United States Patent

[11] 3,547,245

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[21] Appl. No. 696,585
[22] Filed Jan. 9, 1968
[45] Patented Dec. 15, 1970

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[54] MULTIPLE PITCH MARGIN CONTROL
9 Claims, 5 Drawing Figs.

[52] U.S. Cl. 197/63, 197/84, 197/187
[51] Int. Cl. B41j 21/02
[50] Field of Search 197/63, 70, 82, 84, 84.1, 84.2, 84.3, 85, 86, 87, 88, 92, 94, 96, 176, 177, 178, 179, 187

[56] References Cited

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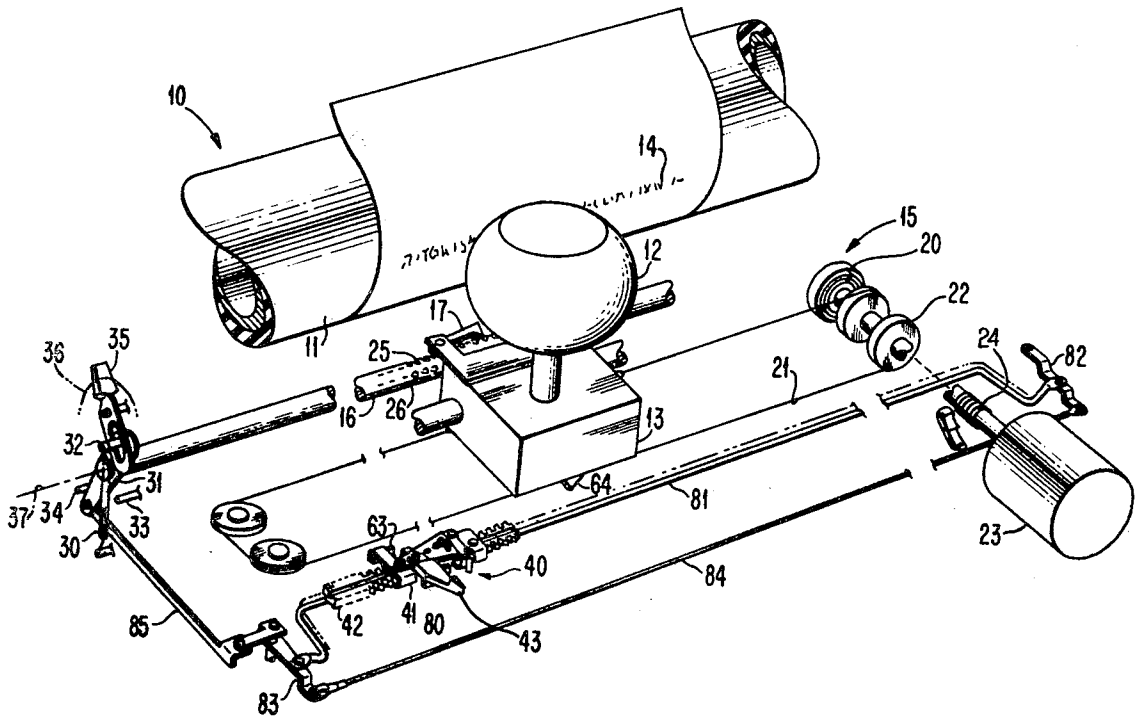
Attorneys—Hanifin and Jancin and E. Ronald Coffman

ABSTRACT: Margin stops are set at letter space positions consistent with either of two different letter feed pitches by the provision of alternate margin racks selectively made effective in accordance with the current pitch of an associated typewriter. Substitution of the alternate racks is accomplished through an overcenter spring device operated automatically when the typewriter pitch mode is changed. Margin stops are adjusted by an operator without consciousness of the pitch mode of the typewriter.



