United States Patent

[11] **3,578,131**

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[45] Patented **May 11, 1971**

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[54] **TYPEWRITER WITH EXTENDED WRITING LINE**
5 Claims, 11 Drawing Figs.

[52] **U.S. Cl.** **197/82,** 197/108, 197/60, 197/63
[51] **Int. Cl.** **B41j 19/00**
[50] **Field of Search** ..... 197/16, 18, 48—55, 60, 82, 84, 84.1, 84.2, 84.3, 114, 186, 186 (A), 186 (B), 107, 108, 63

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ABSTRACT: The writing line of a typewriter is extended by combining movements of the paper and of a type element carrier. Incremental letter feed is accomplished by movement of the type element carrier along a writing line past the paper which is normally stationary. Upon reaching an advanced position, the type element carrier is restored in the reverse direction and the paper is advanced to present the next letter space to the type element in its restored position. Continued typing advances the type element carrier incrementally to the end of the writing line. Operation of a line-return key restores the carrier directly to a new line left-hand margin position, indexes the paper to a new line and restores the paper to its original beginning-of-line position.

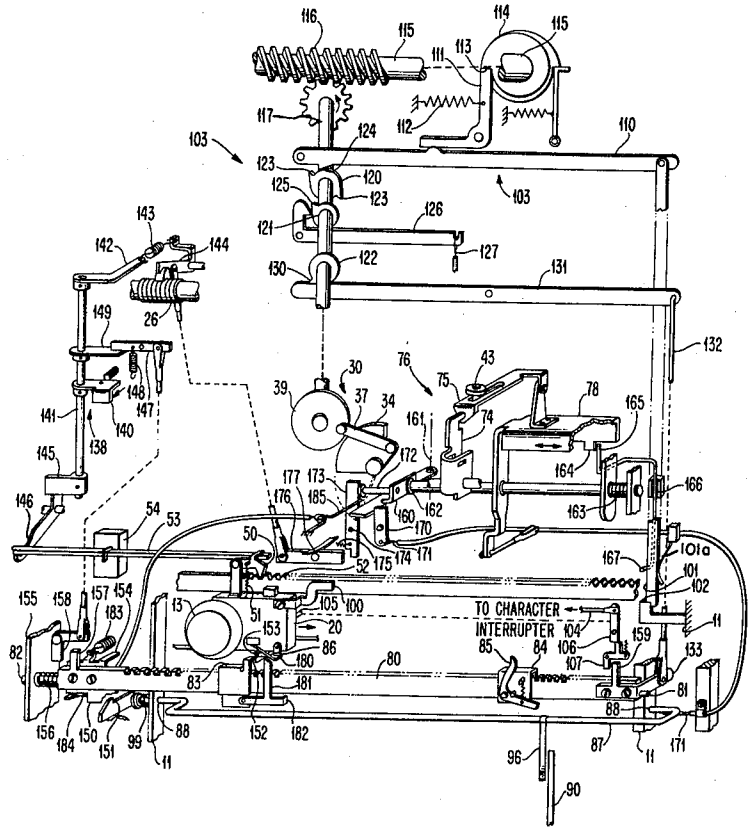


FIG. 1

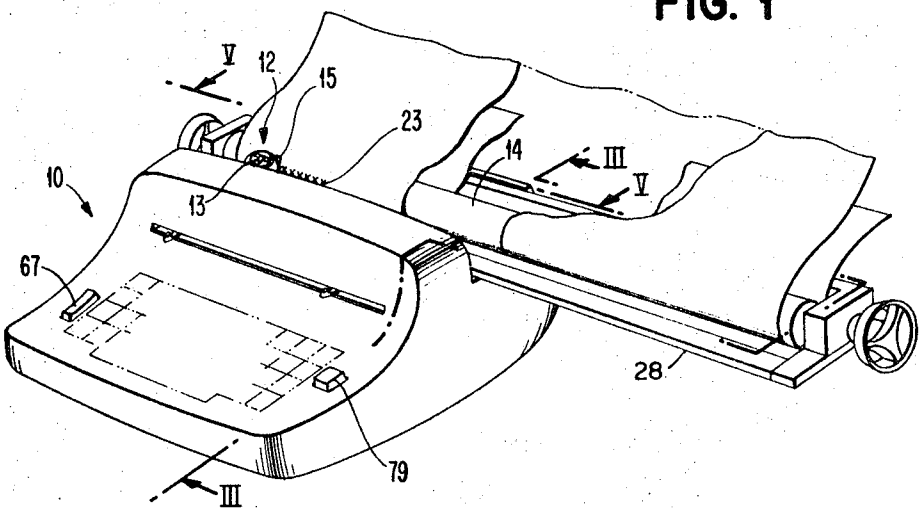


FIG. 2a

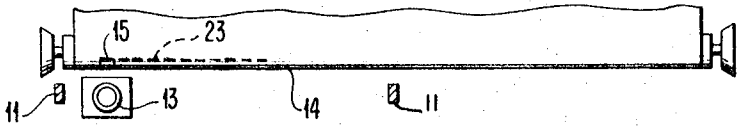


FIG. 2b

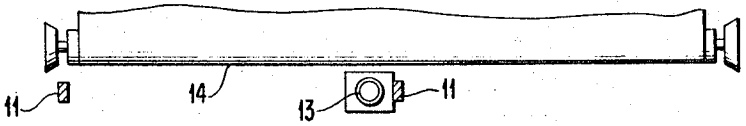


FIG. 2c

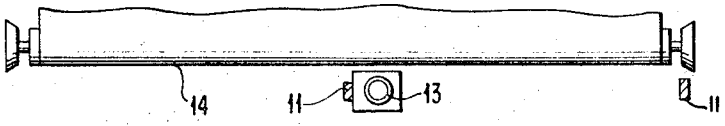
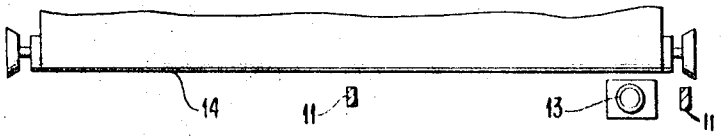


