, type keys and a space-key, escapement mechanism, connections between said escapement mechanism and said type keys, similar connections between said escapement and said space-key, and a governor operated by said keys and acting on said escapement mechanism to permit utilization of said space-key at will as a single or double spacing key.

10. In a typewriting machine, the combination of a carriage, type keys and a space key, escapement mechanism, flexible connections between said escapement mechanism and said type keys, similar connections be-

tween said escapement and said space key and a governor comprising duplicated elements having connections with said escapement and said keys whereby to permit a co-
 5 operation between said escapement and said keys to regulate the movement of the carriage.

11. In a typewriting machine, the combination of a carriage which moves uniform
 10 distances at each escapement, type keys and a space-key, an escapement wheel operatively connected therewith and having parallel studs, pawls adapted to engage said studs, connections between said pawls and said type
 15 keys, similar connections between said pawls and said space key and a space governor having an element in connection with each of said connections between said type keys and said space key, and operative on one of
 20 said pawls to regulate at will the space movement of said carriage.

12. In a typewriting machine, the combination of a carriage which moves uniform
 25 distances at each escapement, type-keys and a space-key, an escapement wheel operatively connected therewith and having parallel studs, pawls adapted to engage said studs, connections between said pawls and said
 30 type keys, similar connections between said pawls and said space key and a space governor having an element in connection with each of said connections between said type keys and said space key, and having a regulatable connection with one of said pawls

whereby to move said carriage single or 35 double spaces at will.

13. In a typewriting machine, the combination of a carriage, type keys and a space key, escapement mechanism, connections between said escapement mechanism and said
 40 type keys, similar connections between said escapement and said space key, and a two-part governor, one part of which is connected to said space key connections, the other part to said type key connections and both
 45 parts of which are operative on said escapement mechanism to regulate the movement of said carriage in single or double spaces.

14. In a typewriting machine, the combination of a carriage, type keys and a space-key, escapement mechanism, connections between
 50 said escapement mechanism and said type keys, similar connections between said escapement and said space-key, and a two part governor having one part connected to said type-
 55 keys, one part to said space-key, and both parts operative on said escapement mechanism whereby, through coöperation of said space and type-keys, said carriage may have
 60 a compound single and double escapement.

In testimony whereof I affix my signature, in the presence of two witnesses.

WALLACE D. ^{his}McGILL.
 mark

Witnesses:

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 M. Cox.