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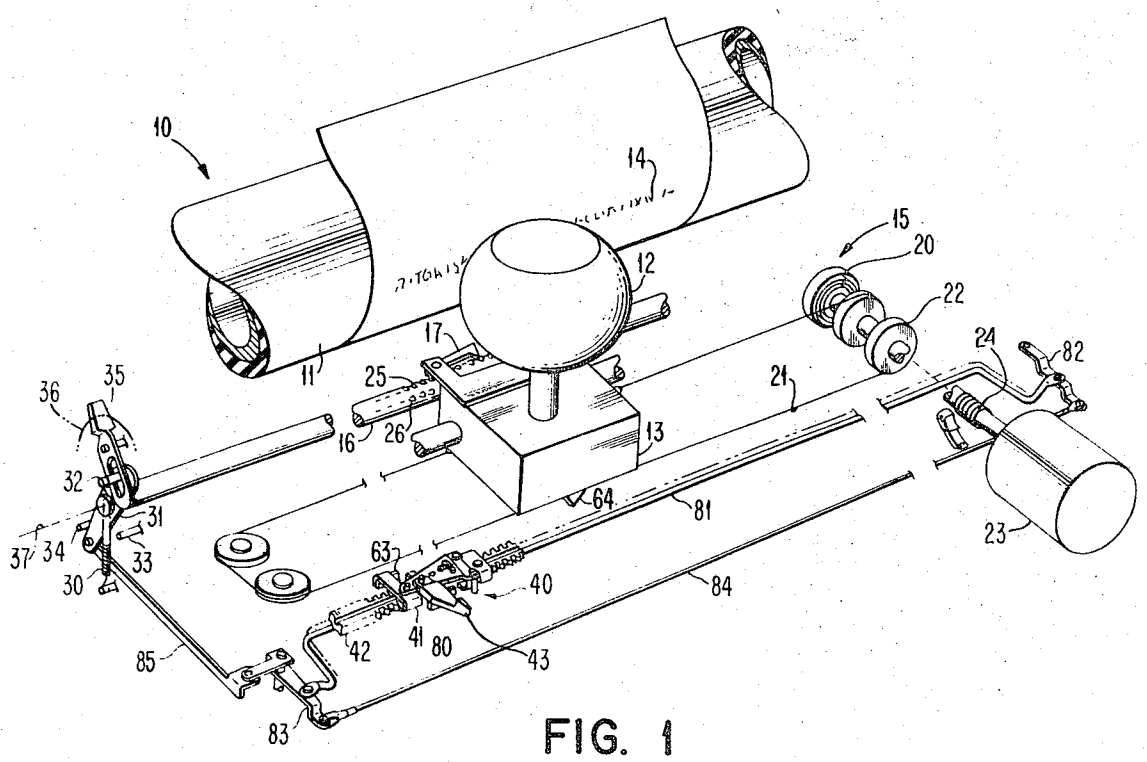