FIG. 2d



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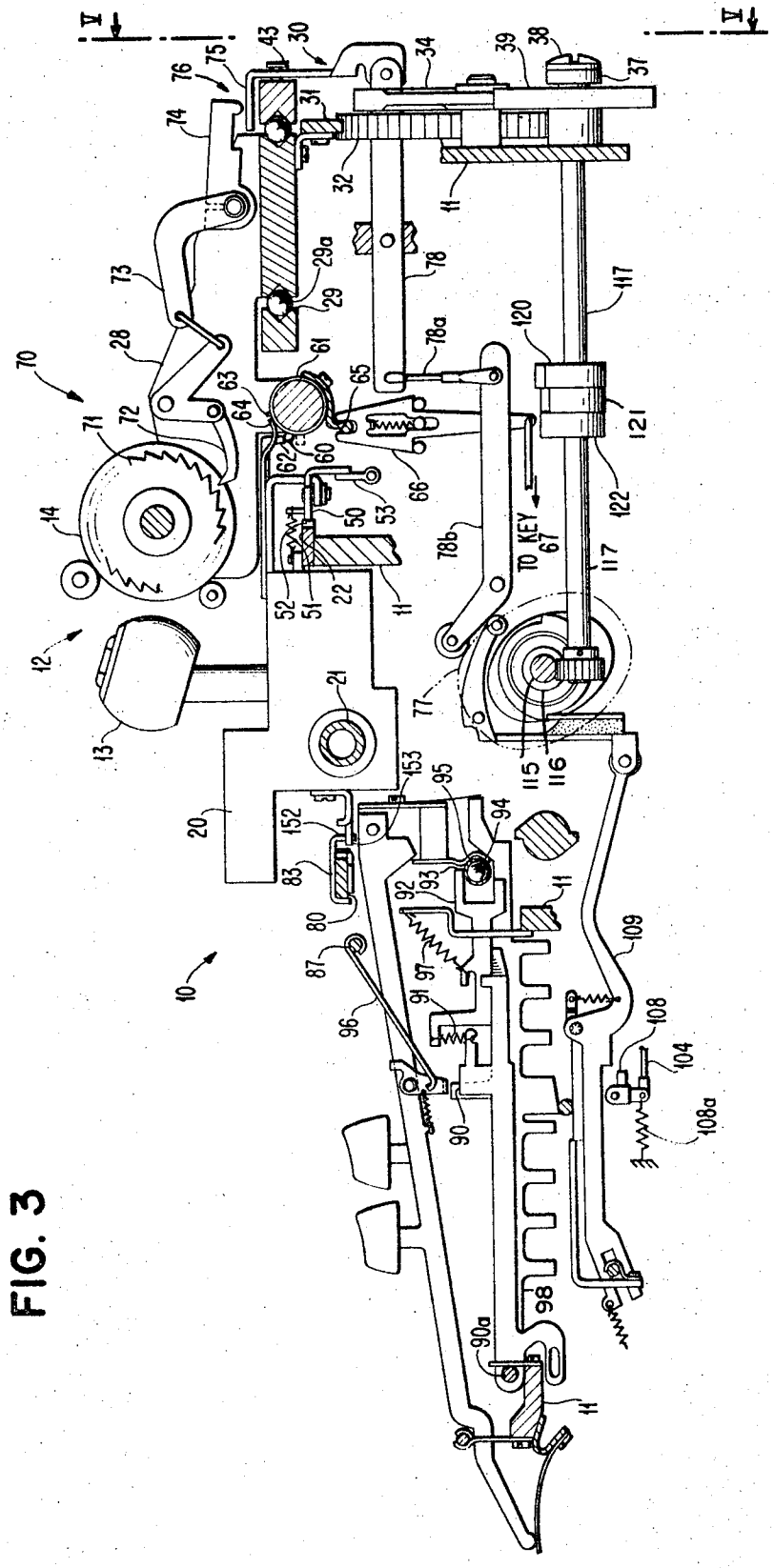


FIG. 3

FIG. 4

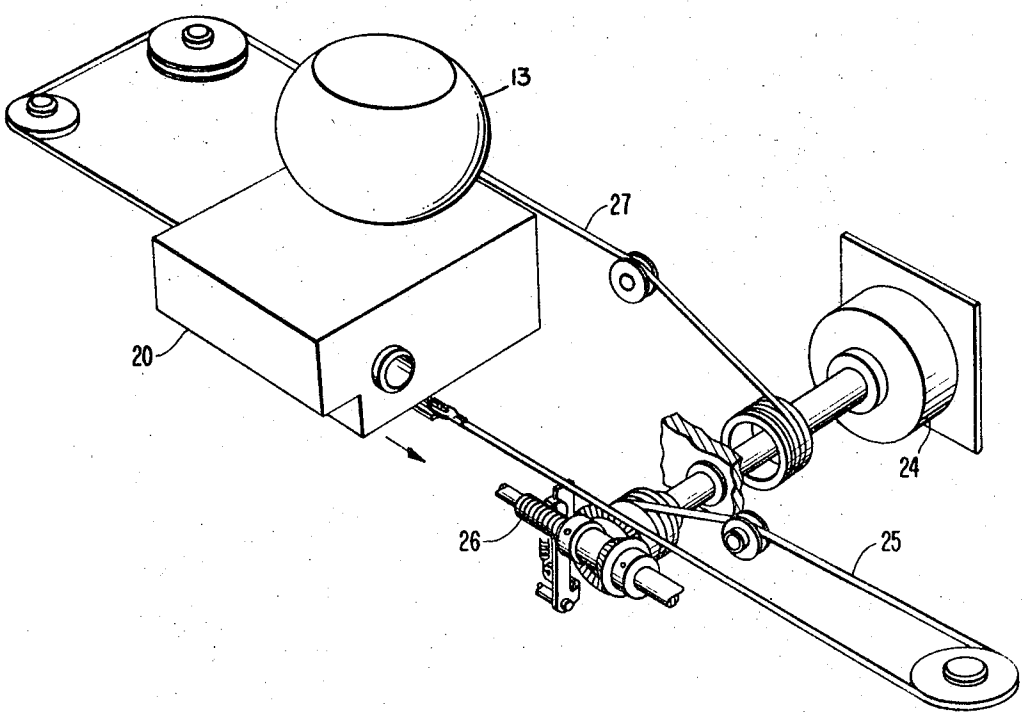
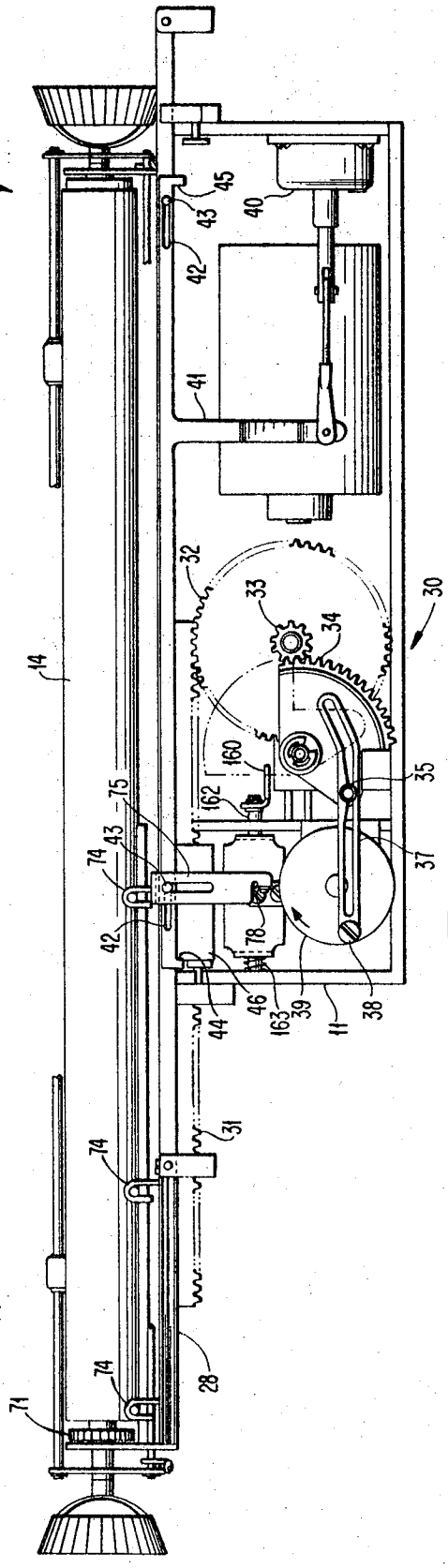