FIG. 1

FIG. 2

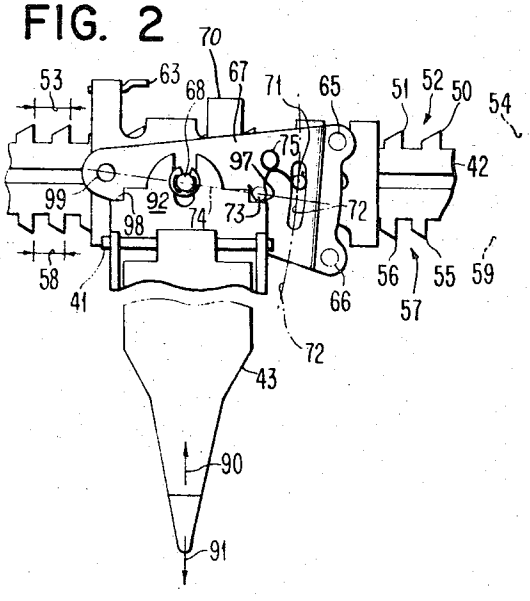

FIG. 3

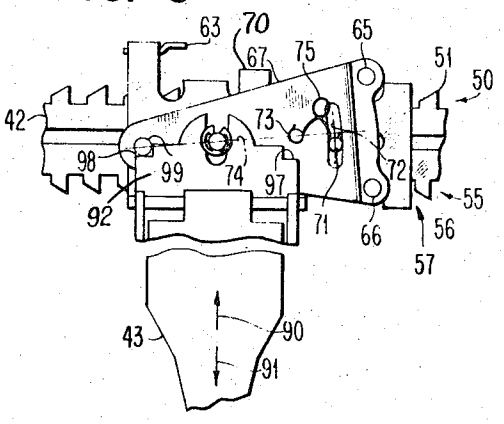

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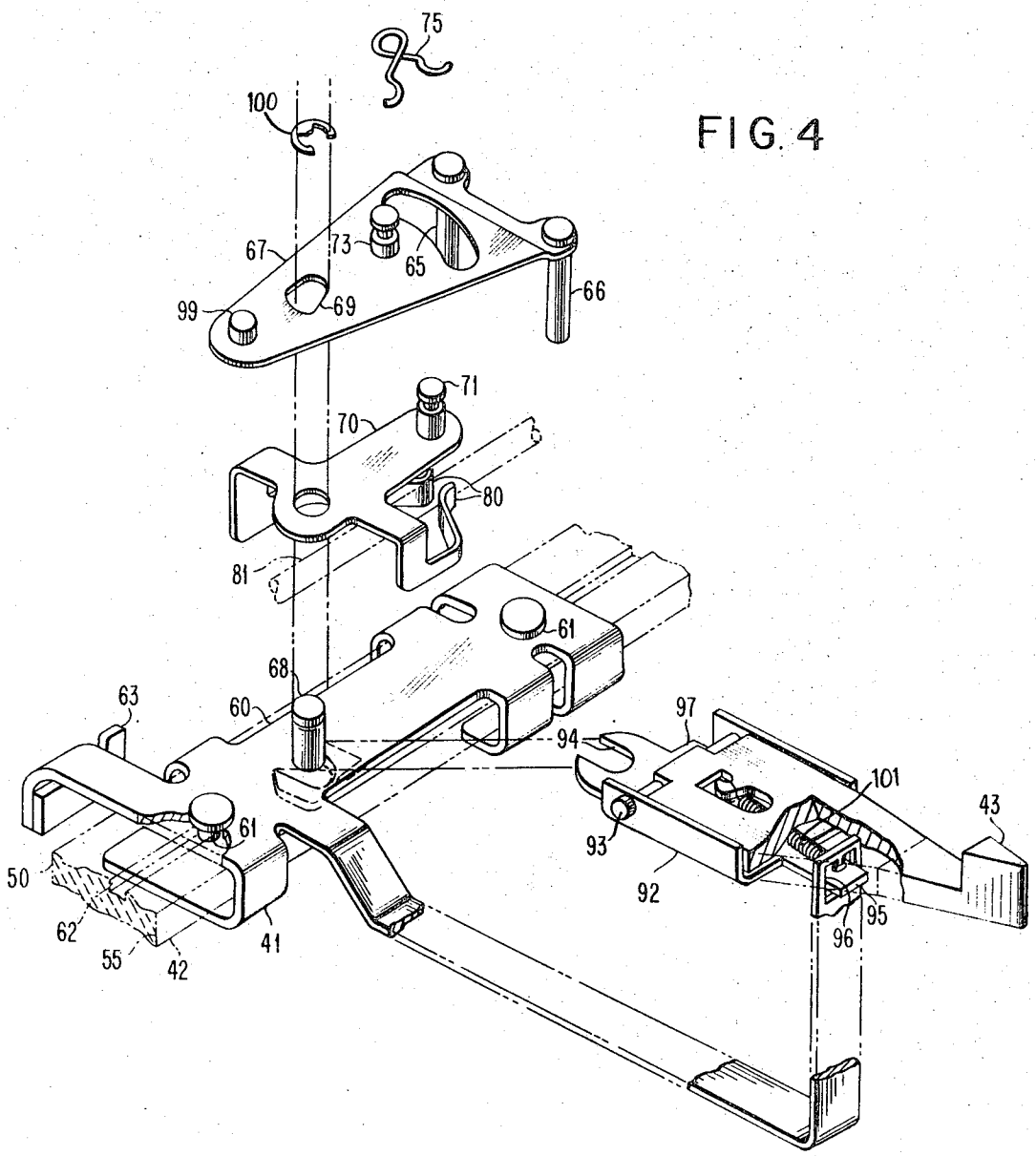
FIG. 4