FIG. 5


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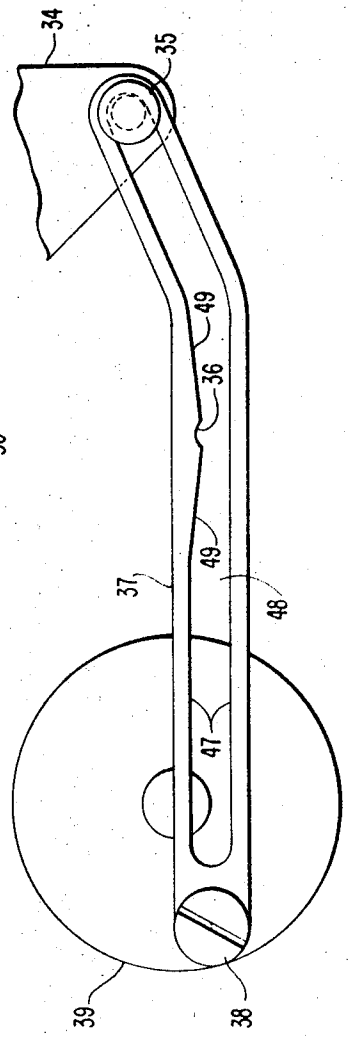

34
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FIG. 5a

FIG. 7

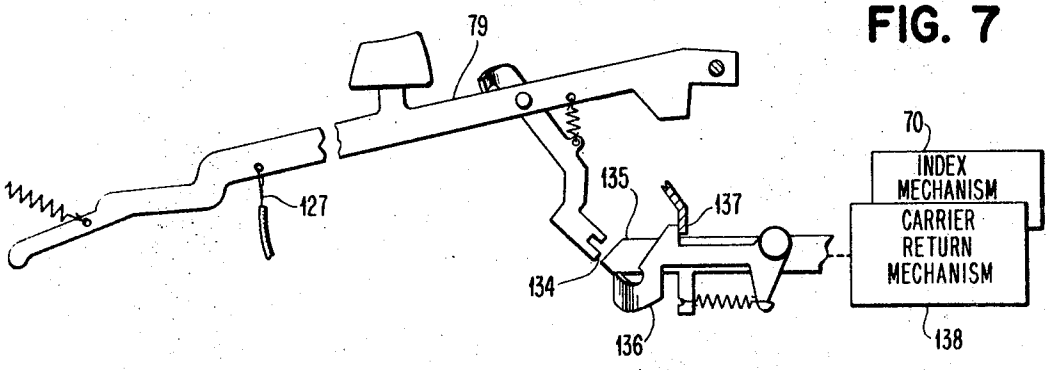
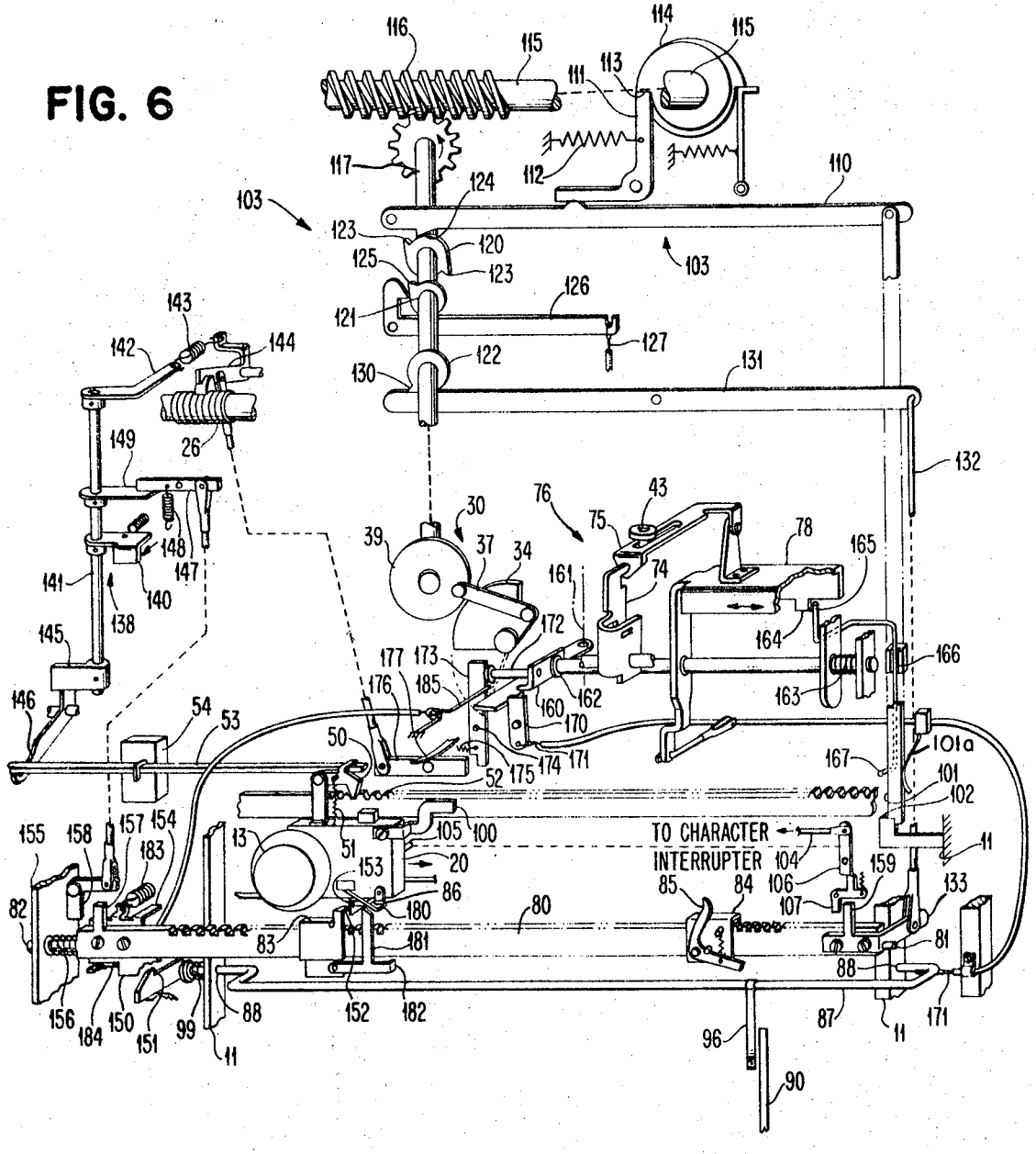

79
127
135
137
134
136
70
INDEX MECHANISM
CARRIER RETURN MECHANISM
138

FIG. 6


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50
52
175
174
171
167
101a
101
102
11
155
158
157
154
183
13
51
153
20
105
100
TO CHARACTER INTERRUPTER
104
106
107
159
133
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84
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TYPEWRITER WITH EXTENDED WRITING LINE

DISCLOSURE OF THE INVENTION

Historical Context

Conventional typewriters have employed a moving paper carriage for advancement of a single character printing point along a writing line. Also, existing typewriters such as that shown in U.S. Pat. No. 2,879,876, employ a stationary paper holding device and an incrementally moving print element carrier for letter feed advancing.

Both forms of known typewriters have practical limits to extension of their writing line. In a moving paper carriage machine, the writing line is limited by the ability to control feed of a large mass and the ability to accept a large overhang space requirement for the machine. In the fixed paper machine, the writing line is limited by the practical width of the entire machine frame which must exceed that of the writing line. In both forms of existing machines, extension of the writing line increases the difficulty of maintaining proper uniform force control for letter feeding by the usual power spring device.

Our invention overcomes the limitations and difficulties inherent in existing machines by combining both forms of letter feed advance in a unique manner. A machine constructed in accordance with our invention will occupy less desk space for a given writing line than a machine having only a movable paper carriage, without increasing the size of the machine frame. In addition, our machine does not require spring operated incremental displacement of a large mass throughout a long distance or through the use of undesirably long mechanical connections.

In the past, it has been proposed to build typewriters with movable print elements and paper carriages for the purpose of achieving variable spacing as shown in U.S. Pat. No. 470,704, and for the purpose of providing changeable type faces as shown in U.S. Pat. No. 2,178,037. Neither of these prior uses of combined moving paper and moving print mechanisms provide or otherwise teach any mechanism by which the writing line of a typewriter can be effectively extended as herein disclosed.

Objectives of Invention

It has been an objective of this invention to effectively extend the writing line of a typewriter without correspondingly extending the overall length of the machine frame.

Another objective of our invention has been to extend the effective writing line of a single element typewriter without substantially complicating the mechanism for controlling incremental letter feed operation, tabulation operation operation and the backspace operation.

Another important objective of this invention has been to effectively extend the writing line of a typewriter without increasing the operator's mental or physical effort significantly.

A further object of our invention has been to provide a typewriter having a potentially extendable writing line, but which can be readily employed to type within a limited writing line without significant loss of space efficiency.

Mechanism Concepts

Our invention adds the travel of a letter feeding print element carrier to the travel of a paper holding carriage to provide an efficiently extended writing line. Letter feeding of the print element is accomplished across the width of the typewriter by an escapement mechanism like that disclosed in U.S. Pat. No. 3,126,998. A fixed increment advance mechanism is provided for shifting the paper carriage to a line-extend position automatically upon attainment by the print element carrier of a predetermined advanced position along the writing line. Advance operation of the paper carriage initiates a return operation of the print element carrier by pulling on the carrier return keylever, to move the carrier to a second predetermined position along the writing line as determined by a fixed stop such that the print element and carriage are mutually located at the immediately following letter space increment of the writing line.

Control mechanism is provided responsive to the current position of the paper carriage to selectively render the right and left margin stops of the typewriter ineffective and to appropriately direct movement of the print element carrier and paper carriage upon operator depression of a line return key. Mechanism is also provided to permit line indexing at any point along the writing line unaccompanied by a new line return operation and to permit tabulation operation throughout the length of the writing line.