75
100
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81
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43
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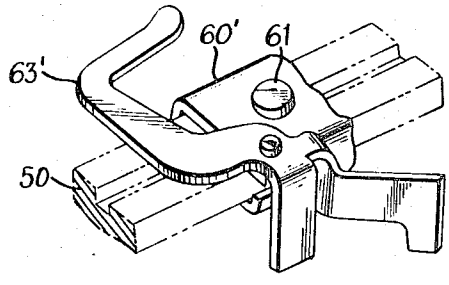
FIG. 5


60'
61
63'
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MULTIPLE PITCH MARGIN CONTROL

DISCLOSURE OF THE INVENTION

With the advent of office typewriters having readily interchangeable type fonts, it becomes both logical and desirable to accommodate a wide range of typing applications with a single machine. To accommodate the requirements of bold face, large character typing with compact, small character typing, mechanism for varying the basic letter feed increment of a typewriter is required. One such multiple pitch mechanism is disclosed in IBM Technical Disclosure Bulletin, Volume 8, No. 5, published October 1965, page 779.

It remains desirable to define limits of a writing line to assure a flush left margin and at least a generally even right margin. It also is desirable that the right and left margins be readily adjustable to accommodate any particular job requirement. The provision of multiple-pitch capacity makes a normal margin control approach inoperable due to inconsistencies of letter positions between the two pitches of the typewriter.

We have provided a margin control mechanism which can be manipulated by the operator without concern for the pitch mode of the typewriter. Our mechanism is completely versatile so as to allow margin positioning anywhere along the available writing line at individual character locations always consistent with the current letter feed mode of the typewriter.

Our invention is accomplished by means of a pair of margin racks corresponding to escapement racks of the typewriter and formed on opposite edges of a common bar. A pair of pawl pins are selectively engageable with respective ones of the racks as controlled by a simple overcenter toggle spring device. Margin repositioning is accomplished in either pitch by a simple manual push-in of a control member to release the stop from the rack, followed by repositioning of the stop along the writing line and release of the control member to reattach the stop to the rack.

These and other objects, features and advantages of our invention will be apparent to those skilled in the art from the following description of an illustrative preferred embodiment of our invention wherein reference is made to the drawings of which:

FIG. 1 is a perspective view of a portion of a typewriter employing a margin stop constructed in accordance with our invention;

FIGS. 2 and 3 are operational plan views of the margin stop shown in FIG. 1 showing its two primary operational modes;

FIG. 4 is an exploded perspective view of the margin stop shown in FIGS. 1 through 3, illustrating the details of its construction; and

FIG. 5 is a fragmentary view of a bellringer bellcrank as employed in a modified version of our invention.

Referring now more specifically to the drawings, in FIG. 1, there is shown a printer or typewriter 10 having a paper supporting platen 11, and a character matrix or print element 12. A carrier 13 supports print element 12 for movement longitudinally along the platen 11 to position characters along a writing line 14. Letter feed means, generally indicated at 15 produces incremental movement of the carrier 13 under control of an escapement rack 16 and cooperating pawl 17 as described in U.S. Pat. No. 3,126,998, entitled "Escapement Mechanism for Typewriter," issued to L. E. Palmer, Mar. 31, 1964.

Pawl 17 on carrier 13 normally resists movement of a conventional winding spring 20 and is pivotal out of the rack 16 to permit incremental movement of the carrier 13 under influence of spring 20. Return movement of carrier 13 is accomplished by winding cord 21 on capstan 22 driven by motor 23 through control clutch 24 as described in greater detail in U.S. Pat. No. 2,902,133, entitled "Typewriter Carriage Return and Indexing Mechanism," issued to N. D. Walton and H. R. Kruspe, Sept. 1, 1959. Rack 16 differs from that of U.S. Pat. No. 3,126,998 by including two series of escapement teeth 25 and 26 disposed longitudinally thereon for selectively receiving the escape pawl 17. The selected series of teeth 25 or 26 defines stable carrier positions in accordance with a first or second letter feed pitch, respectively.