Particular advantage is taken of a character storage mechanism like that of U.S. Pat. No. 3,353,646, whereby a type key stroke made upon initiation of, or during the transfer of the paper carriage and print element carrier to the extended line position, will be stored and automatically printed upon completion of the transfer operation. This is particularly significant in this mechanism as the transfer operation occurs in the middle of a normal writing line.

These and other objects, concepts and advantages of our invention will be more completely understood from the following detailed description of a preferred embodiment of our inventive concepts wherein reference is made to the accompanying drawing of which:

FIG. **1** is a perspective view of a typewriter having an extended writing line obtained through use of our invention.

FIGS. **2***a*, **2***b*, **2***c* and **2***d* are abstracted operational views of the principal active elements of the typewriter shown in FIG. **1** showing four principal positions of these elements.

FIG. **3** is a side elevational view taken in cross section of the typewriter shown in FIG. **1** along line III–III thereof and with the cover removed showing the mechanical relationship of the various components of this embodiment of our invention.

FIG. **4** is a fragmentary perspective view of a carrier positioning mechanism employed in implementing our invention.

FIG. **5** is a rear elevational view of the typewriter shown in FIGS. **1** and **3** taken along line V–V thereof.

FIG. **5***a* is an enlarged fragmental elevational view showing a construction detail of a portion of the mechanism shown in FIG. **5**.

FIG. **6** is a semiperspective schematic layout of the power and control mechanism for interrelating the movement of the type element carrier and the paper carriage.

FIG. **7** is an elevational view of a key controlled mechanism employed in the embodiment of our invention.

Referring now more specifically to the drawing, in FIGS. **1**, **3**, and **5**, there is shown a typewriter or character-by-character printer **10** having a frame **11** that supports cooperative printing mechanism **12** including a type element or character forming portion **13** and a platen or paper supporting portion **14**, the relative positions of which define a printing point **15**. The type element **13** is operated for character selection and printing impact by mechanism fully disclosed in U.S. Pat. No. 2,919,002.

Type element **13** is supported on a carrier **20** that slides laterally of the typewriter **10** on a track formed by a rotatable print shaft **21** and a stationary rail **22** for lateral movement of printing point **15** to define a writing line **23**. Mechanism for driving the carrier **20** is shown in FIG. **4** and includes a main or power spring **24** acting through cord **25** to move the carrier **20** in the advancing letter feed or rightward direction. A selectively engageable spring clutch **26** acts through cord **27** to overpower the main spring **24** and drive the carrier **20** in the return direction of leftward direction. Mainspring **24** is also rewound during return motion of the carrier **20**. A more detailed description of this drive mechanism can be found in U.S. Pat. No. 2,909,935.

Returning to FIGS. **1**, **3**, and **5**, the platen **14** is supported on carriage **28** that is constructed similar to that disclosed in U.S. Pat. No. 2,862,594. Carriage **28** is laterally movably mounted on the machine frame **11** by a parallel rail construction **29**, see FIG. **3**, including bearing members **29***a*. In the embodiment

shown, the carriage 28 is power driven to either of two primary positions including a home position as shown in FIGS. 2*a* and 2*b*, and an advanced or line extend position as shown in FIGS. 2*c* and 2*d*. It will be apparent to those skilled in the art that more than two positions can be provided.

A multiletter-space feeding mechanism 30 for driving the carriage 28 between its primary positions is best shown in FIGS. 3, 5 and 5*a*. A toothed rack 31 is mounted on the carriage 28 and engages a driving gear 32 rotatably mounted on the machine frame 11. An input transfer gear 33, fixedly connected with intermediate transfer gear 32, is driven in alternate directions by a sector 34 also rotatably mounted on the machine frame 11. Sector 34 includes an input pin 35 that normally is retained in a spring detent cavity or depression 36, see FIG. 5*a*, forming a pivotal connection with a pitman connection 38 that is driven at its left end by pivotal connection 38 from a drive crank disc 39. As hereinafter described, crank disc 39 rotates in half revolution increments to move the sector 34 between its full and broken line positions shown in FIG. 5. A 180° clockwise rotation of crank disc 39 drives pin 35 to the right in FIG. 5 rotating sector 34 counterclockwise to rotate transfer gears 32 and 33 clockwise thus driving the carriage 28 to the right in FIG. 5 and to its advanced position as shown in FIGS. 2*c* and 2*d*. A subsequent 180° clockwise rotation of crank disc 39 from its advanced position, pulls arm 37 to the left to rotate sector 34 clockwise and transfer gears 32 and 33 counterclockwise, thus driving the carriage 28 to its original or home position as shown in FIGS. 2*a* and 2*b*.

As disc 39 rotates in 180° increments, the limit of rightward and leftward motion of the carriage 28 is determined by the magnified throw of pitman arm 37. In addition, a bidirectionally operative dash pot or other shock absorbing device 40 is connected through a bracket 41 slidably mounted by slots 42 and pins 43 to frame 11. Bracket 41 includes downwardly extending ears 44 and 45 that are engaged by a carriage frame secured block or stop portion 46 at the end of each carriage stroke to drive bracket 41 against the dash pot 40 and smoothly decelerate the carriage motion.

Although, as mentioned above, the carriage 28 shown in this embodiment of our invention has two principle power driven positions, provision is made for manually positioning the carriage 28 at various locations independently of its feed mechanism 30 to provide an added degree of flexibility to the typewriter 10. As shown particularly in FIG. 5*a*, pin 35 of sector 34 is releasable from its detent depression 36 in pitman cross arm 37. This release is accomplished simply by manually pushing the carriage 28 toward the center of the machine. Crank disc 39 holds pitman arm 37 stationary permitting pin 35 to flex pitman arm side members 47 outwardly and move into either the left or right portion of pitman arm slot 48. In the position shown in FIG. 5, pushing the carriage 28 moves pin 35 to the right as shown in FIG. 5*a*, whereas had the carriage 28 been positioned to the right in FIG. 5, pin 35 would be pushed from depression 36 to the left in FIG. 5*a*. Camming surfaces 49 on the pitman arm 37 assist restoration of the pin 35 into depression 36 upon a subsequent rotation of the drive disc 39.