Rack 16 is normally retained in a selected position by a toggle spring 30 which acts on one end of crank arm 31 via a pin 32 and either of a pair of stops 33 or 34. A manual control lever 35 slidably engages pin 32 and is pivotally supported to displace pin 32 and rotate rack 16 by movement along arc 36. It will be seen that spring 30 passes over the center of rotational axis 37 of the rack 16 to urge arm 31 and rack 16 to a second stable position against stop 34 wherein the second series of teeth 26 are aligned with the escape pawl 17. An alternative form of multiple-pitch letter feeding escapement is shown in IBM Technical Disclosure Bulletin Volume 8, No. 5, October 1965, page 779.

As usual in the case of office typewriters, supplemental margin control means 40 such as margin stop or limit indicator 41 is provided for defining certain specific positions or limits to the control by the letter feed means 15. It is to be understood that our invention is not limited to physical stops alone but is equally applicable to right margin bellringers such as bellringer bellcrank 63' shown in FIG. 5, and other supplementary positioning mechanism. Margin stop 41 is slidably mounted on a rack or bar 42 and includes a manual control member 43 by which the stop 41 can be displaced along the rack 42 to select a desired margin position.

Our invention provides the margin stop 41 with the capacity to seek control positions identical to the stable letter positions defined by escapement teeth 25 and 26 to assure uniform positioning of letter spacing limits. The details of margin stop 41 are more clearly shown in FIGS. 2, 3 and 4.

In FIG. 2, margin stop 41 is shown in the position it assumes when the typewriter 10 is operating at 10 characters per inch. The rack 42 has a first edge portion 50 including teeth 51 spaced in a series 52 at 10 regular intervals 53 per inch along a line 54. A second edge portion 55 includes teeth 56 spaced in a series 57 at 12 regular intervals 58 per inch along a line 59. The lines of teeth extension 54 and 59 are both parallel to the path of movement of the carrier 13 (see FIG. 1).

The margin stop 41 includes a body 60 (see FIG. 4) that slidably surrounds the rack 42 and is guided thereon for movement along lines 54 and 59 by a pair of pins 61 that engage a rack slot 62. The body 60 supports a carrier sensing projection, extension or sensor member 63 that engages an appropriate cooperating stop 64 on the carrier 13 to define a margin position as by arresting carrier return movement. The operation of the margin stop 41 in arresting a carrier return movement is well known and is disclosed in the aforesaid U.S. Pat. No. 2,902,133. The margin stop body 60 is releasably connected to the rack 42 via pawl means comprising a first pin 65, a second pin 66 and an interconnecting supporting arm 67. The pawl pins 65 and 66 are spaced on arm 67 such that only one of them can engage a respective rack series of teeth 52 or 57 at any given time. Force applied to pins 65 and 66 from projection 63 causes engagement with the long flat surface of teeth 51 and 56 respectively. Arm 67 is pivoted on a body pin 68 by an enlarged hole 69 that facilitates pin-in-rack engagement. C-clip 100 retains arm 67 on pin 68.

A pitch control arm 70 is also pivoted about pin 68 and carries an upstanding spring anchor pin 71 that is movable about an arcuate path 72 from a first position as shown in FIG. 2 to a second position as shown in FIG. 3. Pawl arm 67 includes a spring anchor 73 that lies on a line 74 radiating from pivot pin 68 and intersecting the path 72 of spring anchor 71. An expander mode toggle spring or overcenter spring device 75 urges anchors 73 and 71 apart and thereby resiliently biases pawl arm 67 in either of the two positions shown in FIGS. 2 and 3. It can be seen that movement of pin 71 along its path from either of its positions shown in FIGS. 2 or 3 to the other of such positions, causes toggle spring 75 to go over center and reverse its bias effect.