Letter feeding or incremental spacing movement of the printing point 15 (see FIG. 1) is accomplished through an escapement mechanism or incremental letter-space feed control including an escapement pawl 50 (see FIGS. 3 and 6) biased by a spring 51 into a rack 52 which is shown integral with the rail 22, and is liftable from rack 52 by a pivoted torque bar 53 under the control of mechanism 54 described in detail in aforesaid U.S. Pat. No. 3,126,998.

Other ancillary printing point moving controls are provided but not shown herein since they do not differ significantly from mechanism currently known to the art by way of the IBM "Selectric" typewriter. These mechanisms include an incremental backspace mechanism (not shown) and a tabulation mechanism (not shown). The tabulation mechanism cooperates with an elongated series of tab stops 60, one of which is shown in FIG. 3. The tab stops 60 are mounted on the carriage 28 to extend the length of the writing line 23. The tab stops 60 are held by friction in a slotted tube 61 that is permitted limited pivotal movement about its axis for driving the stop 60 against a "setting" projection 62, and for driving a "clear" protrusion 63 of the stop 60 against a "clear" pin 64. "Set" and "clear" pins 62 and 64 are both mounted on the carrier 20 so as to be indicative of its position. The tab stop support tube 61 has attached to it a torque arm 65 extending the length of the writing line and which laterally slidably engages a rockable input member 66 by which a manual key 67 (see FIG. 1) selectively rotates the tube 61 whenever it is desired to "set" or "clear" a tab stop 60.

Vertical index or line spacing is accomplished by an index mechanism 70 including a ratchet 71 carried by the right side of the platen 14 (left as viewed in FIG. 5) and rotated by a line feed pawl or drive member 72 reciprocated through linkage 73 by a drive torque arm 74. A powered index output member 75 carried by the frame 11 is normally aligned with torque arm 74 to provide a severable connection 76 between the pawl 72 and an index power cam 77 through lever 78, intermediate link 78*a* and cam follower 78*b*. In accordance with known practice, the index mechanism 70 is normally operated with operation of the carriage return keylever 79 as indicated in FIG. 7 and as described in detail in IBM Customer Engineering Instruction Manual, Form Part No. 241–5032–2, published Jan. 1966 by International Business Machines Corporation, Armonk, New York, particularly pages 43 through 59 thereof. We prefer to employ three torque arms 74 as shown in FIG. 5 to permit power connection between the index output member 75 and the pawl drive linkage 73 when the carriage 28 is positioned at either of its primary positions or if the carriage 28 is manually positioned at a central position with respect to the frame 11. The connection 76 is effectively severed at all other positions of the carriage 28.

AUTOMATIC WRITING LINE EXTENSION

FIG. 6 shows the automatic controls and operating mechanisms by which the carriage 28 is automatically shifted via sector 34 to extend the writing line. Note that the carriage 28 is not shown in FIG. 6 but its motion can be recognized from the sector 34 which is shown in the normal or beginning of line position. FIG. 6 also shows carrier 20 positioned adjacent the escapement rack 52 and a margin control rack 80 at a left margin position.

The margin control rack 80 and its associated mechanism is similar in structural detail to that described in the aforesaid IBM Customer Engineering Instruction Manual, particularly pages 64 through 67 thereof. As shown in FIG. 6, rack 80 is pivoted about pin shafts 81 and 82, and carries a left-hand margin or start-of-line stop 83 and a right or end-of-line margin stop 84. As carrier 20 approaches the right margin, a bellcrank 85 on stop 84 is engaged by a cam surface 86 mounted on carrier 20 and is driven against a bail 87 that is pivoted to the frame 11 at points 88. Line lock interposer 90 (see also FIG. 3) is pivoted to the frame 11 by wire 90*a* and is connected through relief spring 91 to a keyboard lock bellcrank 92. Bellcrank 92 is also pivoted about wire pin 90*a* and includes a forward end 93 for cooperatively engaging balls 94 of a displacement keyboard interlock 95. When bail 87 is pivoted by bellcrank 85, an actuator 96 depresses interposer 90 and bellcrank 92 is urged downwardly by spring 91 against its own spring 97 toward the interlock 95. As soon as the interlock 95 is free of all other interposers, such as a typical character interposer 98 of the type described in U.S. Pat. No. 3,086,635, forward end 93 of bellcrank 92 enters the interlock 95 and prevents subsequent key operations.

The controls for actually extending the writing line can best be described in a narrative account of a typical typing operation. Starting from the position of the parts shown in FIG. 6, the carrier 20 is positioned adjacent the left-hand margin of start-of-line stop 83 preparatory to writing a line of characters. Right-hand margin stop 84 has been rendered ineffective by a

spring 99 that has displaced bail 87 leftwardly to offset line lock actuator 96 from above line lock interposer 90. Accordingly, cam 86 of carrier 20 will operate margin stop bellcrank 85 as the carrier 20 passes margin stop 84 but bellcrank 85 will be ineffective to operate the line lock bellcrank 92 due to the offset positioning of actuator 96.

Incremental spacing of carrier 20 continues during typing until transfer bracket 100 carried by carrier 20 strikes an initiate-transfer control latch 101 at a predetermined position, conveniently adjacent the right side of frame 11 of the typewriter 10. Latch 101 responds to this movement of the carrier 20 by moving to the right, off a keeper surface 102, to commence advance movement of the carriage 28 by transfer control mechanism 103.

At the right side frame position, carrier 20 also activates character interrupter linkage 104 (see FIGS. 3 and 6) by a carrier pin 105 on the carrier 20 driving latch 106 clockwise to a position where it is retained by spring biased pivoted latch keeper 107. Interrupter linkage 104 rotates finger 108 (FIG. 3) against its spring 108*a* to a position for intercepting keyboard cycle clutch latch control arm 109. A character struck upon initiation of or during transfer will thus be stored for printout upon completion of the transfer in a manner as described in aforesaid U.S. Pat. No. 3,353,646.

When struck by bracket 100, latch 101 is moved downwardly in FIG. 6 by pivoted lever 110 and clutch control bellcrank 111 that is biased by spring 112 toward a release position from under control land 113 of a transfer clutch 114. The transfer clutch 114 thus released, connects the typewriter motor (not shown) to a transfer drive shaft 115. Shaft 115 carries a worm 116 that drives an output sequence control shaft 117 to accomplish several power and control functions. Primarily, shaft 117 drives the crank disc 39 to rotate sector 34 and thereby drive the carriage 28 to its advanced position. Shaft 117 also rotates control cams 120, 121, and 122.