Shifting of spring anchor 71 is accomplished via control extension fingers or parts 80 which extend below the rack 42 and slidably receive an elongated bail or pitch mode indicator

member 81 as shown in FIG. 1. Bail 81 is shifted transversely to its length by a pair of crank arms 82 and 83 interconnected with the bail 81 and with a tie rod 84 into a parallelogram. Crank arm 83 is connected through a link 85 to the crank arm 31 of the escapement rack rotate mechanism. It can be seen that bail 81 will assume either of two positions shown respectively by full and broken lines in accordance with the current position of rotatable rack 16. It will further be seen that the position of bail 81 is transferred through control arm 70 and pin 71 to pawl arm 67 and causes releasable engagement between the pin 65 or 66 and its respective tooth series 52 or 57 in accordance with the current pitch status of the escapement rack 16.

Resetting or repositioning of the stop 41 along the rack 42 is accomplished by depression of control handle 43 in direction 90 (FIGS. 2 and 3), moving handle 43 to the right or left parallel to writing line 14 approximately to a desired new position, and release of handle 43 for movement in direction 91. Handle 43 is interconnected with the stop body 60 by a bracket 92 and pin 93 (FIG. 4) which passes through upstanding flanges of the bracket 92 and the left end of the handle 43. Margin stop body 60 slidably supports bracket 92 by a groove 94 that engages the pin 68 and a tongue 95 that passes through a body window 96. Spring 101 urges handle 43 and bracket 92 rightwardly in FIG. 4. Bracket 92 includes a pair of abutting surfaces 97 and 98 (FIGS. 2 and 3) located on opposite sides of the groove 94. Pawl arm 67 is provided similarly with a pair of abutments or upstanding studs, one of which may be made integral with the spring anchor 73 and the other provided separately at 99. As best shown in FIGS. 2 and 3, the studs 73 and 99 are positioned on pawl arm 67 such that only one stud 73 or 99 is within the range of movement of sliding bracket 92 at any given time. In FIG. 2, for example, stud 73 is abutting surface 97 of bracket 92. The depth of groove 94 limits displacement of bracket 92.

To adjust the position of the margin stop 41, handle 43 is depressed by the typist, in direction 90 to displace stud 73 via abutment 97 and lift pin 65 from teeth 51. Lateral movement of manual control arm 43 will now reposition the margin stop body 60 along the rack 42 to any new desired location. Release of manual control arm 43 permits spring 75 to again restore pawl arm 67 clockwise in FIG. 2 to reengage pin 65 with a new tooth 51 in the series 52 indicative of a 10-pitch letter space position.

In FIG. 3, toggle spring 75 has been thrown overcenter and pin 66 is engaging a tooth 56 in its respective series 57. Depression of manual control arm 43 preparatory to readjusting the margin, now displaces stud 99 via abutment 98 to lift pin 66 clockwise from teeth 56. Again the margin stop body 60 is free to be displaced along the rack 42. Release of manual control arm 43 allows spring 75 to restore pawl arm 67 counterclockwise causing pin 66 to seek a position in its tooth series 57 indicative of a 12-pitch letter space position.

FIG. 5 shows a modification of our invention wherein a conventional bellringer bellcrank 63' is pivoted to a margin stop body 60 in replacement of the sensor member 63.

Those skilled in the art will recognize that various modifications, additions, and deletions can be made to our disclosed illustrative embodiment without departing from the concepts of our invention as defined by the appended claims.

We claim:

1. A printer 10 having a paper support 11, print means 12 adjacent said paper support 11 for printing characters, means 15 to relatively moving the paper support 11 and the print means 12 incrementally along a writing 40 according to either of at least two different letter feeding pitches, and supplemental means (40) for assisting control of relative movement between said paper support 11 and said print means 12 wherein the improvement comprises:

means 42 defining a first series 52 of teeth 51 spaced along a first line 54 at first regular intervals 53;

means 42 defining a second series 57 of teeth 56 spaced along a second line 59 parallel to said first line 54; at second regular intervals 58;

a position sensing projection 63;

means 60 supporting said sensing projection 63 adjacent said two series 52 and 57 of teeth 51 and 56 for displacement along said lines 54 and 59; and

pawl means 65, 66, 67 operatively connected 68, 69 to said projection support means 60 and alternately selectively engageable with either of said series of teeth 52 and 57 for securing said projection 63 at any of a number of different positions relative to said series of teeth 52 and 57 defined by individual teeth 51 and 56 thereof.

2. A printer as defined in claim 1 further comprising resilient means 75 urging said pawl means 65, 66, 67 into a position of normal engagement with one of said series of teeth 52 and 57.

3. A printer as defined in claim 2 wherein said resilient means 75 comprises an overcenter spring device having two stable positions (FIG. 2 and FIG. 3) for selectively resiliently biasing said pawl means 65, 66, 67 into operative engagement with either of said two series of teeth 52 and 57.

4. A printer as defined in claim 1 wherein said two series of teeth 52 and 57 are defined by common support means comprising a substantially integral elongated bar 42, said series of teeth 52 and 57 being formed along edge portions 50 and 55 of said bar 42 and extending parallel to the printer writing line 14.

5. A printer as defined claim 1 wherein said pawl means 65, 66, 67 comprises a pair of separate pawls 65 and 66 each engageable with a respective one of said series of teeth 52 and 57 and means 67 interconnecting said pair of pawls 65 and 66 to prevent simultaneous engagement thereof with their respective series of teeth 52 and 57.

6. A printer defined in claim 3 further comprising 92 operable means 43, 92 movable in a first direction 90 and a second direction 91 that is opposed to said first direction 90 and means 73, 99, 97, 98 interconnecting said pawl means 65, 66, 67 with said manually operable means 43, 92 for movement thereby of said pawl means 65, 66, 67 against the bias of said overcenter spring device 75 upon movement of said manually operable means 43, 92 in first direction 90 and for movement by said overcenter spring device 75 of said pawl means 65, 66, 67 upon movement of said manually operable means 43, 92) in said second direction 91.

7. A printer as defined in claim 6 wherein operable pawl means 65, 66, 67 includes an arm 67 pivotally connected 68, 69 to said projection support means 60, said overcenter spring device 75 biasing said pivoted arm 67 to either of two stable positions (FIG. 2 and FIG. 3) wherein said pawl means 65, 66, 67 selectively engages one or the other of said series 69 teeth 52 and 57; said interconnecting means comprises a pair of abutments 73, 99 on said arm 67 located on relatively opposite sides of the arm pivot connection 68, 69, said manual operable means 43, 92 being positioned to encounter 97, 98 one or the other of said abutments 73, 99 respectively in accordance with the position of said overcenter spring device 75 upon movement of said manually operable means 43, 92 in its first direction 90.

8. A printer as defined in claim 2 wherein said pawl means 65, 66, 67 includes a first arm 67 pivotally connected 68, 69 to said projection support means 60, first spring anchor means 73 mounted on said first arm 67, a second arm 70 movably supported on said projection support means 60, second spring anchor means 71 mounted on said second arm 70 for movement along a path 72 between a first and second position (FIG. 2 and FIG. 3), said second arm 70 including a control extension part 80, said first spring anchor means 73 lying on a radiant 74 from said pivot connection 68, 69 that intersects the path 72 of said second spring anchor means 71; and wherein said resilient means comprises a spring 75 connected between said first and second spring anchor means 73 and 71 for resiliently urging said spring anchor means 73 and 71 away from one another.

9. A printer as defined in claim 8 further comprising a member 81 operatively connected to said incremental moving means 15 and positioned thereby in one of at least two distinct

positions indicative respectively of said moving means being operative in one or the other of said two different letter feeding pitches, said member **81** engaging said control extension part **80** to move said second arm **70** selectively to either of its alternate positions (FIG. **2** and FIG. **3**) to thereby move said spring **75** overcenter.

PO-1050
(5/69)

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,547,245 Dated December 15, 1970

Inventor(s) Selahattin A. Okcuoglu and George A. Walker

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 3, line 65, the word "to" should read -- for --.

Column 3, line 66, the number "40" should read -- line --.

Column 4, line 26, following the word "defined", insert the word -- in --.

Column 4, line 32, the number "92" should read -- manually -

Column 4, line 39, following the word "in", insert the word -- said --.

Column 4, line 44, the word "operable" should read -- said -

Column 4, line 48, the letter "69" should read -- of --.

Column 4, line 51, the word "manual" should read -- manually

Signed and sealed this 11th day of April 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Pate