Latch restore cam 120 includes a pair of lobes 123 which cooperate with follower projection 124 on control lever 110. Carrier return control cam 121 includes a single lobe 125 that cooperates with a follower 126 for pulling down on carrier return keylever 79 (FIG. 7) via shielded cable 127. Margin bypass control cam 122 includes a single lobe 130 that cooperates with a pivoted follower 131 acting through link 132 to pivot margin rack 80 to its "margin release" position.

After shaft 117 has initiated movement of carriage 28 thus severing index connection 76, the carrier return control cam lobe 125 pivots follower 126 counterclockwise thereby pulling shielded cable 127 to pull return keylever 79. As fully described in the aforesaid IBM Customer Engineering Manual, keylever pawl 134 displaces carriage return interposer 135 and its pivotally mounted spring-biased latch 136 downwardly free of frame mounted latch keeper 137. A spring (not shown) urges carriage return interposer 135 to the right to initiate an operation of known carrier return mechanism 138 like that of the IBM "Selectric" typewriter. The carrier return mechanism 138 activates the spring clutch 26 (FIGS. 4 and 6) and from a cam follower (not shown) acting upwardly on a spring loaded torque arm 140 that pivots shaft 141 clockwise. Output link 142 tensions spring 143 to permissively urge clutch shoe 144 against the spring clutch 26. A second output arm 145 acts on bellcrank 146 to rotate escapement torque bar 53 to lift pawl 50 from rack 52 during the return motion. A carrier return latch 147 is urged by spring 148 to a latching position under arm 149 on shaft 141 to retain tension in spring 143 after the initial force is removed from torque arm 140.

Late in the cycle of operation of clutch 114, after shaft 115 has made several revolutions, lobe 123 on control cam 120 engages cam follower 124 on control lever 110 to restore latch 111 to a position for intercepting the ledge 113 of the clutch 114 to terminate the transfer operation. Latch 101 is also restored to keeper 102 by leaf spring 101*a* upon movement of lever 110.

While carrier 20 is being returned, and carriage 28 is being advanced, control cam 122 pivots the margin rack 80 about its support pins 81 and 82 to a release position where it is held by a latching surface 150 that moves under spring biased latch tooth 151. In this position, the margin stop abutment 152 of the left hand margin stop 83 lies out of the path of the corresponding counterstop 153 on the carrier 20. Accordingly, carrier 20, while moving in the return direction, will bypass the left margin stop 83 and continue movement to fixed or final stop 154 at a position adjacent the left side frame 155 of the typewriter 10. Upon engagement with the stop 154 by counterstop 153, the margin rack 80 is driven to the left against spring 156. The carrier return operation is terminated by a projection 157 on margin rack 80 striking bellcrank 158 thus releasing carrier return clutch latch 147 from arm 149 and permitting shaft 141 together with clutch shoe 144 and escapement torque bar 53 to return to their normal positions. Also, leftward movement of margin rack 80 drives pin 159 carried thereby against latch 107 to release character interrupter control link 106 and thereby permit initiation of a print cycle which may have been selected by the operator striking a key at or after the initiation of the transfer operation. Upon completion of the transfer operation, the relative position of the carriage 28 and the carrier 20 is such that the printing position 15 is one letter space to the right of the last printed character or word space.

After the transfer operation has been completed, the sector 34 is in its broken line position as indicated in FIGS. 5 and 6. In this position, the transferred state of the carriage 28 is indicated to the mechanism by slight pivotal displacement of a logic lever 160 about its axis 161 by sector 34. The displaced position of lever 160 is transferred through push rod 162 to displace the index lever 78 laterally to the right in FIG. 6, against spring 163. The function of this motion is to align tab or projection 164 with control crank arm 165 such that manual operation of the carriage return keylever 79, which causes operation of index mechanism 70, will cause a retransfer of the carriage 28, but only if the carriage 28 is in its advanced position. Crank arm 165 operates about a pivot bearing 166 and includes an output arm 167 that engages the initiate-transfer latch 101 to displace that latch 101 to the right upon carrier return operations selected when the carriage 28 is in its advanced position.

The pivotal displacement of logic lever 160 also pivots reversing link 170 to pull shielded cable 171 and line lock bail 87 to displace the line lock actuator 96 rightwardly against spring 99 into a position of alignment with line lock interposer 90.

In its pivoted position, logic lever 160 moves pin 172 to the right in FIG. 6 to permit carrier direction control lever 173 to pivot clockwise about its axis 174 by its spring 175. In its clockwise position, lever 173 intercepts the right end of a carrier return clutch shoe interrupter link 176 that is normally centered by a leaf spring 177.

As typing continues, carrier 20 moves along the writing line established prior to transfer. Upon passing the left margin stop 83, an extending pin or wire arm 180 engages bellcrank 181 pivoted to the margin stop 83 to drive end 182 thereof against the line lock bail 87, pivoting the bail 87 slightly, but sufficiently to release latch tooth 151 from latch surface 150 thereby permitting the margin rack 80 to restore to its non-tilted or horizontal position by spring 183. It should be noted that the unlatching pivoting motion thus described is insufficient to cause engagement of the line lock interposer 90. Upon unlatching of the margin rack 80, shielded cable 184 is pulled by force from spring 183 to pull carrier direction control link 173, through its spring finger 185, counterclockwise out of its interrupting position with carrier return clutch shoe interrupter link 176.

Typing in the extended portion of the line continues until the carrier 20 engages margin stop bellcrank 85 by cam surface 86 which operates the line lock interposer 90 as described above.

At the right margin or at any point prior thereto, the operator may select to begin a new line by depressing the typewriter carrier return keylever **79** which will initiate an operation of carrier return mechanism **138**. If the carrier **20** is positioned to the right of left margin stop **83**, and if the carriage **28** is in its advanced position, the carrier return mechanism **138** will pull carrier return shoe **144** into spring clutch **26** and return the carrier **20** to the left-hand margin as determined by stop tooth **152** engaging counter stop **153**. As explained above, operation of the carrier return mechanism **138** also operates the index mechanism **70**, specifically lever **78**, which drives index output member **75** and torque arm **74** to index the platen **14** one line forward. The lifting motion of lever **78** also pivots end **167** of control crank arm **165** rightwardly against clutch latch **101** to release clutch **114** and thereby commence rotation of shaft **117** to return-transfer the carriage **28** to its start-of-line position by 180° rotation of crank disc **39**. Rotation of shaft **117** does not actuate either of control links **126** or **131** at this time since these links are associated with single lobe cams **121** and **122** respectively which are displaced 180° from their position as shown in FIG. **6**. Cam **120** includes two lobes **123** and operates after a predetermined number of revolutions of shaft **115** to restore the clutch latch **111** and its control latch **101** to their latched position to terminate the transfer operation.

When the carrier return operation is selected prior to the original transfer of carriage **28**, projection **164** of the index bracket **78** is not aligned with control crank arm **165** and the carrier return operation proceeds accompanied by an index but not accompanied by a transfer of the carriage **28**.

When the carrier return operation is selected with the carriage **28** in its line extend or advance transferred position, but the carrier **20** is positioned to the left of margin stop **83**, the following sequence occurs. Carrier return mechanism **138** pivots shaft **141** to its latched position thereby pulling output link **142**, tensioning spring **143** and tending to rotate clutch shoe **144** counterclockwise into carrier return clutch **26**. However, motion of clutch shoe **144** is prevented by interrupter link **176** connected rigidly thereto and intercepted by direction control link **173** which prevents its counterclockwise rotation. Recall that direction control link **173** was rotated into its interrupting position by the pivotal displacement of logic lever **160** immediately upon completion of the transfer operation. The carrier return mechanism **138** also releases pawl **50** from rack **52** via arm **145** and bellcrank **146**. Inasmuch as carrier return clutch shoe **144** cannot cause carrier **20** to move to the left, the continuously effective carrier drive spring **24** (see FIG. 4) will cause the carrier **20** to move to the right. This motion continues until carrier **20** passes margin stop **83**, and through pin **180** rotates arm **182** of crank **181** against bail **87** to unlatch the margin rack **80** from its tilted position. When unlatched, margin rack **80** pulls upwardly on shielded cable **184** to act through spring finger **185** to pull direction control lever **173** out of its intercepting position with respect to interrupter lever **176**. Lever **176** is now free to move counterclockwise as it is urged by spring **143** and carrier return clutch **26** engages to return carrier **20** to the left. The carrier **20** thus returns immediately to the left against margin stop finger **152** in a position for commencing a new line. Of course, this operation is accompanied by a simultaneous retransfer of the carriage **28** in a manner identical to that previously described.

Those skilled in the art will recognize that the specific embodiment thus described is but illustration of the novel concepts herein disclosed. It will be apparent that many additions, deletions and modifications can be made and still obtain the benefits of our method of extending the writing line of a printer. Having thus described and illustrated the concepts of our invention, we define the subject matter sought to be patented by the following claims:

We claim:

1. A printer having a frame, cooperative printing means supported on said frame and including a character forming portion and a paper supporting portion positioned adjacent thereto, said character forming portion and said paper supporting portion defining a printing point therebetween, means supporting said paper supporting portion on said frame for lateral movement, track means supporting said character forming portion on said frame for lateral movement of said printing point parallel to the lateral movement of said paper supporting portion to define a writing line, and a letter space feed control for moving one of said portions incrementally in lateral individual letter space steps to define the spacing increments between adjacent characters printed by said character forming portion, wherein the improvement comprises:

multiletter-space feeding means for moving when operated, the other of said portions by increments including a plurality of said spacing increments, selectively to at least a home position and to an advanced position relative to said frame,

return means operatively connected to said one of said portions for selectively restoring said one of said portions in a counter-letter feed direction to a first predetermined position relative to said frame, and

transfer control means responsive to the attainment of a second predetermined position of said one of said portions relative to said frame for selecting operation of both said return means and said multiletter-space feeding means.

2. A printer as defined in claim **1** further comprising:

a start-of-line defining stop selectively conditionable to at least two conditions only one of which is effective to arrestingly engage said one portion during counter letter-feed movement thereof,

said return means including means responsive to cooperative engagement between said one portion and said start-of-line defining stop when in its effective condition, for terminating said return movements, and

said transfer control means including an initiate-transfer member defining said second predetermined position for operating both said return means and said multiletter-space feeding means and for conditioning said start-of-line defining stop to an ineffective condition.

3. A printer as defined in claim **2** further comprising:

line feed means for advancing paper transverse to said writing line and including a line feed power member operable upon operation of said return means, a line feed drive member, and severable connection means normally interconnecting said power and drive members; and wherein

said transfer control means further comprises sequence control means operable in response to operation of said initiate-transfer member for severing said severable connection means prior to operation of said return means.

4. A printer as defined in claim **2** wherein said letter space feed control further comprises:

impositive force means for continuously urging said one of said portions in forward writing line direction, and a letter feed control member normally opposing the urging of said impositive force means;

said return means comprises an overpowering selectively operable drive means operatively connected to said one of said portions for moving said one of said portions in the counter-letter feed direction, and a line return control member selectively operable to activate said drive means and to disable the urging opposing action of said letter feed control member; and further comprising

means responsive to the relative position of said one of said portions and said start-of-line defining stop and to the position of said other of said portions for selectively inhibiting the response of said drive means to operation by said line return control member whenever said one of said portions is positioned between said first predetermined position and said start-of-line defining stop and said other portion is not in its said home position.

5. A printer having a frame, cooperative printing means supported on said frame and including a character forming portion and a paper supporting positioned adjacent thereto,

said character forming portion and said paper supporting portion defining a printing point therebetween, means supporting said paper supporting portion on said frame for lateral movement, and track means supporting said character forming portion on said frame for lateral movement of said printing point parallel to the lateral movement of said paper supporting portion to define a writing line, wherein the improvement comprises:

a letter-space feed control for moving said character forming portion incrementally in lateral individual letter-space steps to define the space between adjacent characters printed by said character forming means, and

manually controllable means for positioning said paper supporting portion laterally along said frame independently of said character forming